UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

Signed July15, 2005

MEMORANDUM

SUBJECT: CSTAG Recommendations on the Pearl Harbor Naval Complex Superfund Site

FROM: Stephen J. Ells /s/ **Stephen J. Ells**
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TO: Lewis Mitani, Remedial Project Manager
EPA Region 9

Background

OSWER Directive 9285.6-08, *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites* (February 12, 2002), established the Contaminated Sediments Technical Advisory Group (CSTAG) to "monitor the progress of and provide advice regarding a small number of large, complex, or controversial contaminated sediment Superfund sites." The main purpose of the CSTAG is to assist Regional site project managers manage their sites throughout the Superfund process in accordance with the eleven risk management principles set forth in the OSWER Directive. CSTAG membership consists of one representative per Region, two from the Office of Research and Development, and two from the Office of Superfund Remediation and Technology Innovation (OSRTI).

Brief Description of the Site

The Pearl Harbor Naval Complex (PHNC) was listed on the National Priorities List (NPL) in October 1992. The Navy, in cooperation with the EPA, State of Hawaii Department of Health, the US Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration (NOAA), and the State Department of Land and Natural Resources, is performing the Remedial Investigation/Feasibility Study (RI/FS) for the site pursuant to a Federal Facilities Agreement. The harbor encompasses approximately 5,000 acres of surface water and is in a watershed of approximately 110 square miles. The watershed includes industrial areas as well as residential and agricultural areas. The Navy has divided the PHNC into 18 Geographic Study Areas (GSAs) which include over 700 discrete "sites" or areas of contamination, many of which may impact the water quality of the harbor. The Pearl Harbor Sediment Study Area, one of the 18 GSAs, is the focus of CSTAG's review of the PHNC Site.

There are seven perennial streams that flow into the Pearl Harbor at a rate varying from 50 to 100 million gallons per day. The streams transport sediment and appear to be a source of contaminants to the harbor. Because the harbor supports a Naval Base, substantial navigational dredging of channels and berth areas has occurred routinely over several decades and is expected to occur in the future.

The harbor is contaminated with several chemicals of concern (COCs) that may present an unacceptable risk to human health and the environment, including polychlorinated biphenyls (PCBs), dioxin/furans, 2-(2-methyl-4-chlorophenoxy)propionic acid, 1,3-dinitrobenzene, arsenic, lead, copper, selenium, zinc mercury, and polycyclic aromatic hydrocarbons (PAHs). In 1998, the State of Hawaii Department of Health issued an advisory not to eat any fish or shell fish from the harbor.

In 1996, the remedial investigation (RI) was initiated. During this phase, 219 surface sediment samples (2 centimeters deep) were taken to quantify contaminant concentrations and to perform toxicity tests with two benthic species. Biota tissue contaminant analyses were performed for samples from 15 locations, and surface water samples were taken from 5 locations. All the summary data and analyses presented to the CSTAG were based on the sampling and studies done in 1996.

The CSTAG visited the Site and met with the Navy and EPA site teams from May 10 to 12, 2005. Three of the invited stakeholders made presentations to the CSTAG. The presenters included Life of the Land, NOAA and Kyle Kajihiro.

CSTAG Recommendations

Based upon our site visit, a review of the site information provided to us, and the presentations made by stakeholders, the CSTAG offers the following recommendations to the Regional site manager and recommends that he relay them to the Navy in order that the site may be managed to more fully address the 11 principles. The CSTAG expects that site project manager will consider these recommendations as the site characterization continues, as the conceptual site model is refined, and as remedial alternatives are developed and evaluated. The site manager is asked to submit, within 60 days, a short written response to these recommendations to the CSTAG.

<u>Principle #1, Control Sources Early</u>

- 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 contaminant 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.

- 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 this magnitude are significant and should be verified for accuracy.
- 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 stormwater discharges.
- 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 effect on PHNC sediment contamination.
- 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.

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 conclusions in the risk assessment and other documents.
- Ensure that the Restoration Advisory Board members or other community groups are aware of the Technical Assistance for Public Participation and technical assistance grants.
- Work with the 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 this process with the community.
- Maintain the fencing and signs to protect the public from catching and consuming contaminated fish.
- Ensure that the revised Community Relations Plan incorporates the aforementioned recommendations and adequately addresses any environmental justice concerns.

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

- Coordinate with the State Total Maximum Daily Load team when quantifying upgradient, off-site, inputs from the tributaries into the harbor.
- Continue to work with trustees by sharing data and developing work plans for future sampling events.

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.
- 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 the 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.
- 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.
- Define horizontal and vertical extent of contamination in near shore sediments next to known source areas such as the Camel Refurbishing Area, all landfills, the old outfall for the Fort Kamehameha treatment plant, and Walker Bay.
- Refine the existing conceptual site model as information is collected on sediment stability, transport of sediment and contaminants, and contaminant concentrations at depth.

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.
- CSTAG supports the use 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 assessments, 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 (PRGs) were exceeded, areas where *Ampelisca 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).

- 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.

<u>Principle #6, Carefully Evaluate the Assumptions and Uncertainties Associated with Site Characterization Data and Site Models</u>

- 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 contamination available to the benthic population.
- 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 corings (*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 contribution to site risks.
- 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 (*e.g.*, 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.
- 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).

- 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.

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.
- 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).

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 assessment 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 the risk-based goals (*e.g.*, reduced fish tissue concentrations, reduced toxicity for benthic invertebrates, *etc.*).

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

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.

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.

Regional Response

Please send us a short written response to these recommendations within 60 days. If you have any questions or would like a clarification to any of these recommendations, please call your Regional CSTAG member or Steve Ells at (703) 603-8822 or Leah Evison at (703) 603-9022.

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