



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX

75 Hawthorne Street
San Francisco, Ca. 94105

May 17, 1991

Commanding Officer
Naval Station Treasure Island
ATTN: Eddie Sarmiento, Staff Civil Engineer
Building I (Code 84)
San Francisco, CA 94130

Dear Mr. Sarmiento:

Enclosed are the following two documents pertaining to the Hunters Point Annex Environmental Sampling and Analysis Plan (ESAP):

Attachment 1. Comments on the Draft Final ESAP

Attachment 2. Comments on the Quality Assurance Project Plan for the ESAP

In addition to EPA's own comments, we have incorporated comments provided to us by the National Oceanic and Atmospheric Administration (NOAA).

It remains unclear as to how the results of the ESAP will be used and what subsequent steps should be taken as a result of the ESAP's findings. Our Comment #29 in Attachment 1, for example, raises a concern related to this issue.

NOAA has suggested to EPA that, given its scope, the ESAP be regarded as the equivalent of a Site Investigation (SI) for a new Operable Unit for the nearshore and offshore areas around HPA where site-related contaminants may have come to be located. Designating the ESAP as such may help put this effort into perspective, and clarify its relationship to the other OU remedial investigations being undertaken at Hunters Point as well as to the Ecological Assessment the Navy needs to undertake. We would like to further discuss this suggestion with the Navy, DHS, and the RWQCB, perhaps at the May 22 Technical Review Committee meeting.

We commend the Navy on the effort being put into this important study. While these comments reflect a need for some "fine tuning" of the proposal, we believe much progress has been made in developing a plan which will contribute to the understanding of the ecological impacts at HPA. Resolving the larger issue of where the ESAP fits into the overall RI/FS process at Hunters Point is an important next step.

If you have any questions, please call me at (415) 744-2388.

Sincerely,



Chuck Flippo
Remedial Project Manager

cc: Louise Lew, WESTDIV
Bill Brown, DHS
Tom Gandesbery, SFRWQCB
Scott Lutz, BAAQMD
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Chip Demarest, NOAA
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**ATTACHMENT 1
COMMENTS ON THE QUALITY ASSURANCE
PROJECT PLAN FOR THE ENVIRONMENTAL
SAMPLING AND ANALYSIS PLAN**

**COMMENTS ON DRAFT FINAL ENVIRONMENTAL
SAMPLING AND ANALYSIS AND QUALITY
ASSURANCE PROJECT PLAN**

DATED 17 MAY 1991

**EPA COMMENTS ON THE
MARCH 14, 1991 ENVIRONMENTAL SAMPLING AND ANALYSIS PLAN
FOR HUNTER'S POINT ANNEX**

1. Page 2.2, Section 2.2.1. We are pleased that sampling areas have been added in the drydock areas.
2. Page 2-3, Sections 2.2.2 and 2.2.3. The revised plan still does not reflect a proper understanding of a "control" replicate versus a "reference" replicate. Control sediments should be collected from the location from which the test organisms are collected. These sediments should match the organisms natural environmental conditions in terms of grain size, sediment quality, etc. The purpose of this control replicate is to control for laboratory effects which may contribute to mortality but which have no relation to the sediments being tested. Thus, the control replicate is very important for quality assurance and quality control in the bioassay.

Reference replicates, in contrast, represent background conditions in a non-pristine area. The exact location of the reference site varies by program and test objective. (In the Ocean Dumping Program, the reference site is located in an area which is similar to conditions at the disposal site, prior to the initiation of disposal. For the 404 program, the reference site is the disposal site). For the ESAP, a site in San Pablo Bay could be used as a reference site, since based on NOAA, 1988, some sites in San Pablo Bay show lower contaminant levels than elsewhere in San Francisco Bay. However, these sites should not be considered *control* sites since all areas of San Francisco and San Pablo Bay have been subject to some amount of contamination.

If a site in San Pablo Bay is to be used as a *reference* site, we recommend moving the sampling stations to the northern side of the shipping channel and away from potential land-based contamination sources. A 1987 NOAA Technical Memorandum (NOS OMA 35) entitled "San Francisco Bay Sediment Quality Survey and Analyses" contains data from a benthic survey conducted in San Pablo Bay. This document shows that fine-grained sediments are located in the center of San Pablo Bay. These sediments would be useful as reference sediments due to their location away from potential land-based sources of contamination and their similarity to the grain size of material found at Hunter's Point.

There may also be value in testing a reference replicate from the shoreline south of Hunter's Point to approximate conditions at Hunter's Point exclusive of contamination contributed by the Hunter's Point facility. The reference locations proposed in the ESAP may be appropriate for this purpose, subject to a review of known contamination sources in those areas.

To summarize the control vs. reference issue: the ESAP can use as many reference locations as are necessary but these locations should represent "background" levels be located away from known discharges or contamination "hot spots". An appropriate control replicate must be tested for QA/QC purposes and should consist of pristine or nearly-pristine sediments and duplicate the natural conditions under which the test organisms are found.

3. Page 2-4, Section 2.3.1. The reference to Table 4 in the paragraph at the top of the page should read Table 5.
4. Page 2-4, Section 2.3.1. As discussed at the January 10, 1991 TRC meeting, the use of *E. estuarius* for the ESAP testing may be appropriate. However, the use of the amphipod *Rhepoxynius abronius* would allow comparison to previous sediment testing at Hunter's Point (for the Missouri Homeporting project); adding it as a test species would be helpful.

NOAA also recommends that the worm *Neanthes* sp., for which the endpoint of growth would provide a more sensitive measure of toxicity than *Nephtys caecoides*, be added as well to the solid phase bioassay.

5. Page 2-5, Section 2.3.3. It is crucial to use test species of the same age. Experiments at the Marine Pollution Studies Laboratory have indicated the possibility of differences in toxicant sensitivity among different aged mysids. If test species will be obtained from a commercial supplier of aquatic organisms, it is possible to receive many brood stock cultured test organisms from the same age class in juvenile form. This approach would avoid speculation on age based on size or wet weight of the organisms.

Also, to avoid underfeeding and cannibalism of *Holmesimysis costata*, test species should be fed *Artemia nauplii* in known amounts. If no *nauplii* are present in the aquarium after four hours, the amount of food should be increased slightly.

6. Page 2-5, Section 2.3.3. The 10% mortality check (20% for zooplankton) mentioned on page 2-5, should be applied to results from the control replicate as described above. This check was not intended for application to mortality occurring during the acclimation period.

7. Page 2-5, Section 2.4.1, first sentence. Will the 10 grab samples per area be located randomly in the area or in a grid pattern? The Navy should provide the proposed locations of all samples.

8. Page 2-6, Section 2.4.1. What is the approximate volume of sediment that will be collected with the Peterson grab?

9. Page 2-6, Section 2.4.1. In the discussion of the radiation measurement that appears in the middle paragraph, please clarify what level of exceedence would be deemed "above background." Also, the Data Quality Objectives, and precision and accuracy goals, of the lab analyses for radioactivity, should be presented here or in the QAPP.

10. Page 2-6, Section 2.4.1. In the next to last paragraph, please clarify the statement made in the next to last sentence that the container will be stored "until analyzed." Which analysis does this refer to? This statement implies a "rush" analysis if the samples are to be used in a test starting within 7 to 10 days of sample collection. How will the Navy ensure timely analysis of these samples?

11. Page 2-7, Section 2.4.1. The second line of the page references "Section 2.9." As there is no Section 2.9, should this be 2.7?

12. Page 2-7, Section 2.4.1. How long will the samples collected for TBT analysis be frozen before analysis?

13. Page 2-7, Section 2.4.2. As we stated in our last comment letter, it is very important that the sediment sampling indicate the contamination of surficial sediment relative to the quality of the underlying sediments. The stratified core samples are useful in providing more information on this issue but a larger number of samples from the deeper sediments will be necessary to address the question. Also, due to differences in sampling equipment, sampling location and handling, it is not advisable to attempt to compare the sediment chemistry results from the bottom 6 inches of the core samples with the composite surficial samples from the grabs. Therefore, we recommend using cores for the ten samples per area rather than the proposed grabs.

If cores are used, sediments can be composited from the tops of the 10 core stations for bioassays and chemical analyses and from the bottom of the cores for chemical analyses. The sampling areas will be evaluated on the basis of the bioassay results from the tops of the cores. The level of contamination in surficial sediments can be compared to deeper sediments using the sediment chemistry results from the top and bottom core samples. In addition, cores may be better sampling devices than grabs due to opportunities for excessive leakage and disturbance of sediments with grabs and the auxiliary information provided by cores on sediment stratification.

In order to compare results from the ESAP to previous sediment testing in the area, it is imperative that the water depth and depth of penetration of the cores be recorded during sampling and provided in the final report. Previous testing for the USS Missouri Homeporting Project showed that sediments below -44 feet were more highly contaminated than sediments above -44 feet. It will be important to evaluate which, if any, of the sediments below -44 feet are sampled as part of the ESAP. If possible, it would be useful to review bathymetric survey information from the sampling areas prior to actual sediment sampling.

14. Page 2-7, Section 2.4.2, last paragraph. Please note comment 28 concerning analytical methods and detection limits. The specific methods cited here may not be the most appropriate for this project.

15. Page 2-7, Section 2.5, and Page 2-11, Section 2.6.2.1. EPA recommends that artificial seawater be aged for 1 to 2 weeks after preparation and intensively aerated before use. In addition, prepared seawater should be passed through a properly maintained ultraviolet sterilizer or a filter effective to 0.45 μm or less. These recommendations are based upon "ASTM Proposed New Standard Guide for Conducting 10-day Static Sediment Toxicity Tests with Marine and Estuarine Amphipods."

16. Page 2-8, Section 2.6. It is very important that a laboratory with experience in conducting sediment bioassays perform the testing outlined in the ESAP. Facilities, equipment and personnel qualifications should be reviewed and approved prior to initiation of the testing.

17. Page 2-8, Section 2.6.1.1. and 2.6.1.2. We recommend using a 0.5 mm sieve any time organisms are to be removed from sediments and also for consistency.

18. Page 2-10, Section 2.6.1.6. According to the EPA/Corps of Engineers' "Draft Ecological Evaluation of Proposed Discharge of Dredged Materials into Ocean Waters, 1990," page 10-23, ammonia should also be measured since the ESAP's proposed testing follows the static renewal design.

19. Page 2-10, Section 2.6.1.9., and page 2-13, Section 2.6.2.9. Statistical procedures given in the revised ESAP are modified from the previous version of the ESAP but are still not entirely correct. For the solid phase bioassay data, if Levene's test indicates that the data are parametric, an ANOVA should be performed. If the results of the ANOVA suggest that statistically significant differences between group means exist, then the means should be tested using Dunnett's test. If Levene's test shows the data are non-parametric, a non-parametric ANOVA, the Kruskal-Wallis test, should be performed, followed by a Wilcoxon test if necessary. These procedures are given in EPA/Corps of Engineers' "Draft Ecological Evaluation of Proposed Discharge of Dredged Materials into Ocean Waters, 1990, Chapter 12. The statistical procedures described for the Liquid/Suspended Particulate Phase tests are appropriate.

20. Page 2-12, Section 2.6.2.4. The ratio of sediment to water cited here should be 1:4 not 4:1.

21. Page 2-13, Section 2.7, second paragraph. The reference to Table 5 should instead cite Table 6.

In the following paragraph, please note that EPA does not *certify* CLP laboratories. (This comment also applies to page 2-14, Section 2.8, last bullet.)

22. Page 2-14, Section 2.7. EPA continues to recommend the Rice et al., 1987 method for TBT given in the EPA/Corps of Engineers' "Draft Ecological Evaluation of Proposed Discharge of Dredged Materials into Ocean Waters, 1990. If the Rice method is not to be used, please provide us with a protocol or reference for the method to be used. We will need to review the protocol before we accept any analyses for TBT.

23. Page 3-4, Section 3.5. How long will mussels be frozen before analysis? The SMW Program holds tissues for 6 months.

24. Page 4-2, Section 4.2.1. In the list at the top of the page, please note that the drawing on Plate 5 appears to show that IR-10's drainage goes to the Area B outfall, not the Area D outfall that will be sampled at ST1. There is no sampling point for the Area B outfall.

25. Page 4-2, Section 4.2.2. Please describe how the bay water samples will be compared to the storm water samples.

26. Page 4-2, Section 4.2.3, and page 4-4, Section 4.4.3. Is this sampling point intended to be a "reference" sample or a "control" sample? Please see our comment 2 above, and clarify the intent of this section. Please also note your response to comment #34 in our original comment letter; this response seems to contradict this text.

27. Page 4-6, Section 4.7.2.2. What will the storm water runoff dilutions be? A dilution factor of 0.5 is recommended. What will the sperm and egg stock dilutions be? These cannot be based on protocol for the East Coast species, *Arabacia punctulata*, since species-specific differences in control fertilization depend upon sperm:egg ratios. Refer to the following reference for details on *Strongylocentrotus purpuratus* and *Dendraster excentricus* fertilization tests:

Dinnel, P., J. Link, and Q. Stober. 1987. Improved methodology for a sea urchin sperm cell bioassay for marine waters. Arch. Environ. Contam. Toxicol. 16: 23-32.

28. Table 6. The approximate quantitation limits for the inorganics in Table 6 should be reported in mg/kg as discussed on pg. 4, Response to NOAA Comments on Draft ESAP.

Many of the detection limits and methods in Table 6 differ from those recommended for sediment testing under EPA's Ocean Dumping Program. A list used by the Ocean Dumping Program is attached for your reference. We acknowledge that the different objectives of the dredged material testing program and the ESAP may result in different acceptable detection limits and methodology. As other Agencies have noted, however, adherence to methods normally used for evaluating human health risks at Superfund sites may not be appropriate for this ecological assessment.

NOAA has noted that the CLP detection limits are based on the drinking water MCLs, which may be higher than certain chronic ambient water quality criteria (AWQC) established for the protection of aquatic life. As noted in NOAA's previous comments (see Response to NOAA Comments, pages 3-4), lower detection limits should be achieved to adequately assess potential impacts on aquatic organisms.

RESPONSE TO EPA COMMENTS

29. Comment #5. We still question the logic of assessing the effects of acute toxicity only from sediments and the effects of bioaccumulation of contaminants only from water column (mussel) bioassays. Bioaccumulation could be an important adverse environmental effect from sediments as well. Sediment chemistry testing could be completed before starting the bioaccumulation testing, to avoid scanning for bioaccumulated contaminants which are not present in the sediment. In this way, analytical costs can be minimized by testing tissues for only those contaminants showing sediment chemistry levels high enough for bioaccumulation potential.

We suggest 28-day sediment bioaccumulation testing be strongly considered as a follow-up procedure to the sediment chemistry testing should elevated levels of contaminants be observed. Such follow-up should be addressed in the Ecological Assessment workplan the Navy is to develop.

30. **Comment #16.** The response indicates that the DO level will be maintained at a minimum of 5 ppm. Pages 2-8 and 2-9, however, state that "Dissolved oxygen will be maintained above 4 ppm." These statements should be changed to reflect the response in Appendix A.

31. **Comment #19.** See comment 19 above concerning statistical methods. Also note that any additional statistical analyses used need to be approved by the regulatory agencies in advance.

32. **Comment #26.** The response describes what the two programs objectives are and not how the analysis data will be compared. The answer implies that no comparison is possible due to the significantly different set of objectives. If this is a valid assumption, a statement in the ESAP should indicate that no baseline data exists for comparative purposes.

RESPONSE TO NOAA COMMENTS

33. **Page 3.** NOAA has commented on the response at the top of page 3 as follows:

The (Draft Final) ESAP holds fast to the notion expressed in the draft "Green Book" that differences between control and test survival should be equal to or greater than 10% before predictions of probable field impacts can be made. While a 10% difference is a good generality for a true difference between test results, there may be times when a significant statistical difference which is less than 10% is true and it is important to observe those times.

IV. PHYSICAL AND CHEMICAL ANALYSES

Sediment physical and chemical tests shall include analysis of the following parameters using the EPA test methods and method detection limits listed. All data shall be reported in dry weight unless otherwise specified. If the site has been contaminated or is suspected of being contaminated, then the suspected contaminants shall be added to the list of chemicals of concern. Strict adherence to the EPA test methods and detection limits defined in this section must be maintained. Any proposed variation from the required procedures shall be approved in writing by EPA Region IX and the Corps' Los Angeles District before the test protocols are changed.

A. Sediment Physical Analysis.

TEST PARAMETER	EPA TEST METHOD	DETECTION LIMIT
1. Grain Size Analysis	Plumb, 1981	% size range phi and mm
2. Total Solids/Water Content	Plumb, 1981	1.0% solids
3. Specific Gravity	Plumb, 1981	0.01 mg/L

B. Sediment Chemical Analysis.

TEST PARAMETER	EPA TEST METHOD	DETECTION LIMIT
1. Metals		
a. Cadmium	7130, 7131	0.1 mg/kg
b. Chromium	7190, 7191	0.1 mg/kg
c. Copper	7210	0.1 mg/kg
d. Lead	7420, 7421	0.1 mg/kg
e. Mercury	7471	0.02 mg/kg
f. Nickel	7520	0.1 mg/kg
g. Selenium	7740, 7741	0.1 mg/kg
g. Silver	7760	0.1 mg/kg
h. Zinc	7950	0.1 mg/kg

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TEST PARAMETER (continued)	EPA TEST METHOD	DETECTION LIMIT
2. Nonmetals		
a. Ammonia	Plumb, 1981	0.1 mg/kg
b. Arsenic	7060, 7061	0.1 mg/kg
c. Sulfides, Acid Volatile	Plumb, 1981	0.1 mg/kg
d. Sulfides, Total	Plumb, 1981	0.1 mg/kg
3. Pesticides		
a. Total Pesticides	8080	30.0 µg/kg
b. Aldrin	8080	20.0 µg/kg
c. Chlordane and Derivatives	8080	25.0 µg/kg
d. Dieldrin	8080	20.0 µg/kg
e. DDT and Derivatives	8080	20.0 µg/kg
f. Endosulfan and Derivatives	8080	25.0 µg/kg
g. Endrin and Derivatives	8080	20.0 µg/kg
h. Heptachlor and Derivatives	8080	20.0 µg/kg
i. Hexachlorocyclohexane and Derivatives	8080	20.0 µg/kg
j. Toxaphene	8080	30.0 µg/kg
4. Organic Compounds		
a. Oil and Grease	413.2	1.0 mg/kg (wet weight)
b. Organic Carbon, Total	9060	0.1%
c. Organotin Compounds	Discuss with EPA	1.0 µg/kg
1) Monobutyltin		
2) Dibutyltin		
3) Tributyltin		

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TEST PARAMETER (continued)	EPA TEST METHOD	DETECTION LIMIT
4. Organic Compounds		
d. Petroleum Hydrocarbons, Total	418.1	1.0 mg/kg
e. Phenols and Substituted Phenols Total	8040	20.0-100.0 µg/kg
f. Phthalated Esters Total	8060	10.0 µg/kg
g. Polychlorinated Biphenyls (PCBs)	8080	10.0 µg/kg
1) Total of All PCBs		
2) PCB Aroclors 1242, 1254, and 1260		
h. Polynuclear Aromatic Hydrocarbons (PAHs)	8100, 8250, 8270	20.0 µg/kg
1) Total of All PAHs		
2) Acenaphthene		
3) Acenaphthylene		
4) Anthracene		
5) Benzo(a)anthracene		
6) Benzo(a,e)pyrene		
7) Benzo(g,h,i)perylene		
8) Benzo(k)fluoranthene		
9) Benzo(b)fluoranthene		
10) Chrysene		
11) Dibenzo(a,h)anthracene		
12) Fluoranthene		
13) Fluorene		
14) Indeno(1,2,3,-c,d)pyrene		
15) Naphthalene		
16) Phenanthrene		
17) Pyrene		

ATTACHMENT 2
COMMENTS ON THE QUALITY ASSURANCE
PROJECT PLAN FOR THE ENVIRONMENTAL
SAMPLING AND ANALYSIS PLAN

COMMENTS ON DRAFT FINAL ENVIRONMENTAL
SAMPLING AND ANALYSIS AND QUALITY
ASSURANCE PROJECT PLAN

DATED 17 MAY 1991

COMMENTS ON QUALITY ASSURANCE PROJECT PLAN FOR ENVIRONMENTAL
SAMPLING AND ANALYSIS AT HUNTERS POINT ANNEX

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1. Minor elements suggested by Guidance documents, but not included in this QAPP include: 1) An approval line for the Navy and for EPA on the Title Page, 2) Lists of Tables, Figures, and Appendices in the Table of Contents.
2. Page 3, Section 4.1: The Organization Chart and listing does not indicate to whom the ATT Program Manager is responsible. Does ATT report directly to the Navy in the person of Richard Powell? Also, there is no indication that the Environmental Sampling and Analysis Plan (ESAP) and the report(s) resulting from ESAP activities are subject to review by EPA and State agencies.
3. Page 6, Section 6.1, paragraph 1: This paragraph describes how the samples will be collected and screened for radioactivity. The last sentence states that the samples will be discarded if they are low in volume or contain visible foreign objects. Where will the samples be discarded? Will they be disposed of overboard? Will the boat be moved off station to prevent further contamination of other samples to be collected at the station? Is there a size limit to the foreign objects below which they will not be removed? What constitutes a foreign object--a piece of wood?
4. Page 6, Section 6.1, paragraph 3: This paragraph describes the compositing procedure. It does not clarify if the compositing will be done in the field or in the laboratory as the previous paragraph indicates discrete samples will be collected and sealed.
5. Page 6, Section 6.1, paragraph 4, sentence 2: This sentence suggests that subsamples for analysis of physical and chemical parameters will be removed from the composited sediment grab samples. Then the "completely filled" 10-liter container will be sealed and labeled. How is it possible to remove a portion of the composited sample and still have a full container? If two subsamples (volume not specified) are taken from the 10 liter container, how will that original 10 liter sample for bioassays be "completely filled"? Will new sediment be added to the container to replace the subsample volume removed?
6. Page 6, Section 6.1, paragraph 5: The size of containers and, therefore, the volume of samples for

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analysis of physical parameters and for chemical parameters is not stated. In the ESAP, Section 2.4.1, page 2-6, materials listed as needed for sample collection and storage include wide-mouth glass jars of minimum 100 ml volume for samples to be analyzed for SOCs and pesticides/PCBs, and wide-mouth polyethylene jars of minimum 100 ml volume for samples to be analyzed for metals and tributyltin. The list does not include a container for samples to be analyzed for physical parameters. Grain size analysis often requires a sample volume on the order of 1 liter.

7. Page 7, Section 6.2, paragraph 1, last sentence : As Sediment cores will be collected as discrete samples, reference to "non-composited samples" has no relevance.
8. Page 8, Section 7.0, paragraph 3: Mussel deployment for the dry weather test should be during August/September. If "normal" weather conditions return to California, April could be the end of the wet season.
9. Page 8, Section 7.0, paragraph 5: This paragraph describes radiation screening techniques. The last sentence states that additional samples will be collected if radioactivity levels are above background levels. Where will these additional samples be collected since the first sentence states that "all mussel tissue samples will be tested for radioactivity"? If all samples have already been collected how will the data be compared from the "additional samples" and the original samples? This information is different from page 12 of this QAPP which states that "if the radioactivity screen results in counts greater than background, samples will be tested in the laboratory". It is preferable that the screened samples be retained and sent to a certified laboratory rather than collecting additional samples of an unknown nature. Resolution of the sampling technique for radioactivity is needed to clarify differences between page 8 and page 12. Techniques on page 8 seem to indicate a field methodology while those techniques on page 12 seem to indicate field preparation of samples for laboratory analysis.
10. Page 9, Section 8.0, paragraph 1: There is no reference to how or when storm water runoff samples will be collected for chemical analysis and, therefore, no description of quality assurance procedures related to collecting these samples.
11. Page 9, Section 10.1: This section described equipment decontamination procedures. For sampling devices deployed

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from boats, will decontamination be conducted on the boat? Depending on the size of the boat, this may be a precarious activity.

12. Page 11, Section 11.5: This section describes quality assurance procedures related to sample handling and storage. However, only handling procedures up to the point of analysis are described. As samples are to be retained pending analytical results (Section 10.2), what procedures will be used to preserve and minimize contamination of samples following analysis and prior to disposal?
13. Page 11, Section 11.5, paragraphs 1 and 4: See comments 5 and 6 concerning inadequate information on source and volume of samples for analysis of physical and chemical parameters. Reference to Table 2 provides information on the weight of sample required for analysis for parameters other than grain size. The size of containers required is not specified.
14. Page 12, Section 11.5, paragraphs 2 and 3: See comment 9 concerning conflicts between this section and Section 8 for activities related to radiation screening and laboratory analysis for radiation in mussel tissue.
15. Page 12, Section 11.5, paragraph 4, last sentence: This sentence says that storm water will be analyzed for chemical parameters as does Table 3 of the ESAP. However, no reference is provided in the QAPP or in Section 4.0 of the ESAP as to how and when storm water samples for chemical analysis will be collected.
16. Page 13, Section 13.0, paragraph 4: Analytical method for grain size analysis is not presented in Table 3.
17. Page 14, Section 14.3: It is not clear whether the results of data validation will be presented as a report addressing achievement of data quality objectives or whether the results of data validation will be presented only in the form of tabulated data. A discussion of the results of data validation is appropriate. Also, the QA report described in Section 15.2 does not qualify as a data validation report.
18. Page 14, Section 15.1: This section describes field QC checks for the water sampling program only. A field check for the sediment program (one-third of entire testing program) is needed. Some or all of the following techniques should be utilized in a sediment QC program. These

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techniques involve use of external spikes which can assess the accuracy of data generated by the analytical systems and procedures. Three types of external spikes have been used in previous field collection of sediment samples for chemical metal analysis: spiked field samples, spiked blanks, and a Standard Reference Material (SRM) obtained from the National Bureau of Standards (NBS). The Central Valley Regional Water Quality Control Board staff has prepared spiked field samples and spiked blanks.

19. Page 14, Section 15.1, paragraph 3: There is no explanation as to why field duplicates of sediment samples will not be collected. In particular, if samples are composited in the field, there is a ready opportunity to prepare duplicates from the composite which should be of consistent content.
20. Page 15, Section 17.1: Radiation meters and other field parameter measurement equipment should be tested and calibrated as well as inspected prior to each use.
21. Table 2: As described in footnote a, extra sample volume will be required to assure that sufficient amounts are available for laboratory analysis and for laboratory QC samples. The minimum size of sample containers to accommodate analysis of multiple parameters and laboratory QC should be stated.
22. Table 4: Does the column "Reporting Limit" indicate the levels to which the laboratory equipment can detect or is this the level to which the samples will be tested?