COMMENTS ON THE LONG TERM MANAGEMENT STRATEGY (LTMS) FOR THE PLACEMENT OF DREDGED MATERIAL IN THE SAN FRANCISCO BAY REGION

DRAFT POLICY ENVIRONMENTAL IMPACT STATEMENT/ PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT

Submitted by

Bay Planning Coalition
303 World Trade Center
San Francisco, CA 94111
(415) 397-2293

July 19, 1996

BAY PLANNING COALITION

303 WORLD TRADE CENTER • SAN FRANCISCO, CALIFORNIA 94111 (415) 397-2293 FAX (415) 986-0694
E-MAIL - ejohnck@emf.net

July 19, 1996

Ms. Karen Mason
LTMS EIS/EIR Coordinator
c/o Environmental Protection Agency
Region 9 (W-3-3)
75 Hawthorne Street
San Francisco, CA 94105

Subject: **Comments on the Long Term Management Strategy (LTMS) for the Placement of Dredged Material in the San Francisco Bay Region *Draft Policy Environmental Impact Statement/Programmatic Environmental Impact Report (DEIS/EIR)***

To the LTMS Agencies:

We are pleased to respond to your request for public comment on the proposed policy alternatives for the placement of dredged material and, in particular, on a policy approach that transitions over time from Alternative 1 (which emphasizes aquatic disposal of most material in the in-Bay and oceans sites, with relatively limited upland/wetland reuse) to Alternative 3 (which emphasizes a balance between ocean disposal (40% and beneficial reuse at upland/wetland sites (40%), with limited in-Bay disposal (20%).

The Bay Planning Coalition (BPC) members representing a cross-section of the Bay's primary producers--ports and maritime industry, shoreline business and property owners, local government and recreational boating users, have much at stake regarding the outcome of the LTMS. Since we were the primary catalyst for the establishment of the LTMS program, we have been and will continue to be actively involved to ensure its successful implementation.

The efforts to produce such an extensive DEIS/EIR are laudable; however, it appears that the LTMS agencies are pursuing a direction, namely, the upland reuse disposal alternative which is based solely on an administrative and predetermined point of view , without providing the required environmental or economic effects evaluations. This policy, if adopted into regulation, would have severe financial implications to Bay business and is significantly off course from the original goals of

the LTMS and contrary to the legal requirements of NEPA/CEQA that alternatives must be practicable. Let us emphasize that BPC very much supports and promotes environmentally-responsible projects such as the beneficial reuse of dredged material, but only when this approach is cost-effective, and the disposal decision is based on sound science that evaluates and provides for the management of environmental effects.

We agree that there are substantial benefits to, for instance, a wetland restoration project using dredged material, such as the Sonoma Baylands. The Baylands project, is really the only large-scale project of this type completed in recent Bay history. The process for project approval was long and complex and only occurred because of specific financial (federal and state subsidies), political (the involvement of the President of the U.S.) and regulatory crisis circumstances. This type of beneficial reuse project may be replicated in the future given a similar set of circumstances. However, wetland restoration reuse projects cannot be achieved as a routine occurrence as perhaps the LTMS agencies' policy options envision.

Based on our members' expertise and experience in dredging , our comments will elaborate on why the upland reuse alternative is not practicable[1] at the present time due to economic and environmental constraints and highlight what further considerations need to be evaluated in the development of the LTMS Management Plan.

We have already begun to experience increased dredging costs in the past few years for maintenance dredging under our normal in-Bay disposal practices due to many factors, including costs for sediment testing and the reduction of dredging contractors operating in the Bay to 1-2 companies. The DEIS/EIR has overlooked an essential factor, i.e. the majority of material disposed at the in-Bay sites is maintenance material; not large volume, new work projects. We do not anticipate any new work projects in the future, except for the Port of Oakland's 50' deepening project and some parts of the S.F. to Stockton ship channel, and these projects will likely be able to utilize reuse opportunities. So for purposes of the DEIS/EIR, it is important to direct LTMS agency attention to the economic impact of moving maintenance material to upland reuse. A predictable and timely completion of the maintenance dredging cycle for all maritime operations is crucial to the stability of the maritime-based economy. Our grave concern is that the implementation of a disposal approach which would limit in-Bay disposal of maintenance dredging to even smaller volumes than presently allowed under the Corps of Engineers in-Bay Site Management Plan (PN 93-3) will have severe business disruption and major

[1] Random House Dictionary defines "practicable" as "capable of being used." The definition of "practicable" according to the Clean Water Act is "...available and capable of being done considering cost, technology and logistics."

economic consequences to Bay users.

The major shortcomings of the DEIS/EIR are the failure to understand and apparent lack of knowledge about the economics of dredging and infrastructure cost associated with upland reuse and also the importance, both legally and scientifically, of the environmental assessment in disposal decisionmaking.

Based on the above-described shortcomings, we cannot recommend a specific option, nor do we think the agencies should select a policy alternative until the LTMS develops and evaluates practicable, cost-effective, and environmentally sound, "real" alternatives. At the present time, there are no upland reuse alternatives available. Certain tasks, such as a more detailed analysis of the environmental and economic impacts of upland disposal and comparisons with aquatic disposal, must be completed.

As part of the environmental analysis, the subject of sediment quality testing and its role in determining environmental effects of disposal must be considered. Sediment quality evaluations drive disposal decisionmaking. At present, there is no consistent and justifiable decisionmaking framework for interpreting the dredged material test data which makes the link from the test results to a determination of demonstrated environmental effects. We recommend that workshops be convened by the LTMS agencies to do the following:

1. Revisit the premises of the existing sediment testing guidelines, Public Notice 93-2. As part of our LTMS comments, a paper entitled **"Sediment Quality Testing: Issues Related to the Testing Guidelines for Dredged Material Disposal at S.F. Bay Sites"** is enclosed for your review and instruction. This paper describes serious flaws with PN 93-2. We recommend that the LTMS agencies convene a series of workshops to rethink and redraft PN 93-2. The workshop agenda should include a discussion of such topics as the approach to the design of testing requirements, interpretative criteria for bioassays, species selection and point of reference for sediment comparison purposes, and allowable mixing. These workshop discussions should result in a new Regional Testing Guidance Manual.

2. Develop a Regional Decisionmaking Framework for evaluating the environmental acceptability of the full continuum of dredged material (both clean and contaminated) management alternatives. Both the Decisionmaking Framework and the replacement of PN 93-2 should be incorporated into a new Regional Testing Guidance Manual and adopted into the LTMS Management Plan.

Rather than revising and recirculating the DEIS/EIR, we recommend that the agencies complete the Management Plan first, which should incorporate these

environmental and economic analyses. These analyses should then establish the basis upon which to chose alternative disposal options; and subsequently, the DEIS/EIR can be finalized which will then include scientifically defensible environmental effects and economic impacts of all disposal alternatives.

I. LTMS achieves progress towards its goals, thus no need to change existing policy which is reflected in the LTMS goals and objectives

In June , 1991, the LTMS participants adopted these goals:

1) *Maintain in an economically and environmentally sound manner those channels necessary for navigation in San Francisco Bay and estuary and eliminate unnecessary dredging activities in the By and estuary.*
2) *Conduct dredge disposal in the most environmentally sound manner.*
3) *Maximize the use of dredged materials as a resource.*
4) *Establish a cooperative permitting framework for dredging applications.*

These objectives were also adopted:

1) *Coordinate the efforts of responsible agencies regarding dredging activities in San Francisco Bay and estuary, including activities to reduce the contaminant flow into sediments.*
2) *Identify an array of acceptable sites for disposal for material dredged from the estuary. Sites shall be selected from a prioritized list which is developed on the basis of agreed- upon criteria. The site selection process shall be based upon adequate scientific studies, strategies which reduce adverse impacts and increase benefits, and environmental analysis.**
3) *Promote the reuse of dredged materials whenever it is shown that there is a need for the material and the placement can be done in an environmentally acceptable manner.**
4) *Describe Federal, State, and local authority, criteria, policies, and protocols for dredging and the disposal of dredged materials.*

*(emphasis added)

These are excellent, well- balanced goals and objectives, and much progress has been made in the last five years towards the achievement of these goals and objectives. We are certainly not at the same place where we were prior to the LTMS, and thus we think it would be premature without sufficient economic and environmental information to change policies now.

A Site Management Plan for the in-Bay disposal sites has been established by the U.S. Army Corps of Engineers, limiting disposal volumes to a set level per month which has improved the sites' dispersive capabilities. Further, the amount of

dredged material at the Alcatraz site is lower overall at about 2,000,000 cy annually. The LTMS studies, and even prior reports, assessing the environmental effects of in-Bay disposal of dredged material have not proven any significant adverse impacts of our present in-Bay disposal practices.

A deepwater ocean disposal site has been designated and has the capacity to accept very large volume projects that meet the Ocean Dumping Act (MPRSA) criteria. The Sonoma Baylands wetland restoration project and the Sherman and Jersey Island levee maintenance pilot projects are examples of completed projects indicating the progress made to "maximize the use of dredged material as a resource." However, these projects have been relatively expensive compared to aquatic disposal, and we are concerned about increases in the cost for maintaining and monitoring these sites. Another project may soon come on line--the Montezuma Wetland Restoration Project, however it has not yet been granted its final permits. Other projects are also in their formative stages, e. g. the proposal for the restoration of Hamilton Airfield.

Even though a simplified permitting process is still not completely installed, dredging predictability has increased. A cooperative permitting framework, using a single consolidated permit application, has been initiated by the LTMS agencies with the signing of General Operating Principles and a Memorandum of Understanding for the operation of a Dredged Material Management Office.

II. Economic Impacts and Constraints Affecting the Practicability of Reuse

A. Cost Factors and Influences on Cost Estimates

The DEIS/EIR relates the costs of proposed disposal alternatives to the "...overall $7.5 billion per year dredging -related maritime economy in the Bay Area (in 1990 $)." This is simply inappropriate because it is not possible for the overall economy to pay for increased dredging costs from the LTMS agencies' policy alternatives unless a new tax was imposed on all Bay Area residents and businesses. The federal government and the ports pay for the costs of dredging, as well as shoreline maritime and industrial facilities and recreational marinas. Increased dredging costs are eventually borne by users of shipped cargo, boat berth rentals and the taxpayers.

It is essential in the context of the Management Plan development to document more accurately the actual costs of dredging to gain a better understanding of what the economic impacts are of the proposal to move maintenance dredging to an upland alternative.

The ports in the Bay are dependent on the federal cost-sharing provided by the U.S.

Army Corps of Engineers to carry out maintenance dredging. The process is intricate and complex and must be completed and authorized by Congress a year in advance. The Corps needs a year's advanced notice to adjust for any changes in maintenance dredging costs, such as a change to local disposal regulations. The federal government generally only pays for what they have paid for historically. Dredging projects nationwide are also competing for a shrinking Federal budget. The local sponsor must have money in the bank first before the Corps will dredge. The bid process, which is based on competitive bidding, affects the price. The site must be available.

Ports cannot miss a maintenance cycle. It is crucial to stay on schedule. Shippers depend on this regular cycle. It would be economically disastrous if a port were held up because Federal cost sharing became unavailable due to new local regulations which increased costs.

We are concerned that a true cost analysis has not been completed for moving maintenance dredged material out of Alcatraz to various upland and ocean alternatives. According to the Construction Operations Division of the U.S. Army Corps of Engineers San Francisco District, using a hopper dredge, the costs to follow any of the policy options will be 2 to 5 times higher than present which is significant. A detailed description of these cost increases are included in the Appendixes of the Port of Oakland's comments, and we incorporate those charts here by reference.

The DEIS/EIR fails to provide the necessary details evaluating the components of the cost of dredging, which include dredging and hauling, surveying, sampling and testing, disposal site preparation, administration and mobilization. Until the LTMS does its homework for different scenarios, we don't know what the actual impact will be, although we can anticipate certain overall adverse economic impacts based on our knowledge and experience with dredging projects. Dredging sponsors are at the mercy of the contractor's estimate, and the following describes the factors in the development of a typical estimate depending on different disposal conditions:

1. Project size: larger size projects (several million cubic yards) spread mobilization, fixed, infrastructure and amortization expenses further, thereby lowering dredging unit prices substantially for upland disposal; it has less of an impact for offshore disposal. Thus we are inclined to think that upland reuse is only practicable for very large, new work projects, since most maintenance dredging volumes are small ranging from as small as 160 cy to 100,000 cy.

2. Dredging Rate: Dependent on size and amount of equipment and digging difficulty; a lower dredging rate means higher unit costs. Any stoppage of disposal

operations will result in higher dredging unit costs.

3. Weather: Inclement weather has little impact on in-Bay dredging and upland disposal operations; it can have major impacts on offshore disposal operations and therefore can halt dredging operations with substantial increases in unit dredging costs.

4. Equipment Impacts: Equipment wear and tear and insurance costs have a significant impact on offshore disposal operations, but this factor also affects upland disposal costs depending on the amount and type of equipment required (levees, pipelines, booster pumps, barge unloading equipment at the upland disposal site) which is not required for offshore disposal.

5. Hauling Conditions: Distance to the disposal site (offshore or upland) from the dredging site, the transiting conditions and depths may favor upland disposal provided adequate water depth is available to the upland disposal site.

6. Commercial Navigation Interference: Dredging in Bay channels (as well as transiting channels and sea lanes to reach disposal sites is like moving a slow truck along a confined roadway filled with normal traffic. Regulatory requirements state that all dredged barges disposing at an offshore site must traverse the large offshore Farallones Marine Sanctuary within a major sea lane leading into and out of the Bay. Transiting to the Collinsville upland disposal site requires very little actual barge ship channel transit. In addition, the use of a pipeline dredge to pump (via pumpline) dredged material to an upland site (in lieu of a clamshell and barge or hopper dredged operation) will require cessation of dredging in the busy channels to minimize interference with commercial navigation.

7. Regulatory Constraints: Many regulatory agency constraints have been proposed or imposed on offshore disposal operations. These include, but are not limited to: light barge loading (fewer cubic yards than barge capacity) to prevent possible wave overtopping from washing material out of the barge, installation of wave barriers on barges, installation of positioning devices to insure that barges are where they are permitted to be during disposal operations and restrictions on operations during high wave and wind conditions, all of which will have a substantial impact on offshore unit disposal costs.

8. Monitoring Costs: The costs to determine the environmental impact of offshore disposal are relatively unknown due to lack of experience, but could be high; those of upland disposal are relatively well defined due to experience with landfills and water quality discharge requirements; however, monitoring in wetland restoration projects is definitely a significant added cost and must be

factored into the per unit dredging cost.

B. Lack of cost-sharing mechanisms and/or cost-sharing plans

Current cost-sharing formulas for dredging projects (based on the Water Resources Development Act (WRDA) of 1986) for both existing, Congressionally authorized maintenance and generally, new navigation projects, dictate that the local dredging project sponsor pay 100% of the costs (land and easement acquisition and site development) for disposal in an upland location. Thus, because of current law there is no economic incentive to develop and utilize alternative disposal sites (other than the historical, open water site). We are supporting the adoption of new cost-sharing provisions in the WRDA '96 which would level the playing field and clarify that the cost of dredged material disposal facilities should be cost-shared at the same rate as other navigation project elements.

Another concept which requires more exploration by the LTMS agencies and that would assist the furtherance of "real" upland reuse alternatives is the development of cost-sharing plans among dredging project sponsors and upland property owners. The concept of a cost-sharing plan should be explored in connection with both Bay Area military base closures and also levee rehabilitation requirements in the Delta, e.g. Bay dredged material could be transported to the Delta for levee maintenance/ restoration purposes based on a cost-sharing plan between the California Department of Water Resources and/or the CALFED program and Bay local/ federal dredging project sponsors.

C. Impact on Shipping and West Coast Trade Due to Increased Costs

The DEIS/EIR did not consider the effect of price increases resulting from alternative disposal requirements on the Bay's competitive advantage. Price increases and dredging regulations have already affected the competitiveness of San Francisco Bay shipping. American President Lines (APL) does not bring its very large ships, the C-10's, into the Bay anymore. APL made an explicit decision to invest in new infrastructure in Southern California over San Francisco Bay. APL has recently developed a 230-acre site in Los Angeles for a new terminal with 12-cranes.

The Bay ports cannot really pass the increased costs along to the tenants for fear of driving them elsewhere, and so they have to absorb increased dredging costs. This effects their bottom line showing increased expenses against revenue and may effect their ability to raise capital.

For some dredging project sponsors, the increased costs may be passed onto their

customers in some form or another. There is no assessment in the DEIS/EIR of the competitive disadvantage to which Bay area importers and exporters and distributors and service providers will be subjected when increased dredged disposal costs are passed on to them. Businesses may be forced to shift their cargoes through other ports; some businesses may close up operations, and those operations may be absorbed through other outlets elsewhere in the U.S. If manufacturers and distributors relocate closer to other lower cost ports, local freight forwarders and other service providers would be forced to follow.

III. Environmental impacts, the management of dredged material , and lack of evaluation of additional disposal alternatives

The title of the project is the Long Term Management Strategy. The environmental impacts associated with various disposal alternatives and the concept of the proper management of dredged material as a mitigation tool were not handled evenhandedly. The agencies have neglected to discuss management based on volume and physical characteristics of the material. Alcatraz could be redredged. There is a need for a confined disposal site such as the Bay Farm Island Borrow Pit. Certain kinds of material should not go to the ocean, such as soft maintenance material. Hard material should not go to Alcatraz.

The "anti-degradation" policy of the Water Board in the Delta was not considered. There may be more serious impacts in moving material upland that haven't been addressed, such as the Central Valley Regional Water Board and the Dept. of Water Resources concerns about the salinity of dredged material.

Regarding implementation of beneficial reuse for wetland restoration projects, there is a significant debate about what kind of habitat is preferable, which hamstrings implementation of wetland projects. The June, 1996 issue of Estuary describes the various wetlands protection and restoration planning activities being conducted in the Bay region. The role of using dredged material in wetlands restoration should be discussed within the context of these planning activities. Otherwise, we envision many obstacles occurring based on the experience with Sonoma Baylands and the opposition of USFWS which held the project hostage in the agency and environmentalists' debate over habitat requirements. The agencies and the public must agree on habitat goals including how much acreage and for what habitat type is desirable. The LTMS agencies have no program for effectively engaging local government--the cities and counties in which wetland projects are located--to ensure acceptance of beneficial reuse projects and reduce the negative "not in my backyard" attitude.

The proposed seasonal fish windows at the Carquinez Disposal Site are not

scientifically justified. The DEIS/EIR was supposed to provide the scientific evaluation for disposal conditions and until the environmental documentation is provided, we recommend withdrawing this proposal.

IV. Required Deliverables to Increase Practicability of Beneficial Reuse

---Place the DEIS/EIR on the right track by completing the economic and environmental evaluations;
---Identify and evaluate "real", i.e. upland reuse sites which are on-line or near on-line alternatives with comparison to alternative restricted and unrestricted aquatic sites to establish cost effective solutions;
---Adopt agency agreements on habitat creation goals affecting wetland restoration projects;
---Develop costsharing mechanisms (such as WRDA '96) and costsharing plans (DWR/ CALFED Delta levees and Bay Area military base conversion program;
---Adopt a Regional Testing Guidance Manual including a revised PN 93-2 and a Regional Decisionmaking Framework for the evaluation of sediment quality;
---Complete the LTMS Management Plan now; finalize DEIS/EIR subsequently.

In conclusion, our comments have attempted to highlight a few of the many issues with the DEIS/EIR that require factfinding and resolution in discussion and collaboration with the users and businesses. We want to work together with the LTMS agencies to promote and implement beneficial reuse of dredged material, but we must complete the proper economic and environmental analyses, including a testing interpretative framework for disposal decisionmaking. prior to even considering these policy matters. Ports and industry must be reinvited to participate in the completion of these tasks in order to produce an implementable LTMS. There is no justified rationale for changing policy direction from the well conceived goals and objectives that form the basis for the current LTMS program.

Sincerely yours,

Ellen Johnck
Executive Director

Enclosures

SEDIMENT QUALITY TESTING: ISSUES RELATED TO THE TESTING GUIDELINES FOR DREDGED MATERIAL DISPOSAL AT SAN FRANCISCO BAY (SF) SITES

INTRODUCTION

As a prerequisite of government approval to dispose of dredged material in waters of the U.S.[1] , dredging project applicants are required to evaluate the dredged material to be disposed using a suite of chemical, physical and biological tests.

The purpose of the tests is to assess the potential for environmental effects on the aquatic ecosystem and its beneficial uses. Discharges of contaminants such as mercury, cadmium, oil, grease, PAH's and PCB's contained in dredged material disposed into "waters of the U.S." are regulated under Section 404 of the Clean Water Act of 1977 (CWA), Public Law 95-217.

Among the more than sixty federal laws and executive orders, including the National Environmental Policy Act (NEPA), associated with the regulation of dredging and disposal activities (not including state laws), the primary legal basis for dredged material evaluation is defined in the CWA Section 404 (b)(1), and the regulations at 40 CFR Part 230, which were issued in 1975, still apply today. Section 230.10 a-d, in sum, requires that the permitting

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1 There are also testing requirements for disposal and beneficial reuse of material in wetlands and uplands, such as in landfills and for levee maintenance, which are similar in concept. However, this paper is primarily oriented to a discussion of testing issues related to traditional aquatic site disposal, other than ocean, which is governed by the federal law, Marine Protection Resource Sanctuary Act (MPRSA)

AGENCY, in order to grant a permit for disposal in waters of the U.S., MUST DEMONSTRATE that there will be no "unacceptable adverse impact" on human health, welfare or the environment (fish and wildlife resources) at the disposal site.

The Corps of Engineers (CE) and the Environmental Protection Agency (EPA) share the Federal regulatory responsibility for the discharge of dredged material. Regulatory responsibility is delegated to the State in California. The state's water quality certifying agency, which derives its authority from Section 401 of the CWA, has jurisdiction and must certify that discharges comply with applicable state water quality standards (40 CFR 230.10(b) (1).

EPA has proposed two revisions to the 1975 40 CFR Part 230 regulation; one, in 1980, revising the procedures for contaminant evaluations and the other, in 1994, revising the procedures to be used as a point of comparison between dredged sediments and reference sediments. However, neither has been adopted as a final rule. Thus, the 1975 regulation still is in force for dredging projects nationwide.

The first Inland Testing Manual (ITM) was published in 1976 to provide regulatory guidance for the implementation of 40 CFR Part 230 regarding contaminant evaluations. After almost twenty years of collaborative discussion between the CE and the EPA on the subject of the appropriate science for contaminant evaluation and related testing issues, in 1994, a new and revised ITM was published. It has been circulated for public review

and comment, but to date a notice of the final version has not been published in the Federal Register. Thus, it is still a draft and not in official use.

In the S.F. Bay Area prior to 1993, the four dredging regulatory agencies, the CE, the EPA, the S.F. Bay Regional Water Quality Control Board (RWQCB) (which is the state water quality certifying agency), and the S.F. Bay Conservation and Development Commission (BCDC) followed the testing guidance in Public Notice 87-1 which was based on the 1975 federal regulation. As this regulation has not been changed, it would appear that the agencies do not have the authority to modify, abrogate, or otherwise change their operational procedures pending final rulemaking on the proposed EPA revisions. However, the agencies had begun a joint collaborative program known as the Long Term Management Strategy for Dredged Material Disposal (LTMS) which had been spawned by a near mudlock in S.F. Bay on dredging. The agencies' desire, to provide a consistent dredged material testing protocol for the local Bay Area, led to their adoption of a joint-sediment testing protocol in 1993, entitled *Testing Guidelines for Dredged Material Disposal at San Francisco Bay Sites,* Public Notice (PN) 93-2.

Ostensibly, this was to be an interim measure until more definitive guidance in the form of a new federal Inland Testing Manual (ITM) became available and/or was superseded by final guidance under future development within the LTMS program. PN 93-2 developed as a hybrid of federal and state guidance, some of which was based on the 1976 ITM, and some from the

1994 draft ITM, including some particular interests of the local regulators. At the time, PN 93-2 was thought to be an appropriate decisionmaking tool by the regulatory agencies.

During the public hearings and workshops on the PN, dredging permit applicants had many questions and voiced several concerns regarding the approach adopted in PN 93-2, many of which continue to be issues today and which prompted this paper. This PN was extensively reviewed by the CE Waterways Experiment Station, and we submit its review for information (Exhibit 1).

Ports, industrial and commercial facilities, and recreational marinas in San Francisco Bay who need to perform navigational dredging frequently experience uncertainty, delays and substantial expense in securing permits because of the problems encountered with sediment quality evaluation. The most recent frustrations stem from the regulatory interpretation of PN 93-2 (prescribed testing) results.

Applicants really do not have a clear picture of how the agencies make decisions using the testing results. There appears to be a lack of uniform and consistently-applied criteria and an undue presence of agency subjectivity to determine the environmental "effects" of aquatic dredged material disposal. Recent examples of dredging projects which demonstrate testing interpretative issues are the Port of Oakland and the Port of Richmond's channel deepening and the Port of Redwood City's maintenance dredging projects. The procedures for regulatory interpretation

of test data, which ultimately result in major economic decisions regarding dredged material disposal, have had the effect of eliminating or severely restricting navigation and commerce movement. The whole process is highly questionable given the complexities and vagaries of the testing process.

While there are general issues about testing (and the interpretation of the results) nationwide and the draft ITM that could be discussed, this paper will discuss the issues related to dredging permit applicants' experience specifically with the agency utilization of PN 93-2 in two areas: 1) whether its requirements are valid according to Federal law at 40 CFR 230.60 and 230.61 concerning use of testing to determine environmental effects; and 2) the lack of a consistent and justifiable decisionmaking framework for interpreting the test data which makes the link from the numbers to a determination of demonstrated environmental effect, i.e. how much is too much bioaccumulation and what to do with false-positive and inconclusive chemical and biological test results.

It is important to note that it is not the idea of testing per se that is at issue. Applicants generally do not object to the concept of testing for environmental protection purposes, as the law requires it. Although there are some issues related to how testing is conducted and the use of certain types of tests, such as the selection of one amphipod over another and the appropriate use of a reference site for sediment comparison purposes, the basic problems are with the agencies' administration of PN 93-2 in the areas of: <u>how many</u> tests should be done, <u>how often</u> the tests should be done, and <u>how should the</u>

numbers--the test data-- be interpreted . Rhetorically speaking, is the lab measured toxicity of 10, 20, or 30% truly environmentally significant or just statistically significant? What is the basis for determining an environmental "effect" when a chemical concentration is not an effect, bioaccumulation is not an effect, and turbidity is not an effect. Is there any relevance to a percentage-based species survival requirement and how do we account for aquatic dispersion and dilution? We need to settle the basic issue of what evidence should be used to define sediment test failure and hence to evaluate the acceptability of sediment for open water disposal.

Although the thrust of the draft ITM is to recommend MORE tests (which is quite unsettling from a cost-effectiveness standpoint), at least the draft ITM is a starting point for the purpose of revisiting the premises of PN 93-2 because the ITM should be the primary Federal guidance implementing the 40 CFR Part 230 regulation in the S.F. Bay Region.

Since the proposed ITM is guidance, and non-regulatory, the CE and the EPA allow for the development of regional manuals to adapt the ITM to local environmental and regulatory conditions. Thus, we are amenable to incorporating appropriate elements of the ITM into regional guidance, pending final publication, but we think that regional guidance on contaminant testing and evaluation SHOULD NOT deviate from the extant regulation, 40 CFR Part 30.

Additionally, it is important to note that while the bulk of the draft ITM is guidance and non-regulatory, one portion of it pertaining to the substitution

of a reference site for the disposal site as a point of comparison was published as proposed rule-making in 1994. As of this date, the rule, as with the ITM, has not been finalized. The reference site issue will be discussed later, and while it is appropriate to adopt the draft ITM for local use, it is not appropriate to substitute a reference site for the disposal site until such time as final rule-making has occurred.

Therefore, a minimum goal is to encourage that the draft ITM become final and, concurrently in the interim, use it to revisit the premises of PN 93-2, discuss the testing problems identified on the next page such as species selection- reference site issues and work towards forming federal, state agency and applicant consensus on the basis for a regional guidance manual. Most importantly the manual should include a regional decisionmaking framework covering test result interpretation. Also, flexibility should be built into the tiered testing procedure so that an applicant can elect to conduct less tests and dispose of the dredged material in a nonaquatic disposal site.

Summary of PN 93-2 Issues:

PN 93-2 follows the format of the tiered testing procedure first initiated in the 1991 revision of the Ocean Dumping manual and later adopted in the 1994 draft ITM. However, PN 93-2 adopts some additional requirements which appear to be inconsistent with the draft ITM and 40 CFR 230.60 and .61.

According to the draft ITM tiered testing procedures, applicants move from

tier to tier conducting different types of tests based upon a principle commonly known and subscribed to by the Federal regulatory agencies as "reason to believe" that the sediments are contaminated and could potentially cause an unacceptable adverse effect. It is only necessary to proceed through the tiers until the regulatory agencies believe there is sufficient information to make a decision on acceptability/unacceptability for disposal.

In the draft ITM, Tier 1 involves a determination that there is or is not contamination and is based on existing information. This tier is also referred to as the "exclusion" from testing, and if the material meets the exclusionary criteria at 40 CFR 230.60, there is no need to test. One of the exclusion criteria provided at 40 CFR Section 230.60 (a) is that a minimum basis for exclusion is if the dredged material is composed primarily of sand, gravel or other naturally occurring inert material.

Another aspect of the exclusion criteria and the next level of evaluation in Tier 1 is that additional testing may not be necessary in a particular case if adequate data are available to establish that the material is unlikely to result in an unacceptable adverse effect on the aquatic ecosystem (e.g. where several years of past testing data show that the material has always met current suitability guidelines), and there is no reason to believe conditions have changed. Assuming there is "reason to believe" that contaminants are present and have the potential to cause unacceptable adverse effects, Tier II is used to identify contaminants and the estimation of theoretical bioaccumulation potential of certain contaminants. Tier III consists of acute

toxicity bioassays and bioaccumulation tests.

In the interpretation of bioassay tests results, there are species survival criteria, and the potential benthic effects are evaluated in terms of differential in response of the test species placed in the dredged material and the reference material at the disposal site. A mortality greater than 10% (20% for amphipods) and that is statistically significantly greater than the test results for the reference sediment indicates a presumed potential for unacceptable adverse effects according to the regulatory agencies.

Similarly bioaccumulation in the dredged material is evaluated in comparison to the reference sediment. If open water disposal of the tested material is considered unacceptable, then the applicant must find an upland disposal site usually at a higher cost or provide "higher resolution" testing. If no suitable disposal site is identified, then dredging is not authorized.

The tiered testing approach then, is intended to provide progressive amounts of information. *"Decisions on the suitability of the material for unrestricted, restricted, or no open water disposal are to be made upon sufficient information rather than a pass-fail basis, recognizing that bioassay results are not absolute indications of environmental effects and allowing for flexible interpretation."* (Wright and Saunders, 1990)

The S.F. Bay agencies are not consistent in following the tiered testing procedures. Frequently, both Tier II and III tests are required initially.

A salient feature of PN 93-2 is the use of a reference site, rather than the disposal site as specified in 40 CFR 230.60, as a point of comparison for determining the suitability for disposal at the S.F. Bay Alcatraz disposal site (SF 11). 40 CFR 230.60 allows a comparison of contaminants in the dredged material with those at the disposal site and allow open-water disposal where contaminants at the two sites are "substantially similar" or where it can be shown that unacceptable concentrations of contaminants will not be transported beyond the boundaries of the disposal site.

Applicants are now required to use a set of standardized test results from a new reference area, the Alcatraz environs instead of the Alcatraz disposal site itself. As described in PN 93-2, the regulatory agencies justify this on the basis that "this approach is intended to reduce the variability in reference site data caused by ongoing disposal operations..." As noted previously, this approach is not in accord with 40 CFR 230.60.

However, the problem with this particular reference site approach is that the Alcatraz Environs sediment is primarily sand, whereas most material dredged in the Bay consists mostly of finer grain materials. The amphipod required for testing is sensitive to grain size, and thus, test organism mortality in fine-grained sediment may be interpreted as indicating chemical toxicity; yet, it may only be an effect of grain size. This grain size difference renders the validity of the Environs a questionable reference choice. Further, the draft ITM's (pages 39-40) comments on the use of the"periodic reference approach" strongly discourages its use. If it is going to continue to be used, it must be shown that it meets the technical requirements as

described in Exhibit 2 of this paper.

Other PN 93-2 requirements are that certain tests species are mandatory, even though questions have been raised about the appropriateness of using non-native species. PN 93-2 adopts a maximum 20% mortality percentage between reference and dredged material survival for all test species to indicate whether test species pass or fail, and this number is often used on a strict pass-fail basis, without allowing for non-test factors and conditions. Further, it appears that the regulatory agencies neglect consideration of interferences or external influences which may confound test results, such as the presence and effect of ammonia, sulfides, salinity and grain size on mortality; elemental facts related to the physics of sediment, e.g. sediments are in a constant state of resuspension and mixing and interactions that occur between the origin and current health of the species and laboratory conditions. Recently, two different laboratories tested the same sample of dredged material and got very different results in a particular contaminant's levels. This may be because two different extraction methods and calibrations were used.

These external influences are not consistently factored into the process of test result interpretation and subsequent disposal decisionmaking. They should be included as part of a proper reference site comparison using a justifiable and mandatory decisionmaking framework.

Another issue is that the required mixing (LPC calculation) following disposal is not accepted by some regulators. This is probably because the

mixing considerations required at 40 CFR 230.10 (b) (1) the amount, if any, is left to the discretion of the state 401 certifying agency.

Other than the traditional exclusion for material composed primarily of sand and gravel, the Tier I exclusion from testing based on a preponderance of existing data is usually disallowed. The regulatory agencies, which have apparently adopted an overcautious policy regarding the exclusions and the adequacy of existing data to make decisions, thereby require that applicants conduct the full suite of tests. This flies in the face of and defeats the intent of tiered testing, as well as the intent of 40 CFR 230.60. As noted above, the tiers as constituted in PN 93-2 are, in themselves, flawed and deviate from the regulation. This begs for remedy. Conducting the entire suite of tests for each dredging cycle, when previous information should be entirely adequate, constitutes a colossal waste of both public and private funds. In fact, the statistic most often cited is that approximately 95% of the Bay's dredged sediment is deemed suitable for aquatic disposal. The question really becomes how much testing is needed to provide further information and is such information really needed.

There is the occurrence of false-positive, and therefore, inconclusive test results. The test results of the chemical evaluations do not always indicate toxicity in bioassays. The question then becomes which test (chemical criteria/standards or bioassays) should be considered definitive in the evaluation of the toxicity of dredged material. The results of the water column acute toxicity bioassays should be definitive and should override numeric standards because they indicate effects. Thus, there should be no

need to conduct any elutriate chemical analyses if acute water column tests are conducted. This also holds for benthic toxicity tests. These tests should be considered as definitive, rather than presumptive, tests. In essence, other than an initial characterization of the material to be dredged (which need not be repeated except for a reason to believe that there has been some change), the only regulatory purpose for sediment chemical analyses is to obtain data to use in the bioaccumulation estimation in Tier II (of the ITM, not PN 93-2).

Testing may provide valuable information; however, because the S.F. Bay regulatory agencies lack uniform or consistent interpretative guidance to provide ecological meaning to many chemical or biological test results, such as the phenomenon of tissue concentration of a bioaccumulated contaminant, or the concentration of a contaminant in the sediment, it is not possible to arrive at a technically defensible evaluation of potential environmental effects of contaminants (as required by 40 CFR 230.60 and .61) and make an environmentally reliable decision regarding disposal.

The most egregious result of PN 92-3 is that some channel and harbor areas may never be dredged because the price of testing is now overtaking the cost of the actual dredging. A recent sediment testing bid proposal, for the full suite of chemical and biological tests, including bioaccumulation, for four berths at the Port of Oakland was $700,000, which is just about double what it will cost to dredge these berths.

The regional economic consequences of allowing this regulatory regime, as

it is being administered locally in the S.F. Bay Area through Public Notice 93-2, to go unchecked and unrestrained could be disastrous. A well-maintained navigation channel system supported by dredging is a vital link to the furtherance of domestic and international trade and commerce and economic stability. Billions of dollars worth of trade and commerce are being lost and opportunities are foreclosed because navigation channel dredging is often stalled by the debates over how many and what types of tests are necessary and the the lack of agreement on what the results mean for the purpose of determining an environmental effect and making an environmentally reliable disposal decision.

Further, in the Bay Area, there is a tremendous opportunity through the LTMS to reach consensus on a 50-year dredging and disposal management plan. The goals of the LTMS is to continue dredging and dispose of sediments in an environmentally-sensitive and economically feasible manner. Importantly, the sediment testing protocol and the regulatory interpretation of the results drives the entire decisionmaking framework of the LTMS. The regulatory testing issues must be addressed if there is to be achieved an implementable dredging plan; otherwise, the $16 million dollar LTMS project will have been a wasted effort.

There must be action now to rethink PN 93-2. If sediment testing is to be a meaningful and technically defensible tool in evaluating dredged material for open water disposal, it must be grounded in "good regulatory science."

It is recognized that environmental protection adds cost. The hard part is to

balance the cost of the desired degree of protection with the economic, social, and other benefits of dredging to maintain ports, navigation, recreation, and other beneficial uses.

SEDIMENT QUALITY TESTING ISSUES

ISSUE 1: HOW MUCH TESTING IS NEEDED TO MAKE A GOOD REGULATORY SCIENCE DECISION?

"40 CFR 230.60 requires the use of available information to make a preliminary determination concerning the need for testing of the material proposed for dredging. This principle is commonly known as "reason to believe," and is used to determine acceptability of the material for discharge without further testing. The decision to not perform testing based on prior information must be documented in order to provide a "reasonable assurance that the proposed discharge material is not a carrier of contaminants" (by virtue of the fact that it is sufficiently removed from sources of pollution (230.60 (b).

The reason to believe that no testing is required is based on the type of material to be dredged and/or its potential to be contaminated. For example, dredged material is most likely to be free of contaminants if the material is composed primarily of sand, gravel or other inert material and is found in areas of high current or wave energy (230.60(a). In addition, knowledge of the proposed dredging site proximity to other sources of contamination, as well as that gained from previous testing or through experience and

knowledge of the area to be dredged, may be utilized to conclude that there is no reason to believe that contaminants are present (230.60(b) and therefore, no need for testing.

This general evaluation and exclusions from testing comprises procedures are found in Tier 1 of the manual's tiered-testing framework. Tier 1 is a comprehensive analysis of all existing and readily available information on the proposed dredging project, including all previously collected physical, chemical, and biological data for both the proposed dredging and discharge sites." (Evaluation of Dredged Material Proposed for Discharge in Waters of The U.S.- Testing Manual (Draft) June 1994, prepared by the CE and EPA)

We note that there are additional exclusions from testing at 40 CFR 230.60 (c) and (d).

Although the standard exclusion defined in 230.60 (a) for material primarily composed of sand or gravel has been allowed, the Tier I level defined in 230.60 (b) is rarely utilized for S.F. Bay projects There currently exists a substantial scientific database of information which is the result of millions of dollars spent by project applicants, including the CE, on chemical and biological toxicity sediment testing for dredging projects over the past ten or more years which could be utilized to reduce test requirements for various projects around the Bay.

Furthermore, in addition to specific dredging projects, the information base includes test results from the following programs: the water and sediment

testing conducted by the S.F. RWQCB in the Section 205(j) Sediment Characterization Studies (1988-93); 2) the State Bay Protection and Toxic Hot Spot Program (1988-1995); 3) the testing conducted by the S.F. Estuarine Institute under the auspices of the Regional Monitoring Program (1993-1995); and 4) the testing conducted for the special studies component of the LTMS (1990-1995).

Given the existence of this substantial database, the agencies should work with the dredging project sponsors to identify the conditions and circumstances under which Tier I (existing information) exclusions as per 40 CFR 230.60(b) can be applied. The time may be ripe for applicants, as well, to submit requests for the Tier I exclusion pointing out that existing information is adequate, and that there is no value added by testing information or additional testing at a particular dredging project.

ISSUE 2: HOW TO DESIGN AN APPROPRIATE TEST USING SCIENTIFICALLY VALID ORGANISMS WHICH UNIVERSALLY DEMONSTRATE A TOXIC ENVIRONMENTAL EFFECT AFTER CORRECTING FOR VARIABLES AND EXTERNAL INFLUENCES

The choice of test species for toxicity testing of San Francisco Bay dredge sediments has been of increasing concern due to the introduction of evidence of grain-size, salinity and ammonia interference and resultant mortality.

Until recently, the work most often referenced on this subject was the

laboratory estimates of grain size interference of Dewitt et al., (1988). The work of Carney et al., (1994) substantially confirms a fine grain-size interference for San Francisco Bay as a serious problem for use of both *Rhepoxinius abronius* and *Eohaustorius estuarius*. In S.F. Bay, most maintenance dredging is conducted in harbor areas with fine grained sediments. Thus, grain size interference becomes an important problem to be recognized and accounted for through resolution of the Alcatraz Environs versus the Alcatraz disposal reference site issue.

Carney et al., (1994) showed that grain size interference introduces a bias of between 4 and 10% survival. When this bias is considered along with the comparison to a sand reference without comparison to a fine-grained reference site, the validity of continued use of these species is of serious concern. A different organism should be used or a correction factor should be agreed upon.

The focus of a discussion of acceptable species for toxicity tests should be on the following:

- Benchmark species (as defined in the draft ITM) should be selected that do not show grain-size interference or agreement should be reached on a correction factor.

- It is imperative that a fine-grained disposal site sediment reference be established and used for comparison of toxicity tests according to the conditions for use of reference site

information in the draft ITM. Inasmuch as 40 CFR 230.60 and .61 require the use of the disposal site as a point of comparison, and the validity of this has been established by proposed rule-making on the part of the EPA, an agreement must be reached on whether to continue to violate current law through the use of the Environs reference or to comply with current law. We support the use of good science to establish an appropriate reference site.

ISSUE 3: WHETHER TIER 3 BIOACCUMULATION TESTING IS RELEVANT, SIGNIFICANT AND ACCURATE FOR THE PURPOSE OF DETERMINING ENVIRONMENTAL EFFECT

Bioaccumulation testing of sediment measures the chemical contents of an organism's tissue after a period of direct exposure to the sediment (usually 28 days) and may be an indicator of the biological availability of a chemical constituent to the aquatic food web and ultimately to humans. The draft ITM states that "to use bioaccumulation data, it is necessary to predict whether there will be a cause-and-effect relationship between the animal's exposure to diluted dredged material and a meaningful effect of adverse elevation of body burden of contaminants above that of similar animals not exposed to dredged material."

Although bioaccumulation testing is a direct indicator of bioavailability, the relationship between body burdens and actual biological effects are uncertain (MacDonald et al., 1992). Except in a few select cases (i.e., DDT

and PCB's), actual harmful effects of bioaccumulation have not been measured. Risebrough (1994) indicated that to date there is no demonstrated link between the observed mortalities or elevated incidence of abnormalities in invertebrates and fish species in San Francisco Bay and the effect at the population or ecosystem level. Bioaccumulation evidently has no relevance to environmental protection except when the concentrations of a contaminant can be related to a known adverse effect and a threshold of effect.

According to the Draft Environmental Effects of Dredging Technical Notes (April 1996) "Proposed New Guidance for Interpreting the Consequences of Bioaccumulation from Dredged Material,": *Bioaccumulation is a measurable phenomenon, rather than an effect. Without specific information about biological effects, (for example, reduced survival, growth, reproduction in animals, cancer risk in humans resulting from bioaccumulation, it is difficult, if not impossible, from a regulatory standpoint to objectively determine what level of bioaccumulation constitutes an "unacceptable adverse effect."*

The regulatory agencies requirement for bioaccumulation testing of sediments appears to have grown out of an interpretation of these tests that any accumulation of a chemical constituent in an organism over that in the reference is indicative of an effect and therefore, automatically assumed to be deleterious.

The focus of a discussion on the issue of bioaccumulation testing should be directed at consideration of the following proposals:

- Unless the dredging site has been shown to have potentially deleterious concentrations of bioaccumulative contaminants, bioaccumulation testing is ecologically meaningless and should not be performed. Of interest is that the bioaccumulation test is a special case in Tier III of PN 93-2; however, the agencies are consistently requiring it for decisionmaking purposes.

- Bioaccumulation testing, if used, should be focused on known "hot spot" sites, many of which are already defined.

ISSUE 4: SHOULD A FINE GRAIN S.F. BAY REFERENCE BE IDENTIFIED AND EMPLOYED IN DISPOSAL DECISIONS

The draft ITM defines reference sediment as :

"A sediment, substantially free of contaminants, that is as similar as practicable to the grain size of the dredged material and the sediment at the disposal site, and that reflects the conditions that would exist in the vicinity of the disposal site had no dredged material disposal ever taken place, but had all other influences on sediment condition taken place. These conditions should be met to the maximum extent possible. For waters of the U.S., it is recognized that background levels of contaminants from sources other than dredged material discharges may be substantial and that consequently, in some cases (e.g. when the whole area within dredging and discharge occur is contaminated, additional clarification on this issue may be provided in

regional applications. The reference sediment serves as a point of comparison to identify potential effects of contaminants in the dredged material. Note: The reference sediment concept is the subject of a CWA Section 404 rulemaking under development."

In S.F. Bay, the reference site for sediment comparison purposes, until the adoption of PN 93-2, was the Alcatraz disposal site (SF-11). Although the Alcatraz Environs continues to be used as the reference sediment site, it has become obvious that the Alcatraz Environs are not suitable because of the difference in the sediment grain-size at the Alcatraz Environs compared with sites around the Bay and the disposal site itself. Thus, the designation of an appropriate reference site continues to be a major issue in the testing process. Further, there are questions related to the use of a reference other than the disposal site for sediment comparison purposes and the inappropriate use of the reference site information in toxicity evaluation contrary to the guidance in the draft ITM.

According to the draft ITM, certain conditions must be met if the reference other than the disposal site approach is going to be used. Thus, the reliability of the reference database is doubtful yet the S. F. Bay agencies continue to use it for comparison to test results (Exhibit 2).

ISSUE 5: DISCONNECTION OF LOCAL AREA EVALUATION CRITERIA FROM OTHER ACCEPTED PRACTICE AND NATIONAL GUIDANCE

There is uncertainty in the wide use of "professional judgment" of sediment chemistry and biological toxicity results. There appear to be no consistent evaluative criteria for the former. There are no sediment quality criteria, although some are proposed in the NOAA's National Status and Trends Program "Sediment Quality Guidelines" April 1996. Water chemistry is different as it is used to determine compliance with state water quality standards. There are criteria for acute biological toxicity in the draft ITM. Bioaccumulation test results are currently subjective, except for Federal Drug Administration (FDA) action levels and fish advisories.

There is also the occurrence of false-positive results as noted earlier, which leads us to recommend the use of acute water column toxicity tests in lieu of numeric water quality standards.

A brief history of the testing of dredged material will illustrate the evolution of current testing requirements. In the zeal to seek rapid improvements to water and air quality during the late 1960's and early 1970's, the U.S. Congress rapidly and routinely promulgated new laws and regulations. Prior to 1970, the regulatory emphasis on contaminants in the aquatic environment was primarily directed toward the control of contaminants in the water column. It then became apparent that it was not only the contaminants in liquid effluent from municipal and industrial point sources that were an

issue, but the discharge of solid and semi-solid material, such as industrial waste, sewage sludge, and even some dredged material, were also potential sources of contaminants. Although bioassays for effluent had been in use for many years, it was not until 1971 that the first scientific journal article appeared that discussed an effort to assess sediment toxicity (Gannon & Beeton, 1971).

A contaminant source was judged by the agencies solely on the perception that all industrial activity was a source of the alarming pollution and apparent degradation to the environment. In part, the alarm concerning environmental degradation was triggered by the discovery that certain pollutants, such as DDT and mercury, appeared to biomagnify in food webs and posed a human health risk. This discovery provided the catalyst for the U.S. Congress to pass an important amendment to the federal Water Pollution Control Act (FWPCA) with the addition of Section 404 in 1972. This amendment established guidelines to regulate the discharge of dredged or fill material into the waters of the U.S. The FWPCA was again amended in 1977 and renamed the Clean Water Act (CWA).

To establish a basis for regulatory decisionmaking and to comply legally with the revised FWPCA, sediment testing of dredged material for pollutants was initiated with the introduction of the "Jensen Criteria" guidelines for bulk sediment chemistry data analysis. Bulk sediment analysis is a measure of chemical constituents associated with sediment particles. The Jensen test evaluates the pollutant levels in dredged sediment based on an unverified notion of what constituted a chemical/metal concentration that was "too high"

and therefore, unacceptable for aquatic disposal. Under the CWA, test results have to meet the 404(b)(1) guidelines and state water quality standards.

In establishing the "Jensen Criteria," there was no investigation of the fraction of metals available to organisms, no determination of the effects of the sorbed metals on organisms, no consideration of the fate of the sediments during disposal.

Thus, it soon became apparent that the bulk chemical sediment test proved ineffective in assessing toxicity because it did not relate the concentration of a given chemical to ecological effects. Further, because sediment is essentially an aquatic soil, it contains all of the elements in the periodic table as well as a variety of natural and anthropogenic compounds. Also, sediments are complex substances, which may contain a wide variety of contaminants which may or may not be available to fish and wildlife.

Another test, the elutriate test, also appeared at this time. It prescribes mixing sediment with water from the disposal site, allowing the solids to settle, and measuring desorbed constituents in the supernatant water. Values from the elutriate test are compared to state water quality standards. If after consideration of mixing in open water, the state water quality standards are exceeded, the sediment is considered unacceptable for open-water disposal. Agencies tend to reject use of the elutriate test because it often shows little effect on receiving waters. It seldom supports rejection of an application, even though it is a direct measure of desorption of

contaminants. This finding should not be surprising because simple chemical kinetics dictate that contaminants in the sediment will be in at least an approximation of equilibrium with those in the water column.

The inadequacy of the bulk sediment chemistry test for the purpose of evaluating potential environmental harm led to the adoption of an ecological effects-based approach in 1976 and the development of the tiered testing framework in use today. The tiered testing framework is described in the draft ITM. The effects-based approach uses organisms to integrate the potential effects of all the contaminants present through the use of bioassays for acute toxicity and the estimation of bioaccumulation potential.

Permit applicants are confronted today with an evolution in testing requirements caused by the incremental and ad hoc additions of many types of contaminant analyses which at times include agencies' staff particular scientific interests and their interpretations (or lack thereof). These analyses have significantly increased testing costs and are conducted with no demonstrable environmental benefits. In particular, there has been the addition of large numbers of organic compounds and trace contaminants to the bulk sediment chemical analyses, such as organohalogens, mercury and cadmium compounds and carcinogens with no apparent cause and effect relationship to sediment toxicity. This raises a serious concern regarding the validity of continuing to conduct chemical analyses on dredged sediments without establishing the contaminants of concern that scientifically pose a defined effect on or risk to ecological or human health. To collect data which cannot be interpreted so as to be used in decision-

making is a waste of both public and private funds and is clearly outside the scope of the Federal regulatory program regarding dredged material.

Moreover, 40 CFR 230.61(b)(1) provides that where there are a large number of contaminants that preclude identification of all of them by chemical analyses, bioassays may be used in lieu of chemical tests.

Further, according to Engler et al. in 1988 "the preponderance of evidence from years of studies of potential water column impacts from contaminates released by dredged material disposal has demonstrated that such impacts are negligible."

ISSUE 6: THERE IS NO CONSISTENCY BETWEEN SEDIMENT QUALITY EVALUATIONS OF FEDERAL PROJECTS AND APPLICANT PROJECTS NOR AMONG APPLICANT PROJECTS

As noted above, there is a lack of consistency in sediment quality evaluations for material proposed for disposal in S.F. Bay. Such evaluations could easily be characterized as "arbitrary and capricious." We are very concerned about these inconsistencies and feel that, in large part, these stem from the lack of published and established procedures and guidelines. PN 93-2 certainly does not provide these, but there is the opportunity within the LTMS to do so. This opportunity should not fall by the wayside.

The requirements of 33 CFR 209, 335, 336, 337, and 338 govern the evaluation of Federal projects. Specifically, this describes the "Federal

Standard," which is the baseline that establishes environmental and other considerations applicable to Federal projects. A key purpose of the Federal Standard is to prevent the expenditure of Federal funds to satisfy local requirements which are beyond the Federal Standard. At 33 CFR 336, the general procedures to be followed for Federal projects are detailed, and 33 CFR 337.2 sets forth the procedures regarding state or other agency requirements.

We would request that the regulatory agencies evaluate applicant permits within the spirit and intent of 33 CFR 209, 335, 336, 337, and 338 and specifically, 33 337.2. If a state or other agency requirement would not be applicable to a Federal project, it should be equally inapplicable to a permitted activity . To do otherwise creates a "double standard" whereby applicants are subject to the whims of other Federal and state agencies. Unlike Federal projects, where the "no-action" alternative may be easily exercised or the state or project sponsor may defray additional costs, the permit applicant is at a disadvantage and the only recourse is litigation.

This problem would not exist were it not for the lack of reasonable and established guidelines for the evaluation of sediment quality. Absent such, we are not sure that Federal projects are evaluated on the same basis as those of permit applicants.

CONCLUSION

The dredged material regulatory structure in the S.F. Bay Area has taken on a life of its own. Testing has lost its connection as a valid decisionmaking tool and its legal basis to determine effects of disposal on the environment. This situation is causing an imbalance in regulatory decisions related to accomplishing dredging projects that are very important to the economic well being of Northern California.

In recognition of the concerns over dredging and importance of navigational trade and commerce and their benefits to the economy, the LTMS was inaugurated. Its goals are to maintain navigation in San Francisco Bay and conduct dredging activities in the most environmentally and economically sound way. Additionally it is seeking to improve coordination, consistency and scientific validity in disposal decisionmaking through the creation of a Dredged Material Management Office (DMMO).

Sediment quality evaluations drive disposal decisionmaking. Thus, the resolution of the sediment quality testing issues outlined in this paper is vital to achieve the LTMS goals and an implementable Management Plan. Resolution of these issues requires data synthesis and/or consensus on interpretation and consistency with federal law and guidance. A more in-depth analysis of these issues, with the addition of others as deemed appropriate, may be required in the future and can be prepared after initial meetings and workshops.

Recommendations of "next steps" are as follows:

- A series of workshops should be convened by the LTMS agencies to revisit the premises of PN 93-2 for consistency with 40 CFR Part 230 and the draft ITM. The workshop(s) agenda should include a discussion of the approach to the design of testing requirements, interpretative criteria for bioassays, species selection and point of reference for sediment comparison purposes and allowable mixing. A Scientific Technical Peer Review Group should be appointed as advisors to the workshop(s).

- Develop a Regional Decisionmaking Framework for test result interpretation. A regional decisionmaking framework should provide for evaluating the environmental acceptability of the full continuum of dredged material (both clean and contaminated) management alternatives (open water disposal, confined disposal, and beneficial reuse applications) and establishing a Quality Assurance and Quality Control Plan. The Framework should be adopted by the LTMS agencies after public hearings and incorporated into the LTMS Management Plan.

- Complete a Regional Testing Guidance Manual. The Manual should replace PN 93-2 and also include the Regional Decisionmaking Framework.

- Establish a testing laboratory certification program to validate and improve QA/QC procedures.

Editor Note:

This paper was reviewed by Thomas D. Wright, Ph.D., Aquatic Biologist.

Since the work on this paper began, additional research on the subject of sediment toxicity evaluations and contaminant testing methodologies has been completed. These works are cited here to be included in future workshops on this subject and updates and revisions to this paper, however, the timing of the publication of this paper precluded including an evaluation of these reports at this time.

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"*Sulfide Tolerances of Four Marine Species Used to Evaluate Sediment and Pore-Water Toxicity,*" Susan Anderson, et al.

"*Determinants of Sediment Toxicity in San Francisco Bay, Final Report,*" Erika Hoffman et al.

"*Potential Positive Interferences in Sediment Toxicity Tests,*" A Briefing Report to the In-Bay Studies Work Group of the Long-Term Management

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DEPARTMENT OF THE ARMY
WATERWAYS EXPERIMENT STATION, CORPS OF ENGINEERS
3909 HALLS FERRY ROAD
VICKSBURG, MISSISSIPPI 39180-6199

REPLY TO
ATTENTION OF

CEWES-EP-D (70-1r) 25 February 1993

MEMORANDUM FOR Commander, USAE District, San Francisco, ATTN: CESPN-PE-R (Mr. Rod Chisholm), 211 Main St., San Francisco, CA 94105-1905

SUBJECT: DOTS Request for Assistance

1. Enclosed is the response to your DOTS request for a review of Public Notice (PN) 92-7. It is unfortunate that we did not have the opportunity to review previous versions of the PN. Further, it is our understanding that the PN was reissued as PN 93-2 and is now considered to be final and in force. In addition to the many technical flaws and inconsistencies noted in our review, the PN is also deficient in that it is neither in accord with CE/EPA national guidance nor current practice in CE Districts and EPA Regions.

2. This is particularly disturbing because many of the projects regulated under the Clean Water Act (CWA) in the San Francisco District with which we are familiar (Oakland, J. F. Baldwin, Richmond, etc.) **are** in accord with national guidance and current practice. In light of the review comments, we urge that you consider revising the PN as expeditiously as possible. Although major revision so soon after issuance may be awkward, it would seem best to handle it as an internal matter between the agencies rather than through public involvement when the draft CWA Manual becomes available. You are fortunate in this regard because there are representatives from the EPA Region and the District on the national CWA Manual Task Force.

3. We appreciate your interest in the DOTS Program and if you need further assistance, please contact Dr. Thomas Wright (601-634-3708).

FOR THE DIRECTOR, ENVIRONMENTAL LABORATORY:

Thomas R. Patin

Encl

THOMAS R. PATIN, PE
Manager, Dredging Operations
Technical Support

CF: wo/encl
T. Wright, ES-F
D. Mathis, CW-PO
K. Stark, CW-OR
J. Wilson, CW-OD

EXHIBIT 1

CEWES-ES-F (70) 25 Feb 93

MEMORANDUM FOR CEWES-EP-D/ENGLER

SUBJECT: Review of Public Notice (PN) 92-7 for CESPN-PE-R (R. Chisholm)

GENERAL COMMENTS

1. Overall, the approach described in this document is not in accord with current technical or regulatory guidance regarding the testing and evaluation of dredged material proposed for open-water disposal. Guidance for disposal regulated under the Clean Water Act (CWA) was first developed in 1976 ("Ecological Evaluation of Proposed Discharge of Dredged or Fill Material into Navigable Waters", CEWES Miscellaneous Paper D-17, May 76) and for the Marine Protection, Research, and Sanctuaries Act (MPRSA) in 1977 ("Ecological Evaluation of Proposed Discharge of Dredged Material into Ocean Waters", CE/EPA, Jul 77). The MPRSA guidance was revised in 1991 and the CWA guidance is currently being revised with CE/EPA field review scheduled for next month.

2. Additional guidance has been provided by Francingues et al. ("Management Strategy for Disposal of Dredged Material: Contaminant Testing and Controls", CEWES Miscellaneous Paper D-85-1, Aug 85), Engler et al. ("Corps of Engineers' Procedures and Policies on Dredging and Dredged Material Disposal (The Federal Standard)", CEWES EEDP-04-8, Aug 88), the revision of 33 CFR 209, 335-338 in Apr 88, CE/EPA ("Evaluating Environmental Effects of Dredged Material Management Alternatives-A Technical Framework", EPA842-B-92-008, Nov 92), as well as numerous Regulatory Guidance Letters, such as 87-8 ("Testing Requirements for Dredged Material Evaluation") and 90-4 ("Water Quality Considerations").

3. Since the mid-70's the CE and the EPA have been working together to achieve environmentally protective, cost effective, technically sound, and, so far as extant regulations allow, consistency in the testing and evaluation of dredged material. This has not been a secret or concealed effort and has received wide publicity in a variety of media. In the recent past, major public workshops sponsored jointly by the EPA and the CE providing guidance on the testing and evaluation of dredged material were held in Tiburon, San Diego, and San Francisco, CA. The latter two were held in the fall of 1992.

4. The timing of this PN is most unfortunate. When, in the immediate future, the draft CWA Manual becomes available for field review, it will be immediately recognized that the PN is severely defective and inconsistent with national guidance developed jointly by the EPA and the CE. As with the MPRSA Manual, a local implementation manual will be required and the existence of this PN will only serve as a hindrance. Although the draft CWA Manual will be in draft form and will be subject to public review and comment before becoming final, it is not anticipated that there will be major changes because it is so similar to the MPRSA Manual. It is inevitable that, during the public comment period, the PN will be compared and contrasted to the national guidance. At the very least, this will be most embarrassing to all of the involved agencies. To the public, it will appear that the agencies are not consistent

with national guidance, are not cost-effective, and, above all, are not environmentally protective.

SPECIFIC COMMENTS

Cover Letter

5. A more appropriate title would be, "Testing and Evaluation of Dredged Material for Open-Water Disposal in San Francisco Bay Sites."

6. 1, 2, 17: How and on what basis does one define chemical degradation?

7. 1, 2, 24: It is my understanding that PN 87-1 was never finalized. Hence, it has no status and should not be referenced in a regulatory document.

8. 1, 4, 2 and 6: I subscribe wholeheartedly to the replacement of the disposal site by the site environs as a reference and that will be national guidance. However, it has been decided at HQ level that this will require formal rulemaking for implementation. Until that has been done, although the approach is technically sound and makes environmental sense, it might not withstand a legal challenge. I would suggest that you consult with HQ on this matter.

9. 2, 0, 28: The development of a reference database and comparison of test results to it is fraught with peril. I am enclosing pertinent pages (encl 1) from the draft CWA Manual and a letter (encl 2) which lists the flaws in this approach and the conditions which must be met if it is used. If you cannot meet the conditions, you should not use this approach.

10. 2, 1, 1: See comment 9 above.

11. 2, 2, 19: Will the testing guidelines be applied to Federal projects? If not, this is not in accord with paragraph 3 of RGL 87-8.

12. 2, 2, 27: As on page 5 (i) of response to comments, you should state here that the guidelines will be modified by the draft CWA Manual.

Guidelines

13. 3, 1, 7: There is already adequate guidance to modify these guidelines to be in accord with national programs and there will be even more when the draft CWA Manual is available.

14. 3, 1, 13: The only agency which issues dredged material disposal permits is the U.S. Army Corps of Engineers.

thus leading to significantly increased costs and project delays. Further, those subject to such increased costs and/or project delays may have probable cause for recovery, either from the state, the Federal government, or both.

Encls

THOMAS D. WRIGHT, PhD, CEP, CFS
Ecologist

CF:
CECW-PO/David Mathis
CECW-OR/Kirk Stark
CECW-OD/Joseph Wilson

Environmental Services for Industry and Government

Seattle, U.S.A.
Vancouver, Canada

EVS ENVIRONMENT CONSULTANTS

Our File: 2/271-10

October 21, 1992

Michael Kravitz
U.S. EPA/OST (WH-585)
401 M Street SW
Washington, D.C.
U.S.A. 20460

Dear Michael:

Re: Periodic Reference Approach for Inland Testing Manual

As per Decision 6 of the Minutes from the Inland Testing Manual Workgroup Meeting (September 21, 1992), the periodic reference approach has been explored, primarily by Dennis Brandon and Michael Paine (of EVS Consultants). We are in agreement that this approach introduces major complications in sampling and statistical procedures and is therefore very limited in terms of useful application. The major complications are:

1. Requirement for a database of responses to reference sediment(s); limitations on statistical power.

   The simplest way to compare the observed response to dredged material with the response to the reference sediment is to compare the mean response to the dredged material to one-sided tolerance or prediction limits for the response to the reference sediment. One-sided tolerance intervals (TL) are given by:

$$TL = \bar{X} \pm t_{\alpha,n-1} SD \quad ,$$

   where: $\bar{X}$ = mean response to reference sediment over several sample dates
   $t_{\alpha,n-1}$ = Student t-value for one-tailed probability α, and $n-1$ degrees of freedom
   n = number of dates on which response has been measured (not number of laboratory replicates)
   SD = standard deviation of responses over time (not standard deviation among laboratory replicates)

../2

2517 Eastlake Ave. East
Suite 200
Seattle, WA 98102
Tel: (206) 328-4188
Fax. (206) 328-4291

105 Pemberton Avenue
North Vancouver, B.C.
Canada V7P 2R4
Tel: (604) 986-4331
Fax (604) 662-8648

EXHIBIT 2

The choice between upper or lower limits would depend on the response (e.g., for survival, one would use the lower 95% TL). Note that the variation among dates, rather than the variation among laboratory replicates, is of interest, and that responses from several dates are required to construct the tolerance limits. Each response mean (of laboratory replicates) for a single date is considered one observation only for calculating the mean, SD, and TL. Values of t for one-tailed $\alpha=0.05$ are 2.13 for $n=5$ dates; 1.83 for $n=10$ dates; and 1.64 for $n=$infinity. The width of tolerance intervals, unlike confidence intervals, does not decrease with sample size except for the dependence of t on sample size (i.e., confidence intervals decrease in width with increasing sample size because the standard error depends on sample size; SD does not depend on sample size). As a result, there will be severe limitations on statistical power if temporal variability in response is high. These limitations cannot be overcome by conducting additional tests. Our prediction, based on experience, is that the variance among dates will be high, unless many samples from a large area are composited on each date.

A time series for responses to a reference sediment could be constructed if the reference area was used repeatedly. One or two years of testing reference and dredged material simultaneously would probably provide sufficient data; at least one year would be required to encompass all four seasons. Ideally, the reference data should come from samples taken on randomly selected dates, but we doubt that this would ever occur in practice. There may also be serial correlation among dates, which would lead to an underestimate of the real SD.

2. Changes in sensitivity of the test organisms

If the response to dredged material is to be compared to responses to reference sediment measured on other dates, then investigators must ensure that the sensitivity of the test organisms is similar among dates. The best way to do this is to compare results of reference toxicant tests. Suppose that an investigator tests dredged material on April 31, and conducts a reference toxicant test at the same time. The reference toxicant test results would be compared with the two-sided tolerance interval for reference toxicant results from previous dates. If the reference toxicant result for April 31 were within the tolerance interval, then it would be reasonable to conclude that the test organisms were similar in sensitivity to organisms used in the past (i.e., when the response to the reference sediment was measured), and the response to the dredged material would be compared to the appropriate tolerance limit as discussed in Point 1 above.

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The procedure described above seems simple, and is similar to comparison of reference toxicant results to warning or control limits. However, there is one important difference, which creates a fatal flaw in the procedure. Warning and control limits are 95 or 99% tolerance limits. When a reference toxicant result is compared to these limits, we are interested in whether the result is significantly different from the responses measured previously (i.e., out of range or control). Similarly, when the response to dredged material is compared to the tolerance limits for responses to a reference, we are also interested in whether the response to dredged material is significantly different from the response to the reference. Under these circumstances using $\alpha=0.05$ or 0.01 is appropriate. However, when we compare a reference toxicant result from a specific date (e.g., April 31) to tolerance intervals based on previous values, we are not really interested in significant differences. Instead, we want to know whether the April 31 response is the same as or similar to previous responses, as an indication that the sensitivity of the test organisms has not changed. The absence of a significant difference does not necessarily indicate that there is no difference. Thus, it would be safer to use 75% tolerance limits rather than 95 or 99% tolerance limits. The selection of 75% tolerance limits is somewhat arbitrary, but follows from the common practice of pooling error terms or dropping interactions only when $P>0.25$. However, if we use 75% tolerance limits, then 25% of the reference toxicant results will be outside those limits purely by chance. Thus, at least 25% of the time, we will conclude that the sensitivity of the test organisms is not similar to that in past tests, and that we are not justified in comparing the response to dredged material to past responses to a reference sediment. At that point, we would presumably have to go back and collect and test dredged and reference sediment simultaneously, negating any cost savings associated with the periodic reference approach.

Based on the above considerations, utility of the periodic reference approach is restricted to conditions where:

1. Response data are available for the reference sediment for several dates spanning at least a year.

2. Variance among dates is low, and there is no serial correlation.

../4

3. Reference toxicant results (and the sensitivity of test organisms) are consistent over time, so that any result within the 95 or 99% tolerance limits is similar to the overall mean

   or

   we are prepared to accept a 25% failure rate when the periodic reference area approach is used, and reference toxicant results are compared to the 75% tolerance limits for past data.

We doubt that even one of these conditions would be met in the majority of cases in which the periodic reference area approach would be used; all three conditions would never be met.

From the above reasoned viewpoint, the inclusion of statistical procedures for the periodic reference approach in Appendix D is not a useful exercise. We suggest that the statement be made in the Main Text that, as per Decision 2 of the Minutes (Sept. 21), the statistics appendix will not provide guidance for handling of a periodic reference, and that it be the onus of the applicant to "provide appropriate statistical interpretation which is technically defensible". Further, we suggest that the complications incumbent with the adoption of this approach and the restrictions on its adoption be clearly stated in the manual.

We welcome your response on whether this is a reasonable alternative to including procedures for a reference approach whose utility is technically questionable and rarely recommended.

Yours truly,

EVS CONSULTANTS

Peter M. Chapman, Ph.D.
Partner

Michael D. Paine, Ph.D.
Environmental Scientist

PMC/jag

cc: Dennis Brandon ACOE/WES (by fax)
Kirk Stark ACOE/Headquarters (by fax)