UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

August 5, 1994

Naval Station Long Beach
Bldg 1, Code N46.2
Long Beach CA 90822-5000
Attn. David Pease

Subject: Draft Technical Memorandum #5 Fish Sampling and Analysis Plan for Naval Station Long Beach (CTO 026) and July 15, 1994 Meeting Minutes

Dear Mr. Pease:

Enclosed please find the Environmental Protection Agency's (EPA's) comments regarding the Draft Technical Memorandum #5 Fish Sampling and Analysis Plan (SAP) received on July 21, 1994 and the July 15, 1994 Meeting Minutes. The July 15, 1994 meeting discussed revisions to the Fish SAP dated January 30, 1994 as proposed in Technical Memorandum (Tech Memo) #5. At the Navy's request we have accelerated our review of Tech Memo #5 to meet the proposed field schedule. However, as we are not in agreement with several aspects of this study, we can not provide a letter of acceptance, as requested, until the comments provided in the attachment are sufficiently resolved.

Previously, EPA provided comments and guidance in our January 14 and 31, 1994 letters regarding the Fish SAP and Risk Assessment (RA) Work Plan. In the February 10, 1994 response to EPA's comments, the Navy indicated that several of our comments regarding water column sampling and fish tissue analysis were not incorporated into the Fish SAP and RA Work Plan because of conflicts with the Clean I Work Plan. In our April 5, 1994 letter we suggested the Navy propose a method for addressing the outstanding issues related to the ecological assessment. Tech Memo #5 proposes revisions to the Fish SAP to include collection and analysis of fish tissue to determine concentrations of contaminates in fish tissue which could be hazardous to human and ecological receptors.

As part of our review of Tech Memo #5, we also reviewed Tech Memo #4 and the RA Work Plan for consistency as these documents all implement investigation of CTO 026. While EPA is encouraged that the Navy has prepared this technical memorandum to address the increased focus on the ecological portion of the investigation, we would like to stress that the investigation for CTO 026 should follow EPA's framework documents for ecological risk assessments. EPA's contention is that the objective of the study should be protection of humans health and the environment (i.e. birds and mammals that live and forage within the harbor). As the Work Plans are currently scoped, they will not achieve this objective. In addition, we are concerned that the Navy has indicated that investigation of the Harbor is planned in phases with this initial phase being a screening level assessment that may or may not "trigger" further ecological investigation. We do not believe that the current plan has appropriate "triggers" to make that determination.

EPA, NOAA and the State have all provided comments and guidance to the Navy regarding the Ecological Investigation of CTO 026. Therefore, we suggest the NAVY re-examine the Work Plans and Technical Memorandum to determine the best over-all strategy for the ecological investigation avoiding multiple phases of investigation, therefore expediting investigation of CTO 026. This is especially important with respect to potential reuse of the Mole and Harbor.

EPA, DTSC and the NAVY Project Managers discussed the Fish SAP in a conference call on August 5, 1994. As discussed in the conference call, EPA is concerned that this study will only address the question as to whether or not fish within the Harbor, as a whole, contain elevated levels of contaminants in tissue compared to fish from outside the Harbor. This will not allow for correlation between the concentrations of contaminates detected in the fish tissue and Harbor sediments. As we anticipate the sediments to be the most significant source of contamination and the goal is remediation of the sediments, if required, it would seem more appropriate to collect the fish tissue data with the intention of correlating this data with the sediment and bioassay data collected within the Harbor.

While there are numerous comments regarding the investigation of CTO 026, we hope that our comments will provide a perspective which the Navy finds valuable as it looks to revise Tech Memo #5 and the RA Work Plan to be submitted at a later date. As it appears that the ecological issues associated with CTO 026 will require additional resolution, we would like to discuss options with the Navy to determine the best way to move forward with the investigation of CTO 026, avoiding future delays to clean up at

the site, while addressing all of the concerns put forth by the agencies.

If you have any questions or comments regarding this letter, please contact me at (415) 744-2410.

Sincerely,

Sheryl Lauth

Sheryl Lauth
Remedial Project Manager

Attachments

cc: Alan Lee, Southwest Division
Alvaro Gutierrez, DTSC
Mike Radecki, Southwest Division
Clarance Callahan, USEPA
Krish Kapur, Bechtel

COMMENTS REGARDING THE JULY 15, 1994 MEETING MINUTES

We are providing these comments based on our assessment of discussions held at the meeting.

Item 1. The change in plans by the Navy to address the ecological concerns in sampling fish is a welcome change. We support any logical and well thought out effort that will provide useful data for the ecological impact assessment of the harbor environment. Although when first reviewing the SAP, we encouraged the Navy to use the opportunity to address potential ecological impact at the same time human health was being examined, we would maintain that the effort must be well thought out with expectations for meeting the needs of the overall ecological risk assessment. We do not have confidence that the SAP, as written, will accomplish this goal.

Item 2. The purpose of the meeting minutes is defined as to "..obtain concurrence from the Agencies on key elements of the SAP." we do not believe that the species proposed by the Navy are the most appropriate. As stated at that meeting by Dr Callahan the Navy has not defined the reason for proposing this effort except a general statement that the Navy wants "to address both human health and ecological risks."

Item 3. The "key guidance" cited by Allan Chartrand essentially relates to human health assessment rather than ecological impact assessment. The objective of the SAP is to "address human health and ecological concerns", however, as presented, what is being assessed and how the measurement will relate to water or sediment concentrations that are believed to be the "problem" at the site are not clearly defined. Denise Klimas (Item 4.) made one of the most direct statements of purpose in stating that the fish species "must have direct links to contamination."

Item 5. As noted, the rubber-lipped surfperch is not a recommended species by EPA/Cal EPA. Allan Chartrand states, "It will be used unless someone objects." Dr. Callahan did not agree with the selection of the rubberlipped surfperch as an ecological species.

Item 6. The sediment is expected to be the source of the problem, therefore the effort should use a species that will be directly related to the pathway for ecological assessment (see Item 4.) and another species that relates to the human health assessment. We believe that Mike Radecki's statement is very helpful in suggesting that the best species should be selected, which is supported by Cynda Maxon's statement that proposed techniques will permit the collection of several species. We would add that the species finally chosen should relate to what we are trying to protect i.e., the assessment endpoint.

Item 8. Sampling of filets and whole body contaminants recognizes the range of uses of the fish caught from the harbor. During this discussion, EPA raised the question of "What is being protected?" "How will the measurements be evaluated?" We do not understand the statement, "Effects would largely be assumed based on literature values;no site-specific toxicity testing is planned."

EPA actually stated that the concentrations must be related to effects that must in turn be related to a concentration gradient.

Item 9. It's not clear how "statistical comparisons with reference stations concentration" will be used and what will a significant difference between the reference station and the harbor station mean?

Item 10. At some point in the discussion EPA did state that if the COCs are being measured in fish, then this measurement must be related to the sediment or water column concentrations to be interpreted as the fish concentration having a potential direct relationship to the contaminant levels in the harbor that might be potentially related to the potential activities of the Navy. Any measurements that are made that have no potential meaning to the COCs of the site is meaningless and without reason. "What is the meaning of the statement, "It is not appropriate to clean up a site if elevated concentrations in fish are identified?"

Although Chris Leadon believes (as does Bill Fisher) that the SAP 'as is' is ok for addressing human health, we do not think that it is ok for addressing ecological impact. We do not agree with the statement that "we select the most appropriate species based on what we currently know, and try to determine the potential for ecological risk." We want to emphasize that someone who knows something about the fishery in the area must be contacted to get the best information available rather than the best that we know.

We would agree with Mike Radecki that based on what has been presented, we would question proceeding with any effort to use fish for any kind of ecological impact assessment. The SAP is inadequate to complete this task. We would maintain however, that there may be a need to evaluate the impact to fish, but within the context of the overall risk assessment, the decision tree (tech memo #4) should be finalized and followed to complete the process.

The statement attributed to Dr. Callahan in the third paragraph needs some clarification. Dr. Callahan pointed out that using the approach as presented can only determine at best a "yes" or "no" answer to the question "Are the concentrations measured in the fish from the harbor significantly different than the concentrations measured in the fish outside the harbor?" There will be no way from the experimental design presented to

determine the relationship between the concentrations of contaminants in specific areas of the harbor to concentrations in the fish that are sampled for this effort. Therefore, if the Navy demonstrates that there is a significant difference between the concentrations in fish collected from the harbor compared to fish collected outside the harbor, they then must determine where in the harbor is the problem. Dr. Callahan disagrees with the Navy's suggestion that they might go directly to "expedited remedial action" without performing any further sampling to fully evaluate the options for remedial design. The Navy will surely discover that sampling to delineate the extent of cleanup is less expensive than remediating the entire harbor. The last sentence actually is most accurate of what was stated by Dr. Callahan, that a "no hit" in the fish concentration comparison i.e., non significance between the concentration of the contaminants in fish in the harbor compared to concentrations in the fish for those outside the harbor **only** means that there is potentially no problem with potential food chain impacts in the harbor as compared to the areas outside the harbor from the potential activities of the Navy.

We did not give the Navy "a green light" with respect to the selection of species for addressing ecological issues.

COMMENTS REGARDING TECHNICAL MEMORANDUM #5:

1. There are several documents that involve ecological components (the original RI/FS Work Plan, the Final Risk Assessment Work Plan, Technical Memorandum #4, the Fish Sampling and Analysis Plan and Technical Memorandum #5), therefore, there must be consistency between the documents. How does this effort fit into the decision tree that was presented in Tech Memo 4? Is this effort being substituted for the "water column" evaluation as shown in Tech Memo 4? The fish SAP appears to be addressing the task of the "water column effects" from Figure 1 in Tech Memo 4 which is before the sediment bioassays and the sediment chemistry is available. We suggest adding a brief discussion into this document indicating the relationship between the document and stating how the changes to the Fish Sampling and Analysis plan will effect the other documents and how these data will be incorporated into the other plans.

2. While we are encouraged by the Navy's effort to address the potential impact to ecological receptors, we want to stress that this effort does not constitute an ecological risk assessment. As we have commented in previous submittals (January 14, 1994 and April 5, 1994 letters from EPA), there are four basis elements of the ecological risk assessment process (Problem Formulation, Exposure, Ecological Effects and Risk Characterization) that need to be included in the assessment.

3. The Navy has not demonstrated an understanding of the process

for ecological assessment as the fish SAP does not include the primary elements of the process. For instance, the Navy has not presented a clear statement for the purpose of the fish SAP other than the general statement, "...focused on a greater emphasis on evaluating potential ecological risk" or "...is intended to address human health and ecological concerns..." As provided in literature given to the Navy and discussions with Bechtel, a risk assessment must identify those items of value i.e., the assessment endpoint and the quantitative tools or measurement endpoints that are used to determine the level of impact. The incorporation of these two pieces of information along with the COCs and receptors, the general process of "ecological risk" becomes one of "measuring impact to site specific receptors."

4. The Navy has selected fish with relatively small home ranges to address the concern that the fish species within the harbor are mobile. Therefore, we suggest that the tissue concentration data should be used in conjunction with the sediment chemistry and bioassay data to develop cleanup criteria and identify areas of concern within the harbor. If significant differences are detected between the harbor and reference sites, the conclusion should be that Naval activities are a source of the contamination.

5. The Navy states that, the concentrations of contaminants in the fish bile and tissue cannot be related to areas of the harbor where sediment samples will be taken. We do not believe that the fish SAP as described can produce data that can be used to answer the question, "...have the contaminants of potential concern (COPCs) potentially associated with Naval activities could have contributed to potentially elevated levels of contaminants in fish tissue which, in turn, could contribute to hazards to human health or the environment?" This is stated as the "intent" of the effort when the Navy on page 5 states that, "... it is not the intent of this SAP to use information on tissue residues to derive cleanup criteria or identify areas within the Harbor (sic) of potential concern." Yet in the very next sentence, the experimental design becomes even more confusing and contradictory in the statement, "The intent is rather to compare information relating to the sediments themselves, which will be used to delineate areas of potential concern and derive cleanup criteria, with tissue concentrations and other data."

6. The certainty of which COPCs could have been contributed by Naval activities and the specific areas of contamination can be found in documentation that direct discharge of contaminates to sediment via storm drains and other sources has occurred at the facility (IAS, 1983). In addition, the RI/FS will provide sediment, soil and groundwater data to determine the COPCs and the nature and extent of the potential source areas. However, EPA suggests that to prove the "contribution of contaminates"

resulting from Naval activities can not be determined without a direct comparison to the sediments.

7. The data analyses for comparing the bile and tissue concentrations is not clear and the approach described will not be sufficient to determine "...whether the contaminants of potential concern (COPCs) potentially associated with Naval activities could have contributed to potentially elevated levels of contaminants in fish tissue which, in turn, could contribute to hazards to human health or the environment." The sampling of fish in the harbor must be at a level to tie the tissue levels to certain areas of the harbor otherwise the effort is lost. This will be very species specific because of life history characteristics. Because the choice of species for assessment of ecological impact is very important to the success of the effort, the Navy must solicit the input from fishery experts who know the harbor area and species relationships that are important to the process. Who might be available from Moss Landing, Long Beach State, etc.?

9. As discussed by EPA at the July 15, 1994 meeting, the assessment and measurement endpoints must be recognized and incorporated into the sampling and analysis effort in the harbor otherwise the fish sampling effort will be wasted. We would suggest that because of the potential problems with the sediments, a bottom feeder should be used to evaluate the movement of COCs from the sediment into food items and then into the fish feeding on sediment organisms. What are the assessment endpoints being addressed by the fish sampling effort?

10. Based on the statement made by the Navy and supported by their consultant, Allan Chartrand during the July 15, 1994 meeting, the Navy would like to sample fish during the only sampling "window" in August. We would caution against sampling fish just because there is an opportunity i.e., "the boat will be out there" as this suggests that the Navy is sampling fish because of the opportunity, rather than addressing a purpose in a well thought out plan.

11. The "key guidance" document is essentially a human health document and provides little if any ecological assessment guidance and certainly there is no clear connection between the document and the ecological assessment as described thus far.

COMMENTS REGARDING TECHNICAL MEMORANDUM #4

Because Technical Memorandum #4 is an integral part of the whole discussion and should be integrated with the fish SAP (Technical Memorandum No. 5) we have provided comments as follows. We have tried to limit our comments to those aspects of Tech Memo #4 that should be clarified based on the Tech Memo #5 and those comments previously provided by EPA that have yet to be adequately

addressed (i.e. May 18, 1994 letter).

1. The triggers for further characterization of CTO 026 (Table 1) must include the fish tissue data. This should also be incorporated into Figure 1. When examining Table 1, the "trigger status" box should be clarified as to what will be done in the next phase for instance, there are really only four possibilities (recognizing another possibility as described below as line 8 that was not included by the Navy) that include:

a) No Further Investigation (NFI) which is only line 5;
b) Water Column Studies (WCS) which are indicated by lines 1,3 and 4;
c) Further Studies (FS) which includes lines 2,6 and 7; and
d) Control-reference Site problems.

Now line 8 which is missing is a special case as there is another possible outcome for the table that could prove to be significant in interpreting these data. If the sediment chemistry indicates non significant levels as we would expect at reference or control sites, but the bioassay and the bioaccumulation tests show a hit, there are at least two interpretations. First, there might be insufficient sediment samples to demonstrate a significant difference i.e., the within variance is greater than the among variance in the analysis of variance test (ANOVA); and secondly, there could be potential water column effects at this location and therefore water column tests must be performed.

By way of explanation, the NFI locations are determined to be non significant because the chemistry results when compared to the reference area by a statistical test, as yet undefined.

2. Page 9, Section 2.1.2 The delineation of areas used for "Triggering" of additional analysis appears to be reasonable and logical if these areas can be described in terms of levels of contaminants present that can be compared to the response to the proposed testing. This is apparently the "plan" as stated in this paragraph, "The utility of this designation is that "triggers" are activated only within that specific area of concern rather than systematically throughout the site. Not designating such areas would seem to suggest that any "hit" would potentially trigger analysis throughout the entire Harbor." This "lack of designation" is in fact what is suggested in the fish SAP, for which the Navy stated (p10) Section 2.1.4, "...is that fish are mobile and as such cannot be correlated to specific sediment locations, or even sediments in general." The Navy further states, "...a separate tract is that not every area within the Harbor will be sampled and analyzed for fish tissue, and as such, it is inappropriate to build additional data "triggers" into these results." The inability to tie fish tissue sampling to the sediment contaminant levels is a serious flaw in the experimental design. In the same and the next paragraph, the

Navy states that fish tissue for ecological impact assessment would follow "...evidence of bioaccumulation in human-consumed fish tissue, mussel tissue (in-situ test), and clam tissue (laboratory test)..." which is not what we heard about the changes proposed in Technical Memorandum No. 5. Any trigger based on human health results for the evaluation of the potential impact to ecological resources in incorrect and unacceptable. These many inconsistencies throughout the documents must be rectified.

SUPPLEMENTAL COMMENTS

The following comments are being provided based on Dr. Callahans re-review of Tech Memo #4 in conjunction with Tech #5. As these comments were not specifically provided previously, they do not require revision of Tech Memo #4. We are, however, providing these comments as guidance to the Navy with respect to the interpretation of the data collected during implementation of Tech Memo #4.

1. Page 11, Preparation of tissue samples. We do not agree with the statement, "EPA has not yet issued specific guidance regarding holding times and extraction methodologies (sic) for tissue samples to be analyzed for semivolatile organic compounds (SVOCs)." The implication is that the only source of methods is less than adequate, therefore the Navy will use "specific standard operating procedures (SOPs) which are consistent with other federal programs..." What is "the contracted analytical laboratory?"

There are a number of agency documents with adequate information including:

1) EPA, 1993. Guidance Manual. Bedded Sediment Bioaccumulation Tests. EPA/600/R-93/183. Office of Research and Development, Washington, D.C. 20460. See Chapter XI, pp114-122.

2) EPA, 1992. Sediment Classification Methods Compendium. EPA 823-R-92-006. Office of Water.Washington, D.C. 20460. See Chapter 7, pp7-1 - 7-10.

Both of these publications have many cited publications that provide techniques regardless of whether or not they are "agency" documents.

The appropriate protocol for the *Macoma nasuta* is the EPA, 1993 (Lee et. al) document cited above. The statement about depuration being "required" raises again the need for defining what is the purpose for these tests as the Navy appears to be confused. Because the purpose of these tests is to determine the uptake of contaminants with respect to potential food chain

impact, then the gut should not be purged. See EPA, 1993 (Lee et al p109), "There are certain situations when gut purging may introduce greater error than leaving the gut sediment...(if) the primary focus is to determine the trophic transport of pollutants." The EPA guidance material in EPA, 1993 (Lee et al, p25) states, "...we recommend a minimum of eight replicates as the "default" number of replicates to provide a statistical power of 95%. In some cases, when variability is low or less power is required, as few as five replicates can be used, though five should be an absolute minimum."

This raises another important point, that of experimental design, which apparently has not been well defined. For instance, nowhere in the proposal is any statement that can be called a null hypothesis or any definite "testable" statement. There may be some serious problems with data analysis without replication at the stations in the harbor. Questions that need to be answered include: What exactly will be compared when chemical concentration data are collected from the individual location samples and the bioassay tests? From p12 of TM-4, the Navy states, "...no true replication for site stations is proposed for the program." Is this design as presented flawed by the lack of replications e.g., see EPA (1993) p27 on pseudoreplication problems. Although there are many textbooks available, neither the Duncan 1955 nor the Dunnett 1955 citations are in the references.

2. Page 13, Section 2.1.6. Overview of Data Use. This material presents some confusing and maybe contradictory statements, for instance the opening paragraph states, "This implementation plan is not intended as a risk assessment work plan and as such does not purpose to include a detailed discussion on how data collected in the field would be interpreted in the RI and baseline risk assessment." Compare this statement to p1, under "Key issues..." "1) "...and includes a discussion on how results fit into the overall baseline risk assessment and RI/FS program." Also, the summary statement on p14 states, "...data from the reference stations, collected as specified in Section 2.9, are important to the overall program because they are intended to provide a benchmark against which test data may be compared. Figures 1 and 2 provide a schematic representation of how data would be used and interpreted to support the baseline risk assessment." All of the proposed effort should have direct relevance to an evaluation of ecological impact as well as potential use in the RI.

3. Page 14 2.2. Defining Potential Water Column Toxicity. Again, from Table 1 the lines that triggered a water column test effort are lines 1,3 and 4 which all had at least one hit in one of the bioassays which strongly suggests a "problem" with sediments when the water column test results are positive. We disagree with Figure 5 in suggesting that with this pathway, the sediments can

be "clean" after showing a hit in sediment chemistry (lines 1,3) or a hit in sediment bioassay (line 4). We agree, however, that there may be land based sources or groundwater sources that can result in water column impacts that are best evaluated by well placed samples.

Also, from Figure 5, when the water column test is negative, the proposed indication of "No further characterization of water column" is contradictory to the fish SAP, how will these various test results be integrated?

4. Page 15, Benthic Community Analysis. Although we believe that community analyses can be very useful in evaluation of potential impacts, the proposed strategy is inadequate because the trigger to perform the analysis is a positive hit from one of the bioassays. This eliminates an important segment of necessary data and will bias the interpretation if it is possible at all. Those data from stations without positive bioassay hits are necessary to evaluate the entire range of responses rather than only those with contaminant hits. Essentially those sites not evaluated under the present strategy are those that might be considered the "control" or "reference" certainly the "low" end of the gradient. Fortunately, all sediment samples will have benthic samples collected so that the full range of responses are possible.

Some questions that need to be answered include: What is the lowest practical taxon? Is abundance counts of individuals? What diversity indices is proposed? What are the "other" indices suggested? How will the range of toxicity observed in the bioassays "be carefully correlated with the benthic community analysis?" We would suggest that the United Heckathorn results be used for guidance (Ecological Risk Assessment of the Marine Sediments at the United Heckathorn Superfund Site, EPA 1994).

5. Page 17, Section 2.3.1. Benthic Community Analysis Performance Criteria. (The chapter in EPA (1992) provides good background information.

This is one of the areas that will be most difficult to interpret. There are several areas that need to be rectified before the data are presented for interpretation. For instance, the first bullet is contradictory to the sample analysis statements listed on page 16; how can samples be compared qualitatively after producing metrics such as abundance, diversity, species richness, and other indices? I would request that lists be produced to show the opportunistic species, the major taxonomic groups and an explanation of "qualitative comparative approaches."

The second bullet defining the "gradient approach" will not be successful without the responses from the low end of the

gradient. The third bullet suggesting the use of an "indicator species" is actually contradictory to the "community" analysis. The community approach takes advantage of the larger interactive responses of many "indicator" species rather than the emphasis of "single" species.

6. Page 18, The assessment of "performance" of community analyses by qualitative means is suggested in one paragraph and yet in the next, numerical comparisons of major taxa, and a "statistical difference in test vs. reference." What major taxa will be compared? What "numerical guidelines" will be "associated with sediment contamination?"

We would remind the Navy that general guidance for bioaccumulation tests should come from EPA, 1993 (Lee et al) as well as the applicable state protocols. In general, the "Green Book" protocols are directed at ocean disposal questions not the specific assessment of bioaccumulation from sediment samples.

7. Page 28, Sediment particle size distribution must be shown as cumulative distributions of the Wentworth scale on the X axis and percent of total frequency on the Y axis which will permit the derivation of the median size for each sample.