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RESPONSE TO AGENCY COMMENTS ON THE DRAFT WORK PLAN ADDITIONAL OFFSHORE INVESTIGATION FOR NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

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CONTENTS

Section		Page
1.0	RESPONSE TO COMMENTS FROM DEPARTMENT OF TOXIC SUBSTANCES CONTROL HUMAN AND ECOLOGICAL RISK DIVISION	1
	1.1 GENERAL COMMENTS	1
	1.2 SPECIFIC COMMENTS	6
	1.3 CONCLUSIONS	12
2.0	RESPONSE TO COMMENTS FROM U.S. ENVIRONMENTAL PROTECTION AGENCY	14
	2.1 GENERAL COMMENTS	14
	2.2 SPECIFIC COMMENTS	15
3.0	RESPONSE TO COMMENTS FROM REGIONAL WATER QUALITY CONTROL BOARD	18
	3.1 GENERAL COMMENTS	18
	3.2 SPECIFIC COMMENTS	18
	3.3 COMMENTS ON DRAFT FINAL REMEDIAL INVESTIGATION AND BASE CLOSURE TEAM MEETING MINUTES	19
4.0	RESPONSE TO COMMENTS FROM DEPARTMENT OF FISH AND GAME OFFICE OF SPILL PREVENTION AND RESPONSE	22
	4.1 GENERAL COMMENTS	22
	4.2 SPECIFIC COMMENTS	22
5.0	RESPONSE TO COMMENTS FROM GEOMATRIX	25
REFERENCES		33

RESPONSE TO AGENCY COMMENTS
DRAFT WORK PLAN FOR ADDITIONAL OFFSHORE INVESTIGATION
NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

This document presents the Navy's responses to comments from the regulatory agencies on the Draft Work Plan for Additional Investigation for Naval Station Treasure Island (NAVSTA TI), San Francisco, California, dated November 6, 2000. Comments were received from the California Department of Toxic Substances Control Human and Ecological Risk Division (DTSC HERD) on December 5, 2000, the U.S. Environmental Protection Agency (EPA) on December 4, 2000, the Bay Area Regional Water Quality Control Board on December 7, 2000, California Department of Fish and Game (DFG) Office of Spill Prevention and Response (OSPR) on December 8, 2000, and City of San Francisco consultants Geomatrix on December 8, 2000.

1.0 RESPONSE TO COMMENTS FROM DEPARTMENT OF TOXIC SUBSTANCES CONTROL HUMAN AND ECOLOGICAL RISK DIVISION

The following are the Navy's responses to comments from DTSC HERD.

1.1 GENERAL COMMENTS

1. **Comment:** **Section 3.1, Project objectives, states that the scope of the investigation described in the Draft Work Plan was discussed with the Base Closure Team. In the past year DTSC staff were involved in discussions regarding the additional investigations of the offshore area adjacent to the "bulge" along the northern shore of Site 12; however, DTSC staff were never provided with a justification for limiting the investigation to the area proposed in the draft work plan.**

   In meeting with the Navy regarding the scope of the additional offshore investigation, DTSC has asserted that additional areas adjacent to onshore debris disposal areas in Site 12 need to be evaluated and considered when determining the scope of the additional offshore investigation. In those meetings Navy representatives acknowledged DTSC's comments but did not comment on the draft work plan once it was issued.

   As a result, DTSC believes that the draft work plan is deficient and is in need of redrafting to include comments previously made by DTSC staff regarding the scope of the investigation. At a minimum, the draft work plan needs to include a discussion of how additional offshore areas adjacent to onshore debris disposal areas were evaluated, including a screening of

contaminants of concern, and a justification for either including or omitting them from the additional offshore investigation.

Response: During the February 10, 2000 Base Closure Team (BCT) meeting, the lines of evidence upon which risk assessment conclusions were drawn for Area G (offshore area adjacent to Site 12 that includes the north and west side of TI) were reviewed. The combined lines of evidence, as listed below, indicated minimal risk: (1) all chemical concentrations in sediment were below the effects range-median (ER-M); only lead and total 4,4,-dichlorodiphenyltrichloroethane (DDT) exceeded the effects range-low (ER-L) and ambient values; (2) all porewater concentrations were below the ambient water quality criteria (AWQC) except for mercury at location G4; and (3) amphipod survival was near 100 percent taking into account the pre-test results.

During the meeting, Mr. Maxwell (RWQCB) expressed concern about sample location G15 in relation to what is known about the lead contamination along the shoreline. He stated that lead was detected in a surface sediment sample from G15 at a concentration of 126 milligrams per kilogram (mg/kg), which is significantly higher than most offshore samples at TI. Also, G15 is located adjacent to onshore IR Site 12 where lead has been detected in buried debris at concentrations exceeding 20,000 mg/kg. Mr. Maxwell went on to state that aerial photographs suggest that debris may have been discharged offshore near sample point G15, and that additional sampling of offshore sediments along the northern shoreline would be necessary to assess the nature and extent of lead contamination.

Based on information recently obtained, it appears that disposal of debris off the northern shoreline would have been unlikely, given that any kind of breach of the seawall could have potentially compromised the integrity and stability of the perimeter dike. The perimeter dike stability evaluation report (Geomatrix 1990), states that several projects to protect the riprapped face of the perimeter dikes have occurred since the original construction of TI in 1937. This has resulted in the placement of additional rock facing, and in local areas, widening of the perimeter dikes (Geomatrix 1990). As can be seen in Figure 1, the "bulge" area is where the perimeter dike was widened; however, the composition of the additional dike material is unknown (Geomatrix 1990). It is likely the Site 12 "bulge" is the result of a widening of the perimeter dike and not offshore debris disposal.

Subsequent to the February 10, 2000 BCT meeting, a review of the onshore data from Site 12, the offshore ERA data, and the ERA conclusions for Area G was conducted. Based on the results of this review, an additional investigation of the entire northern shoreline is not warranted. A baseline ERA has been conducted, and the conclusions indicated minimal risk. Furthermore, since any disposal of debris offshore would have occurred more than thirty years ago, problems resulting from said disposal would have been evidenced in samples collected for the ERA. As stated in paragraph one of this response, chemical concentrations in Area G were only slightly above ambient. Thus, a limited investigation of the "bulge" area where the perimeter dike was widened is proposed.

The general scope of the proposed investigation described in the work plan (WP) was discussed at the May 24, 2000 technical meeting and at the June 13 BCT meeting. Joseph Chou (RWQCB) requested time for the RWQCB to review the aerial photographs again, as well as other data, and to provide a letter or e-mail to the Navy with specific recommendations. Due to the transition of RWQCB personnel, RWQCB recommendations were not received until August, at which time they recommended the Navy proceed with the preparation of the draft WP, so all agencies could review and comment.

Detection of a chemical onshore does not warrant that adjacent offshore areas be reinvestigated, especially if the onshore contamination existed prior to the collection of the offshore data. However, because the origin of the fill material for the widening of the perimeter dike ("bulge") is unknown, and lead concentrations were elevated in adjacent locations onshore, the possibility that the fill material could have had elevated concentrations of lead, may exist. Therefore, additional offshore samples will be collected in this area only. Samples will be analyzed for all metals.

2. Comment:

1) The process for developing a work plan usually involves discussions with regulatory agencies and natural resource trustees prior to production of a draft work plan. This document is the first indication we have had the Navy intends to perform additional sampling of sediments off of TI. Some of the Specific Comments listed below are the result of the lack of previous discussion between the Navy and regulatory agencies.

2) The outline of Installation Restoration (IR) Site 12, the Old Bunker Area (Figure 4, page designator DS.0232.15663) extends from the dike area on the north side of TI around to a portion of the west side of TI. Several areas identified as 'Debris Disposal Areas A and B AOC' are identified on the west side of TI (Figure 6, page designator TC.0232.10552). There is no stated reason to limit the screening effort to the area identified (Figure 5, page descriptor DS.0232.15663). We agree that core sampling and analysis should be performed in the area proposed based on the difference in the TI shoreline in that area. Screening of surface sediment samples should be extended around the north and west side of TI to ensure that the surface sediment samples adjacent to IR Site 12 in areas other than those currently proposed for sampling pose no ecological hazard.

3) The objective of this study should not concentrate solely on lead in sediments adjacent to IR Site 12. X-ray fluorescence (XRF) analysis yields the concentrations of more elements than the concentration of lead (Section 3.1, page 12). All sediment element concentrations that result from the XRF analysis of TI sediments should be reported and assessed. In addition, given the recent detections of polychlorinated biphenyls (PCBs) in terrestrial sties on TI, HERD recommends that at least a subset of the sediment samples be screened for PCBs. Space and Naval Warfare (SPAWAR) Systems Center San Diego has demonstrated the ability to reliably detect PCB concentrations of approximately 150 µg/kg PCB in sediments at Hunters Point Shipyard using immunoassay screening and HERD recommends that SPAWAR Systems Center San Diego staff perform the XRF and PCB screening. Pore water samples from location G4 in previous sampling exceed the Ambient Water Quality Criteria (AWQC) for mercury (Section 4.1.2.1, page 15). At a minimum, some sediment samples around the location of G4 should be analyzed for mercury to prove or disprove that the AWQC exceedance is not a widespread concern.

Response:

1) Please refer to response to DTSC General Comment 1, paragraph five.

2) Please refer to response to DTSC General Comment 1.

3) All inorganic concentrations detected in the investigation area will be reported and assessed. However, PCBs detected onshore do not warrant reinvestigation of adjacent offshore areas, especially since polychlorinated biphenyls (PCB) were not detected in offshore sediments during the previous investigation. Moreover, there is no evidence to suggest that debris was disposed offshore near the area where PCBs were detected onshore. The riprap in this area is about 20 to 25 feet wide, thus debris could not have been "pushed" off without disturbing the riprap and, as previously stated in the response to DTSC General Comment 1, any action that would have compromised the stability of the perimeter dike appears unlikely. With regard to mercury, mercury levels in sediment are below San Francisco Bay ambient at all locations in area G. Although mercury exceeds the chronic AWQC in pore water at location G4, the chronic AWQC is a very conservative number [0.0025 micro grams per liter (µg/L)] that is also exceeded at the Paradise Cove reference site. The concentration of mercury detected at the reference site (0.13 µg/L) is similar to location G4 (0.14 µg/L). Existing mercury and PCB data indicate minimal risk and support a risk management decision of no action.

1.2 SPECIFIC COMMENTS

1. **Comment:** **The citation for the Army Corps of Engineers (COE) report on changes in bathymetric data must be in error (Section 2.1.6.3, page 8 and Appendix A, Section A1.4.5.2, page A-14). A report released in 1979 could not compare bathymetric readings made in 1955 and 1990. Please correct the citation and if necessary the complete reference in the Reference Section.**

   Response: The reviewer is correct; the WP will be modified to reference the source below:

   EPA and others. 1996. "Long-Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region." Draft. April.

2. **Comment:** **As A Decision Criterion Leading To Further Investigation, It Is Proposed That Further Investigation Will Only Occur If 15 Percent Of The Samples Exceed The National Oceanic And Atmospheric Administration (NOAA) Effects Range-Median (ER-M) (Section 3.1, Page 12 And Section 4.1.3, Page 17). The Navy has proposed a Weight of Evidence (WOE) set of criteria which were developed over more than a year of meetings and telephone conference calls regarding Hunters Point Annex (HPA). While this proposed WOE approach has yet to be implemented at HPA, the '15 percent' criterion proposed here has little resemblance to the proposed HPA WOE approach. Many more criteria, such as the magnitude of the concentration and the lateral and vertical distribution of sediment contaminants, must be considered in the decision of whether to proceed with more investigation. In addition to comparison to the San Francisco Regional Water Quality Control Board (SFRWQCB) sediment ambient concentrations and the NOAA Effects Range-Low (ER-Ls) should be presented.**

   Response: The WOE approach for HPS is not applicable to the investigation at TI. The Site 12 offshore investigation is a screening-level assessment to characterize the site and identify whether or not concentrations in offshore sediments exceed toxicity benchmark values.

   The WP data quality objectives (DQO) will be modified to compare XRF sediment concentrations to San Francisco Bay ambient and effects-range low concentrations, in addition to effects range median. The decision rule for question 1 will be modified as follows:

Decision rules for Question 1:

If inorganic chemical concentrations in sediments do not exceed San Francisco (SF) Bay ambient and ER-Ls, then this will indicate no action. If inorganic chemical concentrations in sediments exceed SF Bay ambient and ER-L values, then the results will be discussed with the regulatory agencies to determine whether further investigation is warranted. Results from this additional investigation will include a screening-level assessment and an evaluation of the magnitude and lateral extent of inorganic chemicals detected in Site 12 the offshore area of investigation.

3. **Comment:** **Please provide the basis for using a fine grained sediment criterion of 50 percent fines to determine whether sediments will be dated by lead (^{210}Pb) and cesium (^{137}Cs) concentrations (section 3.1, page 12 and Section 4.2.3, page 18). Some basis for the 50 percent fine grain criterion should be presented for review or the issue should be referred to the U.S. Geological Survey in Menlo Part, California for concurrence.**

Response: In the WP, the 50 percent fines decision point was based on the geotechnical gauge for coarse grained sediment according to ASTM standard. Sediment is classified as coarse grained when more than 50 percent of material is larger than the number 200 sieve size. Sediments are classified as fine grained when more than 50 percent of the material is smaller than the number 200 sieve. Upon further investigation of this issue, it was found that the ASTM definition of fines versus coarse differed slightly from the RWQCB (RWQCB 1998) designation. The RWQCB defines coarse sediment as less than 40 percent fines, and fines as greater than 40 percent fines. Because the RWQCB definition is a more conservative estimate, the WP will be updated to use 40 instead of 50 percent fines for the decision point.

The final WP will me modified to ensure that the basis for this decision is clarified.

4. **Comment:** **The description of the decision criteria which will determine whether to date the sediment core samples (Section 3.1, page 12) is confusing. The text states that '... and radioisotope depth profiles provide evidence of continual sediment deposition or vertical mixing.' Will lead to a decision to age the sediments in the cores. These criteria would seem to cover the entire continuum from completely undisturbed sediments to completely vertically-mixed sediments. Please clarify this decision point.**

Response: Sediment chronologies based on radioisotope depth profiles and grain size will be developed at three locations in the Site 12 investigation area to provide a framework for interpreting historical trends in metal contaminant inputs. Because the evaluation of the sediment dynamics in the Site 12 investigation area is based on several lines of evidence (grain size, ^{210}Pb, and ^{137}Cs) it is not possible to state definitively what value of an individual measured parameter would lead to a particular decision.

Horizontal variation in grain size of bay sediments generally correlates with wave energy; as wave energy decreases, coarse particles are deposited in high-energy areas with finer particles deposited in areas of lowest wave energy (McDonald and Cheng 1993). In an area of high deposition, the percent fines would be expected to exceed 80 percent. The RWQCB defines coarse sediment as less than 40 percent fines, and fines as greater than 40 percent fines (RWQCB 1998).

Because of its 22.3 year-halflife, ^{210}Pb provides an indication of sedimentation occurring over the past 100 years. Steady state sediment accumulation rates will be estimated from the slope of the linear regression of the log normal ^{210}Pb excess activity versus depth using the constant flux-constant sedimentation rate model (Fuller and others 1999). This model assumes a steady-state accumulation of sediments and that the excess ^{210}Pb activity of depositing sediment particles is constant. The surface mixing coefficient and the constant mixed zone depth will also be determined using a numerical sedimentation-mixing model, excess ^{210}Pb, and the sediment bulk density.

^{137}Cs will be used as a time marker with which sediments can be dated. ^{137}Cs first entered the environment in about 1952. Maximum input occurred in 1963-1964 with 90 percent of fallout delivery between 1959 and 1964, and less than 3 percent after 1974 (Fuller and others 1999).

5. **Comment:** **Please provide the citation for the sediment investigation which establishes that the ^{137}Cs sediment concentration 'peaks' in San Francisco sediments deposited in 1963 (Section 3.1, page 13). This statement is made in several places throughout the document without citation. The point of this comment is not that HERD doubts a ^{137}Cs peak during aboveground nuclear testing, but to determine the ^{137}Cs sediment concentration which indicates this time frame.**

Response: ^{137}Cs first entered the environment in about 1952. Maximum input occurred in 1963-1964 with 90 percent of fallout delivery between 1959 and 1964, and less than 3 percent after 1974 (Fuller and others 1999). Citations will be incorporated into the WP accordingly.

6. **Comment:** **Please state the basis for concluding that the sediment vertical mixing zone is at least 100 centimeters (cm) in depth (Section 3.1, page 13) based on ^{210}Pb and ^{137}Cs concentrations. If the basis of this potential conclusion is that sediment ^{210}Pb and ^{137}Cs concentrations will be determined to a depth of 100 cm, state that depth of assessment in this section.**

Response: The basis for concluding that the sediment vertical mixing zone is at least 100 centimeters (cm) in depth (Section 3.1, page 13) is that sediment ^{210}Pb and ^{137}Cs concentrations will be determined to a depth of 100 cm. The WP will be modified as recommended.

7. **Comment:** **The purpose of this investigation is stated as an attempt to 'finalize the offshore sediment OU RI' (Section 3.2, page 13). There remain some issues regarding elevated selenium (Se) concentrations in individual sediment samples from Clipper Cove. The elevated Se concentrations in Clipper Cove were discussed during the February 10, 2000 meeting at TI. The Navy proposed to determine whether the elevated Se concentration was due to Navy activities. HERD has yet to receive the conclusion of that evaluation.**

Response: Selenium was detected in Clipper Cove above the ER-M at four locations. However, concentrations were only slightly elevated above YBI and TI soil background numbers. At Yerba Buena Island, the background soil concentration of selenium ranges from 1.4 to 1.6 mg/kg and the concentration for ambient fill at TI is 0.5 mg/kg. The maximum concentration detected in Clipper Cove was 2.1. Furthermore, the ER-M for selenium was based on toxicity to freshwater organisms; an ER-M specifically for marine organisms was not available, thus there is added uncertainty in a comparison between site sediments and the ER-M for selenium. In addition, selenium is more toxic to higher trophic level receptors than to invertebrates (U.S. Department of Interior 1998). Food chain modeling using site specific sediment and tissue, support that selenium concentrations in sediment are not having an adverse impact on avian receptors.

Selenium concentrations in Area E and Clipper Cove were discussed at the May 24, 2000 technical meeting. At that time, Dr. Polisini stated he was satisfied that selenium in sediment is likely the result of Yerba Buena Island (YBI) background soil concentrations, but requested that the Navy investigate whether petroleum was ever refined at the old power plant located near the site. Jim Sullivan, the base environmental coordinator for NAVSTA TI, reported at the June 14, 2000 BCT meeting that there was no record of petroleum being refined at TI.

8. **Comment:** **Please provide the basis for setting the number of sample locations based on a 90 percent probability of detecting an elevated concentration in a circular area with a radius of 56 feet (Section 4.1.3, page 16). What is the significance of 56 feet?**

Response: The radius of 56 feet was determined using the ELIPGRID program (Gilbert 1987) and was based on the area to be sampled and the anticipated number of samples required to detect a contaminated area with at least 90 percent confidence. The sampling design was based on methodology described by D.O. Gilbert (1987). Table 1 shows how a dramatic increase in the number of samples is required for statistical confidence. For example, to achieve 90% probability that a circular contaminated area with a radius of 20 feet is detected, more than 100 samples would be required.

9. **Comment:** **The sample location figure (Figure 5) indicates that sediment samples will be taken from subtidal sediments. It would seem impossible to mark subtidal field sampling locations with flags as proposed (Section 4.1.3, page 16). Please clarify or correct this statement**

Response: Acknowledged. Sampling locations in the field will be determined using a Magellan Systems Corporation, Nav 5000 Pro, global positioning system. The WP will be modified accordingly.

10. **Comment:** **The description of the existing data for this area (Section 4.2.2, page 17) indicates that from 1 foot to 5 feet of sediment may have accreted in the area of concern (AOC). Please provide the justification for sampling 100 cm cores for ^{210}Pb and ^{137}Cs (Section 4.2.3, page 18) rather than 200 cm cores which would more closely approximate the maximum stated sediment accretion.**

Response: 100 cm cores for ^{210}lead and ^{137}Cs are proposed based on the following rationale. Sediment-bound constituents are rapidly diluted with older material after deposition, therefore, contaminants persist in the mixed zone for many years after deposition (Fuller 1999). More than 75 years are required to bury 90 percent of a deposited contaminant below the mixed zone (Fuller 1999). At a site in Richardson Bay, approximately 10 miles northwest of Treasure Island, Fuller and others (1999) approximated a vertical mixing zone of 33 cm based on a sediment accumulation and mixing model. This predicted mixing zone proves relevant to the sedimentation characteristics off Treasure Island. A core of 100 cm was selected because it will likely capture contamination that has been deposited offshore during perimeter dike widening operations.

11. **Comment:** **The project schedule (Section 6.0, pages 19 and 20) indicates that the field investigation will begin in January of 2001. HERD recommends that the field investigation not be performed during the rainy season in San Francisco Bay. The sampling vessel in the recent sediment screening effort at HPS had difficulty maintaining position in moderate winds.**

Response: The primary reason for not sampling during the rainy season is due to the possible effects of seasonality on the bioassay results. Studies conducted around the bay have consistently shown lower survival for bioassays during winter months. However, the proposed investigation is for chemical analysis only and does not include sediment collection for bioassays.

Although it may be difficult to maintain position in moderate winds, in the past successful sampling efforts have been conducted during the winter months. For example, offshore samples at NAVSTA TI were collected in early March. Furthermore, moderate winds can be a problem year round in the San Francisco Bay.

A new schedule will be prepared when the work plan is sent out. It is anticipated that sample collection for this investigation will occur sometime between March and May 2001.

12. **Comment:** **Sections of the Field Sampling Plan (FSP) (Appendix A) which correspond to the comments made above on the Work Plan (WP) should also be amended so that the FSP reflects the changes made in the WP.**

Response: The FSP will be modified accordingly.

13. **Comment:** **Please describe the process which lead to the selection of sampling locations 232SS001; 232SS003, and 232SS005 Contract Laboratory Program (CLP) confirmation and radioisotope measurement (Appendix A, Section 6.2, page A-7). The selection process does not appear to be random as these three samples were the closest to the TI shore and spread uniformly in the proposed sampling grid. HERD recommends that the samples to be sent for confirmation sampling be determined after the results of the XRF analysis are available. XRF turn around time is relatively short (e.g., 1 or 2 days) which should not impact the holding time criterion for inorganic elements. As the highest inorganic element sediment concentrations are those that will be of concern to the regulatory agencies and the natural resource trustees, the samples to be sent for CLP confirmation can be selected on a conference call once the XRF data are distributed.**

Response: The process by which the sampling locations 232SS001, 232SS003, and 232SS005 were selected for contract laboratory program (CLP) confirmation and radioisotope measurement was determined based upon their proximity to the shoreline and the assumption that debris would be more concentrated in these areas rather than further off shore.

As the highest inorganic element sediment concentrations are those that will be of concern to the regulatory agencies and the natural resource trustees, the Navy agrees with the HERD recommendation that the samples to be sent for confirmation sampling be determined after the results of the X-ray fluorescence (XRF) analysis are available. The samples to be sent for CLP confirmation will be selected on a conference call once the XRF data are available. The WP will be modified accordingly.

14. **Comment:** **The Decision Rules presented (Appendix A, Table A-2) should be amended to agree with changes made in the WP and FSP. The Decision Rules contain references to analysis of lead only, the 15 percent rule above ER-Ms, the 50 percent fine grain sediment criterion and the 100 cm analysis for ^{210}Pb and ^{137}Cs. Some basis for the 50 percent fine grain criterion should be presented for review or the issue should be referred to the U.S. Geological Survey in Menlo Park, California for concurrence.**

Response: Changes to the decision rules will be incorporated throughout the document. Also, the 50 percent fine-grain criterion will be amended to agree with that used by the RWQCB for determining ambient sediments for the San Francisco Bay (RWQCB 1998).

15. **Comment:** **The Tolerance Limits on Error (Table A-2, page A-4) refer to the 90 percent probability of detecting an elevated concentration in a circle with a 56-foot radius. The justification for these values must be presented for review as outlined above. Please see Specific Comment number 8 above.**

Response: Please see response to DTSC Specific Comment 8.

1.3 CONCLUSIONS

1. **Comment:**
   1) **Further justification and discussions must occur to demonstrate that the proposed area of sampling is appropriate.**
   2) **All XRF results for elements other than lead must be reported. HERD recommends a subset of samples near former location G4 be analyzed for mercury and a subset of the sediment samples offshore of IR Site 12 be analyzed for PCBs.**
   3) **The samples to be forwarded for CLP confirmation should be selected after the results of the XRF and PCB screening are reported.**

4) **Several of the Decision Criteria require further discussion.**

5) **SPAWAR Systems Center San Diego has demonstrated success in XRF and PCB screening of San Francisco Bay sediments at Hunters Point Shipyard and Naval Air Station Alameda. HERD Recommends That This Investigation And The XRF And PCB Analyses Be Performed By SPAWAR Systems San Diego staff.**

Response:

1) Please see response to DTSC General Comment 1.

2) Please see response to DTSC General Comment 2.

3) Please see response to DTSC Specific Comment 13 and DTSC Specific Comment 12.

4) Please see response to DTSC Specific Comments 2, 3, 4, and 14.

5) XRF analysis for inorganic chemicals will be performed by SPAWAR Systems San Diego.

2.0 RESPONSE TO COMMENTS FROM U.S. ENVIRONMENTAL PROTECTION AGENCY

The following are the Navy's responses to comments from EPA.

2.1 GENERAL COMMENTS

1. **Comment:** **Although, the work plan appears to propose sufficient samples (See Figure 5) for determining the distribution of any contaminants that may have originated from the shoreline activity near the Site 12 land protrusion there seems to be a lack of clarity for directly meeting the project objectives (p 12).**

   Response: The project objectives will be modified to focus on:

   1) Characterizing the nature and extent of the Site 12 offshore investigation area.

   2) Providing an approximation of the sediment dynamics in the Site 12 offshore investigation area.

   The decision rules for meeting the project objective are:

   Decision rules for Question 1: If inorganic chemical concentrations in sediments do not exceed SF Bay ambient and ER-Ls, then this will indicate no action. If inorganic chemical concentrations in sediments exceed SF Bay ambient and ER-L values, then the results will be discussed with the regulatory agencies to determine whether further investigation is warranted. Results from this additional investigation will include a screening-level assessment and an evaluation of the magnitude and lateral extent of inorganic chemicals detected in Site 12 the offshore area of investigation.

   Decision rules for Question 2: Sediment chronologies based on radioisotope depth profiles and grain size will be developed at three locations in the Site 12 investigation area to provide a framework for interpreting historical trends in metal contaminant inputs. Because the evaluation of the sediment dynamics in the Site 12 investigation area is based on several lines of evidence (grain size, ^{210}Pb, and ^{137}Cs), it is not possible to state definitively what value of an individual measured parameter would lead to a particular decision. See also response to DTSC Specific Comment 4 for a more detailed discussion.

2. **Comment:** **The question posed in the first bullet can be answered by the process described in the work plan. It is doubtful that the second question as shown in the second bullet can be answered by the approach and sampling described in the work plan.**

Response: Please refer to response to DTSC Specific Comment 4.

2.2 SPECIFIC COMMENTS

1. **Comment:** **p12, 3.1. It is not clear how the Navy determined that no further action is justified based on the cutoff point of 85 percent of the sample locations being less than the ER-M value (Long et al, 1995). Perhaps, more explanation can be provided.**

   Response: Please refer to response to DTSC Specific Comment 2.

2. **Comment:** **On what basis was the decision point of 50 percent fines in sediment samples made?**

   Response: Please refer to response to DTSC Specific Comment 3.

3. **Comment:** **If 24 samples are collected, 15 percent = 3.6 and 85 percent = 20.4. Will the decision point for 15 percent be 3 or 4 samples?**

   Response: The DQOs will be modified as explained in response to DTSC Specific Comment 2, eliminating the need to determine what percentage of samples exceed the ER-M.

4. **Comment:** **Appendicies A and B have the same page number designation, perhaps Appendix B pages could start with the label "B" to avoid confusion?**

   Response: Pages in Appendix B will be renumbered accordingly.

5. **Comment:** **Appendix B, pA-7 Decision rules for Question 1. If 24 samples are collected, 15 percent = 3.6 and 85 percent = 20.4. Will the decision point for this evaluation be 3 or 4 samples?**

   Response: The DQOs will be modified as explained in DTSC Specific Comment 2, eliminating the need to determine what percentage of samples exceed the ER-M.

6. **Comment:** **pA-7, How was the scheme/decision for compositing the top two feet of the core selected? Why not one foot? or analysis of a composite of one foot intervals?**

Response: According to Fuller and others (1999) and van Geen and others (1999), the vertical redistribution of contaminants through out the San Francisco Bay estuary is a product of biological mixing. At a site in Richardson Bay, approximately 10 miles northwest of Treasure Island, Fuller and others (1999) approximate a vertical mixing zone of 33 centimeters (cm) based on a sediment accumulation and mixing model. Given the close proximity, this predicted mixing zone is assumed relevant to the sedimentation characteristics off Treasure Island.

The decision to sample the top 2 feet of the sediment was based on the following reasons. First, the extent of the exposure pathway was determined to be between 0 and 2 feet based on the natural history of benthic organisms. Second, the vertical mixing zone associated with the San Francisco Bay estuary is expected to be between 1 and 2 feet (Fuller 1999). According to Fuller (1999), sediment-bound constituents are rapidly diluted with older material after deposition because of extensive vertical mixing. He concluded that contaminants persist in the mixed zone for many years after deposition and that more than 75 years are required to bury 90 percent of a deposited contaminant below the mixed zone. Therefore, a composite core sample of 0 to 2 feet would locate any contaminant disposed offshore TI during the 1950's. The rational for 2-foot composite sampling will be updated accordingly in Appendix A, page 7.

7. **Comment:** **What is the relationship between the core length (3.3 feet) for radioisotope profiling and analysis for lead concentrations (two feet)? I'm not sure from the description on page A-7, Appendix A whether or not radioisotope profiling will be done in a way to determine if mixing of sediments (decision rules no. 2 on page A-7, Appendix B) has actually occurred**

Response: Please refer to response to DTSC Specific Comment 4 and response to EPA Specific Comment 8 below.

8. **Comment:** **Will each one foot section be analysed separately to determine whether or not mixing has occurred? (What is planned for the 0.3 foot sample?) The description is not very clear, perhaps it can be embellished.**

Response: Separate sediment samples will be collected for XRF and radioisotope analysis. In total, 24 locations will be sampled. However, at the three locations where radioisotope analysis is to be conducted, two sediment cores will be collected for a total of 27 core samples. At each location, a composite core from 0 to 2 feet will be collected, composited, and analyzed for metals using XRF. At 12 of these locations (randomly selected), samples will also be collected at the 2 to 4 and 4 to 6 feet depth horizons to assess vertical extent of contamination. Depth samples will also be composited and analyzed using XRF.

The methodology for radioisotope collection and analysis will be consistent with what has been proposed for Hunters Point Shipyard. Each core will measure to a depth of 10 feet or until the point of refusal. Radioisotope analysis will be conducted for 10 micro samples (starting at a depth of 10 cm each, ranging to 100 cm, in 10 cm increments. [3.3 feet]). The remainder of the core (3.3-10ft.) will be used for geological description only.

If the reviewer is referring to the acetate liner extrusion, this applies to packaging the core for mailing purposes. To assure quality of sampling, a 3.5 ft. section will be mailed to the laboratory for radioisotope analysis. The remainder of the core (3.3 to 10 feet) will be cut in half and sent for geological description.. Appendix A, Section 6.2 of the WP will be modified accordingly.

3.0 RESPONSE TO COMMENTS FROM REGIONAL WATER QUALITY CONTROL BOARD

The following are the Navy's responses to comments from RWQCB on the WP. In addition to the WP, the RWQCB also reviewed the draft final RI and meeting notes regarding additional offshore sediment issues. Outstanding issues that will need to be addressed are identified.

3.1 GENERAL COMMENTS

1. **Comment:** **RWQCB staff have reviewed and concur with comments to this document provided by the Department of Toxics Substance Control (DTSC) and U.S. Environmental Protection Agency (EPA). During our Base Closure Team (BCT) meeting on November 14, 2000, the Navy stated the proposed investigation is intended to be the final effort to evaluate the presence of contaminants in sediments offshore of Treasure Island. Based on the agencies' comments and as we discussed during the BCT meeting, additional investigation may also be required in sediment located offshore from the former debris disposal areas where elevated concentrations of lead and other compounds of concern have been detected. As stated in the draft final Offshore Sediment Remedial Investigation (RI), dated March 1999, the objective of the RI is to develop a detailed aquatic risk characterization upon which remediation decisions can be based. The scope of the offshore RI originally included evaluation of 1) sediment drainage areas served by the stormwater outfalls and 2) sediment and surface water in Clipper Cove that was impacted from activities at the former Skeet Range. In order to address the original overall objective of the offshore sediment RI and to complete the final phase of the RI in a single effort, the scope of the draft work plan should be revised to include investigation of possible offshore sediment contamination derived from all possible on-shore sources or provide rationale why additional sampling is not necessary at these locations.**

   Response: Please refer to response to DTSC General Comment 1.

3.2 SPECIFIC COMMENTS

1. **Comment:** **Please provide rationale for selection of compounds of potential ecological concern (COPECs) for each area being investigated.**

Response: During the February 10, 2000 BCT meeting the lines of evidence upon which risk assessment conclusions were drawn for Area G (offshore area adjacent to Site 12 that includes the north and west side of TI) were reviewed. The combined lines of evidence, as listed below, indicated minimal risk: (1) all chemical concentrations in sediment were below the effects range-median (ER-M); only lead and total DDT exceeded the effects range-low (ER-L) and ambient; (2) all pore water concentrations were below the AWQC except for mercury at location G4; and (3) amphipod survival was near 100 percent taking into account the pre-test results. In summary, for the offshore ERA lead and total DDT were identified as COPECs in sediment

During the meeting, Mr. Maxwell (RWQCB) expressed concern about sample location G15 in relation to what is known about the lead contamination along the shoreline. He stated that lead was detected in a surface sediment sample from G15 at a concentration of 126 mg/kg, which is significantly higher than most offshore samples at TI. Also, G15 is located adjacent to onshore IR Site 12 where lead has been detected in buried debris at concentrations exceeding 20,000 mg/kg. He added that aerial photographs suggested that debris may have been discharged offshore near sample point G15, and that additional sampling of offshore sediments along the northern shoreline would be necessary to assess the nature and extent of lead contamination.

2. **Comment:** **RWQCB recommends collecting samples for radioisotope profiling, grain size analysis, and Contract Laboratory Program (CLP) confirmation samples at locations that represent a cross-section of offshore sediments rather than along the length of the shoreline.**

Response: Please refer to response to DTSC Specific Comment 13.

3.3 COMMENTS ON DRAFT FINAL REMEDIAL INVESTIGATION AND BASE CLOSURE TEAM MEETING MINUTES

1. **Comment:** **May 2000 Offshore RPM meeting: the Navy and agencies determined that bioaccumulation of PCBs at B-7 is not a concern; what about the Pb and TBT (per March 2000 memo from C. Maxwell to D. Rist: need to evaluate Pb, PCBs, and TBT at B-7)?**

Response: Mr. Maxwell indicated that B7 was identified as an area of concern because it showed the same pattern of lead at depth as in Clipper Cove. As discussed at the February 10, 2000 meeting, it is likely that the observed increase of lead concentration with depth is due to the past use of leaded gasoline. From surface to depth, lead concentrations ranged from 27 to 56 mg/kg. SF Bay ambient for lead is 43.2 mg/kg.

With regard to tributyltin (TBT) at location B7, TBT was detected only in the surface sample. The chemical concentration of TBT (34 µg/L) was slightly above the screening value for TBT in sediments at Superfund Sites in Puget Sound (EPA 1996). Currently, the Puget Sound screening value for TBT is the only value available for comparison purposes. The Puget Sound screening value for TBT is 25.1 µg/L. The risk to benthic receptors exposed to TBT at location B7 is expected to be minimal. However, the final RI report will incorporate a more detailed discussion with regard to TBT and the associated risks from exposure.

2. **Comment:** **June 2000 BCT meeting: what is the status of the refined dose technical memorandum? Did EPA and DTSC agree with the Navy's conclusions?**

Did EPA and DTSC agree with the Navy's position presented at the BCT meeting?

Response: For the most part, DTSC and EPA agreed with the conclusions in the refined dose technical memorandum although there were comments regarding the site use factor (SUF). Dr. Polisini stated if the willet population at Treasure Island can support a Peregrine diet, particularly that of the pair nesting on the Bay Bridge full-time, the SUF should be 1.0. Dr. Callahan added that it is difficult to provide a realistic estimate of the SUF if the foraging range of the nesting pair is unknown, however, if the pair is successfully breeding, the effects can be assumed to be low. The information used to calculate the SUF was based on a study (Bell and others 1996) specific to the bridge pair. This study estimated the year-round territory of the East Bay pair to be about 39 square kilometers. It was agreed that further discussion with regard to the SUF would be included in the refined dose technical memorandum. The refined dose technical memorandum was discussed with the agencies at the May 24, 2000 technical meeting; no written comments were received.

3. **Comment:** **March 2000 memo from C. Maxwell to D. Rist and August 18, 2000 email from S. Raker to Navy: need to evaluate Pb distribution at Clipper Cove considering the City's planned reuse of the cove; what's the status of the Navy and the City's positions regarding cleanup and reuse at Clipper Cove?**

Response: Collection of additional sediment data at depth would provide additional characterization of the nature and extent of lead concentrations in Clipper Cove; however, lead concentrations in samples collected to date do not indicate a lead problem. In Clipper Cove, lead was detected in 23 of 23 surface and 12 of 12 sediment core samples. Surface sediment lead concentrations ranged from 19.4 mg/kg to 33.5 mg/kg, less than the ambient threshold (43.2 mg/kg). Lead in subsurface sediments was detected at concentrations ranging from 28.7 mg/kg to 63.3 mg/kg. Only three lead concentrations were greater than the ER-L screen.

In the February 10, 2000 BCT meeting, Dr. Polisini (DTSC) stated that unless sediments at depth are exposed, Clipper Cove does not pose an unacceptable ecological risk. Mr. Maxwell (RWQCB) stated that if the redevelopment plan is to dredge in Clipper Cove, either the Navy or the City would likely have to perform additional investigation. Currently, the City of San Francisco is planning to collect sediments in Clipper Cove to determine whether dredge spoils from Clipper Cove will pass disposal criteria.

4. **Comment:** **March 19, 1999 Draft Final Offshore Sediments RI, Section 11.2.1 Groundwater-Surface Water Interactions: The Navy will need to update this section with the results of the tidal mixing zone study and the selection of COPECs using the updated facility wide groundwater screening criteria (updated per the California Toxics Rule and human consumption of fish)**

Response: The tidal mixing zone study is currently in process. Recently, monitoring wells were installed on Treasure Island to assess the extent of the mixing. Results from these wells will lead to the further implementation of other groundwater monitoring wells. If available when the final RI is issued, the offshore RI will be updated accordingly.

4.0 RESPONSE TO COMMENTS FROM DEPARTMENT OF FISH AND GAME OFFICE OF SPILL PREVENTION AND RESPONSE

The following are the Navy's responses to comments from DFG OSPR.

4.1 GENERAL COMMENTS

1. **Comment:** **The Navy intends to develop and implement a consistent, risk-based approach for sediment assessment and remediation at Navy facilities in San Francisco Bay. Naval Station Treasure Island is one of those Navy facilities. The Navy has proposed a Weight-of-Evidence (WOE) approach for use in Hunters Point Shipyard. Why is this approach not used at Naval Station Treasure Island? If the Navy wants to develop and evaluate potential regional remedies for sediments that pose unacceptable environmental risks, this proposed WOE approach should be implemented at Naval Station Treasure Island.**

   Response: Please refer to response to DTSC General Comment 1.

2. **Comment:** **DFG suggests that a phased sampling design (screening survey followed by comprehensive field and laboratory studies) and three lines of evidence (sediment chemistry, toxicity tests, and bioaccumulation studies) be used. Data for the three lines of evidence will be evaluated using a WOE approach. Additionally, we strongly recommend that appropriate bioassays be conducted on the samples collected for bulk chemical analysis. This will eliminate the need for sampling at a later date and provide chemical and biological data from co-located samples.**

   Response: Please refer to response to DTSC General Comment 1.

4.2 SPECIFIC COMMENTS

1. **Comment:** **Section 3.1, pg. 12, bullet items: For lead concentration in sediment, ER-L is 46.7, ER-M is 218, and ambient concentration is 43.2 mg/kg (Appendix C1). DFG follows DTSC guidance for the elimination of inorganic compounds as chemical of potential ecological concern (COPEC). Consequently, any inorganic compound that is statistically greater than background must be considered a COPEC. The criteria listed in the bullets do not meet this requirements and are, therefore, not acceptable to DFG**

   Response: Due to changes to the WP, this comment is no longer applicable. Please refer to response to DTSC Specific Comment 2 for a detailed explanation of how the WP was changed.

2. **Comment:** **Section 3.1, pg. 12, para. 3: After reviewing the WP, DFG does not agree that the further investigation will only be considered if lead concentrations in 15 percent of the samples exceed ER-M. Based on this, lead will be considered a COPEC only if its concentration exceeds ER-M value in more than 15 percent of the samples. Before this approach can be approved, the statement regarding 15 percent must be fully explained and justified with literature citation, and the connection between the statement and the 15 percent criteria must be explained in an understandable manner. It is necessary to also consider the ER-L because the ER-L is based on a 10 percent effect level, and adverse effects at this level would be expected more than "rarely." The ER-M, however, is based on a 50 percent effect level at which much more than occasional adverse effects would occur. This level of adverse effects (i.e. up to 50 percent) is not acceptable to DFG.**

Response: Due to changes to the WP, this comment is no longer applicable. Please refer to response to DTSC Specific Comment 2 for a detailed explanation of how the WP was changed.

3. **Comment:** **Section 4.0, pg. 14, para. 1: To be consistent with regulatory guidance in evaluating the reasonable maximum exposure (RME) for lead, DFG will require that the RME dose be calculated using the 95 percent upper confidence limit (UCL) for all exposure parameters. If values other than the 95 percent UCL are used, an explanation must be provided.**

Response: Because this is a screening level assessment conducted for the purpose of further characterizing the nature and extent of metals in the investigation area, a dose for food chain modeling will not be calculated. For each location, results will be compared to the ER-L and ambient. If inorganic concentrations in sediments are below SF Bay ambient and the ER-L, then this will indicate no action. If inorganic concentrations in sediments exceed SF Bay ambient and the ER-L, then the results will be discussed with the regulatory agencies to determine whether further investigation is warranted. Results of this will include a screening level assessment and an evaluation of the magnitude and lateral extent of inorganic chemicals detected in Site 12 the offshore area of investigation.

4. **Comment:** **Appendix E, quality assurance project plan: Please add the following paragraphs:**

" If the data fall outside the limit of specified accuracy, precision, and recovery, or the problems affect comparability, the laboratory leader must contact the Project QA Officer to discuss options available for rectifying the situation. The Navy QA Officer and the TtEMI QA Program Manager will have final authority on decisions made to rectify problems.

Quality assurance reports will be prepared annually by the Project QA Officer and will include a detailed report of data precision, accuracy, and completeness for each type of analysis. Included in the final laboratory report will be a summary of the practices used to assess data precision, accuracy, and completeness. The Navy QA Officer or the QA Program Manager will review and approve these reports and include results of performance and system audits and corrective actions which have occurred over the period of the reports.

All significant quality assurance problems will be reported to the Project QA Officer or the QA Program Manager, as soon as possible along with recommendations for corrective action.

Any changes in quality assurance procedures, analytical procedures, sampling locations and frequencies, etc., will be submitted in writing to the Navy QA Officer and the TtEMI QA Program Manager for approval prior to implementation of the changes."

Response: Paragraph 1 was not added to the text. Section C1.2.2 describes the required procedures for the laboratory to notify the project team of QA/QC deficiencies.

Paragraph 2 was not added to the text. As described in Section C1.3.3, a quality control summary report (QCSR) will be included with the final report.

Paragraph 3 has been added to Section C1.2.2.

Paragraph 4 has been added to Section A1.3.

5.0 RESPONSE TO COMMENTS FROM GEOMATRIX

The following are the Navy's responses to comments from Geomatrix.

1. **Comment:** **Section 1.0, paragraph 2, on page 1, should not refer to a "No Further Action (NFA)" decision as the forgone conclusion of this study. Depending on the data developed as a result of this and other studies, a decision to conduct remedial action in the study area might be appropriate.**

   Response: Section 1.0, paragraph 2 will be modified as follows: "This WP presents the approach for the Site 12 offshore investigation area. The investigation area is adjacent to the northern shoreline along North Point Drive. The WP includes a FSP and a quality assurance project plan (QAPP), which are included as Appendices A and B to the WP. The primary objectives of the Site 12 offshore sampling investigation are to: (1) determine whether inorganic chemicals exceed conservative screening values and (2) characterize the local sediment dynamics.

2. **Comment:** **Section 2.1.1, paragraph 3, on page 3, should also mention the operation, fueling, and maintenance of passenger aircraft from the island as a significant activity at Treasure Island.**

   Response: Originally, plans were proposed to turn Treasure Island into an international airport after the exposition. Due to limited area on the island, these plans were never completed. However, Pan American Airline's provided a "China Clipper Service" between the years of 1939 until 1945 (Mare Island Naval Shipyard BRAC Environmental Technical Division, 1996). Fueling and maintenance of small passenger aircraft on TI was therefore likely and should be documented. Section 2.1.1, p. 7 of the WP will be updated accordingly.

3. **Comment:** **Section 2.1.6.1, paragraph 3, on page 7, states that the bay receives fresh water (and, by implication, sediment) from sources east of Suisun Bay. This discussion should also mention sources of fresh water and sediment from the watershed immediately surrounding the bay and put these sources in perspective with the water and sediment sources upstream of Suisun Bay.**

   Response: The central valley watershed accounts for approximately 90 percent of the freshwater inflow found in the San Francisco Bay estuary (LTMS, 1996). The Sacramento-San Joaquin Delta is the primary waterway for deposition of sediment and freshwater into the bay estuary from the valley. However, the estuary also receives inflow from the Sonoma Creek, Napa, and Petaluma Rivers (LTMS, 1996). Although the entry of sediment and freshwater from these rivers is not as significant as the Sacramento-San Joaquin system, they still provide important influxes for the bay estuary and benthic habitat off Treasure Island. Section 2.1.6.1 of the WP will be revised as recommended.

4. Comment: **Section 2.1.6.3, paragraph 4, on page 8, refers to Figure 2, which shows contours of changes in the depth of the bay around Treasure and Yerba Buena Islands. The contours are labeled as showing the results of erosion or accretion of sediments. The discussion indicates that the two rounds of depth measurements used to construct the contours in Figure 2 took place in 1955 and in 1990. Therefore, in the area of the "protrusion", the contours actually reflect the effect of the pushing of soil and/or waste into the bay to form the Site 12 "protrusion" as well as natural sedimentation and/or erosion effects. The document should address the question of how the changes of bay bottom contours that resulted from construction of the "protrusion" affect interpretation of the bathymetry data in this area. The bathymetry data reflected on Figure 2 cannot be a reliable indicator of erosion or deposition in that area without accounting for the effect of building the "protrusion."**

Response: Based on the recent review of the perimeter dike stability evaluation report for TI (Geomatrix 1990), several projects to protect the riprapped face of the perimeter dikes have occurred since the original construction in 1937. This has resulted in the placement of additional rock facing, and in local areas, widening of the perimeter dikes (Geomatrix 1990). The "protrusion" area is one of the locations where the perimeter dike was widened as shown on Figure 1 (Geomatrix 1990); Thus, it is likely the Site 12 "protrusion" is the result of a widening of the perimeter dike and not offshore debris disposal. Regardless of the composition material of the "protrusion", the reviewer is correct in stating that the bathymetry data reflected on Figure 2 is not a reliable indicator of erosion or deposition in the investigation area without accounting for changes of the bay bottom due to widening of the perimeter dike/protrusion. The WP will be modified to discuss this point.

5. Comment: **Section 2.2.1, paragraph 4, on page 11, states that Sample G15 was collected directly offshore from the land protrusion near Buildings 1231 and 1233. Figure 4, however, shows that Samples G15 and G21, while both collected comparatively near the shoreline, were both collected to the sides of the protrusion and that no samples have been collected directly offshore of the protrusion itself. This discrepancy should be explained or corrected.**

Response: Section 2.2.1, paragraph 4 will be modified as follows: "Sampling locations G15 through G21 are located in the Site 12 offshore investigation area. Sample G21 is located east of the protrusion near the breakwater and G15 southwest of the protrusion where the storm drains discharge to the bay. Lead concentrations at these locations ranged from 13.5 to 126 (mg/kg), with the maximum concentration at location G15 (see Figure 5)."

6. Comment: **Section 2.2.2, paragraph 1, on page 11, should be expanded to include an appropriate description of the use of Site 12 as an automobile parking area during the Exposition, including a statement about whether the parking area was paved.**

Response: At least part of Site 12 was used as an automobile parking lot during the exposition on Treasure Island (Mare Island Naval Shipyard BRAC Environmental Technical Division 1996). Documented information concerning this parking lot is limited, but it is unlikely that the lot was paved. Asphalt debris was found around Site 12, however, there is little evidence pointing towards any consistency, concentrated pattern, or location. Any resource outlining the construction of a Site 12 parking lot would be appreciated. Section 2.2.2, p. 11 in the WP will be updated accordingly.

7. **Comment:** **Section 3.1, paragraphs 1 and 2, on page 12, indicate that the only possible sediment contaminant that is being considered in this study is lead. In light of the other contaminants that have been detected in soil, waste, and groundwater samples collected from Site 12, an adequate rationale for limiting the study to lead has not been presented. The Navy should review and summarize all chemical data from the area near the "protrusion" and analyze the proposed sediment samples for all contaminants found at elevated concentrations in nearby samples.**

Response: Please refer to response to DTSC General Comment 1.

8. **Comment:** **Section 3.1, paragraphs 3 and 4, on pages 12 and 13 (and similar discussions elsewhere in the document), should clearly state the bases for selecting the specific numerical criteria proposed for evaluating the data collected in the study, and any applicable literature references should be given. In particular, the bases for the following criteria should be stated:**

- **85 percent as the frequency-of-occurrence screening criterion for lead concentrations below the "effects range-median" (ER-M),**
- **the definition of "fine-grained" as applied to sediment in this area,**
- **the presence or absence of "peaks" of Cesium-137 concentrations as a screening criterion for distinguishing erosional versus depositional environments,**
- **the nature of Lead-210 concentration distributions that would suggest depositional or erosional environments.**

Response: Please refer to responses to DTSC Specific Comment 1 and DTSC Specific Comment 4.

9. **Comment:** **Section 3.1, paragraph 4, on page 12 (and similar discussions elsewhere in the document), should clearly state the basis for selecting 50 percent as the erosional-versus-depositional-environment screening criterion for the fraction of "fine-grained" material in sediment, and any applicable literature references should be given.**

Response: Please refer to response to DTSC Specific Comment 4. Although the criterion for determining fine-grained sediments is no longer stated in the decision rule, the same definition as used by the RWQCB when determining ambient sediment values for the San Francisco Bay (RWQCB 1998) will be used to evaluate grain size. The RWQCB defines coarse sediment as less than 40 percent fines, and fines as greater than 40 percent fines. The WP will be updated to use 40 instead of 50 percent fines, where applicable.

10. **Comment:** **Section 3.2, on page 13, as worded, might be taken to imply that this work plan addresses all of the outstanding offshore issues identified by the BCT in June, but this is not correct. Instead, this section should state that it addresses some but not all of the outstanding offshore issues from the referenced BCT meeting.**

Response: The WP addresses all outstanding issues for which additional data must be collected in order to resolve. Section 3.2 of the WP will be modified to clarify this point.

11. **Comment:** **Section 4.0, paragraph 1, page 13, refers to xerographic reproductions of airphotos included in the Work Plan. As worded, the text suggests that the "protrusion" was fully formed between 1950 and 1958, and that it remained relatively stable in size after that. The photo reproductions in the Work Plan, however, seem to show that the size of the Site 12 "protrusion" continued to increase between 1968 and 1975. Unfortunately, the quality of the xerographic photo reproductions in the Work Plan is not good enough to draw this conclusion with a high degree of confidence. Do the original photographic prints show this progressive size increase after 1958 as well?**

Response: The quality of the xerographic photo reproductions in the WP is less than that of the original photos. The purpose of providing a copy in the WP was to provide a reference for the reader. The original aerial photos show a progressive size increase after 1958. The text in the WP will be modified as follows: "Original aerial photos of the northwestern shoreline of NAVSTA TI show the "appearance" of a land protrusion from the northern shoreline between 1950 and 1958; progressive size increases were observed in aerial photos through 1975. Although aerial photos show size increases through 1975, piles of debris along the northern shoreline were removed prior to the taking of the 1969 aerial photo."

12. **Comment:** **Section 4.0, paragraph 1, page 13, indicates that the currently available sampling density is insufficient to conclude whether or not lead concentrations are elevated in the area of the Site 12 "protrusion." On the basis of the data presented on Work Plan Figure 5, however, the lead concentration detected in the sample from station G15 is elevated by a factor of approximately 5 over the average of the other lead concentrations shown and is approximately 3 to 6 times higher than the San Francisco Bay ambient sediment lead concentrations for sediments with 100 percent and 40 percent fines, respectively (as published by the RWQCB and referenced elsewhere in the Work Plan). Therefore, it appears clear that the lead concentration in at least some of the sediment near the "protrusion" is elevated. The significance of this elevated concentration is not clear at this time.**

In addition, the text and Figure 5 give different values for the lead concentration detected in the sample from station G15; the figure says 126 milligrams per kilogram and the text says 146 milligrams per kilogram. Please clear up this discrepancy. Note also that if the text value for the G15 lead concentration is used, then the factor by which that concentration exceeds the average of surrounding sediment concentrations and the RWQCB ambient sediment concentrations also increases.

Response: The lead concentration in at least some of the sediment near the "protrusion" is elevated. The significance of this elevated concentration is not clear at this time. The concentration of lead detected at G15 was 126 mg/kg, not 146 mg/kg as indicated in the text. The text will be modified accordingly.

13. **Comment:** **Section 4.0, paragraph 2, page 14, indicates that lead concentrations at depths greater than 2 feet in the sediment are not environmentally significant, because of limited exposure to possible receptors. The basis for selecting this depth interval for this area should be documented; what is the specific exposure scenario that the Navy believes applies to sediment in this area?**

Response: Due to limitations in oxygen and food supply, most benthic invertebrates are found in the upper levels of the sediment column. Still, anaerobic bacteria and other primary consumers can exist at deeper depths. A 0 to 2-foot exposure pathway takes into account the vertical mixing and redistribution of sediment in the Bay estuary, while also catering to deeper invertebrate habitats. Furthermore, sampling will consist of 12 random cores, which will range from 2 to 4 feet and 4 to 6 feet to assess the extent of vertical contamination. Section 4.0, p. 14 of the WP will be updated as recommended.

14. Comment: Section 4.0, paragraph 2, page 14, indicates that one of three assumptions will be true if lead concentrations are not elevated in the top 2 feet of sediment in the study area. The three listed assumptions are not the only ones that could apply, however. Other scenarios may apply, in light of uncertainty about: 1) the uniformity of lead concentrations in the material that formed the "protrusion", 2) the uniformity of the depositional/erosional environment over the period since the "protrusion" was formed (see Comments 4 and 11, for example), and 3) the stability of the current depositional/erosional environment if institutional controls are not implemented to maintain current conditions (see Comment 17, below, for example).

The area of the "protrusion" is naturally erosional under current conditions.

- The area only appears to be accretional on the Corps of Engineers' differential bathymetry map (Work Plan Figure 2) because the bottom elevation was artificially raised between the two rounds of bathymetry by the Navy progressively pushing debris and soil out into the bay from the area near Buildings 1231 and 1233.

- The earlier material pushed into the bay generally contained higher concentrations of debris, and hence of lead, than later material. This would be consistent with an effort to remove debris piles from the ground surface by disposing of the material in the bay.

- The later material contained less debris, and may have been entirely soil, as efforts were made to completely remove debris piles and leave a clear soil surface or as less-contaminated material was selected for later removal by bay filling. This later material was pushed over the older material, creating a "blanket" of generally cleaner material on top of the older, more-contaminated material.

- Current composite sampling and analysis of only the top 2 feet of bottom material detects relatively low lead concentrations because some or all of the material included in the composite samples is from the later, cleaner fill pushed into the bay over the older fill.

Filling of the bay in this area has stopped and natural erosion will eventually remove the upper, cleaner fill, exposing the earlier, dirtier fill.

The scenario just outlined may not represent the actual conditions in the "protrusion" area, but it appears to fit the available data and shows that only collecting and analyzing composite samples from the top two feet of sediment and fill may not allow an adequate risk assessment to be performed for this area.

The Navy should consider sampling the full depth of any recent (post-1950) fill that is encountered and an additional distance into the underlying older fill and/or native sediments and should consider analyzing discrete samples from progressive depths at each sampling station. If the recent fill is not readily distinguishable from the original 1930s fill that formed the island and/or if manmade fill cannot be distinguished from the underlying native sediments, then the Navy should propose a method for assuring that chemical concentration in materials pushed offshore since 1950 can be distinguished from concentrations in older materials.

Response: In total, 24 locations will be sampled. At each location a composite core of 0-2 feet will be collected, composited, and analyzed for metals using XRF. At 12 of these locations (randomly selected), samples will also be collected at the 2-4 and 4-6 feet depth horizons to assess vertical extent of contamination. Depth samples will be composited and analyzed using XRF.

15. **Comment:** **The document often uses qualitative terms such a high, elevated, and low to describe conditions without providing any indication of what criteria are used to assign those qualitative descriptors or to justify their use.**

Response: In "general", the term low is used to refer to a concentration less than or slightly above the ER-L (or San Francisco Bay ambient). Slightly, as used here, is qualitative. Elevated refers to a concentration above the ER-L and ER-M. High refers to a concentration greater than the ER-M. A paragraph describing the use of these qualitative descriptors will be added to the WP.

16. **Comment:** **During the BCT meeting on Wednesday, November 14, 2000, it was stated that a lead screening level of 242 parts per million would be used in the investigation. This criterion, its source, and its applicability to this project, should be clearly described in the Work Plan, if it is to be used. This screening level is considerably higher than the RWQCB's published ambient sediment lead concentrations from a reference used elsewhere in the Work Plan (RWQCB, 1998 - referenced in the first paragraph of Section 4.1.2.1, but not included in the Work Plan reference list) and is higher than the "effects range-median" (ER-M) listed in RWQCB, 1998.**

Response: The ER-M value stated at the BCT meeting on Wednesday, November 14, 2000 was misquoted. The ER-M for lead is 218 mg/kg (Long and others, 1995) and is the value that is stated and referenced in the WP.

17. **Comment:** **The document appears to provide for determining the lead concentrations in uniformly depth-weighted composite samples made from the uppermost 2 feet of sediment. However, no evidence is presented that the results from such analyses will be comparable to whatever risk-screening values the Navy plans to use. If the planned risk-screening values are derived from exposure assumptions that are incompatible with a 2-foot thick, uniformly depth-weighted composite lead concentration, then the data will not be useful.**

Response: Screening values, such as ER-Ls and ER-Ms used to determine the level of risk to benthic receptors, include multiple sources of uncertainty. Effects on receptors at the site may be under- or overestimated based on this approach; however, this is the best method available for preliminary screening of chemical levels.

The decision to sample the top 2 feet of the sediment was based on the following reasons. First, the extent of the exposure pathway was determined to be between 0 and 2 feet based on the natural history of benthic organisms. Second, the vertical mixing zone associated with the San Francisco Bay estuary is expected to be between 1 and 2 feet (Fuller 1999). According to Fuller (1999), sediment-bound constituents are rapidly diluted with older material after deposition because of extensive vertical mixing. He concluded that contaminants persist in the mixed zone for many years after deposition and that more than 75 years are required to bury 90 percent of a deposited contaminant below the mixed zone. Therefore, a composite core sample of 0 to 2 feet would locate any contaminant disposed offshore TI during the 1950's.

18. **Comment:** **Sections 4.0, 4.2.1, and 4.2.2, paragraph 1 in each section, on pages 14, 17, and 17, respectively, indicate that data from a 1990 Geomatrix field program suggest that the area near the "protrusion" is erosional. The Work Plan should clearly state that this is the Navy's interpretation of the Geomatrix data, not Geomatrix's interpretation. In addition, the Navy should note that the Geomatrix report indicated that the area north of the protrusion was a borrow area during construction of the island. As such, the resulting depression would more likely be an area of deposition rather than an area of erosion.**

Response: The WP will be amended to make it clear that the Site 12 offshore investigation area appears to be erosional based on an evaluation of the grain size and geologic descriptions of soil boring logs from previous Treasure Island Studies (1937 – 1989) as presented in the Perimeter Dike Stability Report (Geomatrix 1990).

REFERENCES

Bell, D.A., and others. 1996. *Bridge Use by Peregrine Falcons in the San Francisco Bay Area.* In Raptors in Human Landscapes, D.M. Bird, D.E. Varland and J.J. Negro (eds.), Harcourt Brace and Company. Academic Press. London.Fuller, C.C., van Geen, A., Baskaran, M., and Anima, R. 1999. "Sediment chronology in San Francisco Bay California, defined by ^{210}Pb, ^{234}Th, ^{137}Cs, and $^{239,240}Pu$." Marine Chemistry. Volume 64. Pages 7-27.

Geomatrix. 1990. "Results of Field Exploration and Laboratory Testing Program for Perimeter Dike Stability Evaluation Naval Station Treasure Island, San Francisco, California." Volumes 1 through 5. August.

Gilbert, R.O. 1987. *Statistical Methods for Environmental Pollution Monitoring.* Van Nostrand Reinhold. New York.

Long, E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder. 1995. "Incidence of Adverse Biological Effects within Ranges Of Chemical Concentrations in Marine and Estuarine Sediments." *Environmental Management.* Volume 19. Number 1. Pages 81-97.

Mare Island Naval Shipyard BRAC Environmental Division. 1996. "Historical Study of Yerba Buena Island Treasure Island And their Buildings." Revision 01. March.

McDonald, E.T., and R.T. Cheng. 1993. "Issues Related to Modeling the Transport of Suspended Sediments in San Francisco Bay, California." Estuary and Coastal Modeling ASCE Proceedings, 1993.

RWQCB. 1998. "Ambient Concentrations of Toxic Chemicals in San Francisco Bay Sediment. Staff Report." May.

U.S. Department of Interior. 1998. "Guidelines for Interpretation of the Biological Effects of Selected Constituents in Biota, Water, and Sediment. Selenium." November.

U.S. EPA. 1996. "Long-Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region." Draft. April.

U.S. EPA. 1996. "Recommendations for Screening Values for Tributyltin in Sediments at Superfund Sites in Puget Sound, Washington." EPA 910-R-96-014. October.

van Geen, A., Luoma, S. 1999. "The impact of human activities on sediments of San Francisco Bay, California: an overview." Marine Chemistry. Volume 64. Pages 1-6.

TABLE 1

TABLE 1

NUMBER OF SAMPLES NEEDED TO DETECT A 9,852-SQUARE-FOOT CIRCULAR CONTAMINATED AREA USING A SQUARE-GRID SAMPLING DESIGN

Specifications:	30-m Grid	25-m Grid	20-m Grid
Study Area = 150,000 square feet			
Probability of finding contaminated area	90.4%	99.8%	100.0%
Number samples needed	16	23	35

Notes:

9,852-square-foot contaminated area is about 915 square meters, which is input into Elipgrid, which specifies a 17.07-meter radius for the contaminated area (56-foot radius)

Study Area is 150,000 square feet or 13,935.5 square meters.

Contaminated area is assumed to be circular in shape.

NUMBER OF SAMPLES NEEDED TO DETECT A 1,257-SQUARE FOOT, CIRCULAR CONTAMINATED AREA USING A SQUARE GRID SAMPLING DESIGN

Specifications:	30-m Grid	25-m Grid	20-m Grid	15-m Grid	12-m Grid	10-m Grid	8-m Grid
Study Area = 150,000 square feet							
% Chance to find contaminated area	12.9%	18.6%	29.1%	51.8%	80.6%	95.9%	100.0%
Number samples needed	16	23	35	62	97	140	218

Notes:

1,257-square-foot contaminated area is about 116.7 square meters, which is input into Elipgrid, which specifies a 6.09-meter radius for the contaminated area (20-foot radius)

Study Area is 150,000 square feet or 13,935.5 square meters.

Contaminated area is assumed to be circular in shape.

NUMBER OF SAMPLES NEEDED TO DETECT A 400-SQUARE FOOT, CIRCULAR CONTAMINATED AREA USING A SQUARE GRID SAMPLING DESIGN

Specifications:	30-m Grid	25-m Grid	20-m Grid	15-m Grid	12-m Grid	10-m Grid	8-m Grid	6-m Grid	5-m Grid	4-m Grid
Study Area = 150,000 square feet										
% Chance to find contaminated area	4.1%	5.9%	9.3%	16.5%	25.8%	37.2%	58.1%	92.1%	99.9%	100.0%
Number samples needed	16	23	35	62	97	140	218	388	558	871

Notes:

400-square-foot contaminated area is about 37.16 square meters, which is input into Elipgrid, which specifies a 3.44-meter radius for the contaminated area (11.3-foot radius)

Study Area is 150,000 square feet or 13,935.5 square meters.

Contaminated area is assumed to be circular in shape.

NUMBER OF SAMPLES NEEDED TO DETECT A 50-SQUARE-FOOT CIRCULAR CONTAMINATED AREA USING A SQUARE-GRID SAMPLING DESIGN

Specifications:	30-m Grid	25-m Grid	20-m Grid	15-m Grid	10-m Grid	5-m Grid	4-m Grid	3-m grid	2-m grid	1.5-m grid
Study Area = 30,000 square feet										
Probability of finding contaminated area	0.5%	0.7%	1.2%	2.1%	4.7%	18.7%	29.2%	52.0%	96.0%	100.0%
Number samples needed	16	23	35	62	140	558	871	1,549	3,484	6,194

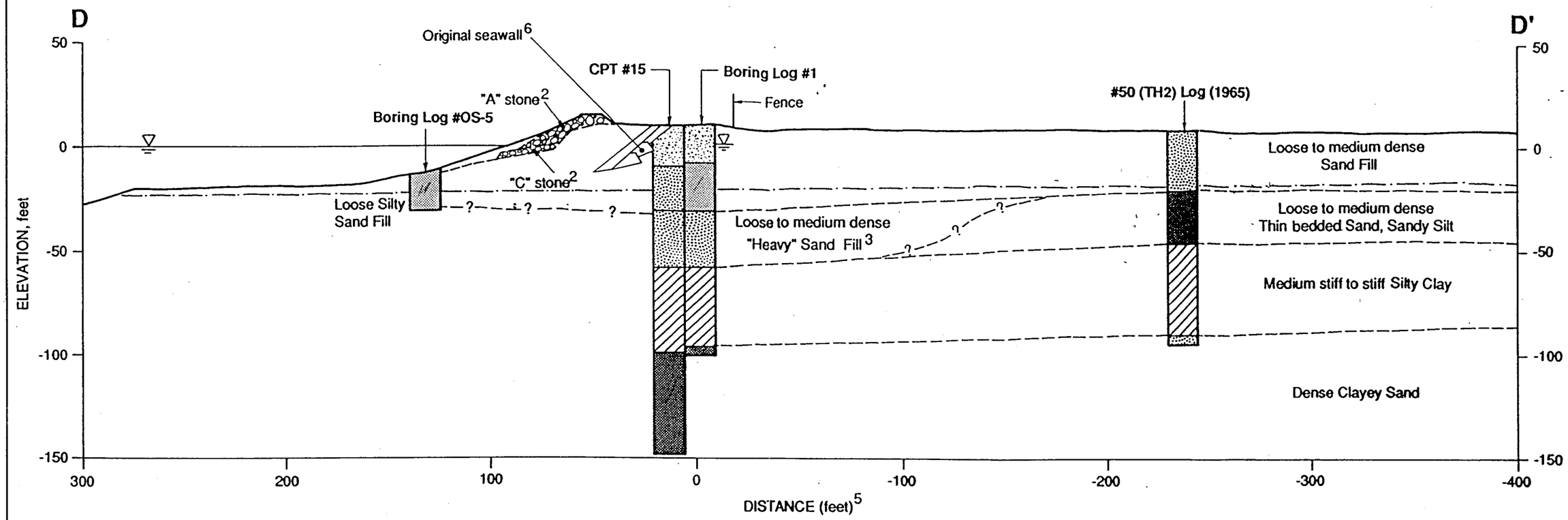
Notes:

50-square-foot contaminated area is about 4.65 square meters, which is input into Elipgrid, which specifies a 1.22-meter radius for the contaminated area (4-foot radius)

Study Area is 150,000 square feet or 13,935.5 square meters.

Contaminated area is assumed to be circular in shape.

FIGURE 1



EXPLANATION

- Poorly graded sand with gravel
- Poorly graded sand
- Silty sand
- Clayey sand
- High plasticity clay

- Ground surface 1
- Lithologic contact
- Lithologic contact - location uncertain 3
- Original ground surface 4

Notes

1. Vertical control based on Sheets 21 & 22 of the "Topographic and Hydro Survey - Nov. - Dec. 1989". Mean lower low tidal datum.
2. Configuration of A-stone and C-stone seawall materials based on Sheet C-8 of the "Repairs to Seawall, Phase 2B, Special Project RCI-83, 1983".
3. Location of "heavy" sand fill based on boring #1, CPT #15 and a description in "Geologic and Engineering Aspects of San Francisco Bay Fill; Bay Mud Developments" Charles H. Lee, Cal. Div. Mines and Geology Special Report 97, 1969, page 69.
4. Original ground surface based on Lee (1969) and Hagwood (1980).
5. Distance measured from survey control line, "Topographic and Hydro Survey , Nov. - Dec. 1989".
6. Configuration of original seawall based on Hagwood (1980); location inferred from Hagwood (1980) and island construction photos.

CROSS SECTION D - D'
Treasure Island Dike Stability
San Francisco, California

GEOMATRIX

Project No.	Figure
1539.05	6