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December 30, 1992

VIA FEDERAL EXPRESS

John J. Lyons, Esq.
Assistant Regional Counsel
U.S. Environmental Protection Agency, Region 9
75 Hawthorne St.
San Francisco, CA 94105

Re: Levin Metals v. Parr-Richmond

Dear John:

Our consultants, McLaren/Hart, have reviewed Batelle's "Draft Work Plan: The Remedial Investigation and Feasibility Study of Marine Sediments at the United Heckathorn Superfund Site," dated October 7, 1992 and prepared the enclosed comments. Although certain of our concerns were communicated to you at our November 19, 1992 meeting, we felt that we should give you the benefit of the enclosed comments on the work plan itself.

If you have any questions or comments, please call me.

Very truly yours,

Richard W. Raushenbush
of LATHAM & WATKINS

Enclosure

cc: (with enclosure)
Patrick L. Finley, Esq.
Thomas W. Kearns, Esq.
Richard R. Patch, Esq.
Carol Dickerson
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November 10, 1992

Carol Dickerson
Senior Hydrogeologist
Environmental Services and Operations
ICI Americas, Inc.
1391 South 49th Street
Richmond, CA 94804

SUBJECT: COMMENTS ON THE BATTELLE WORK PLAN

Dear Mr. Dickerson:

Attached are our comments on the Draft Work Plan, The Remedial Investigation Feasibility Study on Marine Sediments at the United Heckathorn Superfund Site. This lacks clear objectives and the level of detail one would expect for a project at this stage of development.

Both general and specific comments are provided on the relevance of the 2 ppb criterion identified by Battelle and on the proposed sediment sampling and testing strategy. General comments are also provided on remedial alternatives and the proposed use of transport modeling.

If you have questions, do not hesitate to call me or Dr. Sheehan.

Sincerely,

Patrick Sheehan for

James Tull
Senior Health Scientist
ChemRisk® Division
McLaren/Hart

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COMMENTS SUMMARY
DRAFT WORK PLAN, THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY ON MARINE SEDIMENTS AT THE UNITED HECKATHORN SUPERFUND SITE

The Draft Work Plan has been reviewed at the request of the Heckathorn Study Group. As requested, this review is focused on the evaluation of the proposed modeling approach, the proposed sampling approach, and references to DDT background or toxicity criteria. In addition, we have commented on workplan quality and documentation concerns. Within each topic area, we provide both general comments on issues of concern and more specific comments associated with incorrect, misleading or unclear statements.

1.0 General Comments on the Focus and Quality of the Draft Work Plan

1. The Draft Work Plan lacks clear objectives. Without a clear focus for the proposed investigation, it is difficult to determine what kind of data will be most useful and how the data should be collected and interpreted. It is also unclear how the results of the human health and ecological risk assessments will be used to evaluate remediation measures.

2. In general, the background of the site is not adequately summarized. Little background information is presented to explain the factors which prompted the focus of the proposed remedial investigation on chlorinated pesticides, and in particular DDT. One objective of the RI is to define contaminants and levels of concern. However, only DDT and chlorinated pesticides are addressed in the site description. The Draft Work Plan does include the collection of a limited number of samples for other chemicals for both chemical analysis and toxicity testing. However, this program as discussed in latter comments is not considered to be comprehensive. As presently written, the Draft Work Plan assumes the reader has a full understanding of the history behind the designation of chlorinated pesticides as the primary contaminants of concern for the Heckathorn site.

3. One of the primary objectives (No. 2) for conducting the RI is to "determine the total volume of contaminated sediment at contamination ranges down to about 2 ppb dry weight." However, the basis for designation of 2 ppb as a threshold is not provided. Since this 2 ppb threshold value will drive much of the sampling, it is extremely important that the origin and rationale behind designation of this value be provided. Concerns that should be addressed include the following:

- What is the basis for the threshold value: ecological or human health risk-based; representative background for selected chemicals; or analytical limits of detection for selected chemicals?

- What chemicals are included in this value?

- Will contaminant concentrations be summed, or will they be evaluated separately?

- Remediation estimates should be based on risk-based remediation targets.

- For many chemicals, particularly inorganic compounds, this 2 ppb criterion is well below background in the San Francisco Bay.

4. p. 3 (and elsewhere): Objective statement Number 6: *"Analyze alternatives for removing, containing and/or treating sediments to a cleanup level that will allow full attainment of beneficial uses of site waters, including fish and shellfish harvesting and protection of aquatic life and wildlife."*

This statement is provided as one of the primary objectives of the remedial investigation. However, the origin and practicality of the use-attainment objective is unclear. The beneficial uses for the site waters have not been discussed in the Draft Work Plan. Given that this is an industrial shipping channel it is not clear that fish and shellfish

harvesting should be considered appropriate beneficial uses. With regard to this proposed objective, a number of issues need to be addressed/considered:

- Is cleanup to "full attainment of beneficial uses" a realistic objective for industrialized waterways, such as those being evaluated?

- Since shipping channels do not serve as nursing or harvesting areas, is it logical to attempt to cleanup the sediments to a level that will allow fish and shellfish harvesting?

- Do RODs for similar sites meet this standard of full attainment of beneficial uses?

- Toxicity data collected to date suggest that the Lauritzen Canal is the only area addressed in the proposed plan that contains sediment-associated chemicals at levels potentially toxic to aquatic species.

- It is unclear whether the focus of the remediation activities will be a number, as implied by "targeted pesticide cleanup levels," or a use-attainment objective. In either case, the cleanup goal should be guided by a site-specific risk assessment which accurately depicts the beneficial uses and levels of activity in the system. To this end, further clarification on the coordination of the Remedial Investigation objectives and the human health and ecological risk findings needs to be provided.

Specific comments:

p. 8, Section 2.3 Ecological Resources

The discussion of ecological resources warrants further attention than is presented here. Additionally, the statement that "riprap or vertical pilings .... provide very poor shoreline habitat," is incorrect. In fact, riprap and pilings provide excellent habitat for hard-

bottom benthos and associated nektonic food webs. The reference to sightings of brown pelicans by EPA employees should be documented, including the precise listing (state and federal), the particular population(s) of brown pelicans sighted, the number sighted, and the date of the sighting. The shipping channels are not the habitat normally used by brown pelicans for feeding.

p. 10: "DHS ... subsequently designated the area a State Superfund Site."

Further clarification on the designation of the United Heckathorn site as a Superfund site should be provided. Information should be presented on when, how, why, and by whom the site was ranked for NPL status.

p. 12, Figure 3.1 (Total DDT Concentrations in Richmond Harbor):

These statistics should be rechecked to determine whether the values presented, particularly the maximum concentration of DDT in Upper Lauritzen Canal of 765 ppm, are representative of present conditions and of recently available data. Attention should be given to whether these data coincide with new EPA data. Also, the concentration means, minimums, and maximums should be consistently, not selectively, reported for each location. Values for Parr Canal, if available, also should be presented.

p. 15, Section 3.2: *"DDT is ... almost insoluble in water."*

The contention regarding the solubility of DDT conflicts with later concerns for dissolution as a transport mechanism (see p. 17, top of page: "Contaminants may also disperse in dissolved form by desorbing from the sediment, being transported in solution, and later absorbing back onto sediment.") The scientific literature clearly indicates that DDT in aquatic systems is sequestered in sediment and generally not in measurable concentrations in water.

p. 17: *"DDT contamination appears to be concentrated in and may be essentially limited to the recent (YBM) sediments..."*

We believe this is true. It is also likely that DDT may be limited to specific layers of YBM, and therefore, we support the multiple layer analysis approach.

p. 17, Section 3.3: *"Environmental impacts due to pesticide contamination of marine sediments are seen in benthic marine organisms and higher-order organisms, particularly birds."*

This statement needs to be expanded to describe the "environmental impacts" that have been seen and who has "seen" these impacts. Sources of documentation of these data should be cited. Further, it should be noted that detection of concentration levels of pesticides in marine organisms is not indicative of "impacts."

2.0 DDT Background Concentrations

This section addresses the issue of background DDT concentrations and their use/identification in the Draft Work Plan. A key component in any Superfund investigation is establishing the background levels for chemicals that are site-related, so that the boundary of the site may be defined and incremental exposures may be assessed. Organochlorine pesticides are wide-spread in the marine sediments of the San Francisco Bay. Although not naturally occurring in the environment, a residual background level has developed in sediment through runoff from the wide-spread use of these compounds for pest control. This topic is paid scant attention in the Draft Work Plan, but should be considered a keystone in its development, implementation and data interpretation steps. In particular, the following comments are addressed:

p. 15, Top of Page:

The Draft Work Plan sites a San Francisco Bay background report prepared by Long et al., 1988), characterizing background DDT levels as ranging from 0.03 to 20 ppb in

sediments from uncontaminated areas. We were unable to find any other reference to background chemical levels in the report. It seems appropriate that a significant effort should be devoted to defining background. There are new sources of data being generated continuously for DDT and other chemical levels in the Bay which could be used to update the background estimation (e.g., recent EPA, ACOE and NOAA data).

p. 20, Section 4.1 *"Data on the vertical distribution and extent of pesticide contamination to non-detectable levels are needed for the entire study area."*

This requirement appears inappropriate for a remedial investigation designed to lead to a risk-based remedial action program. Non-detect is an analytical term or limitation and has no pertinent basis as a criterion for determining the lateral and vertical extent of the chemicals of interest. A more appropriate approach would be to establish a sound estimate of chemical background levels and then determine the extent of the study area that exceeds this level. This paragraph also contains conflicting references to "non-detectable" and "background" concentrations. These two terms are not interchangeable. If "background" levels of DDT are detected, then achieving "non-detect" may be impossible.

p. 21, Section 4.2: *"...the southern boundary of the study area has been demarcated west of Point Potrero, where pesticide concentrations are consistent with background values for the San Francisco Bay."*

This statement needs to be further supported with references and concentration data.

3.0 Comments on Sampling Program Design

We have reviewed the sampling program design and, based on this review, developed a list of six issues of concern. Each of these issues is discussed below.

Discrete versus Composite Sampling

Although the USEPA has traditionally focused on chlorinated pesticides in its evaluation of the United Heckathorn site, data collected at part of the USACOE Operations and Maintenance Dredging Program in Richmond Inner Harbor indicate that other contaminants may be present such as PCBs, PAHs and petroleum products (EVS, 1989, 1990, and 1991). The concentrations of these chemicals in most areas outside the Laurtizen Canal are greater that the concentrations of organic pesticides. Because of this, a sampling program to screen for the presence of other chemicals of concern is warranted and an action we support. However, as described in the Draft Work Plan, screening analyses will be conducted using composite samples from an undefined number of selected locations. There are several critical factors that result from this approach as outlined below.

- It is unclear from the discussion of composite sampling (p. 31) if composite samples will be composed of sediments from several different cores or from multiple depths within a single core. The collection of composite samples from multiple cores is likely to dilute the chemicals levels present in the sediments at hot spots and inaccurately portray the importance other chemicals might play in the assessment of ecological impacts.

- No restrictions have been placed on the locations or depths from which samples may be combined in a composite. Evaluation of sediment chemical levels should be conducted on an area and depth specific basis. This will allow some degree of delineation and identification of hot spots.

- Composite samples are proposed for collection at only three locations from the Inner Harbor Channel because the existing data are reported to be adequate. No documentation is provided to indicate the resources reviewed. In addition, it is difficult to evaluate adequacy of the data when the objectives have not been clearly defined.

- It is unclear from the description provided in the Draft Work Plan if the other chemicals are being characterized for the evaluation of sediment dredge material disposal options or for evaluation of ecological and human health risk. The approach for these two objectives would be significantly different.

- Comparison of the potential effects of the other chemicals of concern to those of the organochlorine pesticides will be limited if one set of data is developed from composite samples and the other is based on discrete samples.

- Potentially of greatest importance is the lack of discussion describing how these data will be evaluated and incorporated into the determination of remediation alternatives, particularly if the ecological and human health risk assessments are prepared without the benefit of this information.

The Draft Work Plan does not address how sample composite results will be handled. For example, the Draft Work Plan does not describe the approach that will be taken if the results of the screening analyses prove to be positive for some contaminants of concern (e.g., metals). If this occurs, will a full round of discrete sampling for these compounds be conducted? Will sufficient discrete sample volumes be available to conduct additional analyses for other chemicals of concern? Will such analyses be achievable within CLP holding times for the analytes of interest? Additionally, it is unclear how concentrations from the analysis of composites will be calculated. If the concentrations are to be determined by multiplying the measured value by the number of samples in the composite (the usual agency approach), it does not make sense to composite the samples. Since the composites are simply additional nodes on the grid (e.g., Figure 5.1), why not use discrete samples instead?

Sampling Effort Strategy

Based on the availability of data from previous sampling programs, the level of effort in the sediment sampling program is the reverse of what appears to be required to adequately

characterize the site. As presented in the Draft Work Plan, a greater density of samples will be collected in the Lauritzen Canal area, where chemical concentrations are generally well characterized, than in the less contaminated areas such as the Richmond Inner Harbor Channel, upper Santa Fe Channel, and Parr Canal, where characterization of contaminant levels is not as complete. In the areas away from the Lauritzen Canal, where remedial volumes are likely to be limited to "hot spot" areas, sampling density should be increased, not decreased. As designed, the sampling plan increases the likelihood of superfluous remediation. For example, following the proposed sampling plan, the largest misclassification error (i.e., clean sediments are characterized as dirty and are remediated) that can be made within the Lauritzen Canal is 2,500 yds^3. However, in the Richmond Inner Harbor Channel, the misclassification error if one sample location is used to characterize an entire block is 37,500 yds^3.

In those areas where significant sediment remediation is expected (i.e., Lauritzen Canal) the grid should be larger and the samples should be collected for the purpose of characterizing other chemicals of interest and for treatability studies. Conversely, in those areas where moderate levels of pesticides have been measured (levels near the remediation target) or where limited data are available (e.g., Inner Harbor Channel) the sampling grid should be smaller to provide greater accuracy in determining the volume of sediment requiring remediation and greater probability of locating hot spot areas for the chemicals of concern.

According to the Draft Work Plan, the objective of sampling in the Parr Canal is "to assess the magnitude of contamination and identify hotspots" (p. 29, Paragraph 2). Based on information presented in Figure 3.1, however, only three samples will be collected in this area. This is not an adequate number of samples to allow for determination of "hotspots." Additionally, though the number of samples to be collected here is inadequate, only in Parr Canal is the stated sampling objective to "identify hotspots" (p. 29). For efficient, effective risk management, identification of hotspots should be the objective for all areas.

It does not appear that any effort has been made to determine the degree of confidence that could associated with this level of sampling. There are numerous documents produced by the EPA

that discuss the development of sampling strategies and the number of samples required to achieve a specified level of confidence in the estimate of the mean or probability of attaining a specified level of cleanup. Such an approach may be applicable here to evaluate the allocation of the sampling effort between the various sampling areas.

Specific Comments

p. 21, Section 4.2: *Sampling stations will be farther apart in the Inner Harbor Channel, where pesticide concentrations are considerably lower and comparable data are available."*

> One of the main reasons for conducting this RI at all was the identified quality lapse in existing data. How, then, can "comparable data" be available?

p. 47, Bullet 4: *"Approximately 400 sediment samples (including QC samples and composite samples for biological testing) will be analyzed...."*

> Based on the information provided, the sample number does not add up to 400. Detailed tables of matrices, samples and analyses should be included.

Biological Testing

Section 5.2.2.2 Biological Testing, (page 33) discusses the bioaccumulation and solid-phase toxicity testing to be conducted. We believe that such testing is appropriate and necessary, as previous testing conducted by the USEPA evaluated the toxicity and bioaccumulation of selected organochlorine pesticides only. However, the purpose of biological testing is unclear. As with much of the other data proposed for collection in the Draft Work Plan, it is not clear how the resulting data will used because fundamental components of the plan are lacking. For example: Will sediment remediation boundary lines be defined by concentration? Toxicity? Uptake? Interaction of these? And if so, how? The following are points of concern and suggestions regarding the proposed biological testing scope of work:

- The Draft Work Plan states: "All tests will be conducted following the detailed instructions in the Toxicological Testing Plan." This plan should be referenced if it is a published document or included as an appendix if it was developed specifically for this project.

- In the discussion of sample analyses (p. 32, Section 5.2.2.1 and elsewhere), some tissues samples are identified as composites while others apparently are not. It is likely that all tissues will have to be composites in order to obtain a measurable mass. The sample design requires further clarification.

- The plan proposes to screen for other chemicals of concern in a composite of the clam tissue from the five replicates for each sediment sample tested. No information is provided on how this screening will be evaluated. This would be an appropriate approach in a tiered analytical scheme which would statistically compare the initial composite chemical levels to those of a similarly composed composite sample from an appropriate reference location. If statistical differences in bioaccumulation rates or levels are determined, follow up analyses of the individual replicate samples should be conducted for the chemicals of concern to provide a more robust estimate of chemical bioaccumulation, similar to that prepared for the organochlorine compounds.

- It would appear that only one composite sample treatment is proposed for solid-phase toxicity testing for each of the Upper Santa Fe and Lower ("federal") Santa Fe Channel sections. This degree of resolution is inadequate to achieve the stated goal of assessing the *"... the effects of contaminated sediment on marine organisms throughout the study area"* with any significant degree of confidence. A variety of chemicals have been detected in the Santa Fe Channel at a broad range of chemical concentrations. Given the variability in chemical type, location and concentration, this approach is likely to provide an inaccurate portrayal of conditions throughout the Santa Fe Channel. This limited testing will be of

particular concern if it is to be the basis upon which remediation and special handling of large sections of the Santa Fe Channel is determined.

- The solid-phase toxicity test organism proposed is the amphipod *R. abronius*. Recent work in the San Francisco Bay Area has indicated that this species is sensitive to fine grained sediments and that tests frequently result in false positive conclusions with regard to toxicity. The amphipod *Ampelisca abdita*, has been suggested as a test organism which is well suited to fine grained sediments and may be more appropriate for use in the Richmond Inner Harbor area.

- The toxicity testing program calls for the analysis of fine-grained and coarse-grained reference sediments from San Francisco Bay. We support this approach, but believe that criteria or guidelines should be set forth in the Draft Work Plan for the selection of such reference locations.

- The proposed analysis of organochlorine chemicals in the tissues of aquatic organisms is focused on (p. 24, Paragraph 3) *". . . contaminant uptake in the fatty tissue of marine organisms..."* . For assessment of ecological risk, the whole organism (not just the fatty tissue) is of concern.

Data Evaluation and Interpretation

The Draft Work Plan does not adequately discuss how the sampling data will be interpreted and used to evaluate remedial alternatives. In addition, it is unclear how the data will be tied in with results from the human health and ecological risk assessments to be performed for the site by the USEPA. The Draft Work Plan should present methods for data compilation, QA/QC of the sample results, data analysis and, in addition, criteria on which decisions will be made and what decision points will be evaluated.

It is unclear how the toxicity testing and uptake study results will be integrated with the sediment concentration measurements. For example, will a sediment that contains low concentrations of chemicals and yet is "toxic" according to the results of the toxicity testing be included in the volume of sediment that is to be remediated? Similarly, how will a "nontoxic" sediment with a high concentration of chemicals be treated? Also, the different compositing schemes for toxicity/uptake studies and chemical analyses samples will make the linking of these components difficult.

Section 5.2.3 Task 2c: Data Evaluation presents a very brief overview of the uses of the data proposed for collection. Although most of the components appear appropriate, the level of detail here is inadequate. The following topics could be clarified and further defined:

- How will the data QC be conducted ? Section 5.5 page 44, Task 5.0 Quality Control indicates a QAPP will be prepared to address QA/QC issues. It is quite reasonable to prepare the QAPP as a separate document. However, the data quality of objectives for the investigation need to be established prior to preparation of the QAPP.

- This section indicates the pesticide data will be used to "...calculate volumes of sediment representing different ranges of contamination and to assess whether additional sampling is needed"

    - The other chemicals of concern should be included in this process.
    - Criteria to be used to select the appropriate ranges of sediment chemical concentration need to be specified.
    - Criteria to be used to determine that additional sampling is required need to be specified.

- The bioaccumulation test results "...will be evaluated by Battelle/MSL to determine the bioaccumulation of DDT and breakdown products into the tissues of *M. nasuta*."

  - By what methods will bioaccumulation be evaluated?
  - The bioaccumulation of other chemicals of concern should also be evaluated.

- The *M. nasuta* bioaccumulation data will be used to ".... confirm EPA's site-specific model for predicting bioaccumulation potential from exposure to Richmond Harbor sediments."

  - This model should be documented and referenced. To the best of our knowledge, this model has not been reported elsewhere.
  - How does this effort coordinate with the human health and ecological risk assessments prepared for the EPA ?
  - There is no mention of how the indigenous *M. nasuta* chemical results will be treated or used.

- Analysis of variance (ANOVA) for the toxicity testing data will be performed.

  - None of the pertinent statistical parameters are defined (i.e., confidence level, power, expected minimum detectable difference).
  - The DQOs have not been defined.

- The last sentence of the section states: "*Site-specific data will then be used to evaluate cleanup levels provided by EPA to predict the effectiveness of proposed remedial activities on protection of the environment and human health.*"

- What does "evaluate" cleanup levels mean and by what methods and criteria will this be done? Revise? Alter? Repair? Redefine? Compare and contrast?

- It would appear premature for the EPA to provide sediment cleanup levels when the complete list of the chemicals of concern have not been identified and evaluated in the human health and ecological risk assessments.

Contract Laboratory Program (CLP) Procedures

The Work Plan (p. 47, Bullet 7) specifies that "analytical data packages will include the QC information specified in the QAPP, and 10% of the analyses will include raw data." This approach to preparation of the analytical data packages is not consistent with Contract Laboratory Program (CLP) guidelines. All work should be presented according to CLP methods of analysis and reporting.

Comparison to Reference Analyses and Control Samples

Although the RI/FS Work Plan appears to be designed primarily for the evaluation of remedial options, it contains certain field sampling efforts which appear to be designed to support risk assessment elements. This is not outwardly stated in the Draft Work Plan, but is perceived as a necessary component of the RI due to the fact that the human health and ecological risk assessments are being prepared without the benefit of a complete understanding of the chemicals of concern in the system or the boundary of the site. A key component of these aspects of the investigation will be comparisons of site specific conditions to an appropriate reference location. The Draft Work Plan does indicate that reference sediments will be collected for solid-phase toxicity testing. However, it does not appear that reference comparisons are intended for any of the other sampling efforts. We believe this is a critical omission from the Draft Work Plan. Reference comparisons are suggested for the following:

- Solid-phase toxicity testing,
- Bioaccumulation studies,
- Indigenous *M. nasuta* tissue burden analyses,
- Discrete sediment sampling and analysis.

Although control sediment and control tissue samples will be collected, there is no clear definition of the control samples nor discussion of the analyses to be conducted on the control samples. For example, the Draft Work Plan states (p. 32, p.47) that "control sediments collected for biological testing will be frozen" and "archived." It is critical that control samples are analyzed, not archived.

Additionally, the Draft Work Plan states that "duplicates of every sample will be frozen..." (p. 31, Bottom). It is unclear what is meant by "duplicates." Are these to be separate individual samples or aliquots of composites? Further clarification is required.

4.0 Comments on Preliminary Identification of Remedial Alternatives

The evaluation of remedial alternatives needs to be quickly and efficiently focused on realistic alternatives that meet appropriate remedial objectives. The Preliminary Identification of Remedial Alternatives appropriately does not include dredging and incineration of sediments. We believe these alternatives would be unnecessary, infeasible, and prohibitively expensive.

Investment in investigation of remedial alternatives should be minimized pending the outcome of appropriate work to characterize the occurrence and distribution of organochlorine pesticides in the entire Richmond Harbor area. Activities such as the proposed sampling and testing of sediments in the Graving Docks and the investigation of the structural condition of the existing Graving Dock structures (pp. 23 and 24) should be deferred until the need for such sediment

disposal area volume is established by the remedial investigation. The comments which follow address our opinion as to the investigative activities we believe are appropriate.

Containment of Sediments in the Graving Docks

The alternative for disposal of sediments by filling the Graving Docks needs to take into account the following factors that will impact its cost and implementability:

- Gate Structures - The "watertight" gates on the Graving Docks seal the dry dock area only against water moving into the docks from the bay (i.e., the gates would not seal the entrances to the dock areas to prevent the outward migration of fluids from a sediment fill). Although the gate structures might be usable in containing sediments within the Graving Docks, major modifications of the structure will be needed to hold the gates in place and accomplish a seal if the docks are filled with sediment.

- Capping of Sediment Fill in the Graving Docks - Covering the sediment with clean fill and capping it with asphalt would be an appropriate technique in most situations. However, this would not be sufficient for a fill in the Graving Docks. Because of the value of this property to the Port, the completed fill would need to be prepared so that it could be used as part of the Port facility, thereby reducing the life cycle cost of implementing the alternative. To allow the filled docks to be used by the Port, this alternative should include a structural deck placed over the sediment fill.

- BCDC Policy Regarding Open Water Preservation - Conformance with policy of the Bay Conservation and Development Commission (BCDC) would likely require compensation for the elimination of open water in the filling of the Graving Docks. Such compensation could take the form of development of an offsetting open water area of comparable size in another area of the Bay or, possibly, an environmental benefit of comparable value such as the development or enhancement of a new or existing wetlands area. In any

event, the BCDC policy must be addressed in the development of this alternative and cost associated with conformance to the policy must be included.

Parr Canal

The Parr Canal is a drainage canal that conveys municipal storm drainage from a large culvert structure at the head of the Canal. As implied in the Draft Work Plan's preliminary identification of remedial alternatives, it is not a navigable waterway. Remedial alternatives for the Parr Canal should include extending the drainage culvert to the Santa Fe Channel and capping the sediments in place in the canal. The cap could be extended up the canal embankments and the entire canal area could be filled to grade to create usable land in the area that is now occupied by the Parr Canal drainage ditch.

Dredging Techniques

The evaluation of dredging techniques needs to take into account the problems in water management and sediment dewatering that are associated with dredging techniques such as suction dredging that minimize resuspension of sediments. The use of silt booms and screens should be considered in association with dredging by methods other than suction dredging. Although, as suggested on page 23 of the Draft Work Plan, the Corps of Engineers may be a valuable source of information on dredging techniques, other sources may need to be consulted in developing innovative and practical approaches to the dredging problem.

Other remedial alternatives need to be discussed (e.g., capping sediment). Remedial Alternatives for the Parr Canal (e.g., capping) should be discussed.

Specific comments:

p. 18: *"It is likely that removal of DDT-contaminated sediments from a portion of the Richmond Inner Harbor will be necessary to restore the area to its full beneficial use and prevent the transport of contaminated sediments away from the United Heckathorn site."*

Remediation should be based on the results of a site-specific risk assessment. Accurate assessment is necessary to identify the areas to be remediated.

p. 21, Section 4.2:

Determination of contaminated sediment volumes is proposed through the use of a "3-dimensional modeling program." However, no further description of this modeling program is provided.

p. 22, Title for Section 4.4:

One of the objectives for the remedial investigation, as presented in the Draft Work Plan is to "*Characterize sediment and contaminant transport mechanisms in Richmond Harbor such as freshwater flow, tidal flow, and resuspension and dispersion by mechanical means to determine the effect of no-action at the site.*" However, these parameters are transport processes which can not "determine the effect" of no action at the site. Additionally, the "effect" of concern needs to be defined. Is it toxicity? Bioaccumulation? Chemical distribution? What are the media of concern? What are the receptors? All of these factors should be addressed in the discussion of the potential impact of a no-action alternative.

p. 23, Paragraph 1: *"Data needs associated with the removal of contaminated sediments include . . . information about dredging methods least likely to result in resuspension of sediments."*

This statement presumes that sediment resuspension will be a problem. This cannot be known unless it is quantified during the RI/FS.

p. 23, Paragraph 2:

Use of the word "dilution" should be avoided as this is typically not an acceptable means of effluent treatment.

p. 24, Top: *"Samples from the graving docks will be collected to determine the concentration of pesticides in sediment and its availability for bioaccumulation to or above EPA-approved action levels."*

Will EPA provide tissue "action levels" or sediment "cleanup numbers"? The difference is great and important. If use of EPA action levels is planned, the specific criteria should be defined and justified.

5.0 Comments on Approach to Modeling of Sediment Transport

The draft work plan presents a three-phased approach to modeling sediment transport and remediation alternatives. Although the general approach appears appropriate, we have provided comments concerning several different aspects of the phased model.

As discussed previously, it is unclear why the model has been proposed to evaluate the no-action alternative. The chemicals of interest have been in the sediments for an extended period of time and the system has had time to achieve an equilibrium or near-equilibrium state. An effective sediment sampling and risk assessment program should provide the information necessary to evaluate the no-action alternative.

Phase 1 of the modeling approach is scheduled for completion concurrent with the sediment sampling program. As of this time, the ecological and human health risk assessments have not

been completed and a complete list of the chemicals of concern have not been developed. It would appear premature to embark upon a substantial modeling effort before the need for and extent of remediation is further defined. Once those areas requiring remediation are defined using risk-based remediation criteria, a modeling effort can be implemented that focuses on those areas in particular. This will reduce the possibility of significant expenditure of time and money for unnecessary data collection.

According to the Draft Work Plan, the phased modeling approach involves evaluation of existing data, preparation of a box model, evaluation of the sensitivity of model predictions to various input parameters, refining field data collection if needed, focussing the model on critical parameters, and modeling various remediation scenarios to provide evaluation of their impacts. The general outline of the approach appears appropriate; however, some clarification on the field data and model is necessary.

In describing the potential for contaminant dispersion by resuspension of sediments in the shipping channels, an attempt was made to account for contaminant dispersion and effects of shipping. Deposition rates in the area of concern are very sensitive to suspended solids concentrations. Suspended solids concentrations in the area are highly variable and are dependant on a number of factors, including wind speed and direction, water depths over the shallow area outside of the harbor, and the time of year. The approach outlined in the work plan specifies sampling to begin during the spring and a neap tide. It is very unlikely that sampling during this time will yield suspended solids concentrations that are useful for modeling present and future deposition. Additionally, it is unclear how suspended solids concentrations at the backward boundary will be established.

The description of the model is sketchy. Information on the deposition and erosion relations to be used is not provided, nor is information provided on the method to be used to account for the changing properties of the bed during deposition and erosion, the method for establishing mixing coefficients, the sizes of the boxes, or the determination of suspended sediment inputs due to boat traffic or dredging. There is very likely negligible erosion due to tidal currents in this area,

except perhaps at the bayward edge, which will simplify the modeling somewhat. Deposition rates are very sensitive to currents. How detailed are the determination of currents? How are the sorbed and desorbed contaminants partitioned? Further clarification is needed.

It can by argued that the quality of the input data does not warrant a detailed model. However, excellent, widely used two-dimensional hydraulic and sediment transport models are available (the RMA models of USACE TABS-II suite) and they can be exercised on a workstation. Their use would avoid the limitations of box models, and they can easily be adapted to changed configuration and hydraulic conditions. A typical application of these models would include a hydraulic model of the entire bay system (that already exists) to establish boundary conditions for the area of concern throughout the neap-spring cycle. A detailed two-dimensional model of the area of concern would then provide tides and currents in the area for input to the sediment transport model. Verification of the tides and currents by the measurements described in the Work Plan would provide confidence in extension of the models to new conditions.

Specific comments:

p. 40: *"A list of model input parameters is provided."*

There will be a large differential variance in input parameters. This will artificially bias sensitivity analysis. How will the accuracy and sensitivity of the model be controlled and characterized? What are the data quality objectives for execution of the model?

p. 43, Paragraph 1: *"Data collected in Phase 2 can be ... used to improve and validate the box model."*

> Some data should be used to calibrate ("improve"?) the model, some to validate. The same data cannot be used for both. The Draft Work Plan should lay out the strategies and tactics of model calibration/validation.

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