



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION IX  
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**MEMORANDUM**

Subject: Region 9 Response to CSTAG Recommendations on the Pearl Harbor Naval Complex Site

From: Lewis Mitani, Remedial Project Manager /s/ *Lewis Mitani*  
Region 9

To: Stephen J. Ellis and Leah Evison Co-Chairs,  
Contaminated Sediments Technical Advisory Group (CSTAG)

Date: 8 September 2005

This memorandum is in response to the CSTAG Recommendations on the Pearl Harbor Naval Complex Site, July 15, 2005. For each CSTAG comment or recommendation the Region's response is listed below.

**Principle #1 Control Sources Early**

- Based on the information presented at the meeting, it appears that much of the information about on-going sources of contamination is qualitative. In order to evaluate in the FS what source control work must be undertaken to protect the harbor and any remedial action, attempt to quantify contaminant inputs, especially: 1) metals and pesticides from upgradient point and non-point sources including mass loadings of sediment contaminants, and flows from the tributaries and direct runoff into the harbor, 2) groundwater contaminate fluxes into the harbor, and 3) PCB inputs from former transformer sites and other sources, with special attention to transport pathways such as adjacent storm drains.

**Region 9 Response to Comment**

The Pearl Harbor Sediment Team will identify the data gaps and determine the appropriate data collection needed to evaluate remedial alternatives in the feasibility study. The Pearl Harbor Sediment RI will help prioritize the harbor into areas of interest. The Pearl Harbor Sediment Team will then link the areas of interest to land based sites on a geographic basis and begin to assess the data needs in subsequent field efforts.

- The CSTAG notes that sampling conducted during a storm event in the Halawa

stream approximately 4,000 feet upstream of the harbor estimated a 24-hour loading of copper, lead and zinc that ranged from 250 to 1,150 lbs/day during the storm event. Contaminant loadings of the magnitude are significant and should be verified for accuracy.

### **Region 9 Response to Comment**

The Pearl Harbor Sediment Team is reviewing and compiling stream data from the Hawaii Department of Transportation reports and other sources to confirm contaminant loads from the Halawa Stream.

- Continue prioritization of all land-based Navy sources with a focus on areas where contaminants may be released to sediment. Evaluate whether known areas of sediment contamination can be linked to upland sources and/or storm water discharges.

### **Region 9 Response to Comment**

Region 9 recognizes the importance of this comment and has worked with the Navy since 1992 to identify high priority land-based Navy sources. Near shore sites with releases into harbor have been addressed using removal authority. Prioritization of the remaining sites are reviewed annually by Region 9, the Navy and the State of Hawaii in the Site Management Plan (SMP) in accordance with the Pearl Harbor Naval Complex Federal Facility Agreement (FFA). During project manager meetings, the Pearl Harbor Sediment Project team has discussed the contributions of non-Navy upland sources. Region 9 will continue the discussions with the Navy after reviewing the Remedial Investigation Report..

- Consider having the State or Region 9 conduct preliminary assessments/site inspections conducted in order to identify potential upgradient sources of contaminants to the tributaries. Region 9 should evaluate non-Navy contaminant inputs (e.g. sunken ships, Hickam Air Force Base) and their effort on PHNC sediment contamination.

### **Region 9 Response to Comment**

Resources and regional priorities permitting, Region 9 will work EPA and State of Hawaii site assessment programs to identify potential upgradient sources that may release contaminants into the watershed that terminates in Pearl Harbor. The Pearl Harbor Sediment Team has reviewed Hickam Air Force Base documents, specifically sites with the potential to contribute contamination to Pearl Harbor. Also, the Navy has held face-to-face meetings with the Air Force to be updated on sites of interest.

- Pursue an alternative means to implement the planned investigation and removal action in Walker Bay if Oahu Sugar is not able to do so in a timely fashion.

### **Region 9 Response to Comments**

In correspondences and management level meetings, the Navy has been told that as land owners, they are ultimately responsible for the site. Region 9 has been working with the Navy to prioritize Oahu Sugar site as high priority site.

### **Principle #2, Involve the Community Early and Often**

- Ensure that stakeholders have access to sampling data. Discuss with stakeholders how the data have been interpreted and the rationale behind the conclusions in the risk assessment and other documents.

#### **Region 9 Response to Comment**

The Navy provided the sampling data in the BERA and will also provide the data in the RI to the public. These documents area are available in the information repositories. A RAB meeting was held in 2004 at which the Navy presented the conclusions of the ecological risk assessment. A RAB will be held to presented the RI data and conclusions.

- Ensure that the Restoration Advisory Board members or other community groups are aware of the Technical Assistance for Public Participation and technical assistance grants.

#### **Region 9 Response to Comment**

Region 9 has provided Technical Assistance Grants (TAG) grant information to the RAB. The Community Relations Plan for the Pearl Harbor Naval Complex is being updated as the Community Involvement Plan (CIP) for Naval Activities on Oahu and TAG as well as Technical Assistance for Public Participation are included in the draft November 2004 document.

- Work with stakeholders to discuss the communities' vision for future land and waterbody uses, recognizing that Pearl Harbor is a culturally significant feature of Oahu. Develop remedial action objectives and long-term cleanup goals consistent with future land use objectives and discuss the process with the community.

#### **Region 9 Response to Comment**

Pearl Harbor is an active complex of naval facilities and the Navy does not envision any changes in the use of Pearl Harbor in the foreseeable future. Region 9 will work with the Navy so that remedial action objectives and long-term cleanup goals will be presented in the feasibility study and the Navy will present and discuss the objectives with the restoration advisory board.

- Maintain the fencing and signs posted to protect the public from catching and consuming contaminated fish.

### **Region 9 Response to Comment**

Region 9 will work with the Navy and Hawaii Department of Health to ensure signs are maintained.

- Ensure that the revised Community Relations Plan incorporates the aforementioned recommendations and adequately addresses any environmental justice concerns.

### **Region 9 Response to Comment**

Region 9 has reviewed the draft and draft final CIP and has generated comments to the Navy to incorporate environmental justice concerns into the document.

### **Principle #3, Coordinate with States, Local Governments, Tribes, and Natural Resource Trustees**

- Coordinate with the State Total Maximum Daily Load team when quantifying upgrading off-site inputs from the tributaries into the harbor.

### **Region 9 Response to Comment**

The Pearl Harbor Sediment Team are in contract with the State program working on the Total Maximum Daily Load for the State of Hawaii and are periodically updated on their efforts. The Pearl Harbor Sediment Team will consider the data from the State program.

- Continue to work with Trustees by sharing data and developing work plans for future sampling events.

### **Region 9 Response to Comment**

Region 9 has been worked closely with the Trustees and will continue to do so. The Trustees have been an integral part of the project team for of all phases of the Pearl Harbor Sediment Study and will be part of the project team for future work.

### **Principle #4, Develop and Refine a Conceptual Site Model that Considers Sediment Stability**

- Use historical dredging data (bathymetry and dredging frequencies) to calculate preliminary sedimentation rates. Use this information to update the conceptual site model.

### **Region 9 Response to Comment**

The Navy has the dredging data and the Pearl Harbor Sediment Team will evaluate the usefulness of the data.

- Evaluate sediment stability (both at surface and with depth) in the harbor (including the entrance channel) and quantify depositional and erosional rates and processes in areas of harbor. Measure grain size distribution, bulk density, and total organic carbon with depth at multiple cores throughout the harbor. Quantify the transport and fate of resuspended sediment within the harbor, sediment from the watershed, and sediment carried into the harbor from the ocean. Resuspension of sediment by wind-generated waves, currents, and propeller wash should be evaluated. This information will be important in evaluating remedial action alternatives. This work should be focused in contaminated areas (including areas immediately adjacent to dredged areas) that will not be addressed by upcoming navigational dredging (assuming that the navigational dredging will be deep enough to meet any sediment cleanup criteria) where remedial alternatives such as capping and/or monitored natural recovery may be considered.

#### **Region 9 Response to Comment**

Region 9 will work with the Navy to collect appropriate data for evaluating the hydrodynamic and sediment transport properties during the FS, focusing on contaminated areas.

- Evaluate whether diffusion from sediments may be a significant source of contaminants to the water column and a significant exposure pathway for aquatic life. If so, additional work may be needed to quantify diffusion rates.

#### **Region 9 Response to Comment**

The Navy is reviewing Space and Naval Warfare Systems Command (SPAWAR) investigations of diffusion of chemicals from sediments in Pearl Harbor to the overlying water column to determine additional data needs to evaluate diffusion during the FS. One function of SPAWAR is research, development, testing and evaluation in specific subject areas of oceanography. Depending upon the results of the investigation, additional work may be needed.

- Define horizontal and vertical extent of contamination in near shore sediments next to known sources areas such as the Camel Refurbishing Area, all landfills, the old outfall for the Fort Kamehameha treatment plant and Walker Bay.

#### **Region 9 Response to Comment**

Future work to define the horizontal and vertical extent of contamination in known shoreline sites has been anticipated by the Pearl Harbor Sediment Team. We have discussed with the Navy how near shore sites will be grouped into geographic areas of investigation over the past year. The sediment geographic groups will be part of the

prioritization process in the SMP.

- Refine the existing conceptual site model as information is collected on sediment stability, transport of sediment and contaminants, and contaminant concentrations at depth.

### **Region 9 Response to Comment**

The Pearl Harbor Project Team anticipated additional field efforts will be needed to refine the site conceptual model. The conceptual site model will be updated and refined as additional information becomes available.

### **Principle #5, Use an Iterative Approach in a Risk-Based Framework.**

- The CSTAG recommends that additional data collection is needed before remedy selection. Risk assessments should be revised using data collected in the next phase of sampling. Verify assumptions and revisit conclusions drawn using the first phase of sampling data, particularly since almost 10 years will have passed since the original data set was collected.

### **Region 9 Response to Comment**

The Pearl Harbor Project Team anticipated additional field work will be necessary because the current field effort was designed as a screening effort of the harbor to identify and prioritize areas of concern for future work. The Pearl Harbor Project Team also anticipated the data collected from the future work will be used to refine the risk assessment as well as generate data to support remedy selection.

- CSTAG supports the using of the existing RI data collection effort to focus and refine additional sampling efforts. We recommend using the existing information to focus the next phase of sampling in the following ways:
  - use information about upland sources to target more intensive sediment sampling in areas such as storm drain outfalls, groundwater discharge zones, areas impacted by non-point sources of potential erosion (i.e. runoff from upland contaminated areas), and sandblasting areas.
  - Because the initial sampling density is quite low in some areas and only the top 2 centimeters have been investigated, it may be premature to eliminate any areas from consideration for additional sampling. However, information from the initial sampling effort, risk assessment, and upland sources can be used to prioritize areas for more versus less intensive future sampling. Areas that showed higher contaminant concentrations and higher risk (e.g. areas where multiple Preliminary Remediation Goals (PRG's) were exceeded, areas where *Ampellicsa Abdita* bioassays showed toxicity) could be targeted for more intensive sampling, while areas with lower risk could receive less intensive sampling
  - Consider prioritizing fish tissue and sediment sampling in areas of higher habitat value (determined in consultation with NOAA and USFWS) and fishing areas

(e.g. adjacent to housing areas).

### **Region 9 Response to Comment**

The Pearl Harbor Sediment Study along with information from upland sites will be used to focus and refine additional sampling efforts. The resource trustees are an integral part of the Pearl Harbor Sediment Team and discussions concerning high value habitat were part of the scoping process of the current study. Future field efforts will involve the resource trustees.

- Obtain and evaluate dredged material characterization data from past and on-going navigational dredging to obtain information about historical contaminant concentrations and sedimentation trends in the harbor.

### **Region 9 Response to Comment**

The Navy has the dredging data and the Pearl Harbor Project Team has evaluated the data. Future dredging data will also be evaluated by the Pearl Harbor Project Team.

### **Principle #6, Carefully Evaluate the Assumptions and Uncertainties Associated with Site Characterization Data and Site Models**

- Sediment samples collected from the top 2 centimeters may be adequate for a screening phase, but deeper sampling will be needed to adequately characterize the nature and extent of contamination at the site, particularly in areas susceptible to erosion. In addition, the notion that top 2 centimeters adequately characterize the biologically available zone is not supported. At most sediment sites, the top 10 to 15 centimeters are sampled to characterize sediment available to the benthic population.

### **Region 9 Response to Comment**

The Pearl Harbor Sediment Study was not designed to determine the nature and extent of contamination, but as an initial screen of the harbor. The Pearl Harbor Project Team anticipated further work will be necessary in high priority areas to determine the nature and extent of contamination.

- CSTAG understands that determining background levels of contaminants at this site can be difficult because of various contaminant sources in the watershed and lack of an appropriate reference site. However, CSTAG does not agree with using data only from samples collected in areas suspected to contain site-related contamination to determine background levels. Data from the “input” study discussed under Principle #1 and data from cores (i.e. do not rely solely on surface sediment data) from areas of the harbor least expected to be contaminated could be used to determine a more realistic background level.

Owing to the uncertainty associated with the determination of background, clearly explain the methodology and results of the background determination. The risk characterization should discuss the elevated background concentrations of Contaminants of Potential Concern and their contributions to site risk.

### **Region 9 Response to Comment**

Region 9 recognizes the concerns raised by the CSTAG recommendation. The general methodology to determine background is part of the Pearl Harbor Naval Complex Site Management Plan and Region 9 has extensively reviewed and commented on the methodology. The methodology to determine background is dependent on the data used. Region 9 shares CSTAG concerns of using the current data set to determine background. The process is iterative and data gathered from future sediment work, including cores, will be used to refine background. Region 9 has work extensively with the Navy on discussing risk characterization due to elevated background contributions on numerous land sites and will continue do so with sediments.

- The ecological risk assessment (ERA) appears to be heavily reliant on bioaccumulation factor (BAF) values derived from a limited data set (15 locations, not including areas of highest sediment contamination). The ERA should emphasize the limitations and uncertainties associated with the BAF values, and additional tissue data should be collected in the next phase of sampling to verify the BAF projections of tissue concentrations in more highly contaminated areas (i.e. the Naval Station, the submarine base, and the shipyard). Assessments of direct toxicity (e.g. bioassay results), rather than BAFs, should be used to assess ecological effects from exposure to non-bioaccumulative contaminants.

### **Region 9 Response to Comment**

The Pearl Harbor Sediment Team recognizes the potential uncertainties associated with BAF's values developed from a limited data set. The Pearl Harbor Sediment Team is considering the need for additional tissue samples to verify the BAFs. Direct toxicity as measured by amphipod survival for whole sediment and echinoderm fertilization success for sediment pore water was presented in the ERA. Direct toxicity will be considered during the FS to further evaluate ecological effects from exposure to non-bioaccumulative chemicals.

- Identify the reasons for a lack of a robust benthic community (e.g. natural causes, low dissolved oxygen, contamination, predation pressure, frequency of maintenance dredging).

### **Region 9 Response to Comment**

The Pearl Harbor Sediment Team is reviewing investigations on the benthic communities of Pearl Harbor conducted by scientists from the Bishop Museum.



- For future sampling, verify the correlation between twice the sum of the 18 NOAA congeners and total PCBs (as total Aroclors or sum of all congeners) by analyzing a statistically significant quantity of samples using both methods. The suite of PCB congeners present in sediment will be altered based on many variables (the application that the PCBs were used for, water and sediment partitioning, weathering, mode of introduction to the aqueous environment, etc). Therefore, it is necessary to calculate a correlation between congeners and total PCB on a site-specific basis.

### **Region 9 Response to Comment**

The total PCB NOAA 18 method (Valoppi, L., M. Petreas, R., Donohoe, L. Sullivan and C. Callahan. 1998. *Use of PCB congener and Honologue Analysis in Ecological Risk Assessments*. San Francisco: U.S. Environmental Protection Agency IX, Biological Technical Advisory Group (BTAG) January) use to estimate total PCB concentrations based on the NOAA 18 congeners was developed by members of the EPA IX BTAG (L.Valoppi U.S. Fish & Wildlife Service, L.Sullivan - National Oceanic and Atmospheric Administration and C. Callahan - EPA Region IX). Based on the recommendation of the Region IX BTAG of which two members are part of the Pearl Harbor Sediment Team, the NOAA 18 method was selected as the method to estimate total PCB's from congener data collected in Pearl Harbor. The Pearl Harbor Project Team will discuss the merits of calculating a correlation between congeners and total PCB in specific areas of the prioritized harbor.

### **Principle #7, Select Site-specific, Project-specific, and Sediment-specific Risk Management Approaches that will Achieve Risk-based Goals.**

- Do not use the BAF-based preliminary remediation goals (PRGs) (which may be overly conservative) for COCs whose main mode of action is direct toxicity because for these COCs, a BAF-based PRG may suggest cleanup in areas where it may not be warranted. For these COCs, emphasize the sediment toxicity data when developing risk-based remediation goals. Consider risks from direct toxicity as well as from bioaccumulation when developing risk-based remediation goals.

### **Region 9 Response to Comment**

Direct toxicity as measured by amphipod survival for whole sediment and echinoderm fertilization success for sediment pore water will be re-evaluated for COC's whose main mode of action is direct toxicity during the FS and considered when developing risk-based remediation goals.

- Overlay areas targeted for navigational dredging with areas that may require remedial action and look for opportunities to combine sediment remediation with navigation dredging. This information should be shared with those conducting an Optimization Evaluation (see the Navy's 23 April 2004 policy).

## **Region 9 Response to Comment**

The Pearl Harbor Sediment Team has conceptually discussed navigational dredging and areas of the harbor requiring sediment remediation. Once areas of the harbor that require remediation are identified, the Pearl Harbor Project Team will examine overlaying the areas with navigational dredging.

### **Principle #8, Ensure that Sediment Cleanup Levels are Clearly Tied to Risk Management Goals.**

- Before selecting a response action, clearly describe the assumptions and data used, the relationship between the range of sediment cleanup goals, and the human health and/or ecological assessments endpoints that are driving the need for a response action. The decision document for any response action should clearly explain the relationship between the final sediment cleanup levels, residual contaminant concentrations, and risk-based goals (e.g. reduce fish tissue concentrations, reduced toxicity for benthic invertebrates etc.).

## **Region 9 Response to Comment**

Remedy selection documents will follow EPA and Navy guidance.

### **Principle #9, Maximize the Effectiveness of Institutional Controls and Recognize their Limitations.**

- Consider issuing fish consumption advisory warning signs in additional languages with pictures or symbols to enhance understanding by non-English speakers.

## **Region 9 Response to Comment**

The advisory signs include pictures and symbols warning people not to eat fish and crab caught in the harbor. The advisory signs were prepared in accordance with the Hawaii Department of Health guidelines.

- Consider posting consumption advisory signs and/or provide leaflets in community gathering places where local and low-income residents may go for health care and food bank.

## **Region 9 Response to Comment**

The Hawaii Department of Health created a multi-language leaflet that provides information on the advisory and distributed the leaflets in various communities and venues.

**Principle #10, Design Remedies to Minimize Short-term Risks while Achieving Long-term Protection.**

- The CSTAG will evaluate consistency with this principle later in the process.

**Region 9 Response to Comment**

Comment acknowledged.

**Principle #11, Monitor During and After Sediment Remediation to Assess and Document Remedy Effectiveness**

- Consider as early as possible what monitoring will be necessary to assess remedy effectiveness to ensure that an adequate baseline can be developed before any response action. EPA's research lab in Gulf Breeze, Florida could be a useful source of information regarding biological monitoring in tropical systems.

**Region 9 Response to Comment**

The Pearl Harbor project team have scheduled scoping meetings to discuss the next phases of sediment work to include data to support remedy selection and monitoring needs. Region 9, the Navy and EPA ORD have initiated discussions on monitoring needs related to potential remedies at Pearl Harbor. Region 9 plans on utilizing the expertise and resources of the Agency regarding sediment remedies and monitoring in tropical systems. The Pearl Harbor Project Team will also examine the available expertise at the University of Hawaii, the Bishop Museum and NOAA.

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