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). 20m

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. 20n

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. 20o

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).

20s 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). 20s

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 20t

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

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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. 20t

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."*

20u 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. 20u

- 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."

20v 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.

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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. 2

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 2

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.

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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. 20y

Editor Note:

This paper was reviewed by Thomas D. Wright, Consultant.

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.

"*The Utility of Pore-water Toxicity Testing for Development of Site-Specific Marine Sediment Quality for Metals,*" Susan Anderson, et al.

"*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
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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

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T. Wright, ES-F
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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.

15. 3, 3, 15: You should also describe the exclusions from testing at 40 CFR 230.60 (b), (c), and (d).

16. 3, 4, 6: The discussion here is incomplete. The purpose of Tier I is to determine if the material is excluded from testing or if there is adequate information upon which to make a decision as to acceptability. It may be concluded that the material is acceptable, unacceptable, or that information is inadequate. If the latter, additional information is required unless some other disposal option is pursued or the project is abandoned.

17. 3, 4, 15: See comment 7 above regarding PN 87-1.

18. 3, 5: The guidance here is confusing and inconsistent with national guidance in the MPRSA Manual and the draft CWA Manual. Tier II should consist of two parts, one dealing with compliance of state water quality standards and the other with potential benthic bioaccumulation of non-polar organics. One may conduct a water quality screen using the bulk sediment chemistry and the dump model. If this indicates that water quality standards are exceeded, an elutriate is then performed. It is mandatory to demonstrate compliance with water quality standards in order to obtain water quality certification, unless the state waives the standards. If the state has EPA approved biological water quality standards, if there are not water quality standards for all contaminants of concern, or if interactive effects of contaminants cannot be ruled out, water column acute toxicity tests are conducted in Tier III. The bioaccumulation procedure will indicate whether there is cause for concern. If so, actual bioaccumulation is measured in Tier III. If contaminants other than non-polar organics are of concern, actual bioaccumulation must be evaluated.

19. 3, 6, 2: What is the basis for the minimum number of sediment samples?

20. 4, 1, 4: See comment 18 above. Bioassays are not conducted in Tier II.

21. 4, 2, 3: The current MPRSA Manual recommends a minimum of three species in the water column evaluation as will the draft CWA Manual. This is because the use of a single species is not environmentally protective.

22. 4, 2, 14: How does one interpret abnormal development?

22. 4, 3, 8: The current MPRSA Manual recommends a deposit-feeder, burrower, and filter feeder for acute benthic bioassays, as will the draft CWA Manual. Depending on the organisms selected, this means at least two species. One of the species should be an amphipod unless local guidance indicates otherwise. The rationale for multiple species in benthic and water column testing is to take into account differing sensitivities to contaminants and to be environmentally protective.

23. 4, 3, 15: How does one interpret post-exposure reburial success?

24. 4, 3, 24: See comment 9 above regarding the reference database approach. What is the basis of not using statistical significance?

25. 4, 4, 9: This Tier III is confusing and is not in accord with national guidance. For example, unless information in Tier II is adequate, bioaccumulation should always be performed as a part of the evaluation in Tier III. More acute toxicity bioassays? On what basis? This will probably require remobilization of field equipment to collect more sediment because not enough would have been collected in the first place or the storage time was exceeded. Field surveys of benthic communities? Where and what for? On what basis? If I were an applicant, I would probably find it most cost-effective to collect all of the sediment needed and run all of the tests potentially required at the same time. The tiers should be corrected. The problem with the tiers is somewhat surprising considering that EPA Region IX and the San Francisco District have representatives (Mr. Brian Ross and Mr. Wade Eakle) on the draft CWA Manual Task Force. Their guidance on this should be sought as they just finished reviewing the last draft before field review.

26. 6, II, g: What is the limiting permissible concentration calculation?

27. 7: What does one do with this table in regard to acceptability of material for open-water disposal. Most of the values vary over two or three orders of magnitude. I suppose that it is implied in using the reference database approach that sediments collected from the reference area should fall within some sort of range or within some deviation of these values. The table does not have a number, and there is no guidance in the text as how to use it.

28. 8. See comment 9 above regarding the reference database approach. Obviously, there is no way these values can be statistically compared with results from the d[illegible]ed material. Hence, you cannot say whether any differences are real Further, what is the point of reference survival in the suspended particulate phase? YOU DO NOT USE REFERENCE SEDIMENT IN WATER COLUMN TESTS!!

Response to Comments

29. 1, I.a., 30: How will elevated chemistry independently indicate the need for more than routine Tier II testing? What are the criteria? Remember, this is a regulatory program and if you are going to make statements such as this, you need to provide much more guidance than this to avoid charges of arbitrary and capricious decision-making.

30. 1, I.b., 22: Total organic carbon is needed to conduct the Tier I bioaccumulation evaluation. When (and if) sediment quality criteria are ever issued for organics, it will also be needed to calculate them.

31. 1, I.c., 22: This is incorrect. The 20% mortality for amphipods has nothing to do with grain-size. It is used to account for the fact that these

are probably the most sensitive organisms in widespread use. Being highly sensitive, there is a greater "noise" factor. If grain-size is a consideration with a specific amphipod, a different amphipod should be used as per sections 11.0 and 11.2.1 of the draft CWA Manual ("infaunal amphipods are...as a group, tolerant of a wide variety of grain-sizes."). Further, I do not agree that the 20% value with respect to grain-size is "...well established in the scientific literature." If so, I would appreciate seeing the reference(s). Other animals, such as clams, are so hardy that a few percent mortality is a cause for concern. What mortality values are you going to use for the other animals? Again, remember that this is a regulatory program, not a research and development exercise, and you must be explicit in interpretation of the test results.

32. 1, I.d.: See comment 9 above on the reference database approach.

33. 2, I.f., 10: Why are you using the environs approach for Alcatraz and not the other sites? See comment 9 above on the reference database approach.

34. 2, II.b., 7: See comment 15 above.

35. 2, II.b., 30: Please be specific as to what additional testing the state may require and the circumstances under which it may be required. The CE cannot endorse nor acquiesce to state requirements which are beyond the Federal Standard as per 33 CFR 335-338.

36. 2, II.c.: This does not really clarify when Tier III will be required and is internally inconsistent. For example, it was previously stated that >20% mortality in an amphipod was evidence of acute toxicity. You have already used the most sensitive organism. Why would you now use less sensitive organisms? How do you define "elevated" levels of contaminants? What sort of project-specific circumstances might lead to insufficient information in Tier II? What are the criteria for "refutation" of Tier II results? If you would simply comply with national guidance, all of these problems would be resolved. As matters stand, they are going to be the source of endless arguments and confusion.

37. 3, III.d.: See comment 9 above on the reference database

38. 3, IV.a., 31: See comment 28 above.

39. 3, IV.b., 3: How do you interpret reburial? What do you mean by a "marginal" response?

40. 4, IV.c: See comment 28 above.

41. 4, V.a.1: The only agency which issues permits for the disposal of dredged material is the U.S. Army Corps of Engineers.

42. 4, V.b.: This is fuzzy logic. The testing guidelines do not provide better predictability without concurrent interpretative guidance. The testing guidelines will produce better test reproducibility, but this has nothing to do with predictability. In this regard, the testing described herein is in response to the factual determination for contaminants in the 404(b)(1) Guidelines at 40 CFR 230.11(d) as determined by the exclusions and testing in Subpart G. Again, remember that this is a regulatory program and you must provide guidance as to how you are going to interpret/evaluate the results of the various tests.

43. 4, V.c., 16: If either bioassay "fails", then there is no recourse, because failure is an absolute. Hence, your Tier III is irrelevant as it is now constituted.

44. 4, V.d., 13: What is the basis for the assumption that abnormal larvae do not survive?

45. 4, V.d., 19: How are you going to interpret the EC50 values?

46. 5, V.e.: See comment 9 above on the reference database approach.

47. 5, V.e., 20: What happens if material "passes" direct reference testing but fails the reference database or vice-versa? Flip a coin? Keep in mind that, as per encl 2, you are not evaluating on a comparable basis, because the error factor associated with each approach is different.

48. 5, V.g., 6: What are the information requirements of the RWQBC and the BCDC? The only data that they need is that to show compliance with state water quality standards and coastal zone consistency. Nowhere in the PN is there mention of meeting state water quality standards, water chemistry methods and detection limits, or what the state allows for mixing. As per paragraph 3 of RGL 87-8, applicants need this type of. If this is to be a joint document, it should clearly set forth what tests are required and their interpretation regarding acceptability of material for open-water disposal. If state and Federal requirements are not identical, such differences should be noted and guidance provided to applicants as per 33 CFR 335-338.

Recommendations

49. It is my understanding that, during this review, PN 92-7 was reissued as PN 93-2, which I have not seen. Unless the reissuance addressed and reconciled the comments above, you should consider revising the PN to be in accord with national guidance. Because of its obvious inconsistency with national guidance and the problems with the reference database approach, among others, neither Federal projects nor those of permit applicants should be tested or evaluated prior to revision, as its technical and legal basis is highly questionable. If tested and evaluated according to its provisions, such tests and evaluations could easily be set aside on a number of grounds,

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

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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

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EXHIBIT 2