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WASTE MANAGEMENT
DEPARTMENT

RICHARD L. HAYS
DIRECTOR

November 21, 1995

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▶

To Betty S.	From Phil
Dept./Agency	Phone #
Fax # 687-8787	Fax # 4-4213

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

Mr. Phil Dyck
NTC Environmental Coordinator
33502 Decatur Rd., Suite 120
San Diego, Ca 92123-1449

Subject: **COMMENTS ON PRELIMINARY DRAFT WORK PLAN SEDIMENT CHARACTERIZATION OF THE BOAT CHANNEL - NTC, SAN DIEGO**

Dear Mr. Dyck:

I have reviewed the subject document and have several comments. It appears that the goal of the Work Plan as set by the scope of the project is reasonable. However it does not appear as though the actual number of samples to be analyzed or the random method of locating sample points will provide a true description of "the presence and general spatial distribution of chemical constituents in the Boat Channel."

In general, rather than solely comparing the results to other locations in San Diego Bay, a comparison to something more familiar and tangible like a STLC method test regime would also be helpful in truly evaluating the sediment characteristics.

My comments are referenced to page and section and are as follows:

Page	Section	
1-1	1.1	As mentioned above, compare not only to other locations in San Diego Bay.
2-1	2.1	Last paragraph. What is "significant" tidal flushing?
2-11	2.3.1	Last sentence. Please define the ERL/ERM evaluation better. It sounds like you'll be using data obtained in this investigation to evaluate the data obtained in the same investigation. Is this to be a statistical exercise. Please compare results to real levels, not solely a statistical analysis.

2-12	2.3.2	All related data should be evaluated together. All samples selected for toxicity testing should also be tested for chemical makeup.
3-1	Intro.	Last paragraph. This is not a food chain or source study, granted. But the study should be complete enough to effectively evaluate the presence and spatial distribution of contaminants in the sediment column, which should consider dredging, and other potential uses.
3-3	3.3.1	Will random sampling ensure that the goal to determine presence and spatial distribution of contaminants is achieved? Please ensure that the vertical and horizontal extent of contamination is delineated.
3-7	3.3.2	Is it possible to maintain the cores intact, in six foot lengths, until they reach the laboratory? Intact full cores will likely yield better information than pieces.
3-11	3.4.2	First paragraph. 18 surface sediments. 3.3.1 says ten. The more the better, but why the inconsistency? Fourth paragraph. First sentence. Where did test organisms originate? Hopefully from chemically (naturally occurring) similar environments.
6-2	6.2	General. If my understanding of ERM/ERL's is correct, how can you evaluate the sediments on data derived from the medium you're evaluating? A hit is a hit.
6-3	Table 6-1	If the sediment chemistry shows values that exceed Bay levels, even though the worms didn't die, I would think some actions may still be required.
6-3	6.2	Future dredging: This may be key information since only the top of core is to be sampled. The top few inches won't be representative of what happened from 1920-1980. So tests should be more inclusive for reuse. Last paragraph. How do the Ankely evaluations compare to those described herein?
A2-1	2.1	First paragraph. I believe the report falls short of this goal or scope.

Please do not hesitate to contact me at 573-1266, should you have any comments or questions.

Sincerely,

Theodore W. Olson
Underground Storage Tank
Program Manager

TWO:res

cc:Robert A. Epler, Assistant Environmental Services Director
Robert J. Ferrier, Deputy Environmental Services Director/Refuse Disposal
Helen Heim, Deputy Director, Environmental Services/Programs
Tim Johnson, NTC-Reuse Project Director, Office of the City Manager
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Ray Purtee, Senior Engineer-Mechanical, Environmental Services/Refuse Disposal
Jim Durbin, NTC-RAB Community Co-chair, 925 10th St., Unit C, Coronado, CA 92118

file:boat.two

5 November 1995 File: Durbin.2

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From: David Valentine FAX: (619) 454-4616
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Subject: Comments on Draft Work Plan, Sediment Characterization of the Boat Channel, Naval Training Center, San Diego, CA

Page 1-1, Introduction, last two paragraphs.

The "tone" for the field investigation is set here as
"to identify the presence and general spatial distribution of chemical constituents"
"to better characterize the vertical and horizontal distribution and dynamics of sediment contaminants within the Boat Channel."

Page 2-1, 4th paragraph.

"The Boat Channel is the last remnant of the original river bed of the San Diego River." This is probably true. Note, however, that the channel was dredged to its present configuration in 1946. Whether this channel, as it now exists, follows the last river course is problematical. Regardless, dredging did occur and this would have removed the upper layers of riverine sediment. Any additional inputs would, then, have been laid down after the cessation of hostilities in WWII and after the introduction of most organic toxicants of concern. A review of historic aerial photographs should determine how much of the channel follows its historic bed.

Page 2-1, 5th paragraph, 6th line.

"Significant flushing action from San Diego Bay does not occur".

What is viewed as "significant"?. What type of interchange is needed?

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Page 2-3, Figure 2-2.

Define "FFTA"

Page 2-7, Figure 2-4.

The tidal cycle should be superimposed on this figure. This is supposed to be a "flood" drogue study but there is no indication of when the slack tides occurred nor the tidal excursion for the time period during which the study occurred. Even a casual inspection of this figure will demonstrate that the drogues in the channel went to the north but the southern most drogue went south. This is counter-intuitive. Also, the drogues in the mouth of the channel exhibit a complex pattern which cannot easily be explained by supposing that they were dropped on a flood tide.

Page 2-8, Figure 2-5

The same comments are applicable to this figure as on the previous one. According to this figure, drogues released at or near the end of Harbor Island always go into the Bay. This is clearly impossible. Also, the two drogues released in the entrance of the Boat Channel moved toward the east while the drogue supposedly in the east of the Harbor Island Channel moved west, and then presumable toward the Bay. Interesting observation, if true.

Page 2-11, last paragraph, last line

"Sediment chemistry values falling within the lower tenth percentile concentration range (effects range-low [ERL]) and the fiftieth percentile concentration (effects range-median [ERM]) were associated with observed or predicted effects."

This is a rather positive statement which is counter-intuitive. If biological effects were manifested in the lower 10th percentile range then one need not predict effects for higher ranges -- either they would occur or the testing protocol would have been faulty.

It would seem that the manner in which probable effect was defined is purely statistical and has nothing to do with observed effects. That is, one obtains a data set and calculates the appropriate percentiles. Straightforward. However, assuming that these data have any biological meaning is dangerous.

If, in fact, what was described is a purely statistical exercise (this is certainly intimated by the discussion), then it is absolutely impossible to make a statement such as, *"All metal concentrations were below the ERM."* This is clearly impossible since one cannot take a data set, calculate a mean, and then have all of the data fall below the mean! Perhaps a rethinking of this discussion is warranted.

Page 1-12, "2.3.2, Toxicity Results.

The data set being described seems substandard since one cannot make inferences about biological effects unless chemical and biological data are obtained on the same sediments.

Page 3-2, section 3.3.1, Sampling Strategy

The definition of "strata" is questioned. One establishes strata *IF* there are recognizable differences between or among strata (chemically, biologically, topographically, hydrologically, etc). No such differences were established. Assuming "significant" hydrological differences based on the data previously presented is dangerous. Even a simple inspection of the drogue data suggests that there is considerable interchange of water. Where does one establish the "strata" with these data?

Page 3-7, first paragraph.

Placing the three samples in each strata randomly is also questioned. Locating the sampling locations using this method will allow you to calculate the likely *mean* concentration of toxicants in each "strata", but will minimize the amount of information gained regarding the horizontal distribution. The introductory section states that the aims of the study were to

"to identify the presence and general spatial distribution of chemical constituents"
"to better characterize the vertical and horizontal distribution and dynamics of sediment contaminants within the Boat Channel."

The first aim cannot be optimally achieved using a random sampling pattern. Little can be gained on the "dynamics" using this approach. A more reasonable approach would be to place the samples evenly from the upper to the lower boat channel. This gives one the ability to compare and contrast differences between or among one or more data sets and also gain a better perspective into the horizontal distribution of contaminants.

Page 3-7 Sample Collection

Arbitrarily dividing the cores into six subsections is also questioned. Toxicant distribution in sediments is more closely tied to stratification than arbitrary subdivision. That is, the cores may show varving (layering). It would be far more applicable to test each of the layered sections for chemical and toxicological effects. Doing otherwise may well blur distinctions between adjacent core segments. For instance, your basic hypothesis is that the upper cores will be more contaminated than the lower cores. Somewhere in the core length there may well be a varve (this is typical of other sediment studies conducted in San Diego Bay and elsewhere). It is conceivable that contaminated (upper) sediments might be mixed with clean (lower) sediments which would blur the data derived from these studies. It is likely better to test sediments based on sediment characteristics than on a fixed vertical distribution. It would also likely be far less expensive since is it viewed as unlikely that there will be six strata in these cores.

Page 3-11, 4th paragraph.

"For all of the toxicity tests, sediments from which the test organism originated will be tested along with sediments form the Boat Channel". It appears that all of the sediments will be from the boat channel. How does this "negative" control differ from the other sediments to be tested?

"Positive" control sediments for dredging bioassay work have historically be collected off of Mission Bay. Where are these control sediment to be taken from? Some past bioassay work (for the Commercial Basin, for instance), were taken from the main boat channel. These main boat channel sediments were often found to be more toxic (demonstrated more negative biological effects) than the sediments being tested. The sediment control area is, thus, very important.

4-1, Section 4.3 Sediment Sample Collection, last sentence.

This makes reference to analyzing strata within a core. Consider introducing the concept discussed earlier.

It may be that the cores are being sectioned in the field to facilitate transportation to the laboratory. That is, it is easier to transport six one foot cores than one six foot core, or two three foot cores, or three two foot cores. Suffice it to say that the less the cores are handled in the field the less chance there is for the introduction of potential contaminants and the less chance that the cores will be inadvertently mislabelled.

Page 6-1, Data Analysis

The section is reasonably clear though, in my opinion, potentially flawed. An ANOVA does require randomly obtained samples to be truly valid. However, this violates the need to first determine the spatial distribution of contaminants within the boat channel. Remember, the primary thrust of the investigation is to determine the vertical and horizontal distribution of contaminants and not necessarily if the strata are somehow "equivalent" to one another.

Also, one is only going to have three samples from each strata. Calculating a mean within a strata results in the loss of one degree of freedom. If another transformation is required to reach data normality than a second degree of freedom will be lost. This leave only one degree of freedom which results in an ANOVA which approaches powerlessness.

6th paragraph, 6th line

An ANOVA does require a normal distribution but is does not require a "constant" variance. What it does require is that the variances not be significantly different. In other words, that the data points being tested could have been drawn from the same population, not that they are constant. Note also that as the degrees of freedom are decreased that the power of Bartless's test decreases significantly. With one degree of freedom the test borders on uselessness as does the other frequently used variance test, Snedecor's F test.

<u>Draft Field Sampling Plan</u>

Page A2-1

Field measurements. Routinely measuring pH in seawater is not likely to tell you anything. It is a cheap, simple, test but seawater is so highly buffered that massive quantities of acid or base would have to be injected to have any discernable impact on pH. Also, conductivity by itself is of questionable utility. The measurement of choice is salinity which, of course, can be obtained using conductivity and temperature readings. Thus, state that salinity will be calculated.

Page A4-5.

10th "bullet"

The core liner should be extruded from the barrel and inspected. However, the barrel is typically a solid piece of pipe and cannot be opened, *per se*.

11th "bullet"

Consider shipping the liners to the laboratory in an undisturbed condition. Open all at the same time and place them close to one another. This will allow for an extremely easy visual inspection and the ability to follow layers throughout your sample area. The same geologist should log all cores to minimize error.

Regarding the depth of penetration. A six foot penetration is as good a guess as any. However, is it reasonable to supposed an accumulation of several feet (not six feet) of sediments in the channel over the past 49 years? A significant part of the core will likely be in native materials, which is good. However, once the native materials are reached (recall that the channel was previously dredged) then it would seem prudent to test sediment from a single core as a single sample. This would yield information on background chemistry.

Also, the vessel from which the vibra coring will be done must be fairly sizeable since it has to have an "A" frame. It will also likely have a decent depth finder. In these shallow depths a low frequency depth finder (33 kHZ range) should provide sufficient bottom penetration to locate the original channel bottom. Certainly a lower frequency transducer would accomplish the task and would assist in locating the sediment boundaries before sampling occurred. Consider running the survey vessel up and down the channel several times to verify sediment depth and also to "Key" the sampling intervals within the core liners. The GPS system is sufficiently accurate to do a rough plot of sedimentation within the channel.

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9 Nov 1995

To: Jim Durbin → PHIL DYCK, NTC Environmental
From: C.B. Bishop

Subj: Boat Channel Work Plan

1. The following comments fall mostly in the "educational" category in the hope that the answers will enable the RAB to better understand the elements of the work plan.

2.1 Previous measurements of water exchange in the channel are suspect if they indicate little flushing action between the Bay and the channel. Note that a six foot tidal range equates to about 12 million cubic feet of water in the channel (6x400x5000). This usually happens several times in a month, e.g. ten times last October. This probably represents 30-50% water exchange, depending on channel depth, which is not stated. The report states that ground water flow direction is sometimes reversed by tidal action. This would indicate that the channel's fluid contents should have some significant effects from tidal action.

Figs 2-4 & 2-5 These figures are confusing. They don't tell what the tidal times are or the ranges. They have water moving in opposite directions, with flood and ebb tides in the same time periods. They don't give much confidence in the measurements or analysis.

Tables 2-3,4,5,6 Better have someone prepared to explain these tables and ensuing toxicity discussions. How was it ensured that no other agents could have affected the specimens other than the test samples ?? How do the numbers presented relate to regulatory standards ?

Section 3.1 Will these tests account for all probable pollutants, or just those we think may have been deposited in the landfill or storm drains ? For example, the residue from unburnt fuel and exhaust gases from departing aircraft ?

Section 3.4.1 Please have someone explain the differences in the QC/QA standards, with respect to risk vs cost, if possible.

2. I can't make the subcommittee meeting on 11/21 but plan to be there for the RAB meeting on 11-28.

Charlie

Z KRIPKE, MD, MPH

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November 9, 1995

DRAFT WORK PLAN, SEDIMENT CHARACTERIZATION OF THE BOAT CHANNEL

p. 1-1 "The results will be used to better characterize the vertical and horizontal distribution and dynamics of sediment contaminants within the Boat Channel"

But there will be only 10 very localized sites studied at one point in time and without any plan to map plumes or horizontal extent of any 'hits,' which does not fulfill this mandate to study the distribution, much less the dynamics, of contamination.

No matter how high the sediment chemistry numbers (P. 6-3), there will be no further action if sediment toxicity and bioaccumulation tests are negative. Yet in the past testing of the Bay Protection and Toxic Cleanup Program of 1994, there was essentially complete decoupling of the chemistry and toxicity for Rhepoxynius abronius. (Results show this lack of correlation repeatedly - for example P. 2-26 "Comparison of chemical and toxicological results from these two samples showed no correlation patterns").

1. Since one goal is to characterize the horizontal distribution of contaminants, how will the footprint of any positive samples be mapped?

2. Since another goal is to characterize the dynamics of the spread of sediment contaminants, how will this be mapped, plumes outlined, etc.?

3. Since past experience is that toxicity and chemistry are not correlated, positive chemistry levels must be investigated further for footprint, movement and origin rather than listed as 'no further action' (p. 6-3)

4. If soils and waters prove highly toxic to organisms but the chemicals currently studied do not correlate with this toxicity, a search must be conducted for what is poisoning the organisms. The chemicals being tested for should be expanded to include any reasonable hypotheses or to test synergisms among the chemicals present that might account for high mortality in some sediments and waters where each contaminant is at the ERL.

5. Why is bacteriological testing not included? Bacterial, fungal and viral causes may be paramount in organism toxicity (and human health threat) independent of chemical toxin levels.

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