Also, see Regional Board response on Comment #1 – Testing for Bioaccumulation (August 21, 2001 Letter).

(E) Why are you testing for 28 days rather than 45? It has been found that equilibrium may not occur in 28 days - in other words all of the contamination does not transfer from the sediment into the tissue in 28 days. (WA State).

Regional Board Response
Bioaccumulation testing protocols recommend that the bioaccumulation contaminants of concern reach approximately 80% of steady state tissue residues for a proper risk assessment. For PCBs, dioxins, furans, PAHs, and metals, 80% of steady state generally occurs using the 28-day bioaccumulation test (USEPA 1998 and ASTM 2001a). For Phase 1 of the shipyard sediment study, attaining 100% steady state is not required because the goal is to identify contaminants that have the potential to bioaccumulate. It is not the intent of the Phase 1 assessment to develop tissue residue guidelines or tissue residue effects establishing a correlation between tissue contaminant concentrations and sediment chemistry. That relationship will be defined in Phase 2 if the Phase 1 sampling efforts indicates a potential for bioaccumulation. Accordingly, 100% steady state for all contaminants that bioaccumulate is not required and extending the bioaccumulation to 45 days is not necessary.

(F) What are the tissue contaminant levels (from literature) that pose ecological and human health risks? These need to be agreed upon before data is in.

Regional Board Response
Following a literature search for appropriate tissue residue guidelines (TRGs), Exponent recommended the following TRGs for evaluating the potential risks to aquatic-dependent wildlife and human health (Exponent 2001d):

Aquatic-dependent wildlife:
- Great Lakes Water Quality Agreement of 1978
- National Academy of Sciences and National Academy of Engineering Recommended Maximum Tissue Concentrations and U.S. Environmental Protection Agency Water Quality Criteria.

Human health:
- California Environmental Protection Agency's Office of Environmental Health Hazard Assessment – Screening Values

The Regional Board and the resource agencies are in agreement that aquatic-dependent wildlife TRGs are not appropriate for use at NASSCO and Southwest Marine (RWQCB

2001c). Because available TRGs are developed for other states and countries for the protection of wildlife, it is likely that these TRGs were developed for receptors of concern other than those that are representative in San Diego Bay. As a result, they may be either over- or under-protective. It is therefore more appropriate to use site-specific information to evaluate tissue concentrations from the Phase 1 and 2 bioaccumulation investigations at the shipyard sites. Comparison of TRGs to tissue concentrations will be removed from the aquatic-dependent wildlife assessment at NASSCO and Southwest Marine. Final determination of fish/wildlife screening values for site-specific information will be through consultation and best professional judgement of the State and Federal Natural Resource Trustee Agencies.

The Regional Board and OEHHA are in agreement that the OEHHA screening values proposed by Exponent are appropriate for use at NASSCO and Southwest Marine (Broadburg 2001, pers. comm.). Furthermore, it is considered appropriate to calculate screening values for those bioaccumulative chemicals not listed by OEHHA. The calculation procedure must however follow OEHHA's methodologies used to calculate the listed screening values (OEHHA 1999).

(G) How are you considering the fate and transport of bioaccumulators? Isn't any level of bioaccumulation a problem? What literature are you using to determine how bioaccumulation builds over time in the food web - so for example, if you allow a certain concentration of bioaccumulators to remain at the site, when would these be expected to magnify to levels of concern? In other words, how will you consider the "life" of the chemical?

Regional Board Response
The Regional Board's technical approach to evaluating the fate, transport, and effects of chemicals which potentially bioaccumulate, bioconcentrate, or biomagnify is based upon currently recommended ecological risk assessment principles and guidance, promulgated by state and national regulatory agencies (Cal EPA and US EPA). Under this approach, remedial objectives for cleanup of contaminated sediments will be evaluated and selected on the basis of providing protection of human health and the environment, by evaluating risk to human and ecological receptors and beneficial uses of San Diego Bay. This evaluation considers selection of alternative remedial actions which provides a complete and permanent cleanup, and which does not allow the reintroduction of contaminated sediments or associated chemicals. There is a significant amount of literature which has been utilized in the development of State and Federal regulatory guidance for sediment assessment, including a local regional database of existing sediment contaminant conditions in San Diego Bay (i.e., Bay Protection and Toxic Cleanup Program and US EPA's Environmental Monitoring and Assessment Program). The Regional Board can provide specific citations and documentation, if there are specific questions or concerns with regard to the ecological risk assessment approach that has been adopted. In addition,

the Regional Board is consulting with technical experts in appropriate State and Federal environmental protection agencies in implementing the workplan, including the California Department of Fish and Game, California Department of Toxic Substances Control, and US Fish & Wildlife Service.

(H) How will you relate tissue accumulation in *Macoma sp,* to tissue accumulation in fishes and other organisms? Will you use a multiplier?

<u>*Regional Board Response*</u>
Determining the relationship between tissue concentrations in *Macoma nasuta* and tissue concentrations in fishes/other organisms is not necessary because of the two-phased approach that will be implemented at NASSCO and Southwest Marine. The Phase 1 bioaccumulation study using the test species *Macoma* is considered a worst-case, initial screening step to evaluate whether there is a potential for bioaccumulation of chemicals to levels of concern. *Macoma* was selected as the test species for the initial bioaccumulation testing because it is native to the West Coast and actively ingests surface sediments (likely to be the most direct route of exposure to contaminants that accumulate in tissues). If there is a bioaccumulation potential based on the *Macoma* tissue concentrations then direct measurement of fish and shellfish tissue will be performed throughout the shipyard leaseholds (i.e., Phase 2) to further evaluate the potential for contaminant uptake and subsequent food chain transfer of chemicals of concern from the sediment. If required, sediment cleanup levels will be developed from the fish and shellfish tissue concentrations using biota-to-sediment-accumulation factors (BSAFs). The BSAF is the ratio of the contaminant concentration in tissue to the contaminant concentration in sediment.

(I) Will Board staff obtain concurrence with Natural Resource Trustee Agencies on tissue residue levels that will protect California wildlife and California special status species?

<u>*Regional Board Response*</u>
The Regional Board will consult with the resource agencies to obtain their professional advice on tissue residue levels. Also, see Regional Board response on Comment #9 – Protection of Wildlife and Human Health (August 21, 2001 Letter).

(J) What are the special status species on site and feeding at the site?

<u>*Regional Board Response*</u>
The special status species and feeding have yet to be determined and will depend on the revised conceptual site model. The revised model will be developed in accordance with DTSC's guidance document titled *"Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities"* (DTSC 1996). Furthermore, as recommended by Fish and Wildlife (RWQCB 2001c), the following documents will be reviewed by the shipyards to ensure that special status species are not being overlooked:

"San Diego Bay Integrated Natural Resources Management Plan" (September 2000) and *"South San Diego Bay Enhancement Plan"* (March 1990). The Regional Board will be consulting with the resource agencies to discuss the revised model, special status species on-site, and feeding at the site. Also, see Regional Board response on Comment #9 – Protection of Wildlife and Human Health (August 21, 2001 Letter).

(K) What are the limitations of the equation to be used? It has been found that if set to protect a bird species, this level may not protect fishes, for example.

<u>*Regional Board Response*</u>
The key limitation to the site-specific tissue screening level (TSL) equation for aquatic-dependent wildlife consists of the uncertainty associated with information taken from the literature and any extrapolations used in developing a parameter to estimate exposure to a receptor. In order to ensure that ecological risks are not underestimated in the Phase 1 and Phase 2 bioaccumulation studies, Regional Board staff will consult with the resource agencies on all parameters/values proposed by Exponent.

The equation to derive site-specific TSLs for aquatic-dependent wildlife is intended to protect representative wildlife receptors that consume fish and shellfish (such as birds, marine mammals, and large fish that consume small forage fish). TSLs are calculated on a species-specific basis and thus each TSL only provides protection to its respective receptor. It should be noted that the selected receptors will be representative of ecological guilds. Therefore, conclusions regarding risk to the receptors will be considered applicable to ecologically similar species.

Additional risk studies are being considered and evaluated for fish and wildlife receptors at potential risk. These studies include tissue/organ chemical concentrations, histopathological evaluations, and reproductive effect evaluations. The histopathological and reproductive effect evaluations are chemically specific, thus site-specific contaminant information will be necessary to provide guidance on future evaluation.

(L) How were the receptors of concern selected? How much information do you have on indigenous animals? on ingestion and exposure rates? Are scientists in agreement?

<u>*Regional Board Response*</u>
Exponent's selection criteria included choosing species that were higher-trophic level consumers (thus, most at risk form effects of chemicals that bioaccumulate), sensitive to the effects of chemicals at the site, and known or expected to be in the area (Exponent 2001d). According to Exponent, this approach helps to ensure that receptors are conservatively selected on the basis of exposure and effects characteristics, which increases protectiveness of risk assessment conclusions for species for which the chosen receptor

serves as a surrogate. Federal or state listings of species as threatened or endangered were also criterion used to select representative receptors.

Exponent identified fish-eating marine birds and mammals and mollusc-eating birds as important groups of aquatic-dependent wildlife that could be at risk due to exposure to chemicals in prey species at the shipyard sites (Exponent 2001d). Based on the criteria discussed above, four species were identified by Exponent and recommended as suitable representative receptors for assessing potential risk to these groups:

- California least tern – The least tern was selected as a receptor representative of marine birds that may feed on small fish at the shipyard sites. The least tern is a migratory, piscivorous bird whose California subspecies is known to nest at sites in San Diego Bay, nearby Mission Bay, and the Tijuana River Valley during its breeding season, typically April through August in southern California. The California least tern has been a federal and California listed endangered species since 1970 and 1971, respectively.

- California brown pelican – The brown pelican was selected as a receptor representative of marine birds that may feed on small- to medium-sized fish at the shipyard sites. California brown pelicans are known to forage and roost in and around San Diego Bay. The California brown pelican is a Federal and California listed endangered species.

- Surf scoter – The surf scoter was selected as a receptor representative of diving marine birds that may feed on molluscs in soft sediments at the shipyard sites. Wintering surf scoters congregate in the open ocean or in large bays, including San Diego Bay. The surf scoter does not have protected status in California nor the rest of the United States.

- California sea lion – The California sea lion was selected as a receptor representative of marine mammals that may feed on fish at the shipyard sites. California sea lions are known to occur within San Diego Bay. Neither California nor the U.S. government lists the species as threatened or endangered.

Although Fish and Wildlife has indicated that the four species listed above are appropriate (RWQCB 2001c), the final list of receptors will be determined following the development of the revised conceptual model and the review of each of these documents: *"San Diego Bay Integrated Natural Resources Management Plan"* (September 2000) and *"South San Diego Bay Enhancement Plan"* (March 1990). Also, see Regional Board response on Comment #9 – Protection of Wildlife and Human Health (August 21, 2001 Letter).

(M) What toxicity reference values from the literature will you be using?

<u>Regional Board Response</u>
DTSC's *"Ecological Risk Assessment Note 4"* will be used for the toxicity reference values in the hazard quotient model for a wildlife receptor (DTSC 2000). A copy of DTSC's ecoguidance is available on the web at:

- www.dtsc.ca.gov/ScienceTechnology/eco.html#EcoNOTE4

See Regional Board response on Comment #9 – Protection of Wildlife and Human Health (August 21, 2001 Letter).

(N) Exponent proposes to consider only birds and mammals (by testing forage fishes). How did you select the two to four species that will be collected?

<u>Regional Board Response</u>
The fish species (herring, *Clupea spp.* and anchovy, *Engraulis mordax*) proposed in the shipyard workplan to assess aquatic-dependent wildlife risks are considered "candidate" target species (Exponent 2001a). California least terns and brown pelicans, two of the proposed ecological receptors of concern, are known to feed on small fish such as herring and anchovy. The Regional Board is aware that the least tern and pelican may also feed on other types of fish (e.g., mackerel, topsmelt, and sardines). As such, other fish species may by used if they are sufficiently abundant at the shipyard sites, are large enough to provide adequate tissue mass for chemical analyses, and are representative of the receptor's diet.

(O) How will you obtain and incorporate the natural resource trustee agencies input on which species and trophic level transfer pathways are appropriate to test and to consider? What literature are you using to determine trophic transfer pathways (e.g. clams to fishes to birds)?

<u>Regional Board Response</u>
See Regional Board response on Comment #9 – Protection of Wildlife and Human Health (August 21, 2001 Letter).

(P) Ethnic subsistence anglers: how will actual risk be assessed when you are only sampling fillets?

<u>Regional Board Response</u>
See Regional Board response on Comment #7 – Most Sensitive Beneficial Uses (August 21, 2001 Letter).

2. Pore Water Testing, Dilution Series Test

(A) Could you flesh out for us how pore water assessment will be used? What does this give us? Why do you think an empirical derivation of partitioning coefficient is better than using the literature?

Regional Board Response

Pore water sampling for chemical analysis in Phase 2 of the investigation is not intended to define the extent of contamination in the pore water within the shipyard leaseholds. Rather, the objective of collecting pore water samples is to derive sediment cleanup levels based on the EqP approach (RWQCB 2001a). The EqP approach was selected as one of the approaches to develop sediment cleanup levels because it addresses the bioavailability (i.e., the fraction of chemical present that is available for uptake by benthic organisms) of chemicals in sediments. EqP theory assumes that the chemical concentration in pore water and the binding phase in sediment (organic carbon for nonionic organic chemicals and acid volatile sulfides for cationic metals) are in equilibrium and that these two parameters are related by the partition coefficient, Kp. It is also assumed that the use of water quality criteria (i.e., the CTR) developed for the protection of marine organisms can be used for benthic organisms because of their similar sensitivities. The calculation procedure for deriving sediment cleanup levels using the EqP approach consists of multiplying the partition coefficient, Kp, with the water quality criteria for the chemical of interest. Hence, the sediment cleanup levels are predicted to yield, at equilibrium, concentrations in the pore water that are equivalent to water quality criteria.

Deriving partition coefficients empirically by collecting synoptic pore water chemistry and sediment chemistry data provides more accurate values that are specific to the sediment characteristics at NASSCO and Southwest Marine. As noted by the draft EPA guidelines (USEPA Draft), for most chemicals of interest, the available octanol-water partitioning coefficient, Kow, values are highly variable due to the methods used to produce the values. The technology for measuring Kow however has improved in recent years. For example, the generator column method and the slow stirring method appear to give comparable results, whereas earlier methods produced more variable results. Hence, it is recommended that literature values for Kow not be used unless they have been measured using the newer techniques. Furthermore, EPA noted that it is possible that some sites may have components of sediment organic carbon with different properties. This might be associated with sediments whose composition has been highly modified by industrial activity, resulting in high percentages of atypical organic carbon such as rubber, coals particles, or wood processing wastes. Relatively undegraded organic debris or plant matter (e.g., roots, leaves) may also contribute organic carbon that partitions differently from typical carbon. Sediments with substantial amounts of these materials may exhibit higher concentrations of chemicals in interstitial water than would be predicted using generic Kow values, thereby making the sediment cleanup levels underprotective.

(B) How did you choose the number and location of sampling stations? Would you agree that pore water is the primary exposure pathway for benthic organisms?

Regional Board Response
The Regional Board considers the eight proposed sampling stations for pore water described in the shipyard workplan as preliminary estimates of the number of pore water sampling stations. The final number and positions of the pore water stations will be determined based on the results of the Phase 1 sampling.

The Regional Board does not agree that pore water is the primary exposure pathway for benthic organisms. Benthic organisms are not necessarily exposed to pore water just because they live within the sediments (Chapman et. al., 2001). Many organisms, particularly those that construct burrows, live in a microenvironment of their own making. They may have direct exposure to overlying waters and almost no exposure to pore waters. Epibenthic organisms (e.g., an amphipod such as *Hyallela azteca*) are predominantly exposed to overlying water because it spends most of its life time on the sediment-water interface. The U-tube dwelling infaunal organism (e.g., the mayfly *Hexagenia*) is also mainly exposed to overlying water because it actively irrigates its tube with the oxygenated overlying water. Only a few infaunal organisms that can tolerate low levels of oxygen and high levels of sulfide (e.g., oligochaete worms) are mainly exposed to "true" sediment pore water, but many such organisms ingest sediments, which is an additional and often dominant route of exposure.

According to USEPA, pore water may be an important route of exposure for many infaunal benthic invertebrates (USEPA 1994). However, pore water may not be the relevant route of exposure for evaluations of organisms that ingest sediment. Therefore, it is important to characterize risks due to both modes of exposure through analysis of bulk sediment (containing pore water) or toxicity tests.

(C) Can you explain how pore water in the top 2-cm will be representative? Are you suggesting that benthic invertebrates are limited to the top 2 cm? Why are you only concerned about Macro - invertebrates? Experience at Navy at NASNI indicates that pore water is toxic up to 2 feet in depth where burrowing organisms are found.

Regional Board Response
To be consistent with the other lines of evidence in the workplan, it is important to focus on the top 2-cm of sediment. In addition to the pore water collected at the top 2-cm, sediment chemistry data, toxicity tests, bioaccumulation tests, and benthic community analyses are all based on the top 2-cm of marine sediment. The areal and depth distributions of COCs will be a component of the site investigation that will evaluated in the development of

remedial alternatives for cleanup. Also, see Regional Board response on Comment #2 – Sampling for Dilution Series, Pore Water, and Fish Tissue (August 21, 2001 Letter).

The Regional Board disagrees that the workplan only focuses on macroinvertebrates. See Regional Board response on Comment #5(C) - Benthic Fauna Assessment (October 10, 2001 List of Questions).

Naval Air Station North Island (NASNI) was formerly a dumping site where petroleum products and chlorinated solvents were disposed of in a natural depression area. Based on subsurface investigations conducted at NASNI dense non-aqueous phase liquids (DNAPLs) were identified in the groundwater. Because the DNAPLs migrated towards San Diego Bay and leached into the bay sediment, porewater was collected at a depth of approximately 5 feet from the sediment surface (Cheng 2001, pers. comm.). The Regional Board is aware of the groundwater contamination issues at NASSCO, however, there is no indication that the contamination has migrated towards the bay and has impacted the bay sediments (Phillips 2001, pers. comm.).

(D) If pore water exceeds federal water quality criteria, what will happen?

Regional Board Response
If it is determined that sediment cleanup levels developed by the EqP approach are the "best-performing" set of cleanup levels, remedial action will be taken in areas where EqP sediment cleanup levels are exceeded. According to EqP theory, when sediment chemical concentrations exceed EqP sediment cleanup levels the respective pore water chemical concentrations are exceeding the water quality criteria. Because various methodologies (AET approach, EqP approach, etc.) are being used to develop sediment cleanup levels for the protection of aquatic-life beneficial uses, a comparative evaluation of these cleanup levels will be conducted to identify the set of values having optimum performance. Optimum performance will be determined by calculating the overall reliability, sensitivity, and efficiency of each of the candidate cleanup levels developed by the AET and EqP approaches; higher values of overall reliability, sensitivity, and efficiency indicate better performance (RWQCB 2001a and Exponent 2001a).

(E) Will you be using EPA's latest equilibrium partitioning coefficient values?

Regional Board Response
Yes. If there is uncertainty in the site-specific derived equilibrium partitioning coefficients the latest coefficients from the literature may be considered as default.

(F) Exponent indicates that it will determine if the organism is responding as expected with the use of the dilution series test. Responding as expected to which chemicals? How have you determined that all chemical contaminants will be present, and present in appropriate concentrations, in sediment at your one sampling station for the dilution series test?

Regional Board Response
The shipyards' workplan proposes 2 stations for the sediment serial dilution tests, one at each shipyard. If conflicting information is presented between the AET, EqP, and the dilution series tests, additional validation data such as dilution series tests, sediment chemistry, and/or other toxicity tests can be requested in Phase 2. See Regional Board response on Comment #2 – Sampling for Dilution Series, Pore Water, and Fish Tissue (August 21, 2001 Letter).

(G) Without a footprint, how can you determine this?

Regional Board Response
See Regional Board response on Comment #2a – Sampling for Dilution Series, Pore Water, and Fish Tissue (August 21, 2001 Letter).

(H) How can dilution test provide QA check on AET and EqP values when it won't cover the suite of chemicals for which AET and EqP values will be derived?

Regional Board Response
See Regional Board response on Comment #2a – Sampling for Dilution Series, Pore Water, and Fish Tissue (August 21, 2001 Letter).

3. Core Sampling

(A) How can you know where deep sediment cleanup is necessary if you will only test where you predict clean up will be necessary, based on toxicity of surface (2 cm) sediments?

Regional Board Response
See Regional Board response on Comment #3 – Core Sampling (August 21, 2001 Letter).

(B) How will you use the data from Phase 1 to determine location and extent of core sampling?

Regional Board Response
See Regional Board response on Comment #3 – Core Sampling (August 21, 2001 Letter).

(C) In areas of high concentration of contaminants, what ratio of core to cubic yards will you use? For example, how many cores per 10,000 cubic yards will you require?

Regional Board Response
The Regional Board will not require a fixed number of cores per certain square yards of sediment contamination. The Regional Board has required NASSCO and Southwest Marine to propose the total number and locations of cores to adequately define the vertical extent of sediment contamination. The proposed number of cores and locations will be reviewed and approved by the Regional Board.

4. **AET**

(A) What is the variability of grain size on site? How many sampling stations have 20% fines? How many have 20-40% fines, etc.?

Regional Board Response
The table provided below summarizes the grain size data from Exponent's Technical Memorandum 1 - Phase 1 Sediment Chemistry Data for the NASSCO and Southwest Marine Detailed Sediment Investigation (October 2001). The fine-grained sediments range from 43-89% at NASSCO, from 32-100% at Southwest Marine, and from 28-45% at the reference stations.

NASSCO

Survey Station	Fine Grain Size Percent
NA01	80.0
NA01	74.7
NA02	77.2
NA03	74.7
NA04	79.3
NA05	74.7
NA06	75.1
NA07	78.7
NA07	78.5
NA08	85.3
NA09	89.0
NA10	61.2
NA11	73.5
NA12	66.7
NA13	77.8
NA14	68.2
NA15	89.1
NA16	86.7
NA17	81.2

Southwest Marine

Survey Station	Fine Grain Size Percent
SW02	60.0
SW02	60.2
SW03	79.6
SW04	31.8
SW05	55.2
SW06	100.5
SW07	59.8
SW08	68.8
SW09	57.6
SW10	64.1
SW11	71.8
SW12	57.7
SW13	71.5
SW14	73.2
SW15	89.8
SW16	75.3
SW17	94.2
SW18	87.6
SW19	54.0

Reference Stations

Survey Station	Fine Grain Size Percent
REF1	40.8
REF2	41.2
REF3	31.6
REF4	45.3
REF5	28.0
Mean	37.4
Minimum	28.0
Maximum	45.3
Median	32.7

NA18	74.4
NA19	79.3
NA20	42.7
NA21	69.2
NA22	60.4
Mean	74.9
Minimum	42.7
Maximum	89.1
Median	76.2

SW20	55.4
SW21	67.6
SW22	86.1
SW23	82.3
SW24	47.4
SW25	71.9
SW26	47.0
SW27	74.3
SW28	71.5
Mean	68.4
Minimum	31.8
Maximum	100.5
Median	70.2

(B) How does bioavailability vary across the site?

Regional Board Response

The bioavailability of sediment-associated contaminants at the shipyard sites has not been determined yet because the data are not available. Bioavailability of contaminants will be addressed, at a minimum, by:

- Directly measuring the accumulation of contaminants in the tissue of organisms and estimating the BSAFs (i.e., bioaccumulation study),
- Directly measuring the toxic effects of contaminants on biological organisms (i.e., toxicity tests), and
- Comparing metals concentrations to sulfide binding capacity based on metal acid volatile sulfides (AVS)/simultaneously extracted metals (SEM) ratios. The AVS/SEM ratio provides an indication of how bioavailable trace metals in the sediment are to porewater and sediment dwelling organisms.

(C) How many different ecological niches will you be developing AETs for? For example, crustaceans, echinoderms, larval forms of..., bacteria, isopods?

Regional Board Response

AET values will be developed for a suite of ecological niches. From the three designated toxicity tests AET values will be developed for crustaceans (amphipod survival test, *Eohaustorius estuarius*), echinoderms (sea urchin fertilization test, *Strongylocentrotus purpuratus*), and bivalves (mussel development test, *Mytilus edulis*). From the benthic community evaluation AET values will be developed for the following benthic metrics:

- Total abundance – the total number of individuals identified in each replicate sample,

- Taxa richness – the total number of taxa identified in each replicate,
- Abundances of major taxa – the number of individuals of major taxonomic groups (e.g., Amphipoda, Gastropoda, Pelecypoda, Polychaeta) identified in each replicate,
- Taxa diversity – the distribution of individuals among species for each replicate, and
- Percent dominance – the percent contribution of the three most abundant taxa in each replicate.

(D) How many different chemicals will you be determining AETs for?

Regional Board Response
AET values can be calculated for all of the chemicals analyzed at NASSCO and Southwest Marine. AET values, however, will be developed for only a subset of chemicals, termed "indicator chemicals." The indicator chemicals will be selected from the wide variety of chemicals detected at the shipyard sites to serve as indicators of classes of chemicals determined to be important at the site. The methodology for selection of indicator chemicals include:

- Correlations between concentrations of different chemicals - these correlations will identify those chemicals that most strongly covary with a large number of other chemicals,
- Exposure responsiveness in the sediment serial dilution toxicity tests, and
- Correspondence with toxicity test results – chemicals that are consistently above a candidate cleanup level (background or AET) at stations that show toxicity will be regarded as better indicators.

Additional quantitative analyses of the relationships between different chemicals and between chemicals and toxicity will be carried out to help further establish the identity of indicator chemicals. These analyses may include multivariate techniques such as principal components analysis and multiple regression. Results of these analyses may provide a quantitative indication of the relative importance of different indicator chemicals, and will be used in support of the three methods listed above.

5. Benthic Fauna Assessment (Part of triad toxicity testing)

(A) "Benthic effects that are attributable to physical disturbance will not be used to derive chemical-based sediment cleanup levels" (Exponent comments). How will you determine whether effects are attributable to physical disturbance? Is it just the presence of physical disturbance from the photos?

Regional Board Response
See Regional Board response on Comment #5 – Benthic Fauna (August 21, 2001 Letter).

(B) PTI's method for assessing benthic fauna was judged insensitive, so WA State spent additional 200K or so to improve. Will Exponent use the improved methodology?

Regional Board Response
The Regional Board is aware of the benthic endpoints that are currently used by Washington State Department of Ecology for discriminating low contaminant level benthic impacts: Schwarz Dominance Index, enhanced polychaete abundance, Mollusca abundance, Crustacea abundance, and total richness (Striplin 1999). It is expected that Exponent will include these recommended endpoints as well as the benthic endpoints used in Bight '94, Bight '98, and the BPTCP to evaluate the benthic communities at the shipyard sites.

(C) What endpoints are you using to determine benthic fauna impacts?

Regional Board Response
Benthic macroinvertebrates $\geq$1000 *u*m will be collected and identified to the lowest practical taxonomic level. Comparisons at all stations will be made using a method based on a classification analysis of the abundances of benthic taxa. Other benthic community comparisons will be made examining total abundance, taxa richness, abundance of major taxa, taxa diversity, and percent dominance (Exponent 2001a). Furthermore, benthic indices developed in the BPTCP and the SCCWRP Bight 1998 Benthic Response Index for Bays and Harbors will also be calculated if they are available at the time of data analysis.

It was suggested by the San Diego Bay Council at the October 12, 2001 meeting that the workplan should include examining "meiofauna" or microinvertebrates (invertebrates between 44 and 300 *u*m (Snelgrove 1999)). The standard sieve size is the U.S. Standard No. 18 or 1.0 mm (1000 *u*m) screen for marine benthic macroinvertebrates studies (ASTM 2001b). Invertebrates <1000 *u*m will not be enumerated and identified in this study because the taxonomy of macroinvertebrates is better known than microinvertebrates.

Although microinvertebrates will not be directly examined in Phase 1, the sediment-water interface toxicity test will examine the potential impacts from the shipyard's sediment to invertebrates, both macro and microinvertebrates, that may live near and settle into the surface sediments. Bivalve larvae will be exposed to undisturbed sediment samples and their survival and development will be evaluated. At the 48-hour normal development stage, bivalve larvae will be free swimming and approximately 75 *u*m in length (ASTM 2001c).

(D) Will you be identifying organisms to the species level?

Regional Board Response
See Regional Board response on Comment #5(C) – Benthic Fauna Assessment (Part of triad toxicity testing) (October 10, 2001 List of Questions).

(E) What do you think about the use of benthic indexes?

Regional Board Response
We support the BPTCP approach for developing benthic indices because it takes into account only information that characterizes the benthic community and should reflect local conditions. Information like indicator species, species abundance, species richness and community parameters were used in developing the BPTCP index. This index gave a range of benthic community health by using a numerical ranking system. This simplistic index may be best for a waterbody as large as San Diego Bay because it encompasses a wide variety of marine habitats and conditions (SWRCB 1996).

Currently, a similar benthic index is being developed by SCCWRP from their Bight'98 benthic community survey. A Bight'98 Benthic Response Index for bays and harbors in southern California may be available for comparisons in this site assessment. If available, this index will be used for comparisons to benthic community data from NASSCO and Southwest Marine samples.

See Regional Board response on Comment #5(C) - Benthic Fauna Assessment (Part of triad toxicity testing) (October 10, 2001 List of Questions) for the benthic community parameters that will be used in developing the benthic community indices.

6. On site Fauna and Flora – Missing from Plan. Site Habitat Characterization and Consideration of Ecological Effects

(A) One focus of study should be the animals that inhabit the site.

Regional Board Response
See Regional Board response on Comment #6 – On-site Fauna (August 21, 2001 Letter).

(B) How will potential common and special status plant, invertebrate, fish, bird, reptile and mammalian species present at the site be determined? (DTSC)

Regional Board Response
Selection of representative species will be dependent on the revised conceptual site model. The revised model will be developed in accordance with DTSC's guidance document titled *"Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities"* (DTSC 1996). The Regional Board will be consulting with the resource agencies to discuss the revised model and selection of representative species. See Regional

Board response on Comment #9 – Protection of Wildlife and Human Health (August 21, 2001 Letter).

(C) Aquatic Plants: How will leaf tissue residues be evaluated for chemical uptake and trophic transfer to herbivorous animals (i.e. birds, sea turtles) be evaluated? uptake of chemicals (i.e..metals) by plants may be significantly different than uptake by animals(i.e. *Macoma sp.)*. How will adverse effects on plants themselves be evaluated? (DTSC)

<u>Regional Board Response</u>
The shipyards' did not originally propose aquatic plants as an assessment endpoint. Aquatic plants will be considered in the revised conceptual site model because of the presence of eel grass at the shipyard sites (particularly at Southwest Marine). The revised model will be developed in accordance with DTSC's guidance document titled *"Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities"* (DTSC 1996). The methodology to evaluate the potential adverse effects of chemical contaminants on aquatic plants and on animals that consume aquatic plants will be reviewed and approved by the Regional Board (in consultation with technical experts from the resource agencies).

(D) Fish Populations: How will adverse effects of chemical contaminants on near-shore fish populations be assessed. There is evidence that fish are adversely affected by chemicals such as PAHs and PCBs in sediments that do not impact benthic invertebrates (DTSC).

<u>Regional Board Response</u>
The shipyards' did not originally propose fish populations as an assessment endpoint. Fish populations will be considered in the revised conceptual site model. The revised model will be developed in accordance with DTSC's guidance document titled *"Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities"* (DTSC 1996). The methodology to evaluate the potential adverse effects of chemical contaminants on fish will be reviewed and approved by the Regional Board (in consultation with technical experts from the resource agencies).

(E) Will the Board staff seek Natural Resource Trustee Agency review and concurrence on species, habitat and ecosystem aspects and the Work Plan generally? Why did they not seek review before approving the Work Plan and allowing work to proceed?

<u>Regional Board Response</u>
Yes, the Regional Board will be consulting with state and federal resource agencies to discuss the overall approach to assess aquatic-dependent wildlife and human health risks at the shipyard sites.

The Regional Board initiated consultation with the resource agencies following the collection of the Phase 1 sediment quality data (i.e., sediment chemistry, toxicity, benthic community, and bioaccumulation). The Regional Board will be seeking their input on the interpretation of the Phase 1 data and prior to proceeding on to the more intensive bioaccumulation study, if required.

7. Cumulative Risk

(A) How are the Board staff accounting for cumulative risk/impact on species in the Bay?

Regional Board Response
Cumulative risk/impact on species in San Diego Bay are being addressed through the assessment and remediation of contaminated sediments at other sites in the bay. These sites include designated Toxic Hot Spots requiring TMDL development, Department of Defense (DoD) sites, and a number of bayfront private industries. While these sites are being managed through different programs it is the Regional Board's goal to ensure that these contaminated sediment sites are being managed in a consistent manner. Consistent treatment of these sites is important to (1) ensure equitable treatment of all responsible parties, (2) establish consistent investigation and remediation methodologies baywide, (3) develop consistent sediment cleanup levels for the protection of the bay's beneficial uses, (4) share resources where possible, and (5) obtain comparable data that may eventually allow for the development of a baywide database.

The Regional Board also supports and participates in, where possible, bay-wide investigations/evaluations (e.g., Bay Protection and Toxic Cleanup Program, Environmental Monitoring and Assessment Program, and Bight'94/98 studies) to provide a background and description of bay-wide issues of contamination and potential adverse effects on humans and the environment.

(B) Exponent makes the point that fish are mobile and can pick up contamination from other sources besides the shipyard sites. This provides a rationale for setting cleanup levels more stringently to account for cumulative contaminant load - and other stressors - in the Bay.

Regional Board Response
This topic was discussed at the Regional Board's November 7, 2001 meeting with the resource agencies (RWQCB 2001c). The list of fish species in the shipyards' workplan is acceptable because it is based on a list presented in an EPA reference document (US EPA 2000b). It was recommended by the resource agency representatives that the list be modified to include more sedentary fish like surf perch, gobies, and flatfish. These fish tend to have a smaller home range than some of the fish species in the workplan and should give more accurate tissue concentration levels. The Regional Board will require NASSCO

and Southwest Marine to include sedentary fish in the Phase 2 bioaccumulation study, if required.

Although San Diego Bay sediment and water quality issues are not limited to NASSCO and Southwest Marine, the focus of the workplan is just these two shipyards. The quantification of environmental, water quality and public health effects from contaminated sediment unavoidably involves considerable scientific uncertainty. In light of the many uncertainties involved and the lack of clear criteria, the decision on cleanup levels at NASSCO and Southwest Marine will, to some degree, be based on imprecise information and important elements of uncertainty and subjectivity. It is the Regional Board's intention to include a safety factor once shipyard sediment clean levels are established. This safety factor will account for uncertainties such as the difficulty in determining the actual exposure of fish to contaminants from a site.

(C) This also means that shipyard contamination is being spread over and affecting a larger area than just these sites.

Regional Board Response
See Regional Board response on Comment #7(A) and #7(B) – Cumulative Risk (October 10, 2001 List of Questions).

8. Reference Sites

(A) What format is the Board staff requiring for raw data provided by Exponent?

Regional Board Response
Data collected from the project will be provided to the Regional Board in electronic and paper format in accordance with the Regional Board guidelines titled *Guidelines for Assessment and Remediation of Contaminated Sediments in San Diego Bay at NASSCO and Southwest Marine Shipyards* (June 1, 2001) (RWQCB 2001a).

(B) Given that Exponent has apparently determined there is little variability in grain size at the site (the reason given for not requiring as many stations for AET), can you now say whether all 5 reference stations are physically similar to the site?

Regional Board Response
Based on the grain size data that was collected by Exponent during the Phase 1 sampling event, it appears that the 5 reference stations do not entirely span the range of fine-grained sediments at NASSCO and Southwest Marine. The fine-grained sediments at the reference stations range from 28% to 45% and the fine-grained sediments at the shipyard sites range from 32% to 100%. It was expected, based on the Bight'98 data, that the range of sediment grain sizes at the reference sediments would be representative of the shipyard sediment.

The Bight'98 data reported fine-grained sediments ranging from 31% to 79% at these 5 reference sites. Because it is important to match physical conditions between reference and site sediment in order to make appropriate indicator comparisons (i.e., chemistry, toxicity, benthic community composition, and bioaccumulation), the Regional Board is considering requiring the shipyards to propose additional reference sites to match the upper range of fine-grained sediments at the shipyard sites. I have a question on this.

(C) How does EPA define "relatively uncontaminated site?"

Regional Board Response
EPA defines a "relatively uncontaminated site" as a reference site. Often, a reference site is incorrectly referred to as control sediment. A control sediment is a pristine (or nearly so) sediment, free from localized anthropogenic inputs of pollutants with contamination present only because of inputs from the global spread of pollutants (USEPA 1992). A reference sediment, on the other hand, is collected from a location that may contain low to moderate levels of pollutants resulting from both the global inputs and some localized anthropogenic sources, representing the background levels of pollutants in an area (USEPA 1992).

(D) Will you use minimum or maximum chemical contamination and bioaccumulation values from the set of 5 reference stations?

Regional Board Response
All data from the five reference stations will be used to determine whether the site stations are significantly different from background conditions. The criteria to select the appropriate reference station(s) for comparison to each site station will be based on matched physical conditions (grain size and total organic carbon content). Because these five reference stations represent a range of physical conditions and most importantly reflect low chemical contamination, lack of acute toxicity, and a healthy benthic community, appropriate comparisons are possible for each of the onsite stations.

Also, see Regional Board response on Comment #8 – Reference Sites (August 10, 2001 Letter).

(E) Has bioaccumulation testing been carried out at these reference stations by other parties, and if so, what are the results?

Regional Board Response
The U.S. Navy and SCCWRP conducted similar biological effects testing at the same five reference sites for the Chollas Creek and Paleta Creek studies (Bay and Chadwick 2001). The tests included measuring four types of sediment quality indicators: sediment chemistry, toxicity, benthic community composition, and bioaccumulation. The Regional Board will

require NASSCO and Southwest Marine to compare the results of these four indicators from the shipyard investigation to the results from Chollas Creek and Paleta Creek studies.

9. Independent Data Analysis Imperative

(A) Board staff needs to hire the expertise it will require to independently evaluate all data.

Regional Board Response
The Regional Board has the necessary resources to evaluate the data from the shipyard investigation and does not need to hire experts for independent evaluation. Furthermore, the Regional Board will seek assistance, as necessary, from the resource agencies that have the technical expertise on risks to human health and wildlife. See Regional Board response on Comment #9 – Protection of Wildlife and Human Health (August 21, 2001 Letter).

10. OVERSIGHT

(A) Why would Exponent object to the independent sampling and analysis we have recommended?

Regional Board Response
Exponent has reported that they do not agree with independent sampling and analysis because Regional Board staff has already implemented a QA/QC program. The QA/QC program included oversight of Phase 1 sampling activities, collecting and independent analyzing split sediment samples, and directly observing field sampling efforts during Phase 1 (Exponent 2001b).

Irregardless of Exponent's objection to independent sampling and analysis, the Regional Board does not agree that independent experts should be hired to collect and analyze samples form the shipyard sites. See Regional Board response on Comment #11 – Oversight (August 21, 2001 Letter).

References

American Society for Testing and Materials. 2001a. Standard Guide for Determination of the Bioaccumulation of Sediment-Associated Contaminants by Benthic Invertebrates. E 1688-00a. In Annual Book of ASTM Standards, Vol 11.05. Philadelphia, PA, pp1039-1092.

American Society for Testing and Materials. 2001b. Standard Guide for Selecting Stream-Net Sampling Devices for Collecting Benthic Macroinvertebrates. D 4556-85. In Annual Book of ASTM Standards, Vol 11.05. Philadelphia, PA, pp 80-88.

American Society for Testing and Materials. 2001c. Standard Guide for Conducting Static Acute Toxicity Tests Starting with Embryos of Four Species of Saltwater Bivalve Molluscs. E 724-98. In Annual Book of ASTM Standards, Vol 11.05. Philadelphia, PA, pp146-166.

Bay, S., and B. Chadwick. 2001. Sediment Quality Assessment Study at Chollas Creek and Paleta Creek, San Diego – Sampling and Analysis Plan. Southern California Coastal Water Research Project, Westminster, CA and SPAWAR System Center, U.S. Navy, San Diego, CA.

Broadburg, R. 2001. Personal communication (email message to T. Alo of RWQCB regarding the use of OEHHA's screening values at NASSCO and Southwest Marine). Office of Environmental Health Hazard Assessment.

Chapman, P.M., F. Wang, J. Germano, G. Batley. 2001. Pore water testing and analysis: the good, the bad, and the ugly. Marine Pollution Bulletin 1778: 1-8.

Cheng, Charles. 2001. Personal Communication sent via electronic mail on November 27, 2001. California Regional Water Quality Control Board, San Diego Region.

DTSC. 1996. Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities. California Department of Toxic Substances Control Human and Ecological Risk Division.

DTSC. 2000. HERD Ecological Risk Assessment Note 4: Use of Navy/U.S. Environmental Protection Agency (USEPA) Region 9 Biological Technical Assistance Group (BTAG) Toxicity Reference Values (TRVs) for Ecological Risk Assessment. California Department of Toxic Substances Control Human and Ecological Risk Division.

DTSC. 2001. HERD Memorandum: Comments and recommendations on the sediment quality assessment and remedial approaches presented at the August 3, 2001 public workshop sponsored by the San Diego Regional Water Quality Control Board. California Department of Toxic Substances Control Human and Ecological Risk Division.

Exponent. 2001a. Work Plan for the NASSCO and Southwest Marine Detailed Sediment Investigation. Exponent, Bellevue, WA.

Exponent. 2001b. Responses to Comments of the Environmental Health Coalition and San Diego Baykeeper on the NASSCO and Southwest Marine Detailed Sediment Investigation Work Plan. Exponent, Bellevue, WA.

Exponent. 2001c. Technical Memorandum 1: Phase 1 Sediment Chemistry Data, NASSCO and Southwest Marine Detailed Sediment Investigation. Exponent, Bellevue, WA.

Exponent. 2001d. Technical Memorandum 2: Recommended Receptor Species and Tissue Residue Guidelines, NASSCO and Southwest Marine Detailed Sediment Investigation. Exponent, Bellevue, WA.

Gries, T. 2000. Personal communication (Conference call with Regional Board staff [T. Alo, A. Monji, and V. Rodriguez] regarding the calculation of AET values using 50 triad stations. Washington State Department of Ecology.

Johnson, Lyndal. 2000. An Analysis in Support of Sediment Quality Thresholds for Polycyclic Aromatic Hydrocarbons (PAHs) to Protect Estuarine Fish. Northwest Fisheries Science Center, National Oceanic and Atmospheric Administration.

MacDonald, D. 2001. Personal Communication (Telephone conversation with T. Alo of the Regional Board) regarding interpretation of the contingency table provided in the USEPA document titled "Development of a Framework for Evaluating Numerical Sediment Quality Targets and Sediment Contamination in the St. Louis River Area of Concern" (December 2000) (EPA 905-R-00-008). MacDonald Environmental Sciences Ltd.

Meador, James. 2000. An Analysis in Support of Tissue and Sediment Based Threshold Concentrations of Polychlorinated Biphenyls (PCBs) to Protect Juvenile Salmonids Listed by the Endangered Species Act. Northwest Fisheries Science Center, National Oceanic and Atmospheric Administration.

NOAA. 1992. The Coastal Resource Coordinator's Bioassessment Manual. National Oceanic and Atmospheric Administration.

OEHHA. 1999. Prevalence of Selected Target Chemical Contaminants in Sport Fish from Two California Lakes: Public Health Designed Screening Study. Office of Environmental Health Hazard Assessment.

Phillips, E. 2001. Personal communication (Telephone conversation with B. Ott of the Regional Board regarding groundwater contamination issues at NASSCO. San Diego County Department of Health Services.

RWQCB. 2001a. Guidelines for Assessment and Remediation of Contaminated Sediments in San Diego Bay at NASSCO and Southwest Marine Shipyards. California Regional Water Quality Control Board, San Diego Region.

RWQCB. 2001b. Meeting to discuss comments received from San Diego Bay Council on the NASSCO and Southwest Marine sediment investigation workplan. California Regional Water Quality Control Board, San Diego Region.

RWQCB. 2001c. Meeting with the Natural Resource Trustee Agencies to discuss the overall approach to assess aquatic-dependent wildlife and human health risks at NASSCO and Southwest Marine. State Water Resources Control Board, Sacramento, CA.

San Diego County Department of Health Services, Environmental Health Services. June 1990. San Diego Bay Health Risk Study: An Evaluation of the Potential Risk to Human Health from Fish Caught and consumed from San Diego Bay. County of San Diego, CA.

SETAC. 2001. Porewater Toxicity Testing: Biological, Chemical, and Ecological Considerations with a Review of Methods and Applications, and Recommendations for Future Areas of Research - Summary of a SETAC Technical Workshop. A publication of Society of Environmental Toxicology and Chemistry (SETAC).

Striplin. 1999. Puget Sound Reference Value Project - Task 3: Development of Benthic Effects Sediment Quality Standards. Striplin Environmental Associates, Inc., Olympia, Washington.

Snelgrove, Paul. 1999. Getting to the Bottom of Marine Biodiversity: Sedimentary Habitats. Bioscience. Available online at: www.coastal.edu/science/marine/msci302/ocean.htm.

State Water Resources Control Board. 1996. Chemistry, Toxicity and Benthic Community Conditions in Sediments of the San Diego Bay Region. State Water Resources Control Board, Sacramento, CA.

USEPA. 1989. Report of the Sediment Criteria Subcommittee - Evaluation of the Apparent Effects Threshold (AET) Approach for Assessing Sediment Quality. United States Environmental Protection Agency.

USEPA. 1992. Sediment Classification Methods Compendium (EPA-823-R-006). United States Environmental Protection Agency.

USEPA. 1994. Assessment and Remediation of Contaminated Sediment (ARCS) Program (EPA 905-B94-002). United States Environmental Protection Agency.

USEPA. 1998. Methods for Assessing Sediment Bioaccumulation in Marine/Estuarine Benthic Organisms. National Sediment Bioaccumulation Conference Proceedings (EPA 823-R-98-002). United States Environmental Protection Agency.

USEPA. 2000a. Development of a Framework for Evaluating Numerical Sediment Quality Targets and Sediment Contamination in the St. Louis River Area of Concern (EPA 905-R-00-008). United States Environmental Protection Agency.

USEPA. 2000b. Guidance for Assessing Chemical Contaminant Data For Use in Fish Advisories – Volume 1 Fish Sampling and Analysis (EPA 823-B-00-008). United States Environmental Protection Agency.

USEPA. 2000c. Estuarine and Coastal Marine Waters: Bioassessment and Biocriteria Technical Guidance (EPA-822-B-00-024). United States Environmental Protection Agency.

USEPA. Draft. Technical Basis for the Derivation of Equilibrium Partitioning Sediment Guidelines (ESGs) for the Protection of Benthic Organisms: Nonionic Organics. United States Environmental Protection Agency.

WDOE. 1995. Sediment Sampling and Analysis Plan Appendix – Guidance on the Development of Sediment Sampling and Analysis Plans Meeting the Requirements of the Sediment Management Standards – Chapter 173-204 WAC. Washington State Department of Ecology.

WDOE. 1996. Progress Re-evaluating Puget Sound Apparent Effects Thresholds (AETs) Draft Report. 1994 Amphipod and Echinoderm Larval AETs. Volume 1. Washington State Departement of Ecology.

ATTACHMENT

REGIONAL BOARD RESPONSE TO COMMENTS ON AUGUST 21, 2001 LETTER AND OCTOBER 10, 2001 LIST OF QUESTIONS FROM SAN DIEGO BAY COUNCIL REGARDING THE NASSCO AND SOUTHWEST MARINE SEDIMENT INVESTIGATION WORKPLAN

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/s/

FROM: Craig M. Wilson
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OFFICE OF CHIEF COUNSEL

DATE: February 22, 2002

SUBJECT: APPLICABILITY OF STATE BOARD RESOLUTION 92-49 IN SETTING SEDIMENT CLEANUP LEVELS

I.
QUESTIONS PRESENTED

You have asked the following questions with respect to State Water Resources Control Board (State Board) Resolution 92-49:

A. Does State Board Resolution 92-49 apply to setting cleanup levels for bay bottom contaminated sediments? If so, does the Resolution require cleanup to background sediment concentrations, or just background water column concentrations?

B. If Resolution 92-49 does apply, what are the limitations, if any, to its application? What discretion does a regional board have in designating cleanup levels for sediments less stringent than background conditions?

II.
BRIEF RESPONSE

A. A regional board must apply Resolution 92-49 when setting cleanup levels for contaminated sediments if such sediments threaten beneficial uses of the waters of the state, and the contamination or pollution is the result of a discharge of waste.[1] Contaminated sediments must be cleaned up to background sediment quality unless it would be technologically or economically infeasible to do so.

B. Resolution 92-49 is flexible and permits a regional board to set alternative cleanup levels less stringent than background concentrations if attainment of background concentrations is infeasible. Any such alternative cleanup level may not unreasonably affect beneficial uses and must comply with all applicable Water Quality Control Plans and Policies. The Resolution allows for consideration of adverse impacts of any cleanup itself as well as natural attenuation if cleanup goals can be met in a reasonable time.

III. BACKGROUND

The San Diego Regional Board (Regional Board) is currently involved in determining remediation strategies and cleanup levels at various sites within San Diego Bay. Environmental interest groups appearing before the Regional Board have taken the position that under Resolution 92-49, the Regional Board must require cleanup of contaminated sediments to attain background sediment chemistry levels as defined by an off-site reference station. Dischargers argue that Resolution 92-49 applies to water quality and not sediment quality and that attainment of background water quality conditions may not require restoration of background sediment quality conditions. Presumably, in this context, the dischargers interpret the term "water quality" to refer to the concentrations of dissolved or suspended wastes in water associated with contaminated sediment; e.g., in the water column or sediment pore water (the water between particles that make up the bottom sediment).

IV. DISCUSSION

A. Technical Issues

State Board Division of Water Quality (DWQ) staff have indicated that (1) in most cases the exposure route leading to sediment related toxicity is unknown; and (2) in addition to direct contact with, or ingestion of, water containing dissolved or suspended wastes, routes of exposure that lead to toxic effects can include sediment ingestion and direct contact with contaminated sediment particles. The DWQ assessment is supported by the U.S. Environmental Protection Agency (EPA) which has noted that pore water exposures underestimate the toxicity of sediment bound pollutants that are minimally

[1] As used in this memorandum, the term "contaminated sediments" is intended to refer to sediments that either meet the definition of "contamination" under Water Code 13050(k) or that create, or threaten to create, a condition of "pollution" under section 13050 (l).

soluble in water.[2] EPA has also recognized that sediment ingestion is an exposure route. [3]

B. Legal Issues

1. Porter-Cologne Jurisdiction

The Porter-Cologne Act is replete with provisions intended to protect beneficial uses from impacts from contaminated sediment. As discussed below, Porter-Cologne jurisdiction extends beyond water column effects to require the reasonable protection of beneficial uses from discharges of waste to waters of the state.

2. Water Code Section 13304

Water Code Section 13304 requires a person to clean up waste or abate the effects of the waste if so ordered by a regional board in the following circumstances: if there has been a discharge in violation of waste discharge requirements, or if a person has caused or permitted waste to be discharged or deposited where it is, or probably will be, discharged into the waters of the state and creates or threatens to create a condition of pollution or nuisance. "Pollution" is defined as "an alteration of the quality of the waters of the state by waste to a degree which unreasonably affects . . . the waters for beneficial uses . . . ."[4]

The legislative history of the Porter-Cologne Act states in commentary on the definition of "pollution" that "it is the unreasonable effect upon beneficial uses of water, caused by waste, that constitutes pollution."[5] This history expresses the intent that if a person discharges waste into waters of the state and beneficial uses of the water are thereby harmed - then pollution exists even if water column concentrations are not effected by wastes that have settled in sediment.

Settled wastes associated with sediments are some of the most harmful to beneficial uses of waters; e.g., PCBs, pesticides and mercury. If regional board authority under section 13304 were limited to effects on the water column, a regional board could not require cleanup if a discharger dumped into a bay pure PCBs, which due to their insolubility, sunk to the bottom and adsorbed onto sediment particles - resulting in lethal effects to aquatic organisms ingesting or otherwise contacting these sediments.

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[2] See EPA's Contaminated Sediment Management Strategy, pp. 21 and 75, EPA-823-R-98-001, April 1998.

[3] See "The Particle Size Distribution of Toxicity in Metal-Contaminated Sediments, http://es.epa.gov/ncerqa_abstracts/grants/98/envchem/ranville.html.

[4] Water Code section 13050(l).

[5] Final Report of the Study Panel to the California State Water Resources Control Board, 1969, p. 30.

This is inconsistent with the remedial goals of the Porter-Cologne Act to protect beneficial uses of the waters of the state.

State Board Resolution 92-49 describes the policies and procedures that apply to the cleanup and abatement of all types of discharges subject to Water Code Section 13304. These include discharges, or threatened discharges, to surface and groundwater. The Resolution requires dischargers to clean up and abate the effects of discharges in a manner that promotes attainment of either background water quality or the best water quality that is reasonable if background levels of water quality cannot be restored, considering economic and other factors. In approving any alternative cleanup levels less stringent than background, regional boards must apply section 2550.4 of Title 23 of the California Code of Regulations.[6] Section 2550.4 provides that a regional board can only approve cleanup levels less stringent than background if the regional board finds that it is technologically or economically infeasible to achieve background. Resolution 92-49 further requires that any alternative cleanup level shall: (1) be consistent with maximum benefit to the people of the state; (2) not unreasonably affect present and anticipated beneficial uses of such water; and (3) not result in water quality less than that prescribed in the Water Quality Control Plans and Policies adopted by the State and Regional Water Boards.[7]

3. *Water Code Section 13307*

Water Code section 13307, the statutory mandate that led to the adoption of Resolution 92-49, directed the State Board to establish a policy for the investigation and cleanup of discharges of hazardous substances that create or threaten to create a condition of contamination, pollution, or nuisance. "Contamination" is defined as a condition that creates a public health hazard resulting from the disposal of waste, whether or not waters of the state are affected.[8] As noted above, the State Board, consistent with legislative history, has exercised discretion to interpret the term "pollution" broadly to cover effects beyond the water column to protect beneficial uses of waters of the state from discharges of waste. However, given the expansive statutory definition of "contamination" as applying to disposal sites that pose a hazard to the public whether or not waters are affected, no discretionary interpretation is needed to reach the conclusion that Resolution 92-49 applies to more than the water column. Given the bioaccumulation risk posed by many contaminants in sediment, section 13307 requires regional boards to apply Resolution 92-49 in a way that ensures, at a minimum, that any sediment cleanup is protective of public health – whether or not water column concentrations are

[6] Resolution 92-49, Section III.G.

[7] *Id.*

[8] Water Code section 13050(k).

elevated above background concentrations as a result of contact with contaminated sediments.

4. *State Policy for Water Quality Control*

Statutory requirements for state water quality control policy are set forth in section 13142 of the Water Code. The section provides that such policy shall consist of any or all of: (1) water quality principles and guidelines; (2) water quality objectives; and (3) other principles and guidelines deemed essential by the State Board. This broad discretion suggests legislative intent to protect beneficial uses from more than water column effects when a waste discharge threatens such uses. This principle is reflected in the State Board Policy for Implementation of Toxics Standards and the rescinded Enclosed Bays and Estuaries Plan, discussed below, which apply specifically to sediments. With respect to the coastal marine environment, Water Code section 13142.5 provides that wastewater discharges shall be controlled to protect beneficial uses.

5. *Toxic Hot Spots Legislation*

In 1989, the Legislature added Chapter 5.6 to Division 7 of the Water Code.[9] Chapter 5.6 requires the State Board and regional boards to plan for the cleanup of "toxic hot spots." "Toxic hot spots" are defined as "locations in enclosed bays [and other waters] the pollution or contamination of which affects the interests of the state, and where hazardous substances have accumulated in the water or sediment to levels which . . . may adversely affect the beneficial uses of the bay [or other waters] . . . or (3) exceeds adopted water quality or sediment quality objectives."[10] Section 13390 expresses the legislative intent: "It is the intent of the Legislature that the state board and the regional boards establish programs that provide maximum protection for existing and future beneficial uses of bay and estuarine waters." (Emphasis added.)

Water Code section 13393 requires the State Board to adopt sediment quality objectives using the procedures that apply to the adoption of Water Quality Control Plans. Although the Legislature drew a distinction between water quality objectives and sediment objectives in section 13391.5(e), it appears to have been to clarified that the State Board must set objectives that specifically apply to this part of the aquatic environment over which the State Board has jurisdiction, and which had not received the same degree of attention as the more traditional numeric water column objectives found in Water Quality Control Plans. This interpretation is consistent with Water Code section 13181 and the EPA view, discussed below, that sediment criteria are a

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[9] Water Code section 13390 et seq.

[10] Water Code section 13391.5(e).

subset of water quality criteria. Once the sediment objectives are adopted, any sediment cleanup would have to ensure that these objectives are met.
The State Board's Consolidated Toxic Hot Spots Cleanup Plan (Hot Spots Plan) directs the regional boards to implement Resolution 92-49 when implementing the remedial portions of the Hot Spots Plan.[11] The focus of the Hot Spots Plan is on sediment remediation; it provides that: "[c]andidate and known toxic hot spots are locations (sites *in* waters of the State) in enclosed bays, estuaries or the ocean."[12] (Emphasis added.) The State Board intended the term "waters of the state" to be interpreted broadly to include contaminated sediments in these waters. For any dredging project involving contaminated sediments, section 13396(b) prohibits the discharge of dredge spoils in any location "that may cause significant adverse effects to aquatic life, fish, shellfish, or wildlife or may harm the beneficial uses of the receiving waters." There is no condition that the prohibition only applies to harm related to water column effects.

The clear message of the Toxic Hot Spots legislation is that the State Board and regional boards must develop a plan for the cleanup of "toxic hot spots" most of which involve contaminated sediments. The fact that the Legislature did not provide any additional sources of authority to the State Board or regional boards that would allow them to require cleanup of such sites suggests that it viewed the boards' existing powers as broad enough to require cleanup when beneficial uses of the state's waters are threatened by a discharge of waste.

6. *Water Code Section 13181*

Water Code section 13181 directs the State Board to propose a program that includes methods for determining the sources of pollution in coastal watersheds, bays, estuaries, and coastal waters. The proposed program must include methods for determining the degree of improvement or degradation in coastal water quality over time with respect to water quality objectives, sediment quality guidelines, tissue contaminant burden guidelines and health standards. This indicates legislative intent that water quality includes sediment quality.

7. *Judicial Opinions*

The courts have concluded that provisions determining the scope of a regulatory statute must be broadly construed to accomplish the purposes of the statute.[13] The Court of Appeals in *Lake Madrone Water District* v. *State Water Resources Control Board* indicated its support for the proposition that Porter-Cologne jurisdiction extends beyond water column effects by citing with approval an Attorney General opinion on

[11] Hot Spots Plan, p. 6.

[12] *Id.* at p. 12.

[13] *Harvey v. Davis* (1968) 69 Cal.2d 362, 370-71 (1968).

this point.[14] In Opinion No. 55-237, the Attorney General concluded that a discharge of fine-grained materials constituted pollution where the only harm to beneficial uses occurred when these materials settled out on the bottom of a reservoir. The reservoir was used to recharge groundwater and the fine-grained materials sealed the porous surface of the bottom of the reservoir thereby interfering with groundwater recharge. The Attorney General reasoned that a causal relationship existed between the discharge and the impairment even though the immediate cause of the reduction in recharge was the change in the quality of the absorbing surface on the bottom of the reservoir. Applying this same reasoning, the Attorney General also concluded that water was polluted where spawning beds were covered by these same materials - even where there was no effect on the water column.

8. *State Board Policies and Orders*

The State Board has consistently interpreted its jurisdiction as extending beyond the water column where beneficial uses are affected by a discharge of waste. The Enclosed Bays and Estuaries Plan, 91-13 WQ (EBE Plan) (which was rescinded on grounds unrelated to sediment issues), contained the following objectives under the heading "Narrative Water Quality Objectives:" "(1) the concentrations of toxic pollutants in the water column, sediments, or biota shall not adversely affect beneficial uses. (2) Enclosed bays and estuarine communities and populations, including vertebrate, invertebrate, and plant species, shall not be degraded as the result of the discharge of waste." Either of these objectives would be violated if a benthic organism were harmed as a result of the direct contact with, or ingestion of, pollutants in sediment, even if water column or sediment pore water pollutant concentrations were zero. In Order WQ 92-09, the State Board noted that although the EBE Plan did not establish numeric objectives for sediment, Resolution 92-49 required cleanup levels low enough to ensure that these narrative sediment objectives would not be violated.[15]

9. *The Clean Water Act*

EPA is in the process of adopting federal sediment criteria under the authority of Clean Water Act section 304(a), which directs EPA to develop "criteria for *water quality* . . .on the kind and extent of . . . effects . . . which may be expected from the presence of pollutants in any body of water."[16] In 1997, EPA submitted a report to Congress entitled "The Incidence and Severity of Sediment Contamination in Surface Waters of the United States." Section 304 and the EPA report suggest that EPA views sediment criteria as water quality criteria, and that the agency considers contaminated sediments to be contained *in* surface waters to the same degree as a dissolved or

[14] 209 Cal.App. 3d 163, 169 (1989).

[15] Petition of Environmental Health Coalition and Eugene J. Sprofera, September 17, 1992.

[16] EPA's Contaminated Sediment Management Strategy, pp. 21 and 75.

suspended pollutant. Thus, it is clear that EPA would favor an interpretation of the Water Code that is consistent with the Clean Water Act by including the power to regulate more than the water column where necessary to protect beneficial uses of waters of the state from the effects of waste. EPA has indicated that it will publish numeric sediment quality criteria, as guidance, with the intent that states will use the criteria in interpreting existing narrative toxicity water quality criteria. EPA also has noted that states could adopt these federal sediment criteria as state water quality standards.[17]

The Clean Water Act, defines pollution to include "alteration of the chemical, physical, biological, and radiological integrity of water."[18] This definition is analogous to the Porter-Cologne definition, in that pollution is defined to include a change in water. Responding to an attempt by the Federal Energy Regulatory Commission to restrict state authority narrowly to water chemistry issues, and to deny states broader authority over water quality, EPA observed:

> "[P]rotection of water quality involves far more than just addressing water chemistry. Rather, protection of water quality includes protection of the multiple elements which together make up aquatic systems including the aquatic life, wildlife, wetlands, and other aquatic habitat, vegetation, and hydrology required to maintain the aquatic system. Relevant water quality issues include the toxicity and bioaccumulation of pollutants, the diversity and composition of the aquatic species, entrapment of pollutants in sediment, stormwater and non-point source impacts, habitat loss, and hydrological changes."[19]

The United States Supreme Court recognized that water quality, under the Clean Water Act should be broadly construed:

> "In many cases, water quantity is closely related to water quality; a sufficient lowering of water quantity in a body of water could destroy all of its designated uses, be it for drinking water, recreation, or . . . as a fishery. In any event, there is recognition in the Clean Water Act that reduced stream flow; *i.e*, diminishment of water quantity, can constitute pollution. This broad conception of pollution – one which expressly evinces Congress' concern with the physical and biological integrity of

[17] *Id.* at p. 22.

[18] 33 U.S.C. § 1362(19).

[19] Letter from LuJuana Wilcher, Assistant Administrator, United States Environmental Protection Agency to Hon. Lois Cashell, Secretary FERC (Jan. 18, 1991).

> water – refutes [the] assertion that the Act draws a sharp distinction between the regulation of water "quantity" and water "quality."[20]

10. State Board Policy for Implementation of Toxics Standards

The State Board Policy for Implementation of Toxics Standards (the SIP) provides that mixing zones shall not result in "objectionable bottom deposits."[21] This term is defined as "an accumulation of materials . . . on or near the bottom of a water body which creates conditions that adversely impact aquatic life, human health, beneficial uses, or aesthetics. These conditions include, but are not limited to, the accumulation of pollutants in the sediments . . . ."[22] There is no requirement that the adverse impact result from exposure to pollutants in the water column or sediment pore water. Consequently, if the harm resulted from direct contact with, or ingestion of, contaminated sediments, a discharge that resulted in this condition would violate the SIP. This recently adopted Policy reaffirms the Board's long-standing conclusion that its water quality jurisdiction extends beyond water column effects.

V.
REGIONAL BOARD DISCRETION IN SETTING CLEANUP LEVELS

Given these considerations, Resolution 92-49 should be interpreted to presumptively require cleanup of contaminated sediment to background sediment levels. However, the Resolution is flexible and allows a regional board to exercise substantial discretion in setting cleanup levels. Cleanup levels less stringent than background levels are permissible if cleaning up to those levels is technologically or economically infeasible – as long as the less stringent cleanup level is protective of beneficial uses. Beneficial uses must be protected not only from exposure to sediment-derived pollutants in the water column or sediment pore water, but also pollutants in, or on, the sediment particles that can adversely affect aquatic organisms and/or human health through bioaccumulation when such organisms ingest contaminated sediments or come in direct contact with such sediments.

Resolution 92-49 requires alternative cleanup levels less stringent than background to, among other factors, "be consistent with maximum benefit to the people of the state" and requires consideration of "all demands being made and to be made on the waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible." This determination is made on a case-by-case basis and is based on considerations of reasonableness under the circumstances at the site. [23] Finally, the State

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[20] *PUD No. 1* v. *Washington Department of Ecology* (1994) 511 U.S. 700, 719.

[21] SIP at p. 15.

[22] *Id.* at Appendix 1-4.

[23] See SWRCB Order No. WQ 92-09.

Board has indicated that Resolution 92-49 does not require immediate compliance with cleanup goals.[24] Rather, the Resolution provides that a regional board must approve any cleanup proposal that the regional board finds will "have a substantial likelihood to achieve compliance, within a reasonable time frame, with cleanup goals."[25] In the context of underground tank cleanups, the State Board has concluded that "a reasonable time" may be decades where natural attenuation is the proposed cleanup approach.[26]

Although each cleanup project must be evaluated by a regional board on a case-by-case basis, the State Board, in Order WQ 92-09, recognized the infeasibility of dredging to background sediment concentrations at the Paco Terminals site in San Diego Bay. Key considerations included the cost of attaining a background sediment cleanup goal and the expected harm to beneficial uses that would result from the large-scale dredging that would be necessary to achieve background sediment levels.[27] Such harm may be expected due to physical disturbance of habitat and re-suspension of pollutants into the water column. More recently, in its response to comments on the Hot Spots Plan, the State Board indicated that regional boards would have significant discretion in determining when a site was adequately remediated. A commenter wanted to know if background levels would be required or some higher level. The State Board response noted that either of those levels could be selected by a regional board at its discretion.[28]

VI.
CONCLUSION

Regional boards must apply Resolution 92-49 when setting cleanup levels for contaminated sediments if such sediments threaten beneficial uses of the waters of the state, and the contamination or pollution is the result of a discharge of waste. Contaminated sediments must be cleaned up to levels consistent with background sediment quality unless it would be technologically or economically infeasible to do so. Any such alternative cleanup level may not unreasonably affect beneficial uses and must comply with all applicable Water Quality Control Plans and Policies. In setting alternative cleanup levels, regional boards must balance various factors. Resolution 92-49 allows for consideration of adverse impacts of cleanup as well as natural attenuation if cleanup goals can be met in a reasonable time.

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[24] SWRCB Order No. WQ-98-08-UST.

[25] Resolution 92-49, Section III.A

[26] See Note 25 at p. 12.

[27] See Note 15 at p. 4.

[28] Functional Equivalent Document for the Consolidated Toxic Hot Spots Cleanup Plan, p. 353.

bc: Ted Cobb, OCC
Tim Regan, OCC
Debbie Matulis, OCC

TJRegan/mmjohnson/dmatulis
2/8/02 / revised 2/20/02
i:\johnm\2-tjr\resolution 92-49 sediment cleanup levels.doc

Laura Hunter

From: Betts, Brett [bbet461@ECY.WA.GOV]
Sent: Tuesday, February 19, 2002 6:45 PM
To: Elaine Carlin (elainecarlin@worldnet.att.net)
Cc: Joy Williams - EHC; Laura Hunter / EHC San Diego
Subject: Sediment Guideline Comparisons

Good Evening Elaine/Ladies: Well since I've got 99% of the chem data in Sedqual, comparison to different sediment guidelines/criteria is a snap. So...I've enclosed 8 comma delimited files (.csv) that can be loaded into Excel or Lotus at the drop of a hat. The files are named similarly: "Compare all" is all chemicals compared to the guideline numbers available by that guideline system, and "hits"is just the file of parameters that exceeded any guideline/criteria. At first blush, it is interesting to note how the reference stations exceeded the different sediment guidelines. Note: look in each "hits" .csv file and look for the "Exceedance" column - that is the chemical value divided by the guideline so any number greater than "1" is a hit.

I used four criteria/guidance systems for comparison: 1)Ecology's adopted 47 sediment quality criteria (mixed normalization), 2) NOAA's ERL/ERMs (dry weight), 3) Environment Canada's marine TEL/PELs (dry weight) and 4) the 1999 draft Apparent Effects Threshold values from Ecology (using the lowest 2 AETs dry weight).

Elaine, since your draft letter talked about chemicals and comparisons to different guidelines, I really wanted to show you that it can be done relatively easy. I made these files in 15 minutes with Sedqual.

If I'm burying you too much let me know, I'll slow down. (tee hee)

Brett

4436 Carlin Place
La Mesa, CA 91941

March 6, 2002

Chairman John Minan and Regional Board Members
Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego CA 92123-4340

Dear Chairman Minan and Regional Board Members:

The purpose of this letter, submitted on behalf of the San Diego Bay Council, is to highlight major problems evident in the NASSCO and Southwest Marine Sediment Investigation Phase 1 results and their presentation by the Shipyards' consultant. These problems must be addressed before Phase 2 can proceed. The results of the benthic community testing were not yet available at the January 30 meeting - a disturbing fact, as this testing provides a critical piece of the contamination impacts puzzle, and needs to be assessed together with the chemical, toxicity, and bioaccumulation data presented at the January 30 meeting. As a result, for example, no chronic exposure information could be considered.

This letter also again requests that the consultant be required to provide data in Sedqual format - to aid all parties, including your staff, in its analysis. It is my understanding that it would be no problem for the consultant to provide the Phase 1 data in this format, and that a simple request from your staff to the consultant will produce it in short order (Attachment). I would also like to, respectfully, request the names of Board staff and consultants that have the necessary expertise - and that you have assigned - to independently review the Phase 1 testing results. There is a serious concern that the necessary chemical, biological and other expertise is not available to your staff - and thus staff will be unable to perform an adequate, much less excellent, independent review and analysis of the raw data, and the consultant's analysis of this data. *I wish to emphasize that as a regulatory authority, it is critical that you independently analyze the raw data that has been produced. This is particularly essential given your decision to not have the shipyard sites, or even a subset of the sites, sampled and assessed by independent experts.*

The most serious issues evident after the January 30 presentation of data include:

- The failure of the Reference Stations to meet the definition and minimum criteria of a reference station.
- Exponent's use of these Reference Stations - despite their invalidity - to compare to shipyard test results, including the use of pooled numbers and the maximum (most contaminated reference station) values to compare to shipyard contamination levels
- The failure of Exponent to compare test results with Control Test results - a basic and critical first step in toxicity test result analysis.

- The absence of any testing for contamination off site westerly toward the Bay, which would show transport out of the leasehold area, for some of the most critical toxics (like PCBs). It was revealed at the meeting that the consultants were allowed to decide which toxic substances they would test for off site.
- Bioaccumulation is underestimated for key chemicals such as mercury.
- A low number of samples were collected nearshore where PCB and other contaminants are more likely to occur. Conclusions about site contamination are therefore skewed by the greater number of samples collected away from shore -introducing a clear sampling bias. Additional sampling is required to better characterize the nearshore environment.
- Results of testing (AVS/SEM results) - used as an indicator of metal bioavailability - not useable.
- Lack of a context to interpret data, other than contaminated Reference Stations, when control data and recognized sediment quality guidelines could and should be used.
- Reliance on literature as old as 1946 to determine safe levels of chemicals in wildlife.
- Benthic community data unavailable when other data was presented and considered, yet critical to evaluating impacts at the shipyard sites.

A troubling revelation about the data presented by Exponent on January 30 is that Exponent made up contaminant values for areas just outside the leasehold boundary, inserted these into its model, and displayed the results graphically as if they has sampled in these areas and had actual results. In other words, depictions showing a lack of contamination just outside the shipyard site boundaries were made for chemicals that were not tested for off site. Only after questioning from the Navy and others, did Exponent reveal that they had inserted Reference Station values into off site locations.

A basic and critical first step in toxicity test result analysis was missing in the January 30 presentation - comparison of shipyard test results with Control Test results. (See for example, Thursby GB, Schlekat CE. 1993. Statistical analysis of 10-day solid phase toxicity data for amphipods. Abstract, 14th Annual Meeting, Society of Environmental Toxicology and Chemistry. Houston, TX.; and EPA/USACE. 1998. Evaluation of dredged material proposed for discharge in waters of the U.S. - Testing manual. EPA-823-B-98-004, Washington, D.C., available on line at http://www.epa.gov/ost/itm/).

It is important to view the sampling results in the context of nationally recognized sediment quality guidelines (SQGs). This is a critical step in establishing the perspective of how samples from the shipyard area compare to other areas around California and the United States.

The Board has critical decisions to make on how it will handle data falling outside control criteria specifications. In some cases, so many of the values are qualified or estimated so as to render the test invalid. For example, Acid Volatile Sulfide values are estimated for half of the samples, including 3 of 5 Reference Stations. This test measures metal bioavailability.

I was caught by surprise by Exponent's lengthy discussion of its interpretation of pictures taken at the water-sediment interface - for purposes of assessing the benthic community of organisms and its status. Is this interpretation to be used in the assessment of benthic community health, or for other purposes? I do not recall any discussion of this prior to January 30.

I was also surprised, for at least two reasons, by Exponent's strong assertion that grain size at the reference sites will cause more, rather than less, toxicity to show up in the testing, for both the amphipod and bivalve testing. The animal (amphipod) Exponent is using is a species known *not* to be sensitive to grain size. The bivalve sits on a screen entirely above the sediment so could not be affected by the grain size of the sediment. I hope you can appreciate the level of my concern in the face of these kinds of underlying errors in Exponent's strong assertions to your staff.

Reference Stations

Two of the key criteria for a Reference Station are physical similarity to the contaminated site, and lack of significant contamination. None of the 5 Reference Stations are physically similar to the shipyard sites. The lack of physical similarity alone disqualifies them as Reference Stations. But in addition there is the problem of chemical contamination. PCB concentrations in the Macoma (clam) bioaccumulation tests at Reference Station 3 are above the EPA's screening values for human consumption of fish or shellfish. The EPA level is 20 ppb for total PCBs in their 2000 guidance document (EPA-823-B-00-007). These are huge issues because it is not possible to legitimately compare shipyard values with these Reference Stations. Using significantly contaminated sites as reference would result in a failure to cleanup the shipyard sites to safe levels. The goal of sediment cleanup is to achieve a condition in which there are no significant adverse effects, and no significant human health threats

On the issue of toxicity of the reference stations, the point not to miss is that if, for example, the Thursby concept is used to determine that the reference sites are not toxic, then the same determination of toxicity should be used for the shipyard samples. If you apply the same concept to all samples, you will find that more of the shipyard samples should be called toxic. What Exponent is apparently doing instead is to assert that the Reference Stations are not toxic - and that the shipyard samples are not significantly different from the Reference samples - therefore the shipyard samples are not toxic. Exponent's approach will result in a finding of fewer toxic shipyard sites

In comments to you on the Phase 1 design, I raised the issue of pooling of reference station data and the potential for use of data from the "dirtiest" reference station. The basis of this concern was substantiated on January 30 as Exponent presented graphical representations of contamination contours using data from the reference station with the *highest* contamination levels. Exponent then compared these values with shipyard values and illustrated the areas of the shipyard that exceed this contaminated site. I would like to request that contours be drawn using the cleanest reference station, simply to illustrate to you *the difference in the extent of area that would potentially require cleanup*. In other parts of its analyses, Exponent used the average value, again problematic when you have one or more "dirty" stations, as these pull the average down. In yet other cases, Exponent selectively did not pool the values (fertilization test). *Again I wish to emphasize that reference stations by definition must not be "dirty," i.e., must not have significant contamination.*

Bioaccumulation Testing

Also raised previously in meetings with your staff, and in my written comments to you, is the problem of using only one organism to test for bioaccumulation. Different organisms bioaccumulate at different rates depending on the chemical at hand (EPA, State of Washington). For example, when one wishes to determine if bioaccumulation of Mercury is occurring, one tests crustaceans (e.g., crabs). Scientific research has shown that Mercury does not bioaccumulate at the same level in other types of organisms including clams. Exponent used only one organism, a clam, to assess bioaccumulation for all chemicals of concern. So we do not know the extent of bioaccumulation of mercury that is occurring at the shipyard sites. Moreover, Exponent is making the assumption that certain wildlife species eat a diet exclusively of clams, with the rationale that this is a conservative approach. But for mercury, for example, this is a highly problematic approach that will *underestimate* bioaccumulation, and that needs to be corrected.

Agency versus Exponent-derived Standards

When assessing impacts to wildlife it is prudent to use agency guidance that has been tested and has earned general acceptance. For many chemicals of concern, Exponent instead proposes to use a variety of studies from the literature, some dating as far back as 1946 (chromium), yet does not provide a rationale for why these particular studies are being selected, which studies were rejected and why, and why, for some chemicals, agency (e.g., US Fish and Wildlife) guidance is proposed and for other chemicals it is not. We need to know the answers to these questions before your staff judges Exponent's approach. In the development and use of site-specific rather than national or international guidelines, it is imperative that the general rule be followed: *Only site specific guidelines that are more stringent than the national/international levels should be allowed.*

The issue of resuspension and subsequent transport of the contaminated sediments off site (raised by Ed Kimura and Jim Peugh at the January 30 meeting) is apparently not being addressed (See for example, Y. Peter Sheng. 1989. "Predicting the Dispersion and Fate of Contaminated Sediments." In Contaminated Marine Sediments - Assessment and Remediation. National Academy Press. pp. 166-177).

Please be advised I am continuing to review the Phase 1 data, as it becomes available, and am likely to have additional comments to offer. Once the problems in Phase 1 are corrected, I will be providing comments on the design of Phase 2.

Sincerely,

Elaine M. Carlin
Scientific Consultant to San Diego Bay Council

cc. John Robertus

ATTACHMENT

-----Original Message-----
From: Betts, Brett
Sent: Wednesday, December 05, 2001 4:12 PM
To: Tom Alo
Cc: Payne, Martin
Subject: San Diego Data Available in Sedqual

Hi Tom - Hey I just got off the phone talking with Dreas Nielsen and he said providing the San Diego data in Sedqual format to you would be no problem. Dreas requested you contact him by phone or email to discuss the data transfer details. That's really good news and now makes your life way easier to use Sedqual to evaluate the data. With the Sedqual data templates, you can load the data into Sedqual in under 5 minutes.

Of course, first you have to get Sedqual onto a computer there. If you get stuck loading Sedqual off the compact disc onto your computer, I recommend you contact Martin Payne at (360) 407-6925 and he can help walk you through the process successfully. After you get Sedqual onto your computer, I can help walk you through getting the data in and the analysis steps.

Let me know if I can help further.

Brett Betts

From: Tom Alo [alot@rb9.swrcb.ca.gov]
Sent: Friday, March 08, 2002 8:50 AM
To: peugh@cox.net; Emkimr@cts.com; LauraH@environmentalhealth.org; Breznik@sdbaykeeper.org; elainecarlin@worldnet.att.net
Cc: David Barker; Craig Carlisle
Subject: Background Reference Conditions

Good morning. Attached is a letter from the Executive Officer to the shipyards regarding newly defined background conditions. If you have any questions or comments please call or email me.

--Tom

Tom C. Alo
Water Resources Control Engineer
CA Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123
Main: (858) 467-2952
Direct: (858) 636-3154
Fax: (858) 571-6972
<alot@rb9.swrcb.ca.gov>

California Regional Water Quality Control Board
San Diego Region

Winston H. Hickox
Secretary for Environmental Protection

Internet Address: http://www.swrcb.ca.gov/rwqcb9
9174 Sky Park Court, Suite 100, San Diego, California 92123
Phone (858) 467-2952 • FAX (858) 571-6972

Gray Davis
Governor

March 6, 2002

CERTIFIED-RETURN RECEIPT REQUESTED
7099 3400 0017 1547 5046

Mr. Mike Chee
National Steel and Shipbuilding Company
P.O. Box 85278
San Diego, CA 92186-5278

CERTIFIED-RETURN RECEIPT REQUESTED
7099 3400 0017 1547 5251

Mr. Sandor Halvax
Southwest Marine Inc.
Foot of Sampson Street
P.O Box 13308
San Diego, CA 92170-3308

Dear Mr. Chee and Mr. Halvax:

BACKGROUND REFERENCE CONDITIONS FOR ASSESSMENT AND REMEDIATION OF CONTAMINATED SEDIMENTS AT NASSCO AND SOUTHWEST MARINE SHIPYARDS

As you know by letter dated June 1, 2001, I directed NASSCO and Southwest Marine to conduct a contaminated sediment investigation in accordance with the attached document, *"Guidelines for Assessment and Remediation of Contaminated Sediments in San Diego Bay at NASSCO and Southwest Marine Shipyards, June 1, 2001."* These guidelines require that NASSCO and Southwest Marine evaluate the feasibility of various cleanup alternatives including complete cleanup of all waste discharged and restoration of affected water to background conditions (i.e., the water quality that existed before the discharge).

The Regional Board has historically used sediment chemistry concentrations at off-site reference station(s) as a surrogate for characterizing background water quality conditions in sediment cleanup investigations. The focus on sediment chemistry for defining background water quality conditions is based on several factors:

- Pollution effects from contaminated sediment extend beyond those associated with sediment – derived pollutants in the water column or sediment pore water. Pollutants in the sediment itself, as measured by sediment chemistry, can lead to toxic and bioaccumulation effects from sediment ingestion and direct contact with contaminated sediment particles.
- Sediment chemistry concentrations are preferred over water quality concentrations because they are less variable spatially and temporally.

- The definition of background water quality conditions establishes the benchmark for complete removal of all of the waste discharged and sediment chemistry is an important consideration in determining this benchmark.

The Regional Board, with the assistance of the Southern California Coastal Water Research Project (SCCWRP), has identified a new set of reference sites in San Diego Bay from the 1998 Southern California Bight Regional Monitoring Project (Bight'98). These reference sites can be used to establish an expanded definition of background water quality conditions in terms of sediment chemistry, toxicity, and benthic community structure. The criteria used to select the Bight'98 reference stations are summarized in the attached document.

We have determined, based on the reasons described in the attached document, that the background water quality conditions defined by the Bight'98 reference sites should replace the original background water quality conditions defined by reference station REF-03. Accordingly, pursuant to Directive No. 2 of Resolution Nos. 2001-02 and 2001-03, the Bight'98 reference sites shall serve as the "Background Reference Stations" representing background conditions at NASSCO and Southwest Marine. Furthermore, NASSCO and Southwest Marine shall direct their site-specific studies in accordance with the following newly defined background conditions for sediment chemistry, toxicity, and benthic community structure:

Contaminant[a]	**Background Sediment Concentrations Dry Weight (mg/kg) (Upper 95% Confidence Interval)**	**Expected Background Toxicity Conditions**[b]	**Expected Background Benthic Community Conditions**
Copper	84	Amphipod Survival Rate Between 89%-96%	Data Not Yet Available[c]
Zinc	142		
Lead	31		
PCBs	<0.20[d]		
Mercury	0.39		
Arsenic	11		
Cadmium	0.21		
Chromium	46		
Nickel	17		
Silver	0.72		
PAHs	1.2		

(a) Contaminants listed are associated with shipbuilding and repair activities believed to be present in bay sediment. It should be noted that butyltin species, polychlorinated triphenyls, and total petroleum hydrocarbons (also associated with shipbuilding and repair activities) are not listed because Bight'98 did not analyze for these contaminants.

(b) Based on cleanup to the background sediment concentrations determined by the Bight'98 reference sites.
(c) It is anticipated that analysis of the Bight'98 benthic data will be completed in February 2002.
(d) The laboratory is currently reevaluating the analytical data for PCBs due to detection limit issues. The sediment background concentration for PCBs is considered an interim value until these issues are resolved.

If you have any questions, or require additional assistance, please contact Mr. Tom Alo of my staff at (858) 636-3154.

Sincerely,

JOHN H. ROBERTUS
Executive Officer

JHR:dtb:tca

Attachment: Background Water Quality Conditions for NASSCO and Southwest Marine Shipyards as Determined by Reference Station REF-03 and Bight'98 Reference Sites

NASSCO File No.: 03-0066.05
Southwest Marine File No.: 03-0137.05

S:\WQS\Final Documents\Tom\Shipyards\Final Background Reference Conditions – Cover Letter.doc

Laura Hunter

From: Tom Alo [alot@rb9.swrcb.ca.gov]
Sent: Friday, March 08, 2002 8:50 AM
To: peugh@cox.net; Emkimr@cts.com; LauraH@environmentalhealth.org; Breznik@sdbaykeeper.org; elainecarlin@worldnet.att.net
Cc: David Barker; Craig Carlisle
Subject: Background Reference Conditions

Good morning. Attached is a letter from the Executive Officer to the shipyards regarding newly defined background conditions. If you have any questions or comments please call or email me.

--Tom

Tom C. Alo
Water Resources Control Engineer
CA Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123
Main: (858) 467-2952
Direct: (858) 636-3154
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Laura Hunter

rom:	Tom Alo [alot@rb9.swrcb.ca.gov]
Sent:	Friday, March 08, 2002 1:37 PM
To:	peugh@cox.net; Emkimr@cts.com; LauraH@environmentalhealth.org; nielsend@exponent.com; mchee@nassco.com; breznik@sdbaykeeper.org; halvaxs@swmarine.com; elainecarlin@worldnet.att.net
Cc:	David Barker; Craig Carlisle
Subject:	Office of Chief Counsel - State Board Resolution 92-49

Legal Opinion from OCC.pdf

Good afternoon. By letter dated October 31, 2001 the Executive Officer requested a formal legal review and opinion from the State Board Office of Chief Counsel (OCC) regarding the applicability of State Board Resolution 92-49 in setting sediment cleanup levels. Attached is the formal legal opinion from OCC. If you have any questions or comments please contact me.

--Tom

Tom C. Alo
Water Resources Control Engineer
CA Regional Water Quality Control Board
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From: Tom Alo [alot@rb9.swrcb.ca.gov]
Sent: Friday, March 08, 2002 8:50 AM
To: peugh@cox.net; Emkimr@cts.com; LauraH@environmentalhealth.org; Breznik@sdbaykeeper.org; elainecarlin@worldnet.att.net
Cc: David Barker; Craig Carlisle
Subject: Background Reference Conditions

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Water Resources Control Engineer
CA Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123
Main: (858) 467-2952
Direct: (858) 636-3154
Fax: (858) 571-6972
<alot@rb9.swrcb.ca.gov>

Laura Hunter

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Cc: Laura Hunter
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March 6, 2002

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The Regional Board, with the assistance of the Southern California Coastal Water Research Project (SCCWRP), has identified a new set of reference sites in San Diego Bay from the 1998 Southern California Bight Regional Monitoring Project (Bight'98). These reference sites can be used to establish an expanded definition of background water quality conditions in terms of sediment chemistry, toxicity, and benthic community structure. The criteria used to select the Bight'98 reference stations are summarized in the attached document.

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JHR:dtb:tca

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NASSCO File No.:	03-0066.05
Southwest Marine File No.:	03-0137.05

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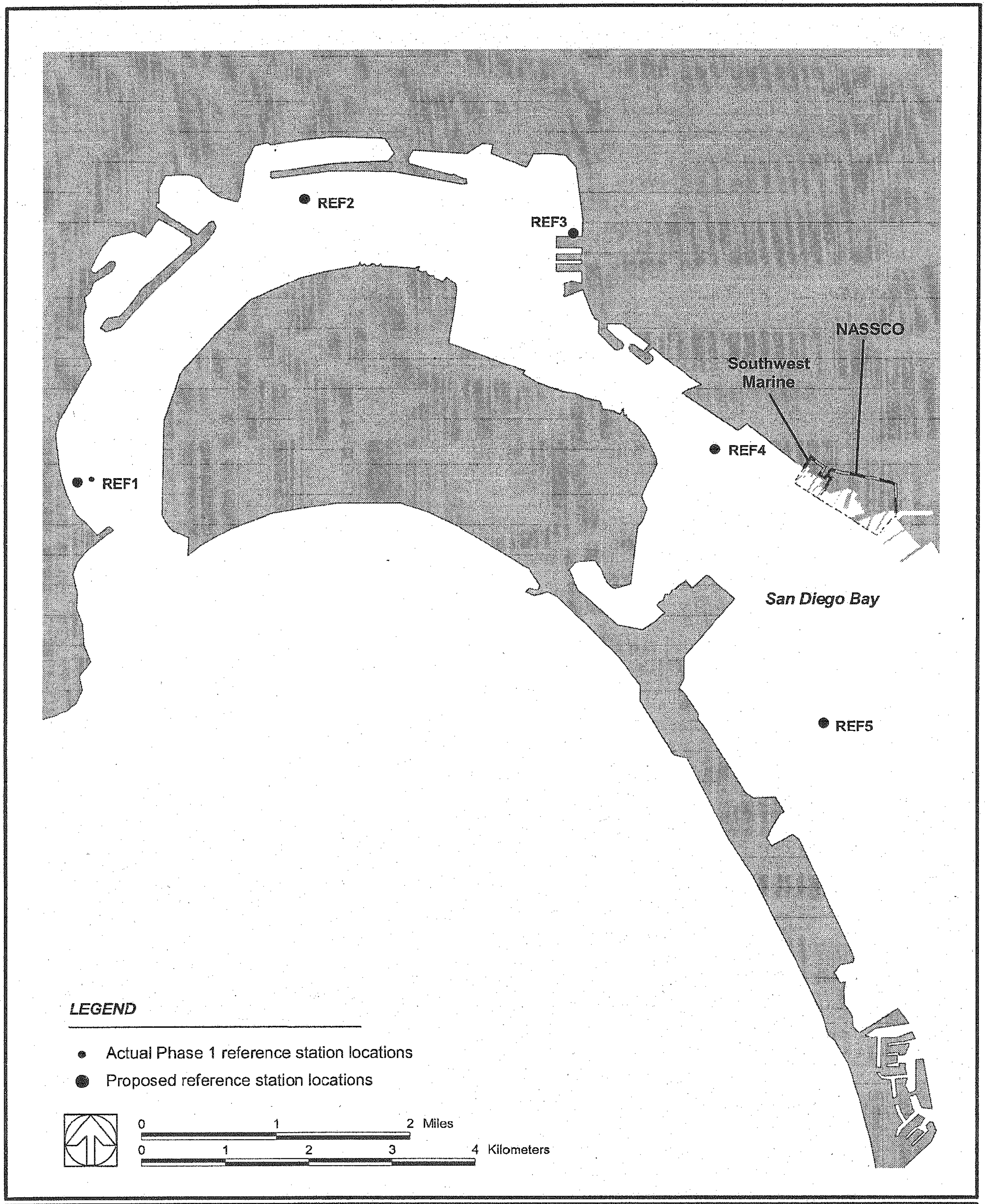

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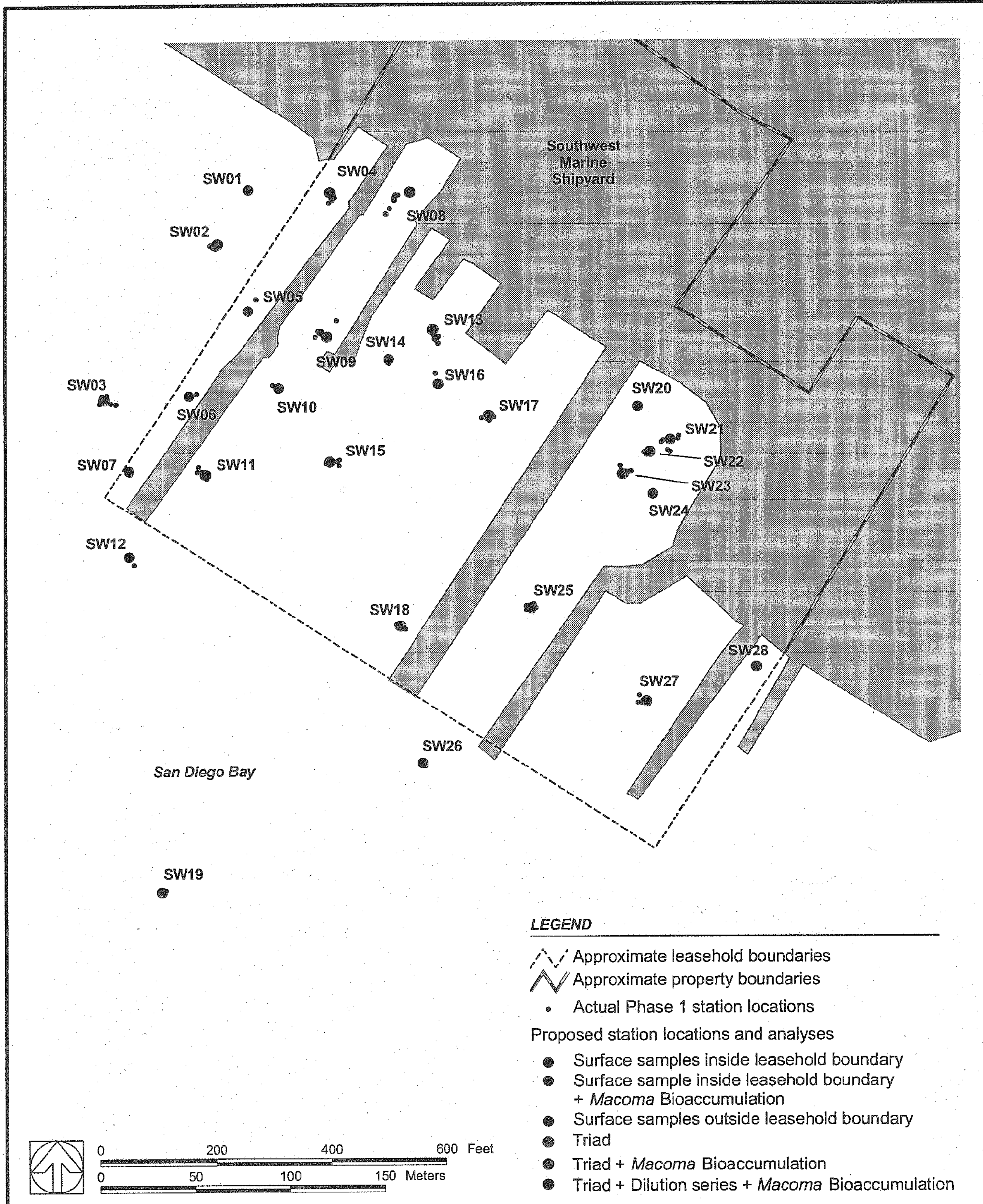

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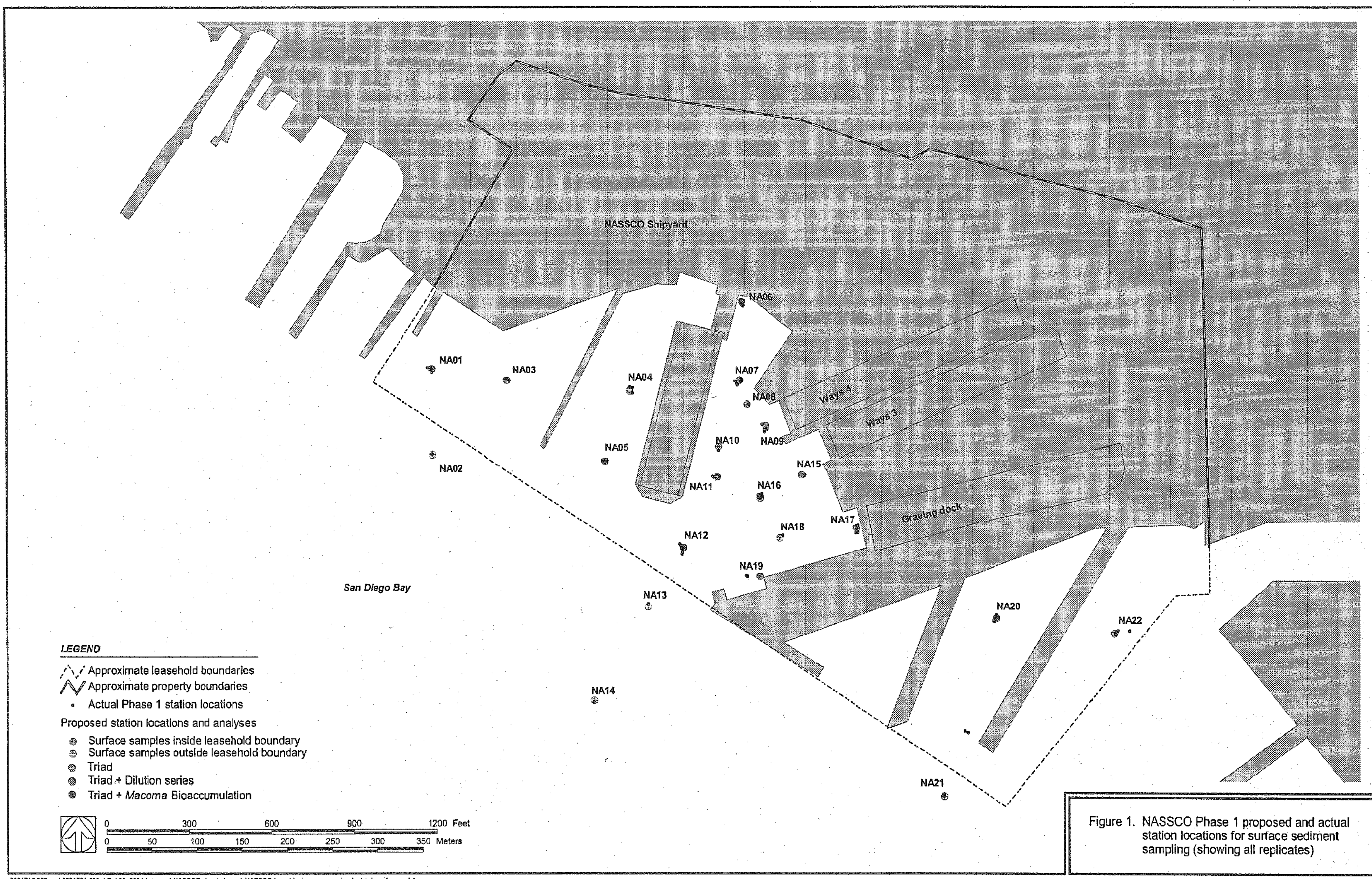

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EHC 002771

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Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

March 6, 2002

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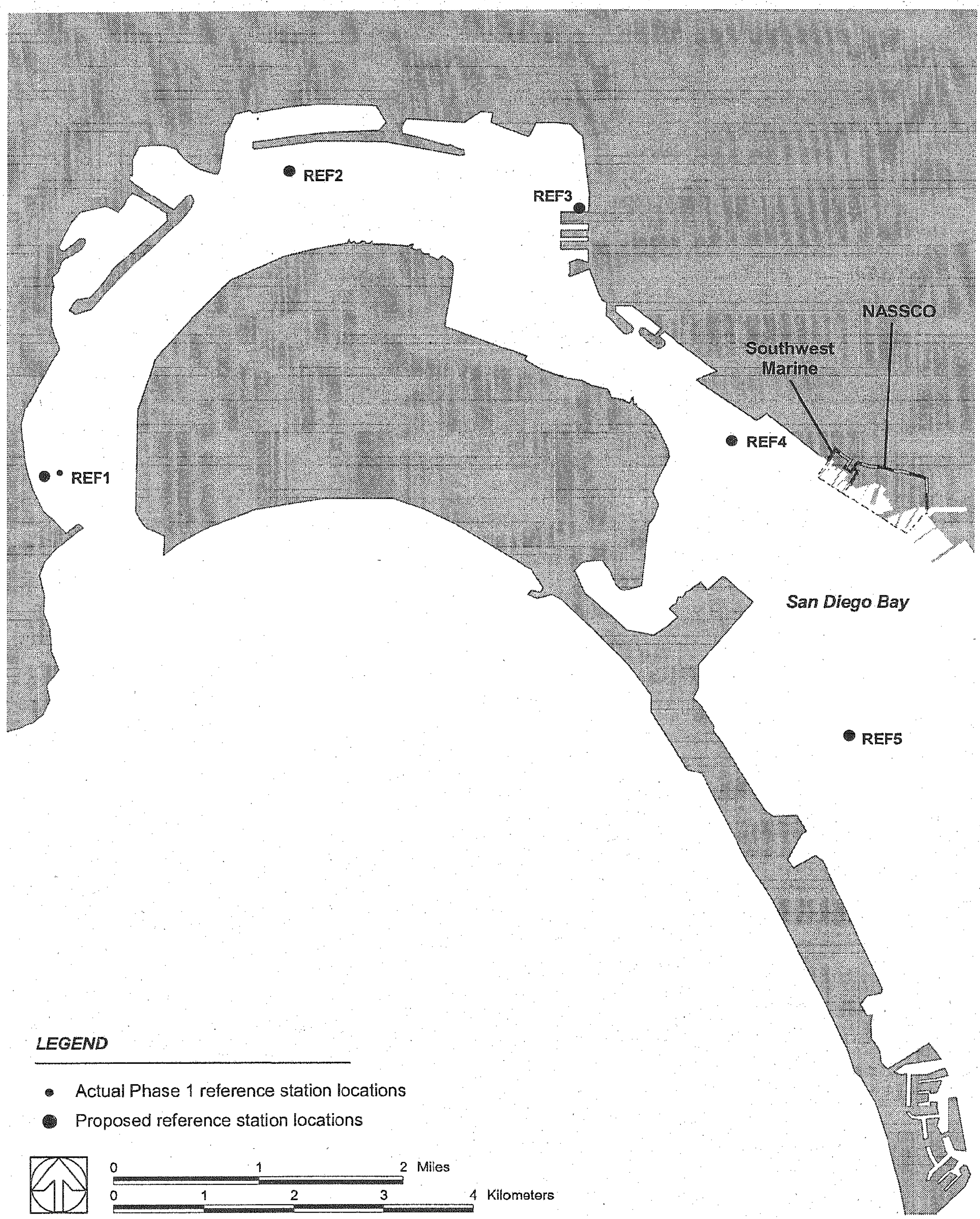

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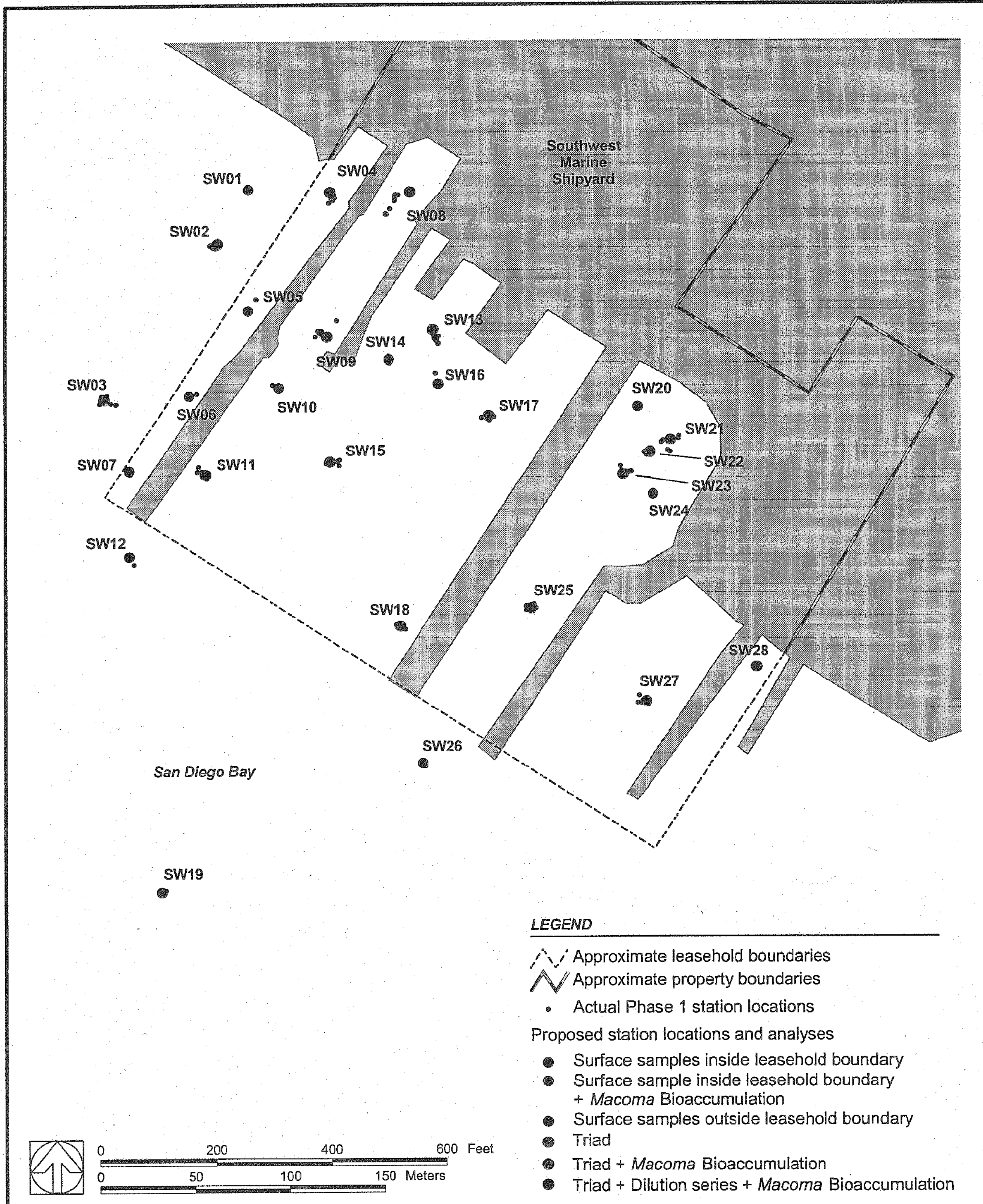

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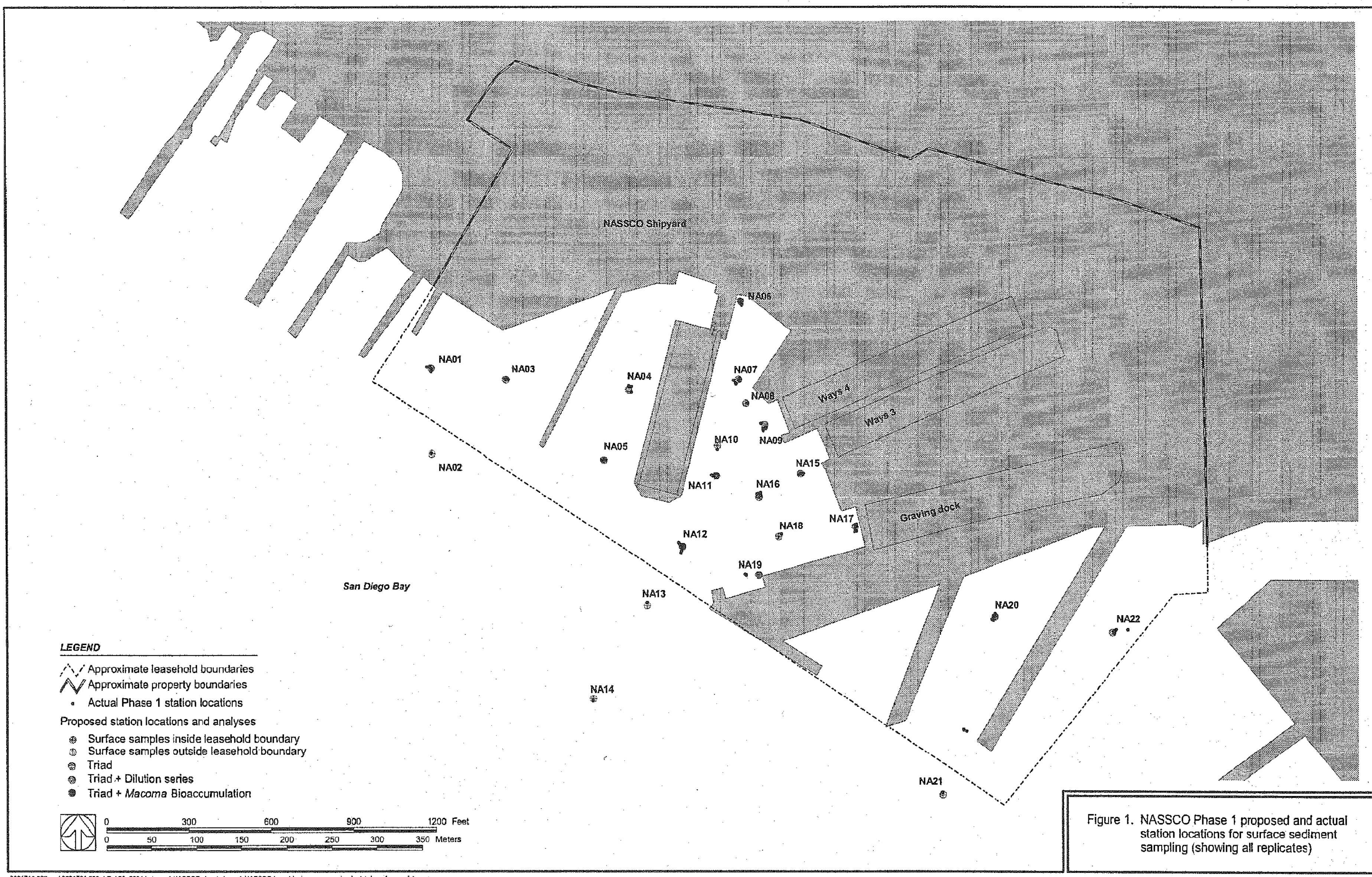

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Campbell AET (9%)	Campbell AET plus 20% (35% remediated)	ER-M (61% remediated)	Background reference (100%)

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	BPTC-SDB		BPTC-State		BAY AET	NOAA		Navy
Chemical	Level-ppm	% samples Toxic	Level	% acute tox	Interim levels*	ER-M	ER-L	Moffet Field
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Laura Hunter

From: Elaine Carlin [elainecarlin@worldnet.att.net]
Sent: Monday, March 11, 2002 11:16 AM
To: Tom Alo
Cc: Laura Hunter
Subject: Re: Background Reference Conditions

Hi Tom:

Thanks for sending me this. If I understand this, the bottom line is that a new set of reference stations has been selected based on the advantages of triad testing (versus chemistry alone used to select previous Ref 03 station).

Will the reference sites used by Exponent change?

How will you determine reference values for butylin species, polychlor biphenyls, and total petroleum hydrocarbons that Bight 98 did not test for?

Given that grain size was measured in the past at the shipyards to range from 2 - 87 percent fines, how will you divide up the shipyards in order to match grain size with appropriate reference station?

More generally, how will you control the choice of reference station?

And finally, how does restoration to background conditions (water that existed before the discharge) compare with reference station conditions?

Thanks!
Elaine
----- Original Message -----
From: Tom Alo <alot@rb9.swrcb.ca.gov>
To: <peugh@cox.net>; <Emkimr@cts.com>; <LauraH@environmentalhealth.org>; <Breznik@sdbaykeeper.org>; <elainecarlin@worldnet.att.net>
Cc: David Barker <barkd@rb9.swrcb.ca.gov>; Craig Carlisle <carlc@rb9.swrcb.ca.gov>
Sent: Friday, March 08, 2002 6:50 AM
Subject: Background Reference Conditions

Good morning. Attached is a letter from the Executive Officer to the shipyards regarding newly defined background conditions. If you have any questions or comments please call or email me.

--Tom

Tom C. Alo
Water Resources Control Engineer
CA Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123
Main: (858) 467-2952
Direct: (858) 636-3154
Fax: (858) 571-6972
<alot@rb9.swrcb.ca.gov>

We need to Replace the South Bay Power Plant

Problem:

Obsolete operations at the South Bay Power Plant are damaging the San Diego Bay ecosystem and degrading the base of the food chain with hot water, chlorine and other toxic chemicals. The plant's cooling system kills marine life in 20 percent of the South Bay water everyday. The SBPP pours 89,000 gallons of chlorine into the South Bay every year. This grossly inefficient plant also is a source of air pollution and a blight on the community. Water discharge permits have allowed these destructive operations for more than 40 years.

Solution:

Replace the Plant

The SBPP must be replaced as soon as possible with a more efficient, dry cooled plant and aggressive commitments to conservation and clean, renewable energy sources. This will result in less air and water emissions and use of less hazardous materials in the region. Officials should establish an enforceable time line to phase out the South Bay plant and ensure some public control over its operation.

Improve the Permit

The SBPP permit is up for renewal for 5 years. The Regional Board should require new, more protective requirements for the discharge. The renewal should include a condition that any replacement plant should not use Bay water for cooling (dry cooled), that current impacts should be fully mitigated and the Bay should be restored.

Designate South Bay as "impaired"

The South Bay is heavily impacted by the power plant discharge. It should be added to the 303(d) list of "impaired" waterbodies so that it receives priority action for protection.

Recommendations:

The South Bay Power Plant must be torn down and its damaging impacts to sensitive South San Diego Bay and South County ended as soon as possible. To this end, we request support for the following recommendations:

State Water Resources Control Board

A. The State Board should add the waters of South San Diego Bay to the 303 (d) list as impaired for heat and chlorine.

B. The State Board should move immediately to update the Thermal Plan. The update should re-designate San Diego Bay as an estuary and strengthen the protections in the Thermal Plan for enclosed bays. The new Thermal Plan should require dry cooling for all coastal power plants. It should specify that all repowered plants are to be considered new discharges for purposes of permitting.

California Regional Water Quality Control Board

San Diego Region

Internet Address: http://www.swrcb.ca.gov/rwqcb9
9174 Sky Park Court, Suite 100, San Diego, California 92123
Phone (858) 467-2952 • FAX (858) 571-6972

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

March 6, 2002

CERTIFIED-RETURN RECEIPT REQUESTED
7099 3400 0017 1547 5046

Mr. Mike Chee
National Steel and Shipbuilding Company
P.O. Box 85278
San Diego, CA 92186-5278

CERTIFIED-RETURN RECEIPT REQUESTED
7099 3400 0017 1547 5251

Mr. Sandor Halvax
Southwest Marine Inc.
Foot of Sampson Street
P.O Box 13308
San Diego, CA 92170-3308

Dear Mr. Chee and Mr. Halvax:

BACKGROUND REFERENCE CONDITIONS FOR ASSESSMENT AND REMEDIATION OF CONTAMINATED SEDIMENTS AT NASSCO AND SOUTHWEST MARINE SHIPYARDS

As you know by letter dated June 1, 2001, I directed NASSCO and Southwest Marine to conduct a contaminated sediment investigation in accordance with the attached document, *"Guidelines for Assessment and Remediation of Contaminated Sediments in San Diego Bay at NASSCO and Southwest Marine Shipyards, June 1, 2001."* These guidelines require that NASSCO and Southwest Marine evaluate the feasibility of various cleanup alternatives including complete cleanup of all waste discharged and restoration of affected water to background conditions (i.e., the water quality that existed before the discharge).

The Regional Board has historically used sediment chemistry concentrations at off-site reference station(s) as a surrogate for characterizing background water quality conditions in sediment cleanup investigations. The focus on sediment chemistry for defining background water quality conditions is based on several factors:

- Pollution effects from contaminated sediment extend beyond those associated with sediment – derived pollutants in the water column or sediment pore water. Pollutants in the sediment itself, as measured by sediment chemistry, can lead to toxic and bioaccumulation effects from sediment ingestion and direct contact with contaminated sediment particles.
- Sediment chemistry concentrations are preferred over water quality concentrations because they are less variable spatially and temporally.

- The definition of background water quality conditions establishes the benchmark for complete removal of all of the waste discharged and sediment chemistry is an important consideration in determining this benchmark.

The Regional Board, with the assistance of the Southern California Coastal Water Research Project (SCCWRP), has identified a new set of reference sites in San Diego Bay from the 1998 Southern California Bight Regional Monitoring Project (Bight'98). These reference sites can be used to establish an expanded definition of background water quality conditions in terms of sediment chemistry, toxicity, and benthic community structure. The criteria used to select the Bight'98 reference stations are summarized in the attached document.

We have determined, based on the reasons described in the attached document, that the background water quality conditions defined by the Bight'98 reference sites should replace the original background water quality conditions defined by reference station REF-03. Accordingly, pursuant to Directive No. 2 of Resolution Nos. 2001-02 and 2001-03, the Bight'98 reference sites shall serve as the "Background Reference Stations" representing background conditions at NASSCO and Southwest Marine. Furthermore, NASSCO and Southwest Marine shall direct their site-specific studies in accordance with the following newly defined background conditions for sediment chemistry, toxicity, and benthic community structure:

Contaminant[a]	**Background Sediment Concentrations Dry Weight (mg/kg) (Upper 95% Confidence Interval)**	**Expected Background Toxicity Conditions**[b]	**Expected Background Benthic Community Conditions**
Copper	84	Amphipod Survival Rate Between 89%-96%	Data Not Yet Available[c]
Zinc	142		
Lead	31		
PCBs	<0.20[d]		
Mercury	0.39		
Arsenic	11		
Cadmium	0.21		
Chromium	46		
Nickel	17		
Silver	0.72		
PAHs	1.2		

(a) Contaminants listed are associated with shipbuilding and repair activities believed to be present in bay sediment. It should be noted that butyltin species, polychlorinated triphenyls, and total petroleum hydrocarbons (also associated with shipbuilding and repair activities) are not listed because Bight'98 did not analyze for these contaminants.

(b) Based on cleanup to the background sediment concentrations determined by the Bight'98 reference sites.
(c) It is anticipated that analysis of the Bight'98 benthic data will be completed in February 2002.
(d) The laboratory is currently reevaluating the analytical data for PCBs due to detection limit issues. The sediment background concentration for PCBs is considered an interim value until these issues are resolved.

If you have any questions, or require additional assistance, please contact Mr. Tom Alo of my staff at (858) 636-3154.

Sincerely,

JOHN H. ROBERTUS
Executive Officer

JHR:dtb:tca

Attachment: Background Water Quality Conditions for NASSCO and Southwest Marine Shipyards as Determined by Reference Station REF-03 and Bight'98 Reference Sites

NASSCO File No.: 03-0066.05
Southwest Marine File No.: 03-0137.05

S:\WQS\Final Documents\Tom\Shipyards\Final Background Reference Conditions – Cover Letter.doc

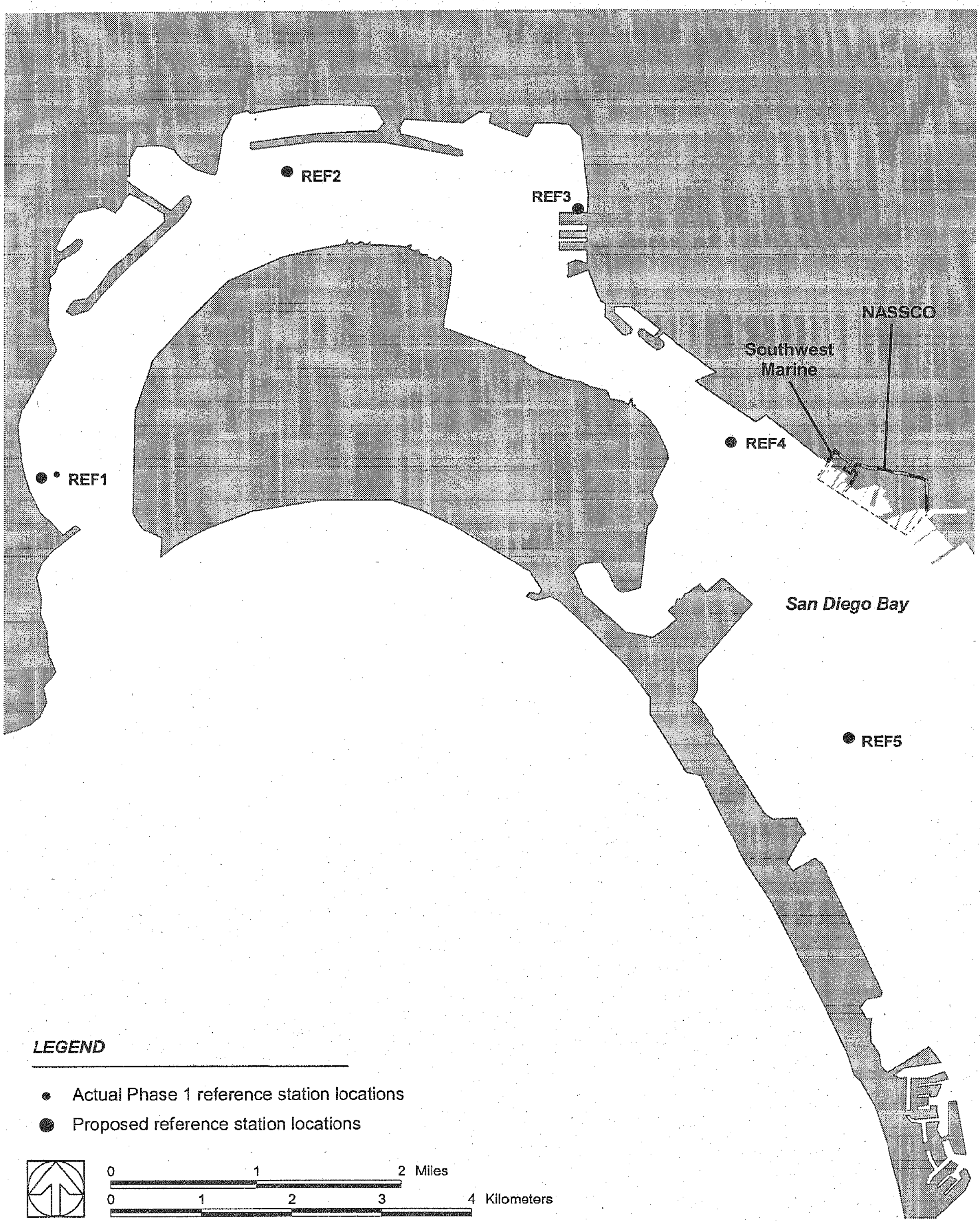

Figure 3. Reference station locations

8601718.002 and 8601731.002 | Oct 26, 2001 | sampled spi ref view | phase 1 reference layout | g:\swm_nassco\projects\phase1_complete.apr

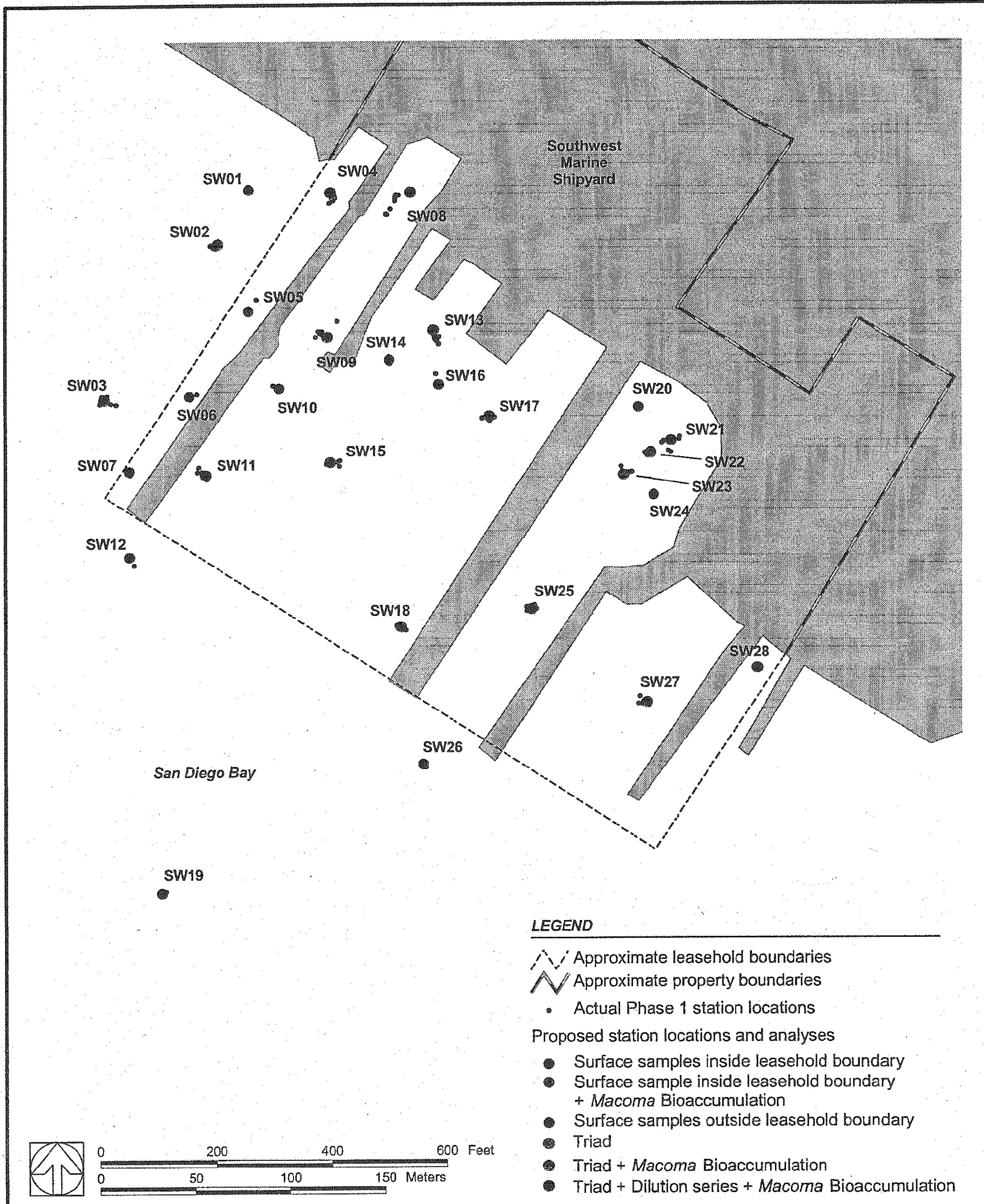

Figure 2. Southwest Marine Phase 1 proposed and actual station locations for surface sediment sampling (showing all replicates)

8601718.002 and 8601731.002 | Oct 26, 2001 | phase 1 SWM view | phase 1 swm layout | g:\swm_nassco\projects\phase1_complete.apr

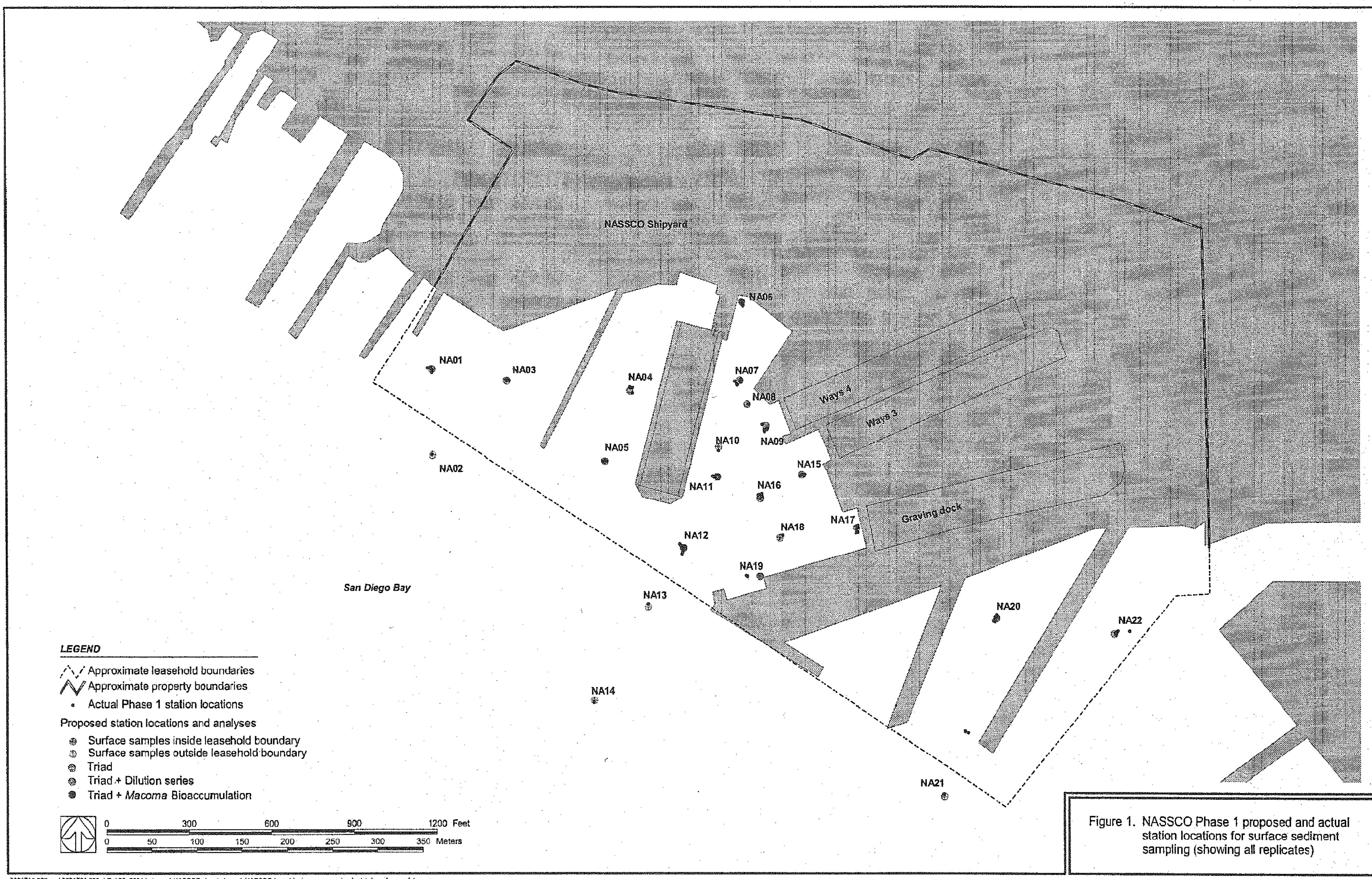

Figure 1. NASSCO Phase 1 proposed and actual station locations for surface sediment sampling (showing all replicates)

8601718.002 and 8601731.002 | Oct 26, 2001 | phase 1 NASSCO view | phase 1 NASSCO layout | g:\swm_nassco\projects\phase1_complete.apr

a) San Diego Bay **sediments** at the Campbell Shipyards site.

Constituent	Level (mg/kg dry wt.)
Copper	810
Zinc	820
Lead	231
Total Petroleum Hydrocarbons	4300
HPAHs	44
PCBs	0.95
Tributyltin	5.75

b) **Ground water** along the seawall as described in Figure 5 of the May 1995 PTI Supplemental Soil and Ground Water report.

Constituent	Level (mg/l)
PAHs	0.000031
Benzene	0.021
Toluene	300
Ethylbenzene	29
Fluoranthene	0.042
Free Product	Recover all free product from the affected ground water zone.

c) Soil at the Campbell Shipyards site. No cleanup required for soil at the East Parking Lot provided Parking Lot Cap conditions exist.

Constituent	Level (mg/kg)
PAHs	3.9
TPH	1000

47. The cleanup levels for soil, ground water and bay sediment are based on the following considerations:

a) Ensuring that the dischargers are required to cleanup the site to levels as close to background conditions as is technically or economically feasible;

b) The need to provide assimilative capacity for possible future waste discharges;

Table 3.3-5

EXISTING ALL-WAY STOP INTERSECTION OPERATIONS

Intersection	AM Peak Hour	PM Peak Hour
First Street/Alameda Blvd	• 65/35 Demand Split • Volume = 850 • LOS C	• 70/30 Demand Split • Volume = 633 • LOS B
Fourth Street/Alameda Blvd	• 55/45 Demand Split • Volume = 1,551 • LOS E	Police Controlled

Source: Linscott, Law and Greenspan

Cleanup Levels in Comparison

	BPTC-SDB		BPTC-State		BAY AET	NOAA		Navy
Chemical	**Level-ppm**	**% samples Toxic**	**Level**	**% acute tox**	**Interim levels***	**ER-M**	**ER-L**	**Moffet Field**
Copper	648	80	400	86	810	270	34	
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From: Tom Alo [alot@rb9.swrcb.ca.gov]
Sent: Tuesday, March 26, 2002 3:42 PM
To: LauraH@environmentalhealth.org; elainecarlin@worldnet.att.net
Subject: Summary of 3/6 Bay Council Letter & 3/29 Agenda

List of ions-Comments March 29, 2002 Agenda.do

Elaine & Laura, attached is a document that summarizes the March 6, 2002 letter that Bay Council submitted to the Regional Board. We plan on using this document during the March 29 meeting to guide us on discussion topics. Hopefully I covered all of the issues presented in the Bay Council letter. Also attached is an agenda for the meeting. If you have any questions or comments please email or call me. See you on Friday at 8:30.

--Tom

EHC 002749

Bay Council Comments/Questions
March 6, 2002 Letter from E. Carlin

Reference Stations

1. Failure of the reference stations to meet the definition and minimum criteria of a reference station.

   (a) Two of the key criteria for a Reference Station are physical similarity to the contaminated site, and lack of significant contamination. None of the 5 Reference Stations are physically similar to the shipyard sites.

   (b) PCB concentrations in the Macoma (clam) bioaccumulation tests at Reference Station 3 are above the EPA's screening values for human consumption of fish or shellfish.

2. Exponent's use of these reference stations, despite their invalidity, to compare shipyard test results, including the use of pooled numbers and the maximum (most contaminated reference station) values to compare the shipyard contamination levels.

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Sampling Outside Leasehold

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6. A low number of samples were collected nearshore where PCB and other contaminants are more likely to occur. Conclusions about site contamination are therefore skewed by the greater number of samples collected away from shore -introducing a clear sampling bias. Additional sampling is required to better characterize the nearshore environment.

AVS/SEM Data

7. Results of testing (AVS/SEM results) - used as an indicator of metal bioavailability - not useable.

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Miscellaneous

(a) Request that Exponent provide data in Sedqual format to aid all parties, including staff, in analyzing the data.

(b) Request the names of Board staff and consultants that have the necessary expertise to independently review the Phase 1 data.

(c) Staff will be unable to perform an adequate, much less excellent, review of the raw data due to the lack of expertise available to staff. Require independent analysis of the raw data by independent experts.

(d) The Board has critical decisions to make on how it will handle data falling outside control criteria specifications. In some cases, so many of the values are qualified or estimated so as to render the test invalid.

(e) I was also surprised, for at least two reasons, by Exponent's strong assertion that grain size at the reference sites will cause more, rather than less, toxicity to show up in the testing, for both the amphipod and bivalve testing.

(f) The issue of resuspension and subsequent transport of the contaminated sediments off site (raised by Ed Kimura and Jim Peugh at the January 30 meeting) is apparently not being addressed (See for example, Y. Peter Sheng. 1989. "Predicting the Dispersion and Fate of Contaminated Sediments." In Contaminated Marine Sediments - Assessment and Remediation. National Academy Press. pp. 166-177).

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Miscellaneous

(a) Request that Exponent provide data in Sedqual format to aid all parties, including staff, in analyzing the data.

(b) Request the names of Board staff and consultants that have the necessary expertise to independently review the Phase 1 data.

(c) Staff will be unable to perform an adequate, much less excellent, review of the raw data due to the lack of expertise available to staff. Require independent analysis of the raw data by independent experts.

(d) The Board has critical decisions to make on how it will handle data falling outside control criteria specifications. In some cases, so many of the values are qualified or estimated so as to render the test invalid.

(e) I was also surprised, for at least two reasons, by Exponent's strong assertion that grain size at the reference sites will cause more, rather than less, toxicity to show up in the testing, for both the amphipod and bivalve testing.

(f) The issue of resuspension and subsequent transport of the contaminated sediments off site (raised by Ed Kimura and Jim Peugh at the January 30 meeting) is apparently not being addressed (See for example, Y. Peter Sheng. 1989. "Predicting the Dispersion and Fate of Contaminated Sediments." In Contaminated Marine Sediments - Assessment and Remediation. National Academy Press. pp. 166-177).

Laura Hunter

'rom: Betts, Brett [bbet461@ECY.WA.GOV]
ɔent: Monday, April 22, 2002 10:42 AM
To: Elaine Carlin (elainecarlin@worldnet.att.net); Laura Hunter / EHC San Diego
Subject: FW: Materials for 4/19 Conference Call

Rusty & Brett.doc

#2...

Brett

-----Original Message-----
From: Tom Alo [mailto:alot@rb9.swrcb.ca.gov]
Sent: Thursday, April 18, 2002 3:54 PM
To: Betts, Brett; fairey@mlml.calstate.edu
Subject: Re: Materials for 4/19 Conference Call

Rusty & Brett, I completely forgot that you guys don't have the history like we all do. Sorry. Attached is a description on how the 5 reference stations were selected. I pulled it out of a workplan that Steve Bay put together for two toxic hot spots in SD Bay. These 5 reference stations are also being used at the NASSCO and Southwest Marine shipyard sites. They will be used for statistical comparisons with the shipyard site stations ... determine impacted sites using sediment chemistry, toxicity, and benthic community data. Hope that makes sense. If not, feel free to call me and I can hopefully clarify.

--Tom

Tom C. Alo
Water Resources Control Engineer
CA Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123
Main: (858) 467-2952
Direct: (858) 636-3154
Fax: (858) 571-6972
<alot@rb9.swrcb.ca.gov>

>>> Rusty Fairey <fairey@mlml.calstate.edu> 04/18/02 03:39PM >>>
Tom- I am looking at the materials you sent but still have a basic question that needs your help. In the material you sent I don't see any information on the what criteria were used to select "reference sites" or what the intended use is. Without that it will be difficult to tackle your purpose of determining the suitability of the reference sites. Could you provide us that information? Rusty

At 03:10 PM 4/18/2002 -0700, you wrote:
>Good afternoon. Attached are materials that we will be using during our
>conference call at 10:00 am. If you have any questions or have trouble
>opening the files please contact me. Looking forward to hearing from you

>all tomorrow.
>
>--Tom
>

>
>

Russell Fairey
Moss Landing Marine Laboratories
Marine Pollution Studies Lab
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(831)633-6035
(831)633-0128- FAX
fairey@mlml.calstate.edu

Five reference sites will be sampled from San Diego Bay to represent background conditions within the bay. These stations were selected from analysis of Bight'98 sediment chemistry, toxicity, and benthic community data using a stepwise screening procedure. The screening procedure was conducted in three phases in order to obtain a pool of candidate sites representing a range of habitat characteristics and locations. In phase I, all 46 Bight'98 stations from San Diego Bay were evaluated on the basis of desired habitat characteristics, lack of acute toxicity, low overall contamination (mean ERM quotient), and diverse benthos (high number of species present). The sequence of steps is shown in Figure 2-5. The phase I selection process identified five of the cleanest stations (level 1) among the Bight'98 dataset, but the grain size and TOC characteristics of these stations were relatively restricted. Grain size of the phase I stations was 31-50% and these stations contained 0.5-0.9% TOC (Table 2-1).

The phase II selection procedure was applied in an effort to identify potential reference stations containing higher concentrations of TOC and finer grain size characteristics. This process differed from phase I in that only stations containing relatively high % fines were included and the criteria for contamination level and species diversity were modified in order to retain a sufficient number of stations (5) for further evaluation.

None of the stations selected in phases I or II were located in the central portion of San Diego Bay, near the study sites. A third selection round was then conducted in order to identify candidate reference sites closer to the Chollas Creek and Paleta Creek study sites. The phase III selection procedure was conducted using only those 16 stations located in the central region of San Diego Bay, near the Chollas Creek and Paleta Creek study sites. Two stations (level 3) were identified in phase III (Table 2-1).

The locations and selected characteristics of the 12 candidate reference sites are shown in Figure 2-1 and Table 2-1, respectively. Data on the three reference sites currently used for NPDES monitoring are also shown.

A subset of five stations is recommended for use in sediment quality studies at the Chollas Creek and Paleta Creek sites. The recommended stations were selected in order to represent a wide range of grain size and TOC, while maintaining relatively low contaminant concentrations. The recommended sites encompass a similar range of sediment grain size and have similar or lower contaminant concentrations that the NPDES reference sites. The recommended stations and some of the characteristics meriting their use are:

R05 (2441): Relatively high TOC and % fines and location near the mouth of the bay.

R03 (2433): Relatively high TOC and % fines, located in northern part of bay.

R04 (2440): Average TOC and % fines, low contamination score, near ship traffic.

R01 (2231): Relatively low TOC and % fines, deep water, near ship traffic.

R02 (2243): Relatively low TOC and % fines, located in south part of bay.

Some of the candidate stations that are not recommended for use contained characteristics that were deemed somewhat undesirable. For example, station 2225 was

located in a marina (potential impacts from boating activities), station 2442 had a relatively high PAH concentration, and station 2227 was located close to another recommended site. The remaining stations were not selected because they contained characteristics that were similar to those already recommended for use.

Any of the 12 candidate stations may be suitable for use as reference sites. The selection of the five recommended stations reflects the use of professional judgment to best satisfy the objectives of varied characteristics, multiple locations within the bay, low contamination, low toxicity, and healthy benthos.

Table **Error! No text of specified style in document.**-1. Characteristics of candidate reference sites for San Diego Bay. The characteristics of the Chollas Creek and Paleta Creek study sites and NPDES reference sites are also shown. Shading indicates recommended reference stations.

Station/ Area	Level	% Fines	TOC	Cu mg/kg	Zn mg/kg	PAH μg/kg	ERMq	# Species
Chollas		33-84	0.7-3.5					
Paleta		24-81	0.3-2.3					
REF-01		38		16.6	49.4	902		
REF-02		42		179	226	72		
REF-03		65		99.1	159	5957		
2227	1	50	0.9	53.9	112	324	0.12	52
2435	1	49	0.5	28.4	64.4	0	0.07	59
2229	1	43	0.9	58.9	99.3	970	0.12	62
2440	1	38	0.5	41.8	81.1	0	0.09	58
2231	1	31	0.6	58.1	92.5	258	0.10	70
2441	2	79	2.0	71.8	123	1061	0.13	84
2225	2	57	1.0	127	130	146	0.19	69
2433	2	71	1.2	71.6	126	240	0.14	58
2442	2	79	2.0	77.7	139	4950	0.14	52
2238	2	57	1.0	55.1	143	0	0.12	41
2243	3	35	0.5	38.8	81.2	0	0.09	47
2240	3	44	0.5	47.4	103	85	0.11	40

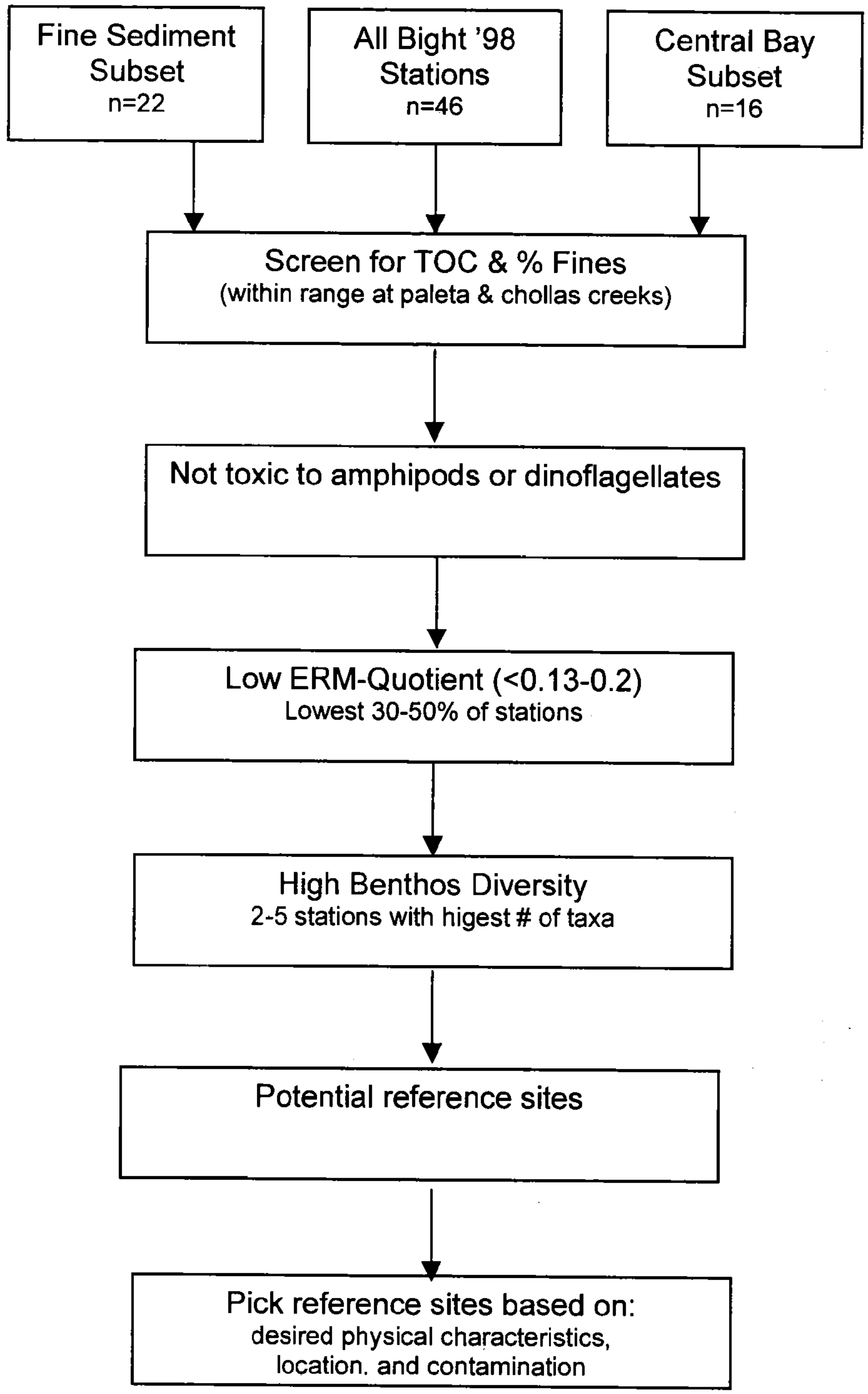

Figure 2-5. Overview of reference site selection process. The selection process was applied to three groups of Bight'98 stations from San Diego Bay.

Laura Hunter

From: Betts, Brett [bbet461@ECY.WA.GOV]
Sent: Monday, April 22, 2002 10:42 AM
To: Elaine Carlin (elainecarlin@worldnet.att.net); Laura Hunter / EHC San Diego
Subject: FW: Materials for 4/19 Conference Call

Reference Station Info.doc Table 1 - Grain Size & TOC.xls.. Table 2 - Toxicity.xls Reference Station Map.pdf

FYI - one of three I'll send to you.

Brett Betts
Sediment Management Unit
Washington Dept. of Ecology

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Subject: Materials for 4/19 Conference Call

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--Tom

EHC 005469

APRIL 19, 2002 CONFERENCE CALL
DISCUSSION ON 5 SD BAY REFERENCE STATIONS
SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

Purpose of Conference Call

Determine the suitability of the 5 reference stations for statistical comparisons to shipyard stations.

Current Position of Regional Board, Fish & Game, NOAA, and SCCWRP

- Use the existing reference stations with caution recognizing the differences in grain size and TOC.
- Because of the variability in sampling, as shown in the Bight'98/SCCWRP-Navy/Exponent sampling events (Table 1), it would be difficult and possibly futile for the shipyards to try to identify additional reference sites with fine-grained sediments. Furthermore, in order to find fine-grained sediments the shipyards would likely have to sample near-shore where there are higher sediment contaminant concentrations.
- Consideration of disqualifying data that is inappropriate for statistical comparisons but do not disqualify the entire reference station.

Issues for Discussion

(1) *Physical Characteristics.* Grain sizes at 5 reference stations do not completely match the range of grain sizes at the study site (Table 1). TOC at 5 reference stations do not completely match the range of TOC at the study site (Table 1).

(2) *Macoma Tissue.* PCB concentrations in the Macoma tissue at Reference Station 3 are above EPA's screening values (20 ppb) and OEHHA's screening values (20 ppb) for human consumption of fish or shellfish.

- R3 = 40 ppb

(3) *Sediment Chemistry.* PCB concentrations (total aroclors) at all 5 reference stations exceed the ERL (22.7 ppb) and 2 reference stations exceed the ERM* (180 ppb):

- R1 = 150 ppb
- R2 = 140 ppb
- R3 = 380 ppb*
- R4 = 438 ppb*
- R5 = 130 ppb

(4) *Toxicity.* Reference stations 2 and 5 exhibited toxicity in the bivalve development test (Table 2). All three toxicity test were normalized against the control mean and compared against 80% of the control mean. No hits in the other reference stations and toxicity tests.

(5) *Benthic Community.* Reference Station 4 had markedly higher species richness than any other reference station. Different from all other shipyard and reference stations.

Urchin Fertilization

Area	Station	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Exponent Stat Sign Diff	Exceed Threshold Value (Control)	Mean	Stdev	Mean all Reps	Stdev all Reps	80% Control Threshold	Normalized Against the control Mean	Compared Against Phillips et al July 2000, Threshold Value (88%)
Control	1	96	91	90	98	94			93.8	3.35					
	1	94	95	97	93	92			94.2	1.92	94	2.6	75.2		
	2	93	91	92	93	92			92.2	0.84					
	2	93	89	93	94	91			92.0	2.00	92.1	1.4	73.7		
	3	83	81	82	82	77			81.0	2.35					
	3	69	75	71	63	70			69.6	4.34	75.3	6.8	60.2		
													64.8		

Batch 1	Station	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Exponent Stat Sign Diff	Exceed Threshold Value (Control)	Mean	Stdev	Mean all Reps	Stdev all Reps	80% Control Threshold	Normalized Against the control Mean	Compared Against Phillips et al July 2000, Threshold Value (88%)
control	1	96	91	90	98	94			93.8	3.35				100	
	1	94	95	97	93	92			94.2	1.92	94.0	2.6	75.2	100	
Reference	4	96	92	92	99	87			93.2	4.55	93.2	4.5	74.6	99	
Nassco	6	99	94	97	99	93			96.4	2.79				103	
	11	93	95	97	93	91			93.8	2.28				100	
SWM	2	95	96	97	97	94			95.8	1.30				102	
	3	96	95	94	96	98			95.8	1.48				102	
	8	94	94	95	97	98			95.6	1.82				102	
	9	94	92	92	95	92			93.0	1.41				99	
	13	91	93	93	92	93			92.4	0.89				98	
	15	94	100	96	97	92			95.8	3.03				102	
	21	96	95	95	96	94			95.2	0.84				101	

Batch 2	Station	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Exponent Stat Sign Diff	Exceed Threshold Value (Control)	Mean	Stdev	Mean all Reps	Stdev all Reps	80% Control Threshold	Normalized Against the control Mean	Compared Against Phillips et al July 2000, Threshold Value (88%)
Control	2	93	91	92	93	92			92.2	0.84	92.1	1.4	73.7	100	
	2	93	89	93	94	91			92.0	2.00				100	
Reference	1	80	80	82	90	83			83.0	4.12	77.9	7.2	62.3	90	
	2	83	69	73	68	71			72.8	6.02				79	
Nassco	1	78	77	84	75	80			78.8	3.42				86	
	3	78	84	74	80	70			77.2	5.40				84	
	4	80	77	85	79	82			80.6	3.05				88	
	12	86	86	85	72	82			82.2	5.93				89	
	15	81	86	78	81	78			80.8	3.27				88	
	16	76	85	70	80	73			76.8	5.89				83	
	17	77	83	82	81	80			80.6	2.30				88	
	19	63	74	57	65	70			65.8	6.53				71	

Batch 3	Station	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Exponent Stat Sign Diff	Exceed Threshold Value (Control)	Mean	Stdev	Mean all Reps	Stdev all Reps	80% Control Threshold	Normalized Against the control Mean	Compared Against Phillips et al July 2000, Threshold Value (88%)	
Control	3	83	81	82	82	77			81.0	2.35	81	2.3	64.8	100		
	3	69	75	71	63	70			69.6	4.34				86		data not used
Reference	3	79	82	81	83	78			80.6	2.07	74.9	6.8	59.9	100		
	5	67	69	69	65	76			69.2	4.15				85		
Nassco	9	69	70	76	73	83			74.2	5.63				92		
	22	83	84	80	85	83			83.0	1.87				102		
SWM	4	85	79	79	82	82			81.4	2.51				100		
	11	76	62	66	69	63			67.2	5.63				83		
	17	70	72	72	73	72			71.8	1.10				89		
	18	67	60	55	66	62			62.0	4.85				77		
	22	74	85	77	76	79			78.2	4.21				97		
	23	82	80	76	83	82			80.6	2.79				100		
	25	74	78	82	71	80			77.0	4.47				95		
	27	72	66	67	71	63			67.8	3.70				84		
						Number of Sites Flagged	**4**	**2**						**2**	**8**	

Outside threshold value
Reference station outside threshold value
Data not used

Copper Chloride	Reference Tox 1 mean fert, 8/10/01	Reference Tox 2 mean fert, 8/14/01	Reference Tox 3 mean fert, 8/17/01
Control	96.8	91.6	72.8
2.5	95.8	87.4	71.2
5	97	90.1	74.4
10	93.6	86.5	75.4
20	56.6	58.6	70.4
40	15.8	14.6	72.2
LC 50	23.36	24.3	>40
Within Control Chart limits	yes	yes	no,Coppper stock prepared incorrectly, verified by chemistry lab

TABLE 1

Station	Exponent		SCCWRP		Bight '98*	
	% TOC	Grain Size	% TOC	Grain Size	% TOC	Grain Size
1	1.1	40.8	1.8	82.8	2	79
2	0.67	41.2	0.5	38.5	1.2	71
3	1.62	31.6	1	26.4	0.5	38
4	1.3	45.3	1	41.2	0.6	31
5	0.51	28	0.56	30.25	0.5	35

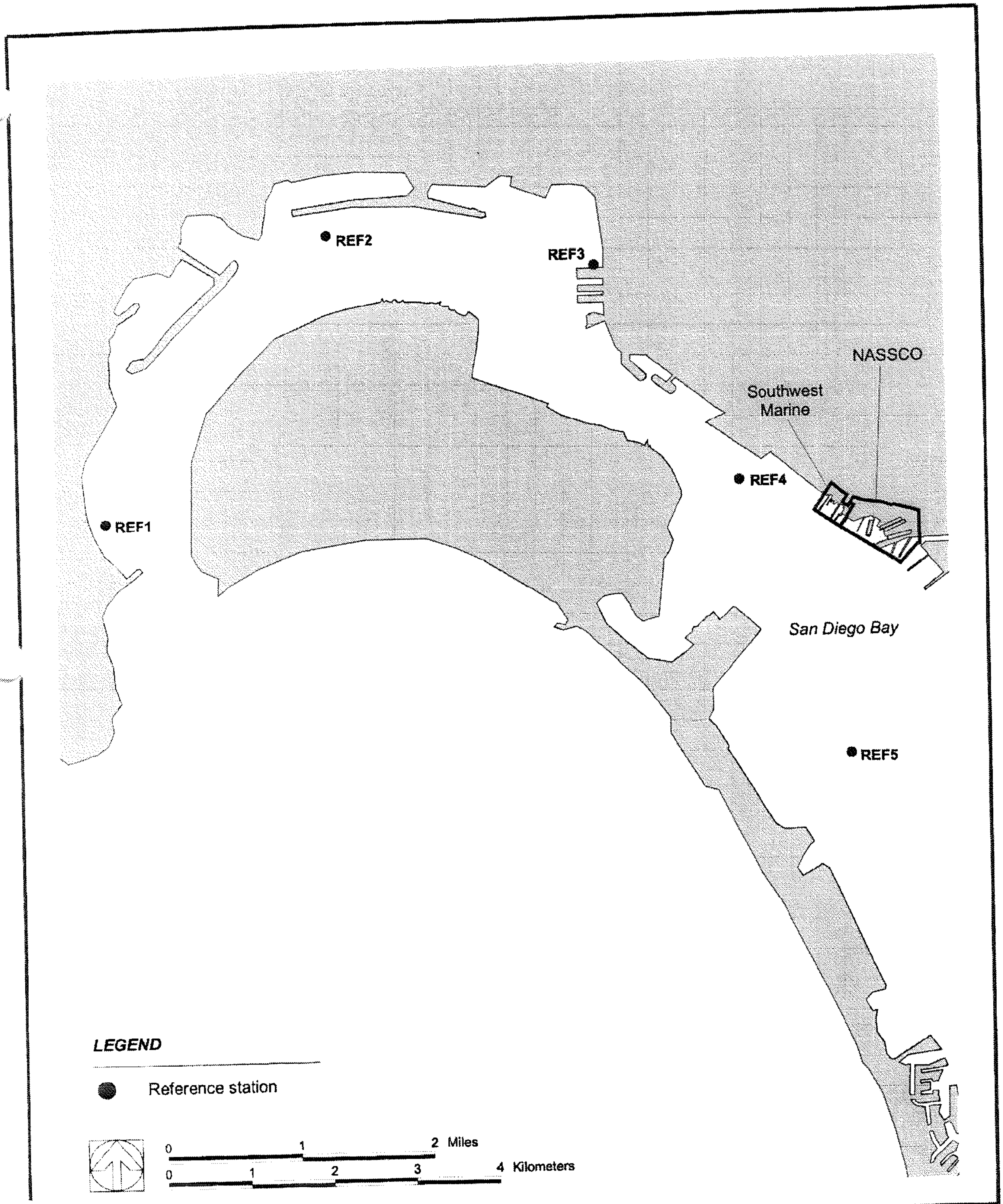

Figure 3-3. Reference station locations

8601718.002 and 8601731.002 | Jul 19, 2001 | figure 3-3 view | figure 3-3 | g:/swm_nassco/projects/workplan.apr

Laura Hunter

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	1	94	95	97	93	92			94.2	1.92	94	2.6	75.2		
	2	93	91	92	93	92			92.2	0.84					
	2	93	89	93	94	91			92.0	2.00	92.1	1.4	73.7		
	3	83	81	82	82	77			81.0	2.35					
	3	69	75	71	63	70			69.6	4.34	75.3	6.8	60.2		
													64.8		
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Nassco	6	99	94	97	99	93			96.4	2.79				103	
	11	93	95	97	93	91			93.8	2.28				100	
SWM	2	95	96	97	97	94			95.8	1.30				102	
	3	96	95	94	96	98			95.8	1.48				102	
	8	94	94	95	97	98			95.6	1.82				102	
	9	94	92	92	95	92			93.0	1.41				99	
	13	91	93	93	92	93			92.4	0.89				98	
	15	94	100	96	97	92			95.8	3.03				102	
	21	96	95	95	96	94			95.2	0.84				101	
Batch 2	Station	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Exponent Stat Sign Diff	Exceed Threshold Value (Control)	Mean	Stdev	Mean all Reps	Stdev all Reps	80% Control Threshold	Normalized Against the control Mean	Compared Against Phillips et al July 2000, Threshold Value (88%)
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	2	93	89	93	94	91			92.0	2.00				100	
Reference	1	80	80	82	90	83			83.0	4.12	77.9	7.2	62.3	90	
	2	83	69	73	68	71			72.8	6.02				79	
Nassco	1	78	77	84	75	80			78.8	3.42				86	
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	4	80	77	85	79	82			80.6	3.05				88	
	12	86	86	85	72	82			82.2	5.93				89	
	15	81	86	78	81	78			80.8	3.27				88	
	16	76	85	70	80	73			76.8	5.89				83	
	17	77	83	82	81	80			80.6	2.30				88	
	19	63	74	57	65	70			65.8	6.53				71	

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Nassco	9	69	70	76	73	83			74.2	5.63				92		
	22	83	84	80	85	83			83.0	1.87				102		
SWM	4	85	79	79	82	82			81.4	2.51				100		
	11	76	62	66	69	63			67.2	5.63				83		
	17	70	72	72	73	72			71.8	1.10				89		
	18	67	60	55	66	62			62.0	4.85				77		
	22	74	85	77	76	79			78.2	4.21				97		
	23	82	80	76	83	82			80.6	2.79				100		
	25	74	78	82	71	80			77.0	4.47				95		
	27	72	66	67	71	63			67.8	3.70				84		
						Number of Sites Flagged	**4**	**2**						**2**	**8**	

Outside threshold value
Reference station outside threshold value
Data not used

Copper Chloride	Reference Tox 1 mean fert, 8/10/01	Reference Tox 2 mean fert, 8/14/01	Reference Tox 3 mean fert, 8/17/01
Control	96.8	91.6	72.8
2.5	95.8	87.4	71.2
5	97	90.1	74.4
10	93.6	86.5	75.4
20	56.6	58.6	70.4
40	15.8	14.6	72.2
LC 50	23.36	24.3	>40
Within Control Chart limits	yes	yes	no,Coppper stock prepared incorrectly, verified by chemistry lab

TABLE 1

Station	Exponent		SCCWRP		Bight '98*	
	% TOC	Grain Size	% TOC	Grain Size	% TOC	Grain Size
1	1.1	40.8	1.8	82.8	2	79
2	0.67	41.2	0.5	38.5	1.2	71
3	1.62	31.6	1	26.4	0.5	38
4	1.3	45.3	1	41.2	0.6	31
5	0.51	28	0.56	30.25	0.5	35

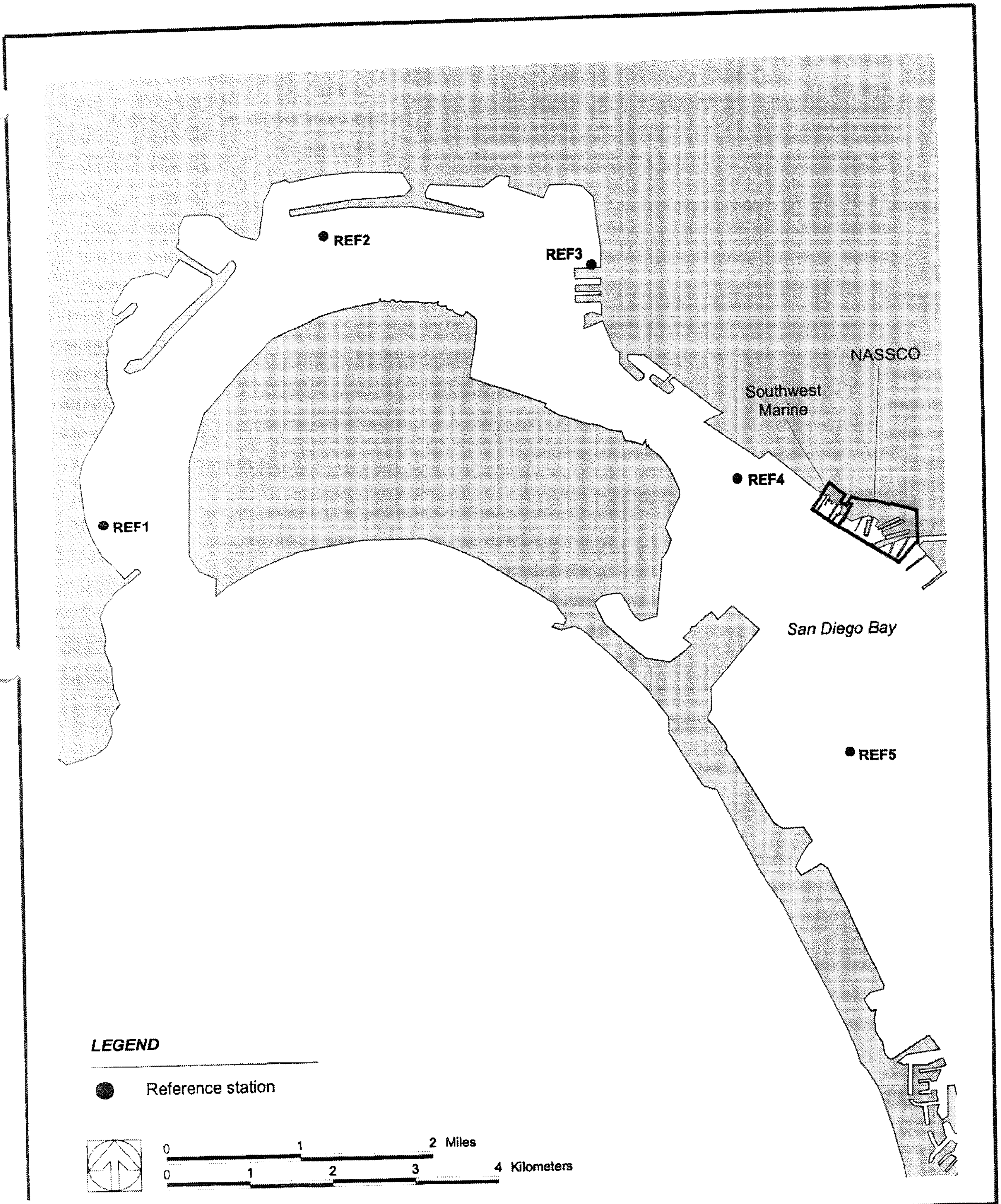

Figure 3-3. Reference station locations

8601718.002 and 8601731.002 | Jul 19, 2001 | figure 3-3 view | figure 3-3 | g:/swm_nassco/projects/workplan.apr

Laura Hunter

'rom: Betts, Brett [bbet461@ECY.WA.GOV]
ɔent: Monday, April 22, 2002 10:42 AM
To: Elaine Carlin (elainecarlin@worldnet.att.net); Laura Hunter / EHC San Diego
Subject: FW: Materials for 4/19 Conference Call

Rusty & Brett.doc

#2...

Brett

-----Original Message-----
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To: Betts, Brett; fairey@mlml.calstate.edu
Subject: Re: Materials for 4/19 Conference Call

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--Tom

Tom C. Alo
Water Resources Control Engineer
CA Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123
Main: (858) 467-2952
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Fax: (858) 571-6972
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>>> Rusty Fairey <fairey@mlml.calstate.edu> 04/18/02 03:39PM >>>
Tom- I am looking at the materials you sent but still have a basic question that needs your help. In the material you sent I don't see any information on the what criteria were used to select "reference sites" or what the intended use is. Without that it will be difficult to tackle your purpose of determining the suitability of the reference sites. Could you provide us that information? Rusty

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Five reference sites will be sampled from San Diego Bay to represent background conditions within the bay. These stations were selected from analysis of Bight'98 sediment chemistry, toxicity, and benthic community data using a stepwise screening procedure. The screening procedure was conducted in three phases in order to obtain a pool of candidate sites representing a range of habitat characteristics and locations. In phase I, all 46 Bight'98 stations from San Diego Bay were evaluated on the basis of desired habitat characteristics, lack of acute toxicity, low overall contamination (mean ERM quotient), and diverse benthos (high number of species present). The sequence of steps is shown in Figure 2-5. The phase I selection process identified five of the cleanest stations (level 1) among the Bight'98 dataset, but the grain size and TOC characteristics of these stations were relatively restricted. Grain size of the phase I stations was 31-50% and these stations contained 0.5-0.9% TOC (Table 2-1).

The phase II selection procedure was applied in an effort to identify potential reference stations containing higher concentrations of TOC and finer grain size characteristics. This process differed from phase I in that only stations containing relatively high % fines were included and the criteria for contamination level and species diversity were modified in order to retain a sufficient number of stations (5) for further evaluation.

None of the stations selected in phases I or II were located in the central portion of San Diego Bay, near the study sites. A third selection round was then conducted in order to identify candidate reference sites closer to the Chollas Creek and Paleta Creek study sites. The phase III selection procedure was conducted using only those 16 stations located in the central region of San Diego Bay, near the Chollas Creek and Paleta Creek study sites. Two stations (level 3) were identified in phase III (Table 2-1).

The locations and selected characteristics of the 12 candidate reference sites are shown in Figure 2-1 and Table 2-1, respectively. Data on the three reference sites currently used for NPDES monitoring are also shown.

A subset of five stations is recommended for use in sediment quality studies at the Chollas Creek and Paleta Creek sites. The recommended stations were selected in order to represent a wide range of grain size and TOC, while maintaining relatively low contaminant concentrations. The recommended sites encompass a similar range of sediment grain size and have similar or lower contaminant concentrations that the NPDES reference sites. The recommended stations and some of the characteristics meriting their use are:

R05 (2441): Relatively high TOC and % fines and location near the mouth of the bay.

R03 (2433): Relatively high TOC and % fines, located in northern part of bay.

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R01 (2231): Relatively low TOC and % fines, deep water, near ship traffic.

R02 (2243): Relatively low TOC and % fines, located in south part of bay.

Some of the candidate stations that are not recommended for use contained characteristics that were deemed somewhat undesirable. For example, station 2225 was

located in a marina (potential impacts from boating activities), station 2442 had a relatively high PAH concentration, and station 2227 was located close to another recommended site. The remaining stations were not selected because they contained characteristics that were similar to those already recommended for use.

Any of the 12 candidate stations may be suitable for use as reference sites. The selection of the five recommended stations reflects the use of professional judgment to best satisfy the objectives of varied characteristics, multiple locations within the bay, low contamination, low toxicity, and healthy benthos.

Table **Error! No text of specified style in document.**-1. Characteristics of candidate reference sites for San Diego Bay. The characteristics of the Chollas Creek and Paleta Creek study sites and NPDES reference sites are also shown. Shading indicates recommended reference stations.

Station/ Area	Level	% Fines	TOC	Cu mg/kg	Zn mg/kg	PAH μg/kg	ERMq	# Species
Chollas		33-84	0.7-3.5					
Paleta		24-81	0.3-2.3					
REF-01		38		16.6	49.4	902		
REF-02		42		179	226	72		
REF-03		65		99.1	159	5957		
2227	1	50	0.9	53.9	112	324	0.12	52
2435	1	49	0.5	28.4	64.4	0	0.07	59
2229	1	43	0.9	58.9	99.3	970	0.12	62
2440	1	38	0.5	41.8	81.1	0	0.09	58
2231	1	31	0.6	58.1	92.5	258	0.10	70
2441	2	79	2.0	71.8	123	1061	0.13	84
2225	2	57	1.0	127	130	146	0.19	69
2433	2	71	1.2	71.6	126	240	0.14	58
2442	2	79	2.0	77.7	139	4950	0.14	52
2238	2	57	1.0	55.1	143	0	0.12	41
2243	3	35	0.5	38.8	81.2	0	0.09	47
2240	3	44	0.5	47.4	103	85	0.11	40

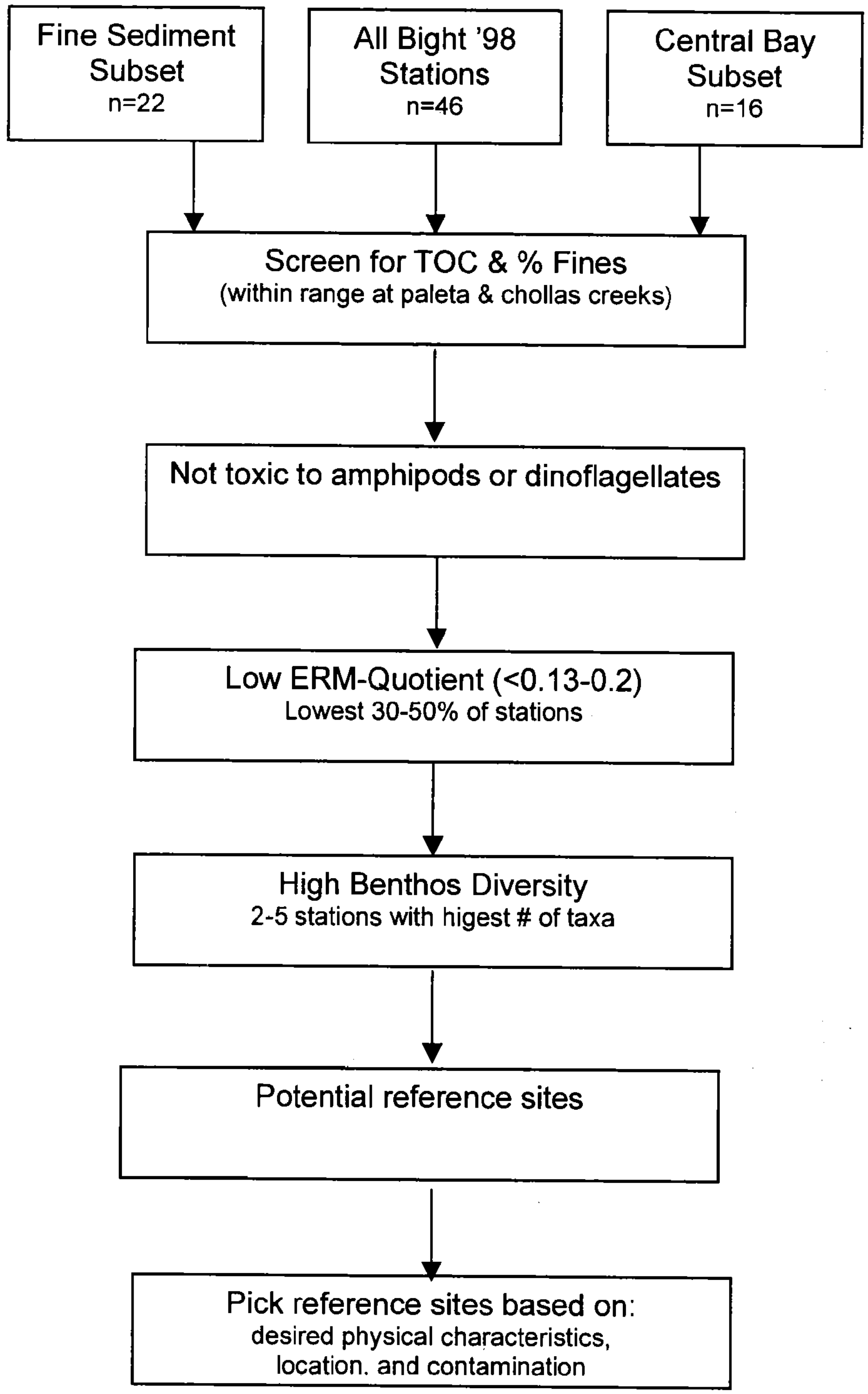

Figure 2-5. Overview of reference site selection process. The selection process was applied to three groups of Bight'98 stations from San Diego Bay.

Laura Hunter

From: Betts, Brett [bbet461@ECY.WA.GOV]
Sent: Monday, April 22, 2002 10:42 AM
To: Elaine Carlin (elainecarlin@worldnet.att.net); Laura Hunter / EHC San Diego
Subject: FW: Materials for 4/19 Conference Call

Reference Station Info.doc | Table 1 - Grain Size & TOC.xls.. | Table 2 - Toxicity.xls | Reference Station Map.pdf

FYI - one of three I'll send to you.

Brett Betts
Sediment Management Unit
Washington Dept. of Ecology

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Subject: Materials for 4/19 Conference Call

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APRIL 19, 2002 CONFERENCE CALL
DISCUSSION ON 5 SD BAY REFERENCE STATIONS
SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

Purpose of Conference Call

Determine the suitability of the 5 reference stations for statistical comparisons to shipyard stations.

Current Position of Regional Board, Fish & Game, NOAA, and SCCWRP

- Use the existing reference stations with caution recognizing the differences in grain size and TOC.
- Because of the variability in sampling, as shown in the Bight'98/SCCWRP-Navy/Exponent sampling events (Table 1), it would be difficult and possibly futile for the shipyards to try to identify additional reference sites with fine-grained sediments. Furthermore, in order to find fine-grained sediments the shipyards would likely have to sample near-shore where there are higher sediment contaminant concentrations.
- Consideration of disqualifying data that is inappropriate for statistical comparisons but do not disqualify the entire reference station.

Issues for Discussion

(1) *Physical Characteristics.* Grain sizes at 5 reference stations do not completely match the range of grain sizes at the study site (Table 1). TOC at 5 reference stations do not completely match the range of TOC at the study site (Table 1).

(2) *Macoma Tissue.* PCB concentrations in the Macoma tissue at Reference Station 3 are above EPA's screening values (20 ppb) and OEHHA's screening values (20 ppb) for human consumption of fish or shellfish.

- R3 = 40 ppb

(3) *Sediment Chemistry.* PCB concentrations (total aroclors) at all 5 reference stations exceed the ERL (22.7 ppb) and 2 reference stations exceed the ERM* (180 ppb):

- R1 = 150 ppb
- R2 = 140 ppb
- R3 = 380 ppb*
- R4 = 438 ppb*
- R5 = 130 ppb

(4) *Toxicity*. Reference stations 2 and 5 exhibited toxicity in the bivalve development test (Table 2). All three toxicity test were normalized against the control mean and compared against 80% of the control mean. No hits in the other reference stations and toxicity tests.

(5) *Benthic Community*. Reference Station 4 had markedly higher species richness than any other reference station. Different from all other shipyard and reference stations.

Urchin Fertilization

Area	Station	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Exponent Stat Sign Diff	Exceed Threshold Value (Control)	Mean	Stdev	Mean all Reps	Stdev all Reps	80% Control Threshold	Normalized Against the control Mean	Compared Against Phillips et al July 2000, Threshold Value (88%)
Control	1	96	91	90	98	94			93.8	3.35					
	1	94	95	97	93	92			94.2	1.92	94	2.6	75.2		
	2	93	91	92	93	92			92.2	0.84					
	2	93	89	93	94	91			92.0	2.00	92.1	1.4	73.7		
	3	83	81	82	82	77			81.0	2.35					
	3	69	75	71	63	70			69.6	4.34	75.3	6.8	60.2		
													64.8		
Batch 1	**Station**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 4**	**Rep 5**	**Exponent Stat Sign Diff**	**Exceed Threshold Value (Control)**	**Mean**	**Stdev**	**Mean all Reps**	**Stdev all Reps**	**80% Control Threshold**	**Normalized Against the control Mean**	**Compared Against Phillips et al July 2000, Threshold Value (88%)**
control	1	96	91	90	98	94			93.8	3.35				100	
	1	94	95	97	93	92			94.2	1.92	94.0	2.6	75.2	100	
Reference	4	96	92	92	99	87			93.2	4.55	93.2	4.5	74.6	99	
Nassco	6	99	94	97	99	93			96.4	2.79				103	
	11	93	95	97	93	91			93.8	2.28				100	
SWM	2	95	96	97	97	94			95.8	1.30				102	
	3	96	95	94	96	98			95.8	1.48				102	
	8	94	94	95	97	98			95.6	1.82				102	
	9	94	92	92	95	92			93.0	1.41				99	
	13	91	93	93	92	93			92.4	0.89				98	
	15	94	100	96	97	92			95.8	3.03				102	
	21	96	95	95	96	94			95.2	0.84				101	
Batch 2	**Station**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 4**	**Rep 5**	**Exponent Stat Sign Diff**	**Exceed Threshold Value (Control)**	**Mean**	**Stdev**	**Mean all Reps**	**Stdev all Reps**	**80% Control Threshold**	**Normalized Against the control Mean**	**Compared Against Phillips et al July 2000, Threshold Value (88%)**
Control	2	93	91	92	93	92			92.2	0.84	92.1	1.4	73.7	100	
	2	93	89	93	94	91			92.0	2.00				100	
Reference	1	80	80	82	90	83			83.0	4.12	77.9	7.2	62.3	90	
	2	83	69	73	68	71			72.8	6.02				79	
Nassco	1	78	77	84	75	80			78.8	3.42				86	
	3	78	84	74	80	70			77.2	5.40				84	
	4	80	77	85	79	82			80.6	3.05				88	
	12	86	86	85	72	82			82.2	5.93				89	
	15	81	86	78	81	78			80.8	3.27				88	
	16	76	85	70	80	73			76.8	5.89				83	
	17	77	83	82	81	80			80.6	2.30				88	
	19	63	74	57	65	70			65.8	6.53				71	

Batch 3	Station	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Exponent Stat Sign Diff	Exceed Threshold Value (Control)	Mean	Stdev	Mean all Reps	Stdev all Reps	80% Control Threshold	Normalized Against the control Mean	Compared Against Phillips et al July 2000, Threshold Value (88%)	
Control	3	83	81	82	82	77			81.0	2.35	81	2.3	64.8	100		
	3	69	75	71	63	70			69.6	4.34				86		data not used
Reference	3	79	82	81	83	78			80.6	2.07	74.9	6.8	59.9	100		
	5	67	69	69	65	76			69.2	4.15				85		
Nassco	9	69	70	76	73	83			74.2	5.63				92		
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Station	Exponent		SCCWRP		Bight '98*	
	% TOC	Grain Size	% TOC	Grain Size	% TOC	Grain Size
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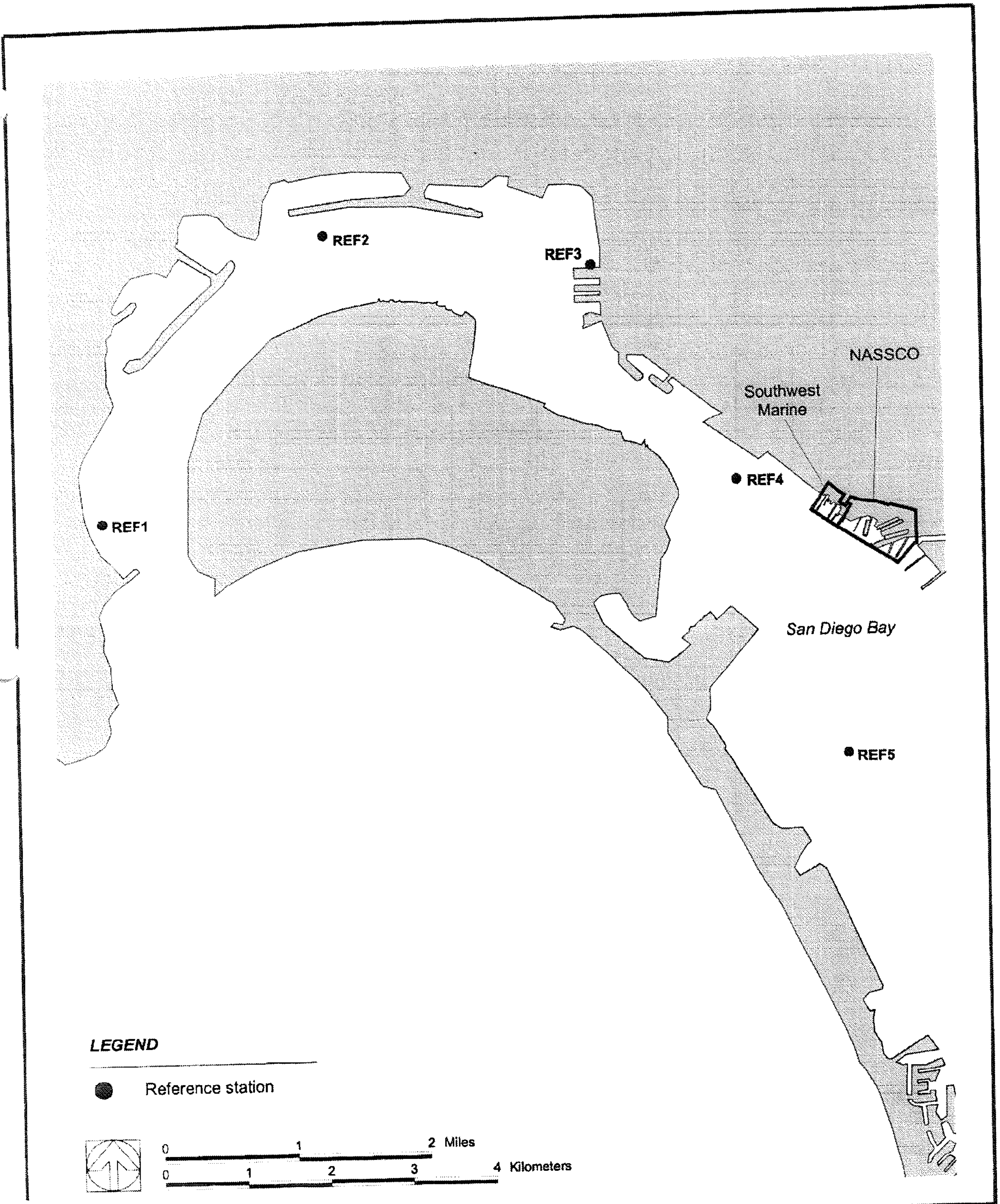

Figure 3-3. Reference station locations

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2227	1	50	0.9	53.9	112	324	0.12	52
2435	1	49	0.5	28.4	64.4	0	0.07	59
2229	1	43	0.9	58.9	99.3	970	0.12	62
2440	1	38	0.5	41.8	81.1	0	0.09	58
2231	1	31	0.6	58.1	92.5	258	0.10	70
2441	2	79	2.0	71.8	123	1061	0.13	84
2225	2	57	1.0	127	130	146	0.19	69
2433	2	71	1.2	71.6	126	240	0.14	58
2442	2	79	2.0	77.7	139	4950	0.14	52
2238	2	57	1.0	55.1	143	0	0.12	41
2243	3	35	0.5	38.8	81.2	0	0.09	47
2240	3	44	0.5	47.4	103	85	0.11	40

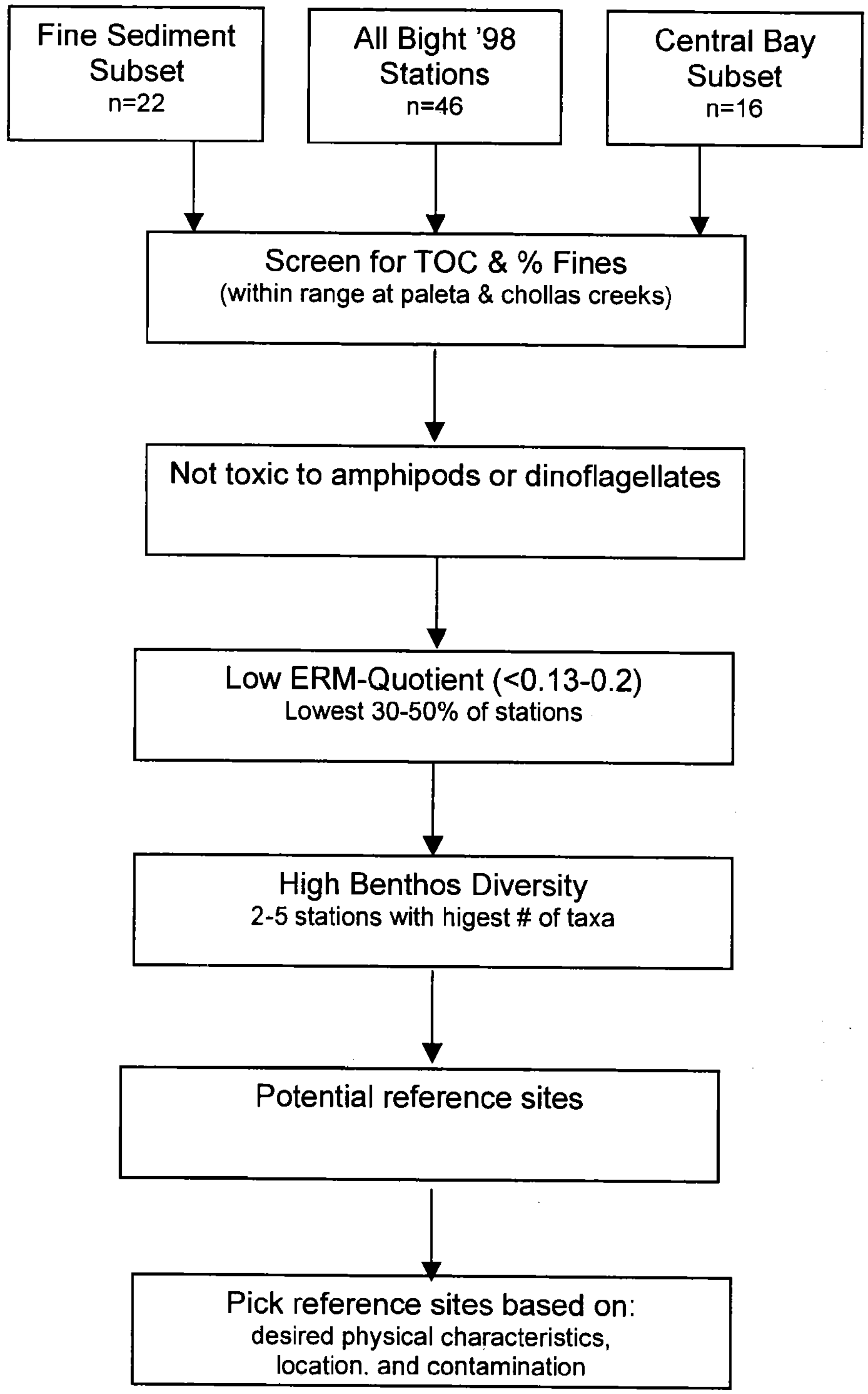

Figure 2-5. Overview of reference site selection process. The selection process was applied to three groups of Bight'98 stations from San Diego Bay.

Laura Hunter

From: Betts, Brett [bbet461@ECY.WA.GOV]
Sent: Monday, April 22, 2002 10:42 AM
To: Elaine Carlin (elainecarlin@worldnet.att.net); Laura Hunter / EHC San Diego
Subject: FW: Materials for 4/19 Conference Call

Reference Station Info.doc   Table 1 - Grain Size & TOC.xls..   Table 2 - Toxicity.xls   Reference Station Map.pdf

FYI - one of three I'll send to you.

Brett Betts
Sediment Management Unit
Washington Dept. of Ecology

-----Original Message-----
From: Tom Alo [mailto:alot@rb9.swrcb.ca.gov]
Sent: Thursday, April 18, 2002 3:11 PM
To: Betts, Brett; fairey@mlml.calstate.edu; Denise.Klimas@noaa.gov; Donald.macdonald@noaa.gov; Mmartin@OSPR.DFG.CA.GOV; Scott_Sobiech@rl.fws.gov; David Barker; Craig Carlisle; Alan Monji; Brennan Ott; steveb@sccwrp.org
Subject: Materials for 4/19 Conference Call

Good afternoon. Attached are materials that we will be using during our conference call at 10:00 am. If you have any questions or have trouble opening the files please contact me. Looking forward to hearing from you all tomorrow.

--Tom

Development of Sediment Bioassays using Newly Settled California Halibut (*Paralichthys californicus*)

Liesl L. Tiefenthaler
Mark A. Skracic

The California halibut (*Paralichthys californicus*) is an important flatfish to recreational and commercial fisheries in Southern California (CDFG 1989). Adult halibut inhabit sandy bottoms along the coast and spawn from February to September (Plummer *et al.* 1983). Larvae spend approximately one month in the plankton before settling and migrating to semiprotected bays, harbors, and estuaries (Allen and Herbinson 1990). Newly settled halibut (Figure 1) live directly on the sediment and have high surface-to-volume ratios. They are, therefore, likely to suffer toxic effects from contact with contaminated sediments. Since the nursery areas are being impacted by dredging and urban runoff, it is important to determine if juvenile halibut are being affected by sediment contamination. The objective of this study was to develop a long term (28 d) flow-through sediment toxicity test for newly settled California halibut. This test will measure and evaluate the effects of sediments on halibut survival and development.

MATERIALS AND METHODS

Prior to developing the toxicity test, preliminary experiments were conducted to determine a suitable sediment and test container, and to examine the effect of sediment renewal on growth and survival. The toxicity test was then used to determine the effect of sediment collected from five sites in Southern California on growth and survival of juvenile halibut. These sites included a reference station in Mission Bay, three industrialized harbors (Los Angeles Harbor East Turning Basin, Outer Los Angeles Harbor, and the San Diego shipyard) and an area near a large municipal wastewater outfall (Palos Verdes shelf) (Figures 2a and 2b). Sediment was collected with a $0.1 m^2$ Van Veen grab. Only the upper 2-cm layer of each grab sample was removed for toxicity testing and grain-size analysis. This layer was then thoroughly homogenized before being separated into subsamples. The toxicity test sediments were stored in 1-L polyethylene jars at 0 to 5° C for three days before being used in the test. The remaining subsamples were placed in 4-oz plastic cups and stored at 0 to 5° C until analyzed for grain size by the methods of Plumb (1981).

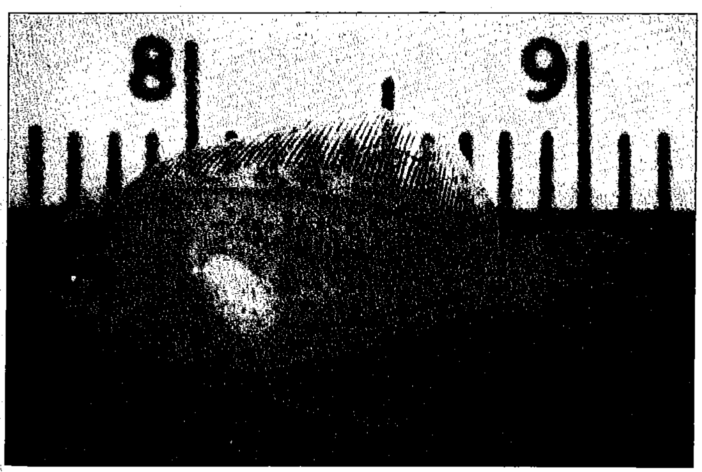

FIGURE 1. Newly settled California halibut (*Paralichthys californicus*), 12.5 mm standard length.

California halibut were provided by the Los Angeles County Natural History Museum Halibut Hatchery Project, Redondo Beach, California. Four hundred larval halibut were siphoned into separate plastic bags (100 fish/bag) filled with seawater. The bags were then placed into ice chests to keep the fish at 15 ± 1° C. Upon arrival at the laboratory the fish were transferred into 33 L holding tanks with seawater. Seventy-five larval California halibut were placed in each tank. Halibut cultures were maintained at 15 ± 1° C with mild aeration and fed newly hatched brine shrimp, *Artemia* sp., nauplii seven days a week until they had completely settled (approximately three weeks). Settled fish are defined as having fully migrated eyes, shortened dorsal rays, and lying on the substrate except when swimming up to feed (Gadomski *et al.* 1990).

An artificial sediment was created to simulate a field-collected sediment from Alamitos Bay, Long Beach, California, (a representative juvenile halibut site) both chemically and physically. Grain size analysis for Alamitos Bay determined a coastal sand type sediment composed of fine- and medium-grained sand (> 0.125 mm diameter) (Table 1). Two different artificial sediments, one representing 93% sand and the other 50% silt/clay (< 0.063 mm grain diameter), were then made following the formulated sediment procedures of the United States

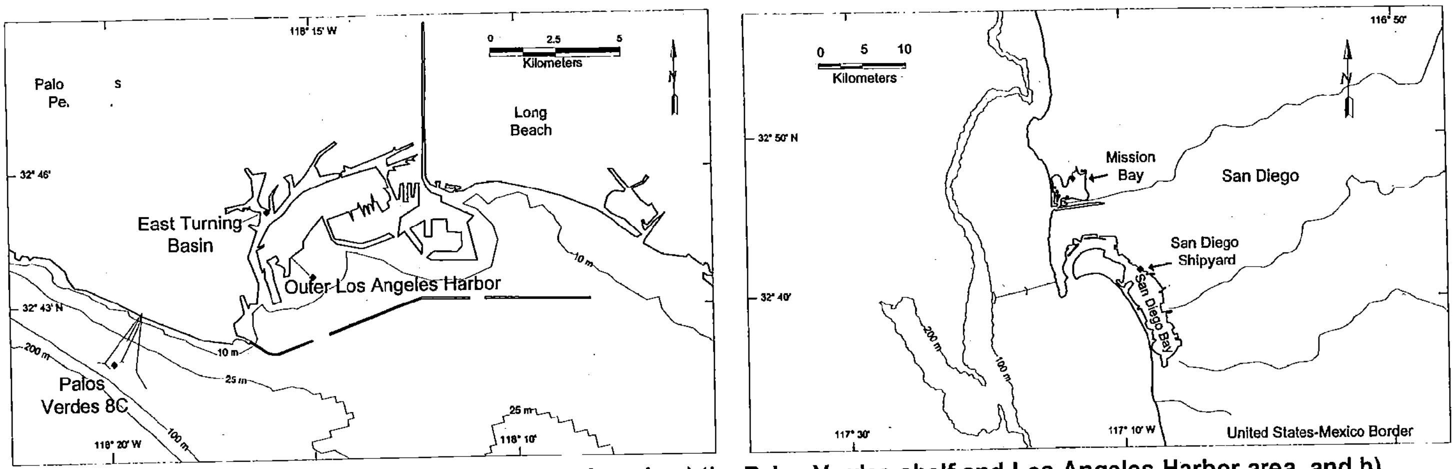

FIGURE 2. Location of sediment collection stations in a) the Palos Verdes shelf and Los Angeles Harbor area, and b) Mission Bay and San Diego Bay, California.

Environmental Protection Agency (USEPA 1994). Silica sand was washed and placed in a drying oven overnight at 60° C. The sand was then sieved to represent coarse (0.5-2.0 mm), medium (0.25-0.5 mm) and fine (0.05-0.25 mm) sand particles. ASP 400®, an aluminum silicate, was used to represent the silt fraction. ASP 600, ASP 900 (also aluminum silicates), and montmorillonite clay were used to represent the clay fraction. Since the silts and clays averaged a pH of 3.5, $CaCO_3$ was added as a pH buffer. The $CaCO_3$ was sieved to <0.05 mm. The silt, clays, and $CaCO_3$ constituents were ashed at 550° C for 1 h in a muffle furnace to remove organic matter. Peat moss was then used for the organic carbon source. The peat moss was rinsed and then soaked in deionized water for 5 d with daily water renewal. Moist peat moss was then sieved to provide an average particle size of 0.84 mm. All constituents were then mixed dry in 5 L plastic tubs before adding filtered seawater. After preparation, a conditioning period of at least 7 d was required for pH stabilization. Conditioning involved static renewal of the overlying seawater.

All experiments were 28 d exposures conducted with a 12:12 h light:12 h dark photoperiod in temperature (15 ± 1° C) controlled water baths. A 28 d exposure period was chosen to facilitate comparisons to other long term sediment bioassays conducted at the Southern California Coastal Water Research Project (i.e. *Lytechinus*, *Amphiodia* and *Grandidierella*). Only robust fish, defined as settled, well-pigmented, and with full guts, were used in the experiments. Artificial and field-collected sediments were placed in either small 1.8-L polyethylene plastic tubs (ST) or tall 4-L glass jars (TJ). One day prior to the start of the experiments the sediments were added to the test containers and the seawater flow was initiated. Each tub or jar contained a 2 cm layer of sediment and 1 L of overlying filtered seawater (3 L for the glass jars). Each replicate received mild aeration and a seawater flow rate of 4 mL/min. Experiments were initiated by adding 10 (five in the initial test) California halibut which had been digitally imaged to each of five replicate containers per treatment. Since California halibut are visual feeders (Haaker 1975), brine shrimp nauplii, *Artemia* sp. were added to the test containers early in the day to maximize feeding potential. Each day, old brine shrimp were removed from the test containers using a 60 µm net and 15 mL of new *Artemia* (20 *Artemia*/mL) were added using a 25 mL

TABLE 1. Sediment grain size and organic content of sediments used in bioassays with newly settled California halibut (*Paralichthys californicus*).

Station	Station Code	% Gravel	% Sand	% Silt	% Clay	% TOC
Alamitos Bay	AB	-	93.0	3.8	3.0	0.50
Agua Hedionda	AH	-	33.2	62.4	4.3	NA
93% sand	93% AS	-	92.7	3.9	3.2	0.50
50% silt/clay	50% AS	-	50.0	28.0	22.0	0.50
Play Sand	PS	0.1	99.5	0.2	0.2	NA
Los Angeles Harbor East Turning Basin	LAHETB	4.5	22.8	51.8	21.0	0.59
Mission Bay (Reference)	MB	-	13.8	46.1	40.1	1.63
Outer Los Angeles Harbor	OLAH	-	48.3	36.8	14.9	0.69
Palos Verdes 8C	PV 8C	-	38.9	49.4	11.6	3.10
San Diego Shipyard	SDS		29.1	35.9	35.0	2.83

artificial sediment.
NA=not analyzed.
TOC = total organic carbon.

pipette. Water quality measurements (dissolved oxygen, pH, salinity and ammonia) were taken three times a week. Flow rates and mortality were checked daily. Dead fish were preserved for histological analyses in 70% ethanol and then fixed using Davidson's fixative. California halibut still alive at the end of the experiment were again digitally imaged, preserved, and fixed for histological analyses.

Standard length measurements were made at the beginning and end of each experiment on the digital images using Optimus™ software. Halibut growth was measured by subtracting the mean standard length (SL) of all the fish in each replicate at the beginning of the experiment from the mean SL of all the surviving fish in each replicate at the end of the experiment. The test end points were mortality, defined as no visible signs of fish movement after gentle prodding, and growth, defined as the increase in SL during the bioassay.

The final sediment bioassay on field-collected sediments varied slightly from the preliminary experiments. The sediment was not changed after two weeks for this experiment and, due to a shortage of robust California halibut only nine fish were added to each test container. In addition, each field-collected sediment sample was press sieved through a 1.0 mm mesh screen to remove potential infaunal predators before being added to the test containers. Since the preliminary experiments indicated there was no significant difference in container type, plastic tubs were selected for use in this experiment.

Sediments used in our exposures have not yet been analyzed for total organic carbon content (TOC), trace metals, and synthetic organics. Historical chemistry data from the collection sites can be found in the Bay Protection and Toxic Cleanup Program database (CDFG 1994) and from SCCWRP data on the Palos Verdes shelf (SCCWRP 1994).

The proportions of California halibut surviving in all experiments were evaluated using a One-Way Analysis of Variance (ANOVA) with the following modified arcsine square root transformation:

$$\theta = \arcsin \sqrt{\frac{Y + 3/8}{n + 3/4}}$$

Dunnett's test was used to locate differences between the treatment means. Effects of the sediments on California halibut growth were tested using One-Way ANOVA (Sokal and Rohlf 1995).

RESULTS

Preliminary Experiments

The initial experiment was conducted to determine a suitable reference sediment. California halibut were exposed to a field-collected sediment (Agua Hedionda), to commercial play sand, and to artificial sediments. Exposure to these different sediment types had variable effects on juvenile halibut survival. Percent survival of California halibut was highest (88%) for the artificial 93% sand sediment (Figure 3). On the formulated 50% silt/clay, the play sand, and the Agua Hedionda sediment types halibut survival varied from 60 - 76%. There was no significant difference among the sediment types ($F = 1.47$; $P = 0.249$). However, because survival was highest on the artificial 93% sand sediment, it was chosen as the reference sediment for the toxicity test. Since the power for the initial experiment was so low ($1-\beta = 0.135$), the sample size was increased to 10 fish for the next experiment (small vs. tall container and not changing vs. changing the sediment).

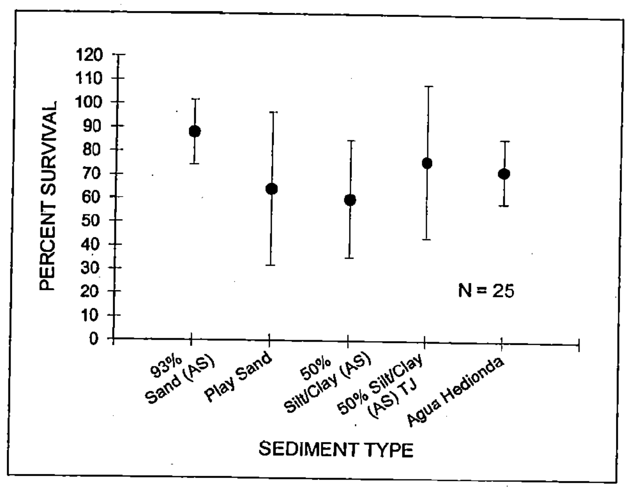

FIGURE 3. Percent survival of newly settled California halibut (*Paralichthys californicus*) on artificial and natural sediments. The error bars indicate the 95% confidence interval. AS = artificial sediment; TJ = tall jars.

The next experiment was conducted to determine a suitable test container and to test for effects of sediment renewal on California halibut survival using the artificial 93% sand as the substrate. After 14 d, sediment was changed on two of the treatments (one small tub treatment and one tall jar treatment). Juvenile halibut survival was fairly low for all treatments (Figure 4). Percent survival was similar between small tubs and tall jars (18-34%) without sediment renewal. Likewise, percent survival was also similar between small tubs and tall jars (38-50%) with sediment renewal. In addition, ʽ·en the sediment was re-. .wed, a similar increase in halibut survival occurred between the small tubs and the tall jars. Results indicated that there was no significant difference in survival among container types or sediment renewal status (F = 2.1; P = 0.119). However, in both cases where sediment was renewed, the results suggested a trend toward increased halibut survival.

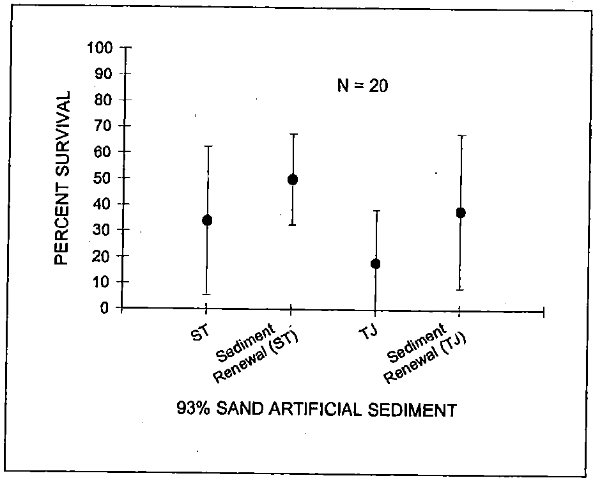

FIGURE 4. Percent survival of newly settled California halibut (*Paralichthys californicus*) in different test containers and on original and renewed sediment. The error bars indicate the 95% confidence interval. ST = small tubs; TJ = tall jars.

Test of Sediment Toxicity

The final sediment bioassay was conducted to evaluate the effects of contaminated sediments on California halibut growth and survival. Percent survival varied from 4 to 31% on the East Turning Basin, Palos Verdes 8C, San Diego Shipyard, and Outer Los Angeles Harbor sediments (Figure 5). Percent survival was h· ·er on the artificial sand and Mission Bay reference se..ments and ranged from 44 to 47%. Even though control survival was poor for this experiment an ANOVA showed that there was a statistically significant difference in halibut survival among the treatment groups (F = 11.2; P < 0.001). A Dunnett's test showed that the reference sediments (Mission Bay and the artificial sand) had significantly higher survival than the San Diego shipyard, Palos Verdes 8C, and the Los Angeles Harbor East Turning Basin sediments.

Mean halibut growth did not differ significantly (F = 0.423; P = 0.826) by sediment type. There was, however, a trend toward less growth for treatments that had the lowest survival (Table 2). Newly settled California halibut at the beginning of the experiment had a size range of 6 to 9 mm SL within each replicate. The difference between the means of all the fish at the start of the experiment from those fish surviving at the end indicates an average of only 4 mm of growth.

DISCUSSION

The initial experiments demonstrated that artificial sediment can provide suitable substrate for California halibut through 28 d of exposure. The results of our final ex· ·ure on the field-collected sediments indicate that ju. .ile California halibut are tolerant of a wide range of sediment particle sizes (<0.004 mm - 2.00 mm). The reference site, Mission Bay, which had the highest halibut survival, has a fairly small grain size with sediment composed of silt and clay (Table 1). Artificial 93% sand, which had the next highest survival had a larger grain size containing a mixture of coarse, medium, and fine sand grain sizes. The Outer Los Angeles Harbor, San Diego shipyard, and the Los Angeles Harbor East Turning Basin sediments were all composed of smaller grain size (<0.06 mm) silty clay. Palos Verdes 8C sediment was silt. Since the highest California halibut survival occurred on contrasting grain sizes of Mission Bay and artificial 93% sand grain size is not a major factor influencing survival. While our results showed that the halibut can survive on a wide range of sediment grain sizes, Drawbridge (1990) and MBC (1991, 1992) found that recently settled fish preferred clay/silt sediment over coastal sand.

The reason the survival results for the preliminary experiment (small vs. tall container and not changing vs. changing the sediment) and field-collected exposures were sharply lower than the initial experiment may have been due to an unhealthy halibut brood stock. During these experi-

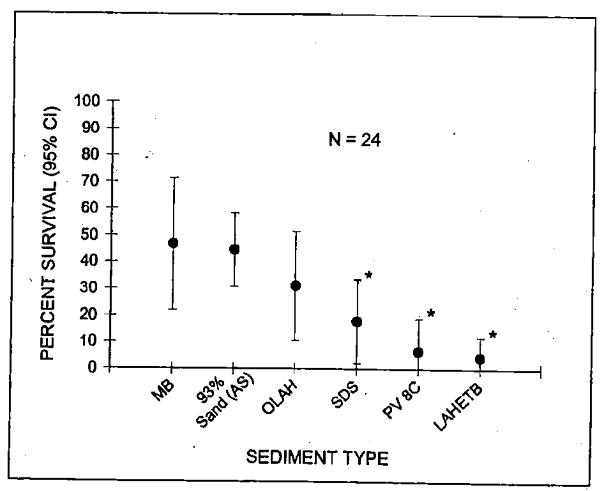

FIGURE 5. Percent survival of newly settled California halibut (*Paralichthys californicus*) on contaminated sediment. The error bars indicate the 95% confidence interval. See Table 1 for station abbreviations. * = Treatment groups that are significantly different from Mission Bay and the 93% sand artificial sediments.

TABLE 2. Mean and standard deviation of newly settled California halibut (*Paralichthys californicus*) growth on artificial, contaminated, and natural sediments from coastal, bay, and harbor areas off Los Angeles and San Diego, California.

	Mean	SD	N
MB	4.87	1.34	5
AS	4.40	0.51	5
OLAH	4.41	0.48	5
SDS	4.33	2.06	5
PV 8C	4.12	1.18	2
LAHETB	3.40	0.34	2

See Table 1 for meaning of station abbreviations.

mental periods the halibut hatchery had been experiencing an unusually high mortality rate (>80%) of larval fish possibly causing the low percent survival seen in these two experiments. Laboratory halibut mortality is normally less than 10% (Caddell *et al.* 1990). Alternatively, the limited diet fed to the halibut may also have effected their survival. In the future, a variety of prey such as copepods, amphipods, mysids, and cumaceans should be provided to the halibut to enhance their nutrition and improve their survival.

The PV 8C, Los Angeles Harbor East Turning Basin (LAHETB) and the San Diego shipyard (SDS) sediments have had elevated concentrations of metals and/or organics in previous studies (Anderson et al 1988). The LAHETB and SDS stations have previously been found to be toxic to the amphipod, *Grandidierella japonica* (Anderson et al 1988). However, until the sediments from our exposures are analyzed, no definitive source of the decreased survival of the juvenile halibut on these sediments can be determined.

Since mortality was so high in the final field-collected sediment experiment, it is possible that the data could be biased if more small or large fish were dying. This issue may be addressed by ranking each fish by size at the beginning and the end of the experiment. Those fish that died during the experiment and those corresponding to the same rank at the start as those that died would be removed from the analysis. Growth would then be measured on the remaining fish. The growth endpoint may be a more valuable tool to assess effects when survival is not affected.

While sediment tests using juvenile California halibut show some promise as a research tool, there is much further study that needs to be done. Testing using spiked sediments and reference toxicants should be done to discover the range of response. Feeding tests should be performed to optimize growth and survival. The most important factor for future tests is to insure the experiments are started using healthy animals. At this time, there is only one source of juvenile halibut and their availability is limited to late spring through summer.

CONCLUSIONS

Sediment testing using newly settled California halibut juveniles is technically feasible. The halibut are tolerant of a wide range of sediment particle sizes (<0.004 - 2.00 mm). Artificial sediment is a suitable substrate for maintaining California halibut to 28 d of exposure. We were able to detect a significant difference between sediments thought to be clean and those assumed to be contaminated. Much further study is needed to improve the methodology.

LITERATURE CITED

Allen, M.J., and K.T. Herbinson. 1990. Settlement of juvenile California halibut, *Paralichthys californicus*, along the coasts of Los Angeles, Orange, and San Diego Counties in 1989. *Calif. Coop. Oceanic Fish. Invest.* Rep. 31:84-96.

Anderson, J.W., S.M. Bay, and B.E. Thompson. 1988. Characteristics and effects of contaminated sediments from Southern California. Prepared for Calif. State Water Resources Control Board, Sacramento, CA. (Contract No. 6-214-250-0). So. Calif. Coastal Water Res. Proj., Long Beach, CA. 51 pp.

Caddell, S.M., D.M. Gadomski, and L.R. Abbott. 1990. Induced spawning of the California halibut, *Paralichthys californicus*, (Pisces: Paralichthyidae) under artificial and natural conditions. pp. 175-198, *In*: C.W. Haugen (ed.), The California halibut, *Paralichthys californicus*, resource and fisheries. *Calif. Dep. Fish Game, Fish Bull.* 174.

California Department of Fish and Game. 1989. Review of some California fisheries for 1988. *Calif. Coop. Oceanic Fish. Invest. Rep.* 30:7-17.

California Department of Fish and Game. 1994 SWRCB/NOAA Cooperative Project (Legs 5-14), database description data report. Prepared for Calif. State Water Resources Control Board, Bays Estuar. Unit, Bay Prot. Toxic Cleanup Prog., Sacramento, CA. 24 pp.

CDFG. See California Department of Fish and Game.

Drawbridge, M.A. 1990. Feeding relationships, feeding activity and substrate preferences of juvenile California halibut, *Paralichthys californicus*, in coastal and bay habitats. M.S. Thesis, San Diego State Univ., San Diego, CA. 214 pp.

Gadomski, D.M., S.M. Caddell, L.A. Abbott, and T.C. Caro. 1990. Growth and development of larval and juvenile California halibut, *Paralichthys californicus*, reared in the laboratory. Pp 85-98, *in*: C.W. Haugen (ed.), The California halibut, *Paralichthys californicus*, resource and fisheries. *Calif. Dep. Fish Game, Fish Bull.* 174.

Haaker, P.L. 1975. The biology of the California halibut, *Paralichthys californicus* (Ayres), in Anaheim Bay, California. Pp 137-151. *in*: E.D.

Lane and C.W. Hill (eds.), The marine resources of Anaheim Bay. *Calif. Dr Fish Game, Fish Bull.* 52(71):267-351.

MacDonald, D.D. 1994. Approach to the assessment of sediment quality in Florida coastal waters, Volume 1, Development and evaluation of sediment quality assessment guidelines. Prepared for Florida Dep. Environ. Prot., Off. Water Policy, Tallahassee, FL. 126 pp.

MBC Applied Environmental Sciences. 1991. Distribution of juvenile California halibut (*Paralichthys californicus*) in bay and coastal habitats of Los Angeles, Orange, and San Diego Counties in 1991. Prepared for So. Calif. Edison Co., Rosemead, CA. MBC Appl. Environ. Sci., Costa Mesa, CA. 91-RD-35. 37 pp.

MBC Applied Environmental Sciences. 1992. Distribution of juvenile California halibut (*Paralichthys californicus*) in bay and coastal habitats of Los Angeles, Orange, and San Diego Counties in 1992. Prepared for So. Calif. Edison Co., Rosemead, CA. MBC Appl. Environ. Sci., Costa Mesa, CA. 92-RD-015. 41 pp.

Plumb, R.H. 1981. Procedures for handling and chemical analysis of sediment water samples. U.S Dep. Army, Corps of Engineers, Vicksburg, VA. Tech. Rept. EPA/CE-81-1.

Plummer, K.M., E. E. DeMartini, and D.A. Roberts. 1983. The feeding habits and distribution of juvenile-small adult California halibut (*Paralichthys californicus*) in coastal waters off northern San Diego County. *Calif. Coop. Oceanic Fish. Invest. Rep.* 24:194-201.
SCCWRP. See Southern California Coastal Water Research Project.

Sokal, R.R., and F.J. Rohlf. 1995. Biometry. 3rd Edition, W.H Freeman Co., New York, NY. 887 pp.

Southern California Coastal Water Research Project. 1994. Toxicity of sediments on the Palos Verdes shelf. Pp. 79-90. *in*: J.N. Cross (ed.) Southern California Coastal Water Research Project annual report 1993-1994. So. Calif. Coastal Water Res. Proj., Westminster, CA.

USEPA. See United States Environmental Protection Agency.

United States Environmental Protection Agency. 1994. Methods for measuring the toxicity and bioaccumulation of sediment-associated contaminants with freshwater invertebrates. U.S. Environ. Prot. Agency, Duluth, MN. EPA 600/R-94/024. 133. pp.

ACKNOWLEDGMENTS

The authors would like to thank Dr. Jeffrey N. Cross for his expertise and Dr. Robert J. Lavenberg, Director of the Halibut Hatchery Project, and Jim Rounds (both of Los Angeles County Museum of Natural History) for the larval halibut and their expert assistance. They would also like to thank the following members of the SCCWRP staff: Darrin Greenstein, for advice on the paper; the Toxicology group for their extensive help; Larry Cooper and Shelly Moore for their assistance; and David Tsukada for grain size analysis.

Southern California Coastal Water Research Project

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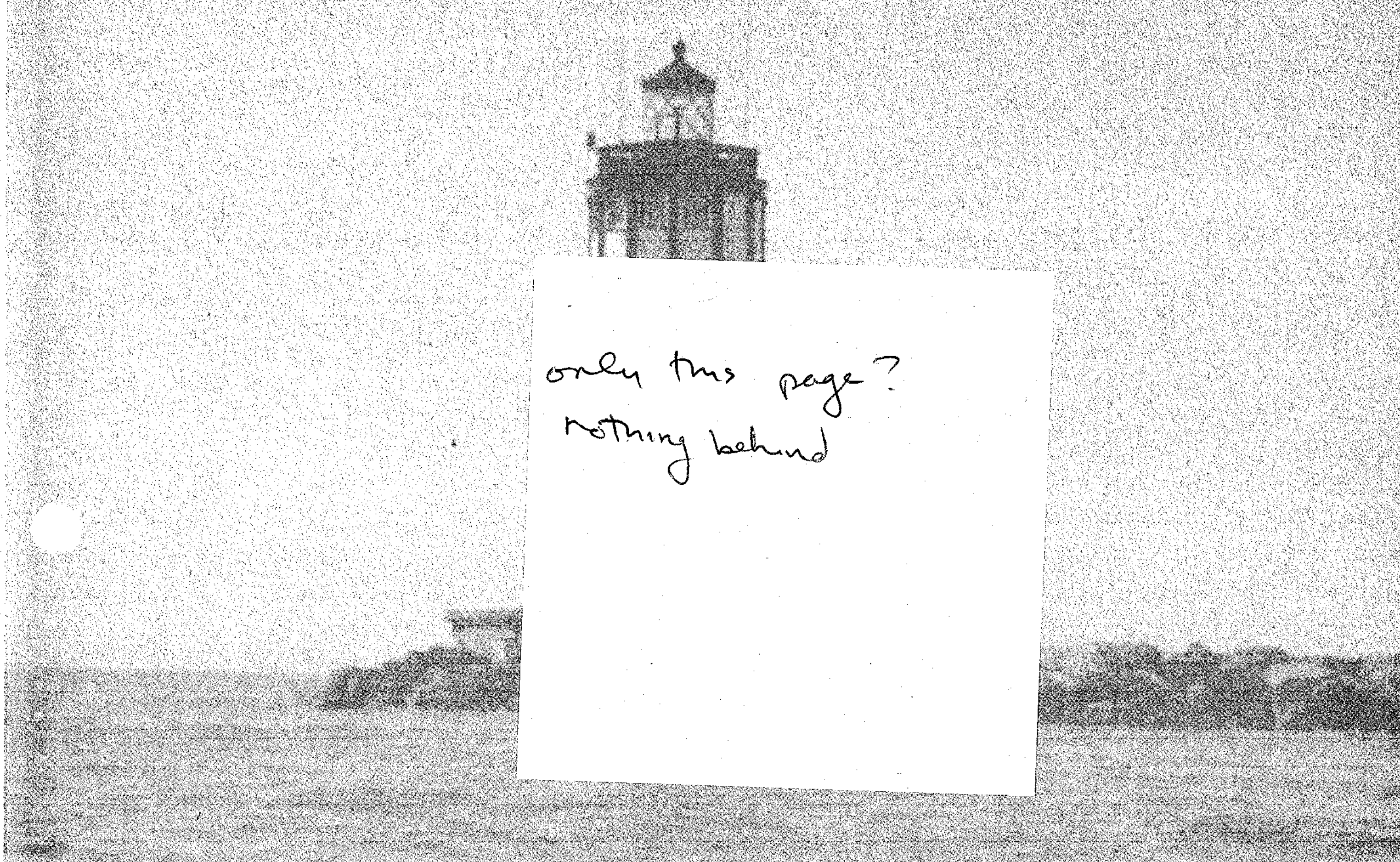

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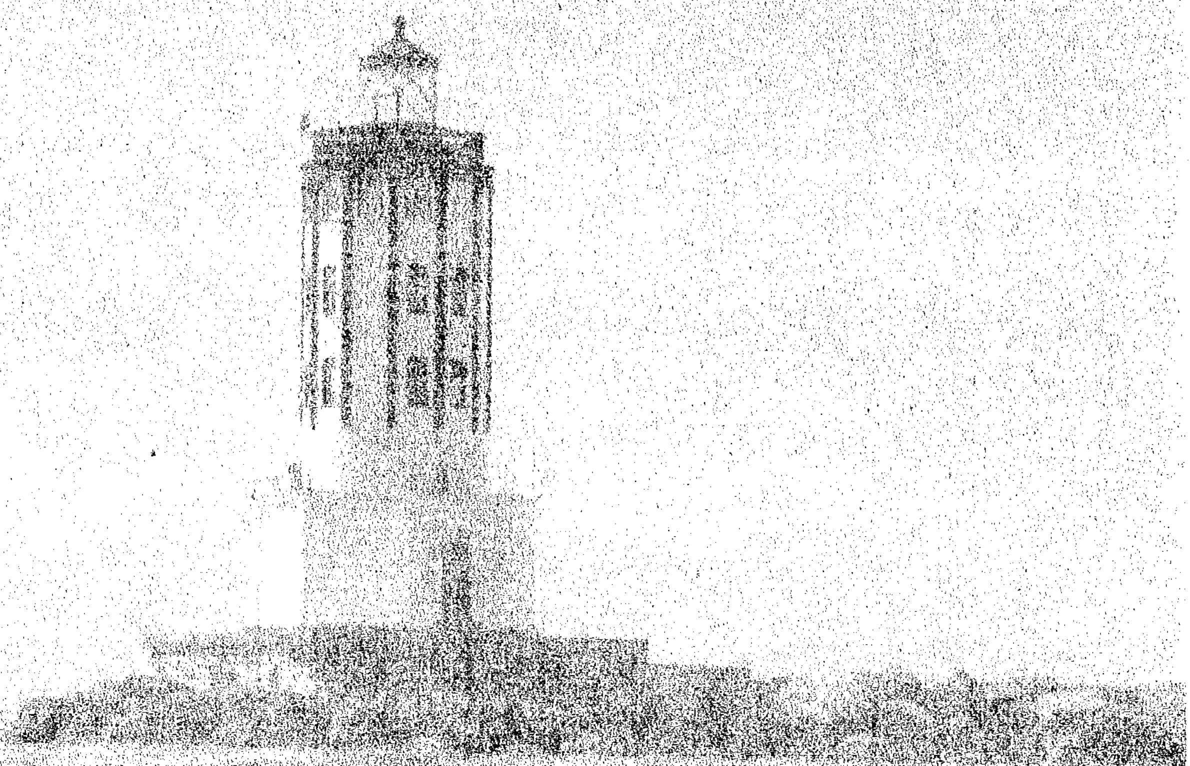

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Subject: Halibut declaration
Date: Mon, 02 Jun 97 10:01:23 MST
From: sharon_kramer@mail.fws.gov
To: huntfor@waonline.com

TO: Laura Hunter, Environmental Health Coalition

FROM: Sharon Kramer, National Marine Fisheries Service

6/2/97

Between 1985-1990, I conducted research on the early life history of California halibut that was supported by the National Marine Fisheries Service, Southwest Fisheries Science Center in La Jolla. The research was used to satisfy requirements for a Ph.D. dissertation at Scripps Institution of Oceanography. The key questions that I was trying to address included: 1) what are the specific habitats where most juveniles are found and how does habitat preference change with age, 2) what are the benefits of a shallow water existence, 3) how does California halibut compare to other juvenile flatfishes living in the same shallow water habitats.

Most of this research was conducted in Mission Bay, Agua Hedionda Lagoon, and along the open coast from September 1986 through September 1988. In the summer of 1988, some additional funds were made available to spend two weeks (June 20-July 5) in San Diego Bay. Standing stock of small juveniles (<50 mm standard length) was compared in San Diego Bay, Mission Bay, and Agua Hedionda Lagoon (results reported in Kramer, S.H. 1990. Distribution and abundance of juvenile California halibut, Paralichthys californicus, in shallow waters of San Diego County. Calif. Dept. of Fish and Game, Fish. Bull. 174: 99-126). The standing stock of juveniles <50 mm standard length (SL) in San Diego Bay was 13,860 (2SE=10,880). In comparison, the standing stock of juveniles <50 mm SL in Mission Bay was 22,080 (2SE=18,600) and 10,190 in Agua Hedionda Lagoon (2SE=10,190). Thus the standing stock of juveniles in San Diego Bay was less than that in Mission Bay, yet the area of Mission Bay is only about 1/5 of the area of San Diego Bay. The abundance of juveniles was much lower than in any of the other habitats surveyed during the same time period, although the area of San Diego Bay is large (3615 hectares, in comparison to Mission Bay with 890 hectares, and Agua Hedionda with 120 hectares).

In addition, the density of juvenile halibut in comparable depths of all three bays was lowest in San Diego Bay (reported in Kramer, S.H., and J.R. Hunter. 1988. Southern California wetland/shallow water habitat investigation Annual Report for Fiscal Year 1988, Southwest Fisheries Science Center, La Jolla, CA.). Density of halibut <50 mm SL in shallow water habitats < 1 m in depth was 21/hectare in Agua Hedionda, 66/hectare in Mission Bay, and <1 hectare in San Diego Bay.

Results from this study do not allow determination of the causes of the differences in abundance between the three bays. The low abundance and density of halibut in San Diego Bay could be caused by affects of dredging, pollution, or by a difference in the timing of settlement in San Diego Bay relative to other areas. The latter explanation seems the least likely; a time series for all three bays would be required to reach a definite conclusion.

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY
P.O. Box 47600 • Olympia, Washington 98504-7600
(360) 407-6000 • TDD Only (Hearing Impaired) (360) 407-6006

June 17, 2002

Laura Hunter
Environmental Health Coalition
1717 Kettner Blvd, Suite 100
San Diego, CA 92101

Subject: Evaluation of San Diego Bay Reference Station Chemistry and Bioassay Results

Dear Ms. Hunter:

As you know, Ecology has offered our free Sedqual Information System software to all parties in the San Diego Bay area to aid them in their evaluation of sediment quality data from that region. I have specifically entered chemistry and bioassay data from the shipyards' August 2001 survey to enable demonstrations of Sedqual's capabilities. Sedqual quickly and reliably evaluates complex chemistry and bioassay data for source control, cleanup and dredging decision-making.

Per your request, I have used Sedqual to compare the 5 reference stations sediment chemistry results to three different sets of North American sediment guidelines and criteria: NOAA ERL/ERMs, Canada's TEL/PELs and Washington State's adopted sediment quality standards (SQS). I have also used Sedqual to interpret two bioassays conducted for each reference station to corresponding Washington State's marine sediment reference sediment bioassay performance criteria. I have provided a quick synopsis below of these results and have attached an Excel chemical hits table identifying the "hits" from all comparisons and have also enclosed the hyperlink to the copy of the scientific development paper from 1994 which identifies the regional marine sediment larval "normal survivorship" reference sediment performance standard used in Washington State.

As you will note below, there are sediment quality issues with reference stations 2, 3, 4, and 5. I discussed these and other issues in April during a rather long conference call organized by the Regional Water Quality Control Board staff. During that conference call I recommended that further evaluation of **all** San Diego Bay sediment quality data for the last 10 years be evaluated. I continue to recommend these data be used to establish a range/distribution of contaminants within San Diego Bay "clean" areas. This will help determine an appropriate reference sediment location for further shipyard testing. For

Date 5-26-94

FP 1996 MCON PROJECT DESIGN AND CONSTRUCTION DATA

P-701	Controlled Industrial Facility	Naval Air Station North Island
P-No.	Title	Activity

DESIGN DATES AND PERCENTAGES: (Express date as month-year, i.e., 1-86)

Start . . . . 4-94 (Actual A/E award date or in-house work start date)

45% Complete . . . . 2-95 (Actual or scheduled date)

Design Release . . . . 7-95 (P&S complete and ready to advertise)

% as of 30 Sep . . . . 15% (Est. % complete at NAVCOMP submission)
(BY-2)

% as of 30 Nov . . . . 15% (Est. % complete at OSD submission; if less than 35%, provide explanation below)
(BY-2)

% as of 1 Jan . . . . . 50% (Est. % complete at Congressional submission)
(BY-1)

% of 1 Oct . . . . 100% (Est. % complete at start of FY of Execution)
(BY-1)

Comments: The 45% and Final Design Award is scheduled to be awarded to the A-E on 12-5-94

CONSTRUCTION AWARD DATE 11-14-95
CONSTRUCTION DURATION (MONTHS) 21 months

DESIGN TYPE (Check one)

____ Unique design - one of a kind facility
____ Generic design - similar to private sector facilities (i.e., chapels)
____ Standard layout - (i.e., BEQ, medical): ________
(Indicate type and identify)
____ Conceptual Definitive No. (P-272. Part I) ________
____ Detailed Definitive No. (P-272, Part II) ________
____ Standard Construction Drawing/Specification (P-34) ________
X Design Re-Use: FY 92, P-622, Puget Sound Naval Shipyard in Bremerton, Washington, Controlled Industrial Facility
(Identify FY, P-No., Location, Description)

DESIGN AGENT A/E x In-House ___

DESIGN COST ($000)
1. $ 750 Production of P&S (costs subject to 6% statutory cost limit)
2. $ 557 All other design costs (other A/E costs & In-House costs)
3. $1,307 Total of (1) + (2) must equal (4) + (5)
4. $1,222 All Contract Costs
5. $ 85 All In-House Costs

ATTACHMENT 1
Enclosure (1)

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EHC 002660

example, Washington State has previously established reference station chemistry performance standards at the lower 90th% of the chemical distributions for accepted reference areas. It may be helpful to note that in Washington's adopted Sediment Management Standards rule, the definition for "Reference sediment sample" identifies the "Reference sediment samples represent the nonanthropogenically affected background surface sediment quality of the sediment sample. Reference sediment samples cannot exceed the applicable sediment quality standards…." Additionally, the comprehensive San Diego Bay sediment analysis may prove useful for identifying contaminant trends that could emphasize further source controls needed to prevent ongoing sediment contamination and to protect beneficial uses identified in state and/or federal clean water law.

Perhaps, the existing reference stations are the "best" that can be identified, but they seem to be showing PCB sediment contamination which could be a watershed-wide contaminant and ongoing source control issue. Per the above, Washington State would not allow use of reference stations 3 and 4 based on PCB contamination. Use of the current reference stations should be done with caution as they appear impacted and regulatory cleanup comparisons using these stations could lead to less stringent cleanup levels and unacceptable protections for beneficial uses.

Chemical comparisons

I compared the reference stations' sediment chemistry results to three sets of guidelines (attached), each establishing a range having lower and higher (more stringent/less stringent) values, e.g., ERL is a lower (more stringent) value than ERM. Likewise for Washington's SQS and minimum cleanup level (MCUL) and Canada's TEL/PEL. Many chemical exceedances of the ERL and TEL values were identified and no exceedances of Washington's cleanup standard, the MCUL were identified. It is significant to note that PCB hits were identified when reference stations 3 and 4 were compared to all three sediment guideline systems. That is to say, reference stations 3 and 4 exceeded ERMs, SQS and PELs for PCBs.

Bioassay comparisons

The 5 reference stations all passed Washington's reference performance standard for the amphipod mortality test. The reference performance standard for this test is the reference sediment must have less than 25% mortality.

Reference stations 2 and 5 failed Washington's reference performance standard for the larval normal survivorship that evaluates mortality and abnormality in larval species, e.g., *Mytilus galloprovincialis* used in this test.

PROJECT SPECIAL CONSIDERATIONS

P-NO 701 ACTIVITY/PROJECT TITLE Naval Air Station North Island, San Diego, California; Controlled Industrial Facility

POLLUTION PREVENTION, ABATEMENT, AND CONTROL

This project causes environmental pollution which will be abated by:

/_/ Corrective measures included as part of this project
/_/ Related Project No. ________.

ENVIRONMENTAL IMPACT

/X/ An environmental impact assessment (EIA)/statement (EIS) has been prepared and indicates the subject project will have no significant impact on the environment.

/_/ An (EIA)/(EIS) has been prepared and indicates the subject project will have a significant impact on the environment and has been addressed in project planning and design.

PRESERVATION OF HISTORICAL SITES AND STRUCTURES

/_/ The proposed project will have an effect on a district, site, building, structure, object or setting listed in the National Register of Historic Places as indicated on the attached paper.

DESIGN FOR ACCESSIBILITY OF PHYSICALLY HANDICAPPED PERSONNEL

/X/ Provisions for physically handicapped personnel will not be provided because: The Controlled Work Area radiological requirements dictate that only able-bodied employees work in this area. Handicapped provisions will be provided in the Uncontrolled Work Area.

FLOODPLAIN MANAGEMENT AND WETLANDS PROTECTION

/_/ Executive Orders 11988 and 11990 apply and have been accommodated.

"NEW START" CRITERIA FOR COMMERCIAL OF INDUSTRIAL ACTIVITIES PROGRAM

/_/ The project is a new start in accordance with OMB Circular A-76 and has been approved by the Assistant Secretary of the Navy.

INTERGOVERNMENTAL COORDINATION

/_/ OMB Circular A-95 applies and coordination of the project with state and area-wide clearinghouses and agencies has been accomplished.

PLANNING IN THE NATIONAL CAPITAL REGION

/_/ The siting and configuration of the project have been submitted to the National Capital Planning Commission for approval.

/_/ The project has been approved by the Commission of Fine Arts and Advisory Council on Historic Preservation. Approval by the National Capital Planning Commission is pending.

NATO INFRASTRUCTURE PROGRAM

/_/ Prefinancing under NATO procedures is planned for this project.

LIFE CYCLE COST ANALYSIS

/_/ A lift cycle cost analysis has been performed for this project.

ATTACHMENT 2
ENCLOSURE (1)

The reference station bioassay performance standard is a regional standard established by the four regional dredging agencies here and can be found on the Seattle Corps' Dredged Material Management Office webpage at:

http://www.nws.usace.army.mil/publicmenu/DOCUMENTS/larv_94.pdf

Although Sedqual can evaluate any user-defined sediment bioassay, I have not provided comments on the echinoderm fertilization test conducted on San Diego Bay sediments. I am familiar with the test, but have never analyzed echinoderm fertilization bioassay data for regulatory purposes, so I have not entered this data or provided an evaluation of it. For your information, Washington State does not routinely use this sediment bioassay for regulatory purposes within the adopted Sediment Management Standards and associated source control, cleanup and dredging programs.

I hope you and others find these comments useful in the protection of San Diego Bay sediment quality. I also appreciate your early efforts to install and use Sedqual for evaluation of the sediment quality data in San Diego Bay. For your information, Washington State currently stores over 8000 stations of fresh and marine sediment data in Sedqual and makes this information readily available to the public. Additionally, we have recently received funding to begin development of a benthic analysis tool to be included in Sedqual, completing the sediment triad approach (chemistry, bioassays, benthos) for Sedqual analysis tools. If I can be of further assistance on use of Sedqual as a data warehouse and analysis tool or on details of Washington's sediment management program, please feel free to call me at (360) 407-6914 in Lacey, Washington.

Sincerely,

Brett Betts
Sediment Management Unit

NAVY FORMAT BUILDING COST SUMMARY
NAVFAC 4140/1 (2-76) WESTDIV (OP) 4140/A REV 8-82) SHEET OF

TITLE AND LOCATION:	**NAS NORTH ISLAND - CONTROLLED INDUSTRIAL FACILITY** **SAN DIEGO, CALIFORNIA MCON PROJECT P-701**	DATE PREPARED: **24 JUNE 1994**
NAME OF ESTIMATING FIRM: **LOCKWOOD GREENE ENGINEERS, INC.**		TYPE OF ESTIMATE: **[X] PED [ ] 45% [ ] 100% [ ] FINAL**
ESTIMATE FOR CONTRACT NO: **N62474 - 89 - C - 6943**	ESCALATED TO: **1 SEPT 1996**	BLDG AREA (DOD 4270.1M) **48,701 GSF**
		STORIES: **2 STORIES**

PRIMARY FACILITY BUILDING		QUANTITY	SYSTEM UNIT	COST/ SYST UNIT	PERCENT	COST/ BLDG SF GROSS	TOTAL COST
0100	Foundation	40,550	GRD FLR SF	14.48	2.86%	12.05	587,040
0200	Structural Frame	48,701	BLDG SF	59.53	14.12%	59.53	2,899,092
0300	Floors	48,701	BLDG SF	35.37	8.39%	35.37	1,722,601
0400	Roof	42,879	ROOF SF	34.40	7.18%	30.29	1,475,036
0500	Exterior Walls	51,606	WALL SF	33.67	8.46%	35.68	1,737,720
0600	Interior Walls	16,475	WALL SF	15.68	1.26%	5.30	258,254
0700	Interior Finishes	193,220	FINISH SF	5.99	5.64%	23.77	1,157,452
0800	Doors & Windows	48,701	BLDG SF	9.48	2.25%	9.48	461,770
0900	Specialties	48,701	BLDG SF	1.03	0.25%	1.03	50,347
1000	Plumbing	29	FIXTURE	4,503.45	0.64%	2.68	130,600
1100	Mechanical	200	TON	17,956.33	17.49%	73.74	3,591,265
1200	Electrical (Inc. UPS)	48,701	BLDG SF	46.08	10.93%	46.08	2,244,199
1300	Special Equipment (Including Cranes)	48,701	BLDG SF	86.61	20.54%	86.61	4,218,067
	Subtotal Building				100.00%	421.62	20,533,443

SUPPORTING FACILITIES		QUANTITY	SYSTEM UNIT	COST/ SYST UNIT	TOTAL COST
UTILTITIES					
1401	Electrical Distribution	15	KV	49,481.80	742,227
1402	Electrical Site Work	4,000	LF	48.53	194,127
1403	Additional Electrical Site Work	4,500	LF	49.66	223,456
1404	Exterior Water System (Inc. PW)	2,500	LF	59.34	148,362
1405	Steam & Cond System	300	LF	174.58	52,373
1406	Additional Steam & Cond System	500	LF	324.01	162,006
1407	Additional Compressed Air System	5,000	SCFM	160.61	803,045
1408	Storm Drainage System	1,400	LF	65.17	91,240
1409	Sanitary Sewer	1,200	LF	52.42	62,899
	Subtotal Utilities				2,479,735
SITE PREPARATION AND IMPROVEMENTS					
1410	Demolition	93,792	SF	26.58	2,492,930
1411	Pilings	38,925	LF	23.19	902,764
1412	Building Relocations	14,606	SF	60.05	877,065
1413	Pavements	600	SY	46.55	27,932
	Subtotal Site Preparation and Improvements				4,300,691
	TOTAL SUPPORTING FACILITIES				6,780,426
	PRIMARY FACILITY 1				20,533,443
	TOTAL BASE BID ITEM 1				**$27,313,869**

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SURVEY_	STN_ID_N	SAMP_DT	SAMP_ID	FIELD_RE	SUB_SAM	LAT_DECI	LON_DEC	TEST_TY
Comparison to NOAA 1995 Marine Sediment Guidelines								
SDP101	REF1	8/11/01	SD0034	#	#	32.69148	117.2353	**ER-L**
SDP101	REF1	8/11/01	SD0034	#	#	32.69148	117.2353	**ER-L**
SDP101	REF2	8/12/01	SD0041	#	#	32.7223	117.2083	**ER-L**
SDP101	REF2	8/12/01	SD0041	#	#	32.7223	117.2083	**ER-L**
SDP101	REF2	8/12/01	SD0041	#	#	32.7223	117.2083	**ER-L**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**ER-L**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**ER-L**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**ER-L**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**ER-L**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**ER-L**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**ER-L**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**ER-L**
SDP101	REF4	8/8/01	SD0013	#	#	32.69456	117.1556	**ER-L**
SDP101	REF4	8/8/01	SD0013	#	#	32.69456	117.1556	**ER-L**
SDP101	REF4	8/8/01	SD0013	#	#	32.69456	117.1556	**ER-L**
SDP101	REF4	8/8/01	SD0013	#	#	32.69456	117.1556	**ER-L**
SDP101	REF5	8/14/01	SD0049	#	#	32.66445	117.1418	**ER-L**
SDP101	REF5	8/14/01	SD0049	#	#	32.66445	117.1418	**ER-L**
SDP101	REF5	8/14/01	SD0049	#	#	32.66445	117.1418	**ER-L**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**ER-M**
SDP101	REF4	8/8/01	SD0013	#	#	32.69456	117.1556	**ER-M**
Comparison to Washington State Sediment Criteria								
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**SQS**
SDP101	REF4	8/8/01	SD0013	#	#	32.69456	117.1556	**SQS**
SDP101	REF4	8/8/01	SD0013	#	#	32.69456	117.1556	**SQS**
Comparison to Canadian Marine Guidelines								
SDP101	REF1	8/11/01	SD0034	#	#	32.69148	117.2353	**TEL**
SDP101	REF1	8/11/01	SD0034	#	#	32.69148	117.2353	**TEL**
SDP101	REF2	8/12/01	SD0041	#	#	32.7223	117.2083	**TEL**
SDP101	REF2	8/12/01	SD0041	#	#	32.7223	117.2083	**TEL**
SDP101	REF2	8/12/01	SD0041	#	#	32.7223	117.2083	**TEL**
SDP101	REF2	8/12/01	SD0041	#	#	32.7223	117.2083	**TEL**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**TEL**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**TEL**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**TEL**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**TEL**
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SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**TEL**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**TEL**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**TEL**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**TEL**

CONTROLLED INDUSTRIAL FACILITY
Naval Air Station North Island
San Diego, California
June 24, 1994

HIGH COST PROJECT COMPONENTS

The following list itemizes the individual project components that have costs in excess of $200,000.

BUILDING COMPONENTS:

Structural System	$2,899,000
Painting	707,000
RCA Stainless Ductwork System	840,000
HEPA Filters	405,000
Temperature Controls	297,000
Motor Control Centers	355,000
UPS System	230,000
Intercommunications Systems	310,000
Cranes	2,888,000

SUPPORTING FACILITIES:

Compressed Air Equipment	625,000
Electrical Substation	742,000
Piling	902,000
Building Demolition	1,450,000
Building Relocation	877,000
Site Paving Demolition	450,000
Hazardous Materials Abatement	384,000

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SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**TEL**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**TEL**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**TEL**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**TEL**
SDP101	REF4	8/8/01	SD0013	#	#	32.69456	117.1556	**TEL**
SDP101	REF4	8/8/01	SD0013	#	#	32.69456	117.1556	**TEL**
SDP101	REF4	8/8/01	SD0013	#	#	32.69456	117.1556	**TEL**
SDP101	REF4	8/8/01	SD0013	#	#	32.69456	117.1556	**TEL**
SDP101	REF4	8/8/01	SD0013	#	#	32.69456	117.1556	**TEL**
SDP101	REF4	8/8/01	SD0013	#	#	32.69456	117.1556	**TEL**
SDP101	REF4	8/8/01	SD0013	#	#	32.69456	117.1556	**TEL**
SDP101	REF5	8/14/01	SD0049	#	#	32.66445	117.1418	**TEL**
SDP101	REF5	8/14/01	SD0049	#	#	32.66445	117.1418	**TEL**
SDP101	REF5	8/14/01	SD0049	#	#	32.66445	117.1418	**TEL**
SDP101	REF3	8/13/01	SD0043	#	#	32.71843	117.174	**PEL**
SDP101	REF4	8/8/01	SD0013	#	#	32.69456	117.1556	**PEL**

This section contains the Cost Summary by specification section and back-up sheets for estimating demolition costs.

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CHEM_C	CONC_Q	CONC_U	SQS_CO	SQS_UNI	MEAS_BA	EXCEED_	QALF_CD	TOC_QT
COPPER	37	PPM	34	PPM	DRY	1.088	#	#
MERCUR	0.16	PPM	0.15	PPM	DRY	1.066	#	#
COPPER	39	PPM	34	PPM	DRY	1.147	#	#
MERCUR	0.21	PPM	0.15	PPM	DRY	1.4	#	#
PCBS	43	PPB	22.7	PPB	DRY	1.894	#	#
ACENAPT	26	PPB	16	PPB	DRY	1.625	#	#
ANTHRAC	100	PPB	85.3	PPB	DRY	1.172	#	#
COPPER	48	PPM	34	PPM	DRY	1.411	#	#
FLUOREN	29	PPB	19	PPB	DRY	1.526	#	#
LEAD	76	PPM	46.7	PPM	DRY	1.627	#	#
MERCUR	0.28	PPM	0.15	PPM	DRY	1.866	#	#
PCBS	270	PPB	22.7	PPB	DRY	11.89	#	#
ARSENIC	8.3	PPM	8.2	PPM	DRY	1.012	M	#
COPPER	81	PPM	34	PPM	DRY	2.382	EM	#
MERCUR	0.42	PPM	0.15	PPM	DRY	2.8	M	#
PCBS	380	PPB	22.7	PPB	DRY	16.74	#	#
COPPER	47	PPM	34	PPM	DRY	1.382	J	#
MERCUR	0.25	PPM	0.15	PPM	DRY	1.666	#	#
PCBS	49	PPB	22.7	PPB	DRY	2.158	#	#
PCBS	270	PPB	180	PPB	DRY	1.5	#	#
PCBS	380	PPB	180	PPB	DRY	2.111	#	#
PCBS	16	PPM	12	PPM	TOC	1.333	#	1.61
MERCUR	0.42	PPM	0.41	PPM	DRY	1.024	M	#
PCBS	29	PPM	12	PPM	TOC	2.416	#	1.3
COPPER	37	PPM	19	PPM	DRY	1.947	#	#
MERCUR	0.16	PPM	0.13	PPM	DRY	1.23	#	#
2BANTH	8.5	PPB	6.2	PPB	DRY	1.37	#	#
COPPER	39	PPM	19	PPM	DRY	2.052	#	#
MERCUR	0.21	PPM	0.13	PPM	DRY	1.615	#	#
PCBS	43	PPB	22	PPB	DRY	1.954	#	#
2BANTH	32	PPB	6.2	PPB	DRY	5.161	#	#
ACENAPT	26	PPB	6.7	PPB	DRY	3.88	#	#
ACENAPT	11	PPB	5.9	PPB	DRY	1.864	#	#
ANTHRAC	100	PPB	47	PPB	DRY	2.127	#	#
BAA	210	PPB	75	PPB	DRY	2.8	#	#
BAP	230	PPB	89	PPB	DRY	2.584	#	#
CHRYSE	290	PPB	108	PPB	DRY	2.685	#	#
COPPER	48	PPM	19	PPM	DRY	2.526	#	#
FLUORAN	540	PPB	113	PPB	DRY	4.778	#	#
FLUOREN	29	PPB	21	PPB	DRY	1.38	#	#
LEAD	76	PPM	30	PPM	DRY	2.533	#	#
MERCUR	0.28	PPM	0.13	PPM	DRY	2.153	#	#

DESCRIPTION OF HIGH COST/UNUSUAL FEATURES

Following in this section is a listing of high cost and unusual features for this facility. For additional description of unique features relative "Radiological" considerations see the "Executive Summary" contained in Section One of this document.

PCB-1254	190 PPB	63 PPB	DRY	3.015 #	#
PCBS	270 PPB	22 PPB	DRY	12.27 #	#
PHENANT	200 PPB	87 PPB	DRY	2.298 #	#
PYRENE	580 PPB	153 PPB	DRY	3.79 #	#
2BANTH	14 PPB	6.2 PPB	DRY	2.258 #	#
ARSENIC	8.3 PPM	7.2 PPM	DRY	1.152 M	#
COPPER	81 PPM	19 PPM	DRY	4.263 EM	#
LEAD	41 PPM	30 PPM	DRY	1.366 M	#
MERCUR	0.42 PPM	0.13 PPM	DRY	3.23 M	#
PCB-1254	240 PPB	63 PPB	DRY	3.809 #	#
PCBS	380 PPB	22 PPB	DRY	17.27 #	#
COPPER	47 PPM	19 PPM	DRY	2.473 J	#
MERCUR	0.25 PPM	0.13 PPM	DRY	1.923 #	#
PCBS	49 PPB	22 PPB	DRY	2.227 #	#
PCBS	270 PPB	189 PPB	DRY	1.428 #	#
PCBS	380 PPB	189 PPB	DRY	2.01 #	#

1. COMPONENT NAVY	FY 1996 MILITARY CONSTRUCTION PROJECT DATA	2. DATE JAN 1994
3. INSTALLATION AND LOCATION NAVAL AIR STATION NORTH ISLAND, SAN DIEGO, CA 92135-5112		
4. PROJECT TITLE CONTROLLED INDUSTRIAL FACILITY		5. PROJECT NUMBER P-701

28. Design For Accessibility Of Physically Handicapped Personnel. The new facility will be designed to be barrier-free and completely accessible to all physically handicapped persons. The facility will be designed in accordance with the Uniform Federal Accessibility Standards, Federal Register, (49 FR 31528 dated 07 August, 1984 as amended by 51 FR 18647 dated 21 May 1986), and the Americans with Disabilities Act Accessibility Guidelines.

29. Floodplain Management And Protection Of Wetlands; Coastal Zone Management.

Floodplain Management and Wetland Protection: Requirements of Executive Order Number 11988 (Floodplain Management) and Executive Order Number 11990 (Wetland Protection) are not applicable.

Coastal Zone Management: In accordance with the Federal Coastal Zone Management Act of 1972 (as amended), this project may affect the coastal zone in a negligible manner. To be consistent with the California Coastal Act of 1976, Chapter 3, "Coastal Resources Planning and Management Policies", a coastal Consistency Determination will be prepared and issued at a later date.

30. Intergovernmental Coordination. In accordance with OPNAV Instruction 11010.35, this project has been reviewed with respect to OMB Circular A-95 requirements. ~~It has been determined that the project will have no impact on community plans and programs that would require intergovernmental coordination. Therefore, submittal of the project to state and area wide clearing houses for review is not required~~.

31. Planning In The National Capital Region. Does not apply to this project.

32. NATO Infrastructure Program. Does not apply to this project.

33. Natural Resource. In the process of site selection, impacts on natural resources and endangered species will be considered. Flora and fauna existing on site and adjacent to the proposed site will be studied. There is a possibility that Blue Herons are nesting in the eucalyptus trees in the vicinity of building 417 which could be impacted by this project. The impact of the project on the possible nesting site will be assessed in the Environmental Impact Statement (EIS) for Nimitz Class Aircraft Carrier Homeporting Project at Naval Air Station North Island, California which is being prepared for the U.S. Department of Navy, Naval Air Station North Island.

34. Graphic Materials. The following drawings illustrate the schematic parameters of the new facility and include a location map, site plans, existing site area, and building floor plans.

The project may increase traffic within the city of Coronado which may have an impact on community plans and programs that would require intergovernmental coordination. Therefore submittal of the project to area wide clearing houses for appropriate review is required.

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18. Defense Access Roads. The impact of the project on off-base road systems will be thoroughly evaluated. The primary access to the project will be via First Street which is a two lane roadway section approaching Naval Air Station gate 2. North of this gate the roadway section becomes a two-lane roadway (Quay Road) section as it continues through the air station on to Bay Road and then on to the project site. Existing traffic counts will be counted on First Street during a 24-hour period (ADT) which will indicate the operating level of service. It is assumed that at build-out of the project, the primary access road will maintain an acceptable level of service.

Off base improvements to First Street are not required; however, improvements to Roe Street which is adjacent to the project site will be required and are included in the overall development plan and cost estimates.

19. Nuclear Survivability. Does not apply to this project.

20. Industrial Facilities. A hazard analysis is desirable for the CIF. This will be accomplished during, and in conjunction with, the construction phase of the project.

21. Telephones. Telephone communications systems for the project will include telephone, computer data and closed circuit television. A public address system will also be provided to all areas of the building and site.

a. Telephone Support - The estimated costs of the telephone support items have been established and identified in the construction cost for this facility. These items include empty conduits, raceways, cable trays, support structures, risers, backboards, utilities, telephone rooms, and switch rooms necessary to support main telecommunications systems.

b. Communications Systems/Equipment - The activity/user will fund all communications systems other than support items. Systems include exterior and interior wiring, connection devices and all instruments including main system processor.

22. Intrusion Detection Systems (IDS). Security systems for this project consist of perimeter exterior door monitoring, closed circuit TV monitoring of exterior building perimeter and exterior dusk to dawn lighting. The estimated costs of IDS system, support system, and equipment have been established and identified in the construction costs for this facility. These items include conduit runs, utilities, equipment space backboards, exterior and interior wiring, wiring devices, TV monitoring cameras, and all system equipment.

23. Hyperbarics. Does not apply to this project.

24. Uninterruptible Power System (UPS). Computer utilization and operations require a UPS for this project. Required support features such as conduits, space allocations and utilities shall be provided by MILCON. UPS components will be funded by MILCON.

25. Tempest Shielding. Does not apply to this project.

26. Physical Security. The project will be reviewed in the context of the installation physical security plan and security requirements which are needed will be incorporated.

27. Preservation Of Historic Sites And Structures. The may context of the new facility has been reviewed and it is concluded that the project ~~will not~~ have an effect on ~~any district, site~~, buildings ~~structure, object, or setting in or~~ eligible for listing in the National Register of Historic Places. ~~nor will the project have any effect on archaeological, historical, or cultural resources which are not eligible for the National Register~~. The new facility will be designed using the Base Exterior Architecture Plan for Naval Air Station North Island. Coordination with State Historical Preservation Office will be initiated.

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(g) Compressed Air - 100 psig, 40°F Dew Point

Consumption	281×10^6 SCF/yr
Demand	2250 scfm

9. Siting of the Project. The siting of the project was discussed in paragraph 3. The location is most centrally located and adjacent to the new CVN pier for support of CVN availabilities. Consideration of explosives safety, electromagnetic radiation (EMR), noise and airspace and airfield safety is not applicable to this project.

10. Economic Analysis. This project is required to properly support depot level maintenance of homeported CVN propulsion plant systems which will provide cost effective maintenance support and minimize costs from frequent relocations of Ship's Force personnel and their families if these facilities are not provided. A detailed economic analysis to support this project is currently being performed by Puget Sound Naval Shipyard.

11. Environmental Impact/Pollution Prevention, Abatement and Control. An Environmental Impact Statement (EIS) for Nimitz Class Aircraft Carrier Homeporting Project at Naval Air Station North Island, California is being prepared for the U.S. Department of Navy, Naval Air Station North Island. The EIS will address the CIF and also air and water pollution issues. The EIS will result in a Record of Decision prior to award of this contract.

12. Quantitative Data.

(QUANTITATIVE DATA TABLE)

	C.C. 213-65
a. Unit of Measure	SF
b. Total Requirement	48,701
c. Existing Substandard	- 0 -
d. Existing Inadequate	- 0 -
e. Existing Adequate	- 0 -
f. Other Assets, Not in Inventory	- 0 -
g. Funded, Not in Inventory	- 0 -
h. Adequate Assets (e + f + g)	- 0 -
i. Deficiency (b - h)	48,701

13. Maintenance Facilities. Not applicable.

14. Moral, Welfare and Recreation Facilities. Not applicable.

15. Relocate Facilities. Not applicable.

16. Storage Facilities. Not applicable.

17. Hazards, Identification, Assessment and Analysis. A detailed Occupational Safety and Health Analysis will be prepared for the Controlled Industrial Facility by NAVSHIPYD PUGET in accordance with OPNAVINST 51100.23B. Copies will be available upon request.

STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

WORKSHOP AGENDA

SAN DIEGO BAY CONTAMINATED MARINE SEDIMENTS ASSESSMENT AND REMEDIATION

Tuesday, June 18, 2002
9:00 a.m. – 5:00 p.m.

Water Quality Control Board
Regional Board Meeting Room
9174 Sky Park Court
San Diego, California

Workshop includes informal discussion of items to be presented for action at a future business meeting. Persons who are interested in items on the agenda are urged to attend workshops as they may miss valuable discussion that will not be repeated at future Regional Board meetings. There is no voting at workshops. Items requiring Regional Board action must be scheduled for consideration at Regional Board meetings.

1. Roll Call and Introductions *(Chairman Minan)*

2. Overview and Perspective *(David Barker, RWQCB)*

3. Bight'98 Regional Monitoring Study - Results *(Steve Bay, SCCWRP)*

4. NASSCO and Southwest Marine Contaminated Sediment Assessment and Remediation *(Suggested order of presentation)*
   - Regional Board Approach *(Tom Alo, RWQCB)*
   - Environmental Group Perspective *(San Diego Bay Council)*
   - Preliminary Results *(NASSCO & Southwest Marine)*
   - Southern California Water Research Project Perspective *(Steve Bay, SCCWRP)*
   - Resource Agency Perspective and Involvement *(Michael Martin, Fish & Game)*
   - What's Next *(Craig Carlisle, RWQCB)*
   - Speaker Discussion

5. Contaminated Sediment Containment
    - Campbell Shipyard - Remedial Alternatives *(Tentative- Port of San Diego)*
    - Convair Lagoon PCB Cap *(Craig Carlisle, RWQCB)*

6. Bay Sediment TMDLs and Toxic Hot Spots Remediation
    - Current & Upcoming TMDLs *(Alan Monji, RWQCB)*
    - Preliminary Results for Chollas Creek and 7th Street Channel *(Bart Chadwick, SPAWAR/Navy and Steve Bay, SCCWRP)*

7. DoD Sites - NASNI, Boat Channel, and NAB Coronado. *(Charles Cheng, RWQCB)*

8. SLIC Sites – Solar Turbines and Goodrich Aerostructures *(Peter Peuron, RWQCB)*

9. Questions and Comments from Interested Persons

NOTES:

A. GENERAL STATEMENT

The primary duty of the Regional Board is to protect the quality of the waters within the region for all beneficial uses. This duty is implemented by formulation and adopting water quality plans for specific ground or surface water basins and by prescribing and enforcing requirements on all domestic and industrial waste discharges. Responsibilities and procedures of the Regional Water Quality Control Board come from the State's Porter-Cologne Water Quality Act and the Nation's Clean Water Act.

The purpose of the workshop is for the Board to obtain testimony and information from concerned and affected parties and make decisions after considering the recommendations made by the Executive Officer.

B. ACCESSIBILITY

The facility is accessible to people with disabilities. Individuals who have special accommodation or language needs, please contact Ms. Lori Costa at (858) 467-2357 or costl@rb9.swrcb.ca.gov at least 5 working days prior to the meeting. TTY/TDD/Speech-to-Speech users may dial 7-1-1 for the California Relay Service.

C. PRESENTATION EQUIPMENT

Providing and operating projectors and other presentation aids are the responsibilities of the speakers. Some equipment may be available at the Board Meeting; however, the type of equipment available will vary dependent on the meeting location. Because of compatibility issues, provision and operation of laptop computers and projectors for Power Point presentations will generally be the responsibility of the individual speakers. To ascertain the availability of presentation equipment please contact Ms. Lori Costa at (858) 467-2357 or costl@rb9.swrcb.ca.gov at least 5 working days prior to the meeting.

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Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego

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56

California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
San Diego, California 92123

PRSRT STD

SAN DIEGO
MAY 24'02
CA

U.S. POSTAGE
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REC'D MAY 28 2002

ENVIRONMENTAL HEALTH COALITION
LAURA HUNTER
CLEAN BAY CAMPAIGN COORD
1717 KETTNER BLVD., #100
SAN DIEGO, CA 92101-2532

REC'D MAY 28 2002

92101+2532 45

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SAN DIEGO, CA 92101-2532

REC'D MAY 28 2002

92101+2532 45

Laura Hunter

From: Denise Klimas [Denise.Klimas@noaa.gov]

Sent: Wednesday, June 19, 2002 2:18 PM

To: Beverly Thomas; bobbye smith; Chris Piehler; Erica Arakawa; Holly Anselmo; Jesse McDaniel; jim polisini; john miesner; ken mcdermond; larry gamble; Laura Hunter; Lisa Hicks; Martin S. Kenzer; Maurice Knight; Michael Dailey; Nancy Paschal; patty stevens; pete ramirez; Rachel Jacobson; Sally Madsen; Sandy Jaquith; Tina Gassen; Vicky Peters; Tonya Brami; Steve Klimas

Subject: Toxics and fish

This is just incredible!! Read about EPA's new findings on how toxic discharges effect fish.

-------- Original Message --------
Subject: genuis at work
Date: Wed, 19 Jun 2002 14:43:08 -0500
From: "Charles A. Flanagan" <cflan@cox.net>
To: "Denise Klimas" <denise.klimas@noaa.gov>

http://www.washingtontimes.com/national/20020619-13558.htm

Laura Hunter

From: Tom Alo [alot@rb9.swrcb.ca.gov]
ent: Thursday, August 15, 2002 8:32 AM
ro: peugh@cox.net; Emkimr@cts.com; MAnders7@dtsc.ca.gov; LauraH@environmentalhealth.org; fairey@mlml.calstate.edu; Denise.Klimas@noaa.gov; Donald.Macdonald@noaa.gov; RBRODBER@oehha.ca.gov; MMARTIN@OSPR.DFG.CA.GOV; Scott_Sobiech@r1.fws.gov; steveb@sccwrp.org; Breznik@sdbaykeeper.org; elainecarlin@worldnet.att.net
Cc: David Barker; Craig Carlisle; Alan Monji; Brennan Ott
Subject: Shipyards Draft Phase 2 Workplan

Draft
Phase2_FSP.pdf

Good morning. Attached is the draft workplan for Phase 2 sampling at NASSCO and Southwest Marine shipyards. Please review the workplan and plan on presenting your comments at the stakeholder group meeting on Thursday, August 22 at 9:00 am. The meeting will be held at the Regional Board office. Again, for those that cannot physically attend the meeting we will have a teleconference # available. If you have any questions or have trouble opening/printing the workplan please contact me.

--Tom

Tom C. Alo
Water Resources Control Engineer
CA Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123
Main: (858) 467-2952
Direct: (858) 636-3154
Fax: (858) 571-6972
<alot@rb9.swrcb.ca.gov>

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From: Tom Alo [alot@rb9.swrcb.ca.gov]
`ent: Thursday, August 15, 2002 12:11 PM
ıo: peugh@cox.net; Emkimr@cts.com; MAnders7@dtsc.ca.gov; LauraH@environmentalhealth.org; ginnt@exponent.com; nielsend@exponent.com; trittm@exponent.com; fairey@mlml.calstate.edu; mchee@nassco.com; Denise.Klimas@noaa.gov; Donald.Macdonald@noaa.gov; RBRODBER@oehha.ca.gov; MMARTIN@OSPR.DFG.CA.GOV; Scott_Sobiech@r1.fws.gov; steveb@sccwrp.org; Breznik@sdbaykeeper.org; halvaxs@swmarine.com; elainecarlin@worldnet.att.net
Cc: David Barker; Craig Carlisle; Alan Monji; Brennan Ott
Subject: Agenda & Teleconference Info

August 22,
:002 Agenda.do

Good afternoon. Attached is the agenda for the stakeholder group meeting scheduled on Thursday, August 22. Also, here's the teleconference information:

- Conference Call Date: August 22, 2002

- Conference Call Time: 9:00 AM to 3:00 PM

- Conference Call Phone Number: (916) 574-2346

- If you have any questions or problems please give the State Board Telecommunication Unit a call at (916) 341-5071 or (916) 341-5068.

Please let me know if you are available to participate in the stakeholder group meeting. If available indicate whether you will be present at the meeting or calling in. I need to get a head count so that I can reserve a conference room. Thanks.

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California Regional Water Quality Control Board
San Diego Region

Internet Address: http://www.swrcb.ca.gov/rwqcb9/
9174 Sky Park Court, Suite 100, San Diego, California 92123
Phone (858) 467-2952 • FAX (858) 571-6972

Winston H. Hickox
Secretary for Environmental Protection

Gray Davis
Governor

AGENDA
Stakeholder Group Meeting
NASSCO & Southwest Marine Draft Phase 2 Workplan
August 22, 2002 - 9:00 am to 3:00 pm
RWQCB9 Office

1. Introductions

2. Project Schedule

3. Presentation on Draft Phase 2 Workplan

4. Comments & Discussion on Draft Phase 2 Workplan

5. Closing/Action Items

Laura Hunter

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Winston H. Hickox
Secretary for
'nvironmental
Protection

Gray Davis
Governor

AGENDA
Stakeholder Group Meeting
NASSCO & Southwest Marine Draft Phase 2 Workplan
August 22, 2002 - 9:00 am to 3:00 pm
RWQCB9 Office

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2. Project Schedule

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ent:	Thursday, August 15, 2002 8:32 AM
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Cc:	David Barker; Craig Carlisle; Alan Monji; Brennan Ott
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Draft
Phase2_ESP.pdf

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<alot@rb9.swrcb.ca.gov>

Laura Hunter

From:	Tom Alo [alot@rb9.swrcb.ca.gov]
`ent:	Wednesday, August 21, 2002 2:32 PM
ı'o:	LauraH@environmentalhealth.org
Cc:	David Barker; Craig Carlisle
Subject:	Draft Phase 2 Workplan

Laura,

From your last email I understand that you will be attending tomorrow's stakeholder group meeting to review the draft Phase 2 workplan but that you will not be able to fully review the workplan prior to the meeting. To allow some additional time for your review I am extending your time to submit comments on the workplan to August 30. There is a need to proceed with Phase 2 field sampling on September 3 so that a Regional Board hearing can be held in February/March 2003 to set final cleanup levels at the shipyards.

We will still hold the stakeholder group meeting tomorrow so that Exponent can formally present the draft workplan to the group and can receive comments from those that have reviewed the workplan. We will direct Exponent to adjust their field sampling to address comments received from you by August 30 that staff agrees with. Exponent is well aware of the changes that may occur while they are sampling in the field.

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From: Tom Alo [alot@rb9.swrcb.ca.gov]
`ent: Wednesday, August 21, 2002 2:32 PM
ſo: LauraH@environmentalhealth.org
Cc: David Barker; Craig Carlisle
Subject: Draft Phase 2 Workplan

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If you need to contact him and have trouble, let me know. I can call him
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EHC 000131

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San Diego Bay Council

A coalition of San Diego environmental organizations dedicated to protection and restoration of San Diego's coastal water resources

August 28, 2002

Mr. Tom Alo
Regional Water Quality Control Board
Transmitted via E-MAIL

RE: Bay Council Comments on Phase 2 Field Sampling Plan

Dear Tom:

The member organizations of the Bay Council appreciate the additional time to comment on the Shipyard Phase 2 work plan. Elaine Carlin, our consultant, has been out of town and so did not have a chance to review or comment on this document. However, based on our review we have the following recommendations for change and concerns about the Phase 2 work plan.

General objection to stalling the clean up decision in order to conduct expensive risk assessments

Unfortunately, we must begin by restating the same caveats that we have had about this process all along. As we have said before, conducting an outrageously expensive risk assessment, designed and executed in a manner that is heavily manipulated to retain uncertainty in the process is unnecessary, of questionable relevance, and is not supported by our organizations.

The law is clear. The presumption of cleanup is to background and background is defined by sediment contamination levels already established by the staff. This was, once again, underscored at the workshop. The shipyard's interest in quick resolution to this problem would be better served by applying the money spent on Exponent to removal of all contaminated sediments to background levels.

Any recalculation of background should be based on large data sets based on samples taken by independent agencies.

We are concerned about conducting additional testing of the background stations in order to recalculate the background levels already established by the staff. We are concerned about the lack of a clearly stated sampling and analysis objective or disclosure about how this data will be used once collected. We have made suggestions about how the background levels might be established or further refined but allowing additional testing by discharger consultants is not an appropriate action. We do support consideration of all the data sets that are available such as the Bay Protection and Toxic Cleanup data set. Again, we repeat our request that the input of Dr. Russell Fairy be solicited on

Formal Positions expressed in letter are of signatory organizations only.

ENCLOSURE 6: MONORAIL SYSTEM
Crane Number: CIF-0071-MONO-6
Capacity: 1 Ton

CRANE DATA SUPPLEMENT

MILCON P-701 GENERAL DESIGN REQUIREMENT FOR MONORAIL CRANES IN THE CONTROLLED INDUSTRIAL FACILITY.

Crane for which this supplement applies is:

1 Ton High Bay, Contaminated Hose Hydro

1. Crane shall be designed for CMAA Class C Service.

2. Crane shall be designated SPS.

3. All drive motors shall be wound rotor AC operating at 480 volts, 3 phase, 60 hertz.

4. Crane motion shall have 2 speed points of 33 and 100 percent of maximum speed.

5. Crane motion shall be pendant controlled and be of dead man type.

6. The Hose Hydro service crane shall have equal hoist and traverse speeds so that the hose sections may be lifted without dragging the hose. This crane shall be operated froma fixed station located near the Hose Hydro trough on the goround floor and from a plug-in pendant.

7. Crane supporting structure shall be designed to withstand a test load of 1.3 times the rated capacity of the crane. Crane support structure is to be provided by crane manufacturer. Crane rail is to be provided by the crane manufacturer.

8. All welds on crane shall be continuous. All crevices in weldments shall be seal welded. All crane surfaces shall be smooth to the touch to facilitate cleaning or decontamination.

9. All nonoperating exposed surfaces shall be painted. Surface preparation techniques shall result in the removal of all oil, grease, rust, scale and foreign matter. The paint system shall be Epoxy-Polyamide conforming to Mil-P-24441. Minimum dry film thickness shall be 3.5 mils.

#N/A - INFORMATION NOT AVAILABLE. WILL FURNISH IF APPLICABLE
N/A - NOT APPLICABLE

establishing background levels for the Bay. The BPTCP data set is the largest on the Bay and it included both potential toxic sites and baywide conditions in its sampling design.

Uptake of contaminants by gobies should be analyzed in the Ecological Risk Assessment

There was much discussion at the workshop about the ecological receptors for the ecological risk assessment. It is clear that gobies (even though hard to catch) are the most direct link between toxic sediments and the higher trophic levels. Gobies also have the highest site fidelity of all the fish discussed. Therefore, we strongly recommend that they be added to the assessment. Phil Unit, bird curator of the Natural History Museum, should be contacted and this matter should be discussed with him. In our discussions with him he noted that the Bay's deep-diving birds that eat fish are loons (winter residents) and double-crested Cormorants. Although they eat fish out of the water column they could catch and consume gobies. Surf Scoter eat directly off the bottom (crustaceans etc...) and are also a potential receptor. It is also important to note that other sources state that gobies are consumed by terns. We know that nature is not wasteful and that **something** in the bay eats gobies and something else eats that, so a risk analysis should be conducted on a higher trophic level assuming 100% consumption of gobies. It is important to note that all the resource agencies agreed with this recommendation.

Human Health Risk Assessment

In all cases, the HRA must assume those consumption patterns and quantities for the subsistence and the most at-risk consumer of fish. We were very troubled to hear the representative of OEHHA state that the assessment should be conducted, not on how people **do** eat fish but on how they **should** eat fish. This is completely untenable. In San Diego, we are fortunate to have a large southeast asian immigrant community as well as indigenous, Latinos, and a large community from Africa. Stews, raw and whole fish consumption, and other non-fillet-only based consumption patterns can be found in these communities. These practices must be accounted for, not just judged as "improper" and dismissed. To the extent that whole fish examination could dilute the results, that must be considered. However, the converse could also be true. For example, contaminants at concentrate in fatty tissues and organs may be missed by fillet-only analysis.

Pore Water should be analyzed as a factor in assessing impacts to beneficial uses.

We believe that violations of water quality standards in pore water constitute a known impact to beneficial uses. We believe that part of the sampling design for phase 2 should include pore water analysis to determine where pore water exceeds water quality standards. It would be especially important to conduct pore water samples where the previous data was equivocal i.e. high chemistry and no toxicity.

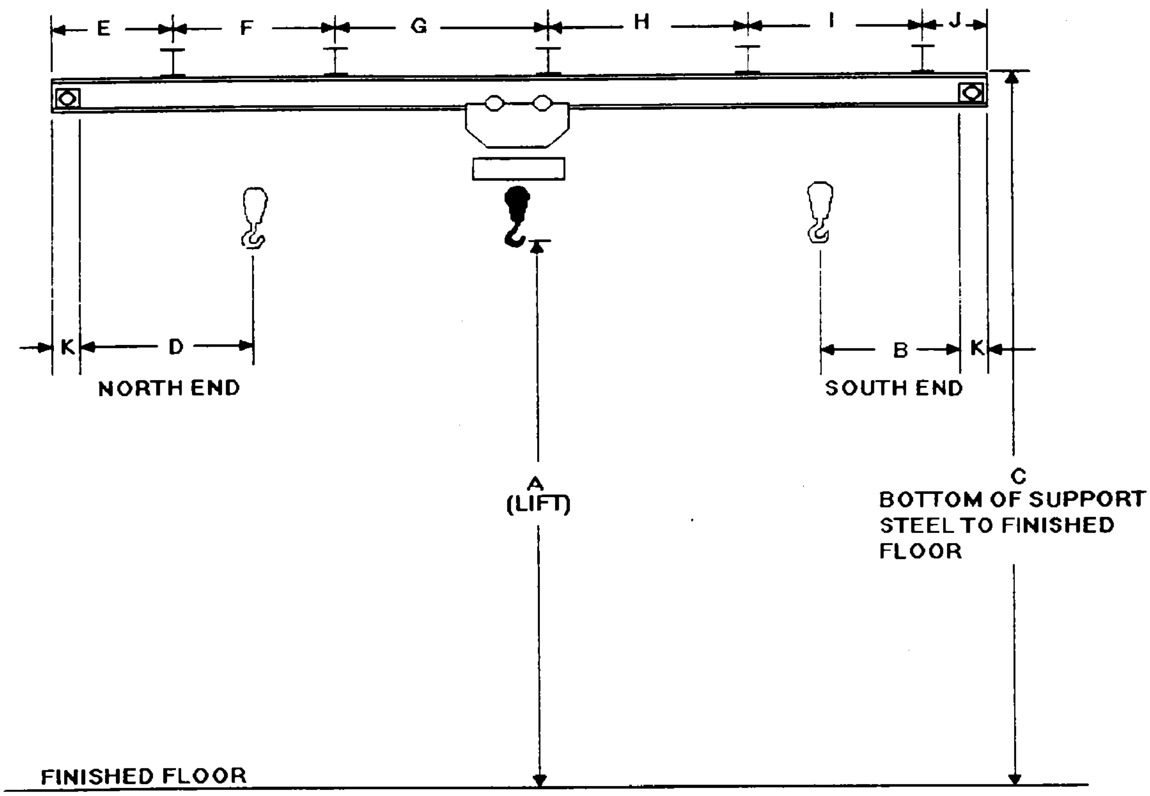
Assess liver bile for PAH Metabolites

While fish histopathology on livers will show long-term and high level impacts of PAH exposure, bile analysis will show lower levels and recent exposure to PAH. This should be conducted on fish that are analyzed.

ENCLOSURE 6: MONORAIL SYSTEM
Crane Number: CIF-0071-MONO-6
Capacity: 1 Ton

CLEARANCE SKETCH

MONORAIL ELEVATION VIEW



A: 55 FT. 0 IN.	F: 9 FT. 7 IN.
B: 2 FT. 3 IN.	G: 14 FT. 0 IN.
C: 60 FT. 8 IN.	H: 9 FT. 4 IN.
D: 2 FT. 3 IN.	I: 24 FT. 0 IN.
E: 6 FT. 5 IN.	J: 6 FT. 3 IN.
	K: 0 FT. 4 IN.

RUNWAY LENGTH: 69' - 7" OF STRAIGHT TRACK

#N/A - INFORMATION NOT AVAILABLE. WILL FURNISH IF APPLICABLE
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PAH Analysis

It appears that no EqP will be established for PAH as there are no water quality criteria for PAH. The lack of a formal WQC is not excuse to drop analysis of a toxic substance that has severely contaminated and degraded our waterways. There are numbers that should be used for this analysis or very protective numbers could be developed to be used for this purpose. We do know that at levels very much lower than the levels measured at the shipyard sites substantial increase in contamination related injuries were observed in some fish. Effects were shown at 1,000 ppb, far lower than the levels found at the Shipyard sites. (Johnson, Collier, Stein; *An analysis in support of sediment quality thresholds for polycyclic aromatic hydrocarbons (PAHs) to protect estuarine fish*; Aquatic Conservation" Marine and Freshwater Ecosystems; February 17, 2002)

There are a lot of impacts from PAH that are getting overlooked in the analysis in Phase 2. First, that PAH are toxic to fish embryos. Second, there is phototoxicity of PAH. When exposed to UV the toxicity of PAH increases for zooplankton, fish and fish larvae. This was a study at Lake Tahoe that took surface water samples to check the toxicity of the motorcraft PAH discharges. Third, there are new biomarkers for PAH. Fourth, there is evidence of endocrine disruption caused by PAH.

Here are the web sites covering these points:

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http://archive.greenpeace.org/~odumping/pahospar.html effect of PAH on fish embryos
http://zoology.muohio.edu/oris/TahoePoster.pdf Tahoe-PAH toxicity UV
http://www.afsc.noaa.gov/abl/OilSpill/pstoxici.htm fish embryo PAH toxicity
http://www.cefas.co.uk/publications/tech110.pdf biomarkers for PAH marine environment
http://www.cerc.cr.usgs.gov/pubs/BEST/synthesis.htm biomarkers
http://es.epa.gov/ncer/progress/grants/97/endocrine/zacharewski99.html endocrine disruption

These PAH related impacts are potentially a very serious impact to beneficial uses.

Any impacts to RARE species must be elevated as a concern.

One of the many problems with risk assessment is that it assumes exposure as if this exposure were the only exposure in an otherwise pristine environment. That, sadly, is far from the truth. The cumulative and incremental risk must be the concern and for rare and endangered species, it is even more significant since those are the species that are already close to the brink of extinction from the cumulative impacts. The explanation given by Exponent that they are considering the impact to an individual and therefore will be protective is not satisfactory. If this is like the many other risk assessments conducted, this is not an either/or analysis. There will be varying levels of impact shown and some controversial, arbitrary "level of significance" established. Given the precarious state of the rare species in the bay the standard should be that **any** impact is significant because it adds to an already unacceptable cumulative burden.

Thank you for the opportunity to comment on this important matter.

Formal Positions expressed in letter are of signatory organizations only.

ENCLOSURE 6: MONORAIL SYSTEM
Crane Number: CIF-0071-MONO-6
Capacity: 1 Ton

14 IS RADIO INTERFERENCE SUPPRESSION REQUIRED? Yes

15 IS FUNGUS RESISTANCE TREATMENT OF ELECTRICAL COMPONENTS REQUIRED? Yes

16 IS ANY SPECIAL PAINTING REQUIRED? Yes. See Note 9 of Crane Data Supplement, Page 7

17 WILL THE CRANE BE ERECTED BY THE GOVERNMENT UNDER THE SUPERVISION OF A SUPERVISING ERECTOR FURNISHED BY THE CRANE MANUFACTURER OR WILL IT BE ERECTED BY THE CRANE MANUFACTURER? Crane Manufacturer

18 WHAT IS THE PLACE OF DELIVERY OR LOCATION OF THE FIELD WORK? Naval Air Station, North Island (San Diego, CA Region)

19. PROVIDE A FLOOR PLAN OF THE BUILDING IN THE AREA OF CRANE OPERATION SHOWING:

(a) Structural steel supports
(b) Maximum allowable load on supports
(c) Location of electrical junction box
(d) End approach to walls
(e) North arrow
(f) End approach to walls

See drawings S-24, S-26, and E-10

20 ARE THERE ANY SPECIAL REQUIREMENTS OR CIRCUMSTANCES NOT COVERED BY THE PRECEDING QUESTIONS OR THE CLEARANCE SKETCHES? See Crane Data Supplement, Page 7

21. FOR NEW BUILDINGS, PLEASE FORWARD A COMPLETE SET OF 100% BUILDING PLANS AND SPECIFICATIONS WHEN RETURNING COMPLETED INFORMATION FORM: #N/A

#N/A - INFORMATION NOT AVAILABLE. WILL FURNISH IF APPLICABLE
N/A - NOT APPLICABLE

Sincerely,

Laura Hunter
Environmental Health Coalition

Bruce Reznik
San Diego Baykeeper

Jim Peugh
San Diego Audubon Society

Marco Gonzalez
Surfrider Foundation, San Diego Chapter

Ed Kimura
San Diego Chapter of the Sierra Club

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(b) Location: At End of Bridge: N/A; At Middle of Bridge: N/A; Attached to Trolley: N/A; Remote Room (Specify): N/A; Other (Specify): See Note 6 of Crane Data Supplement Page 7.

(c) Shall Cab Be Open or Enclosed, Heated or Air Conditioned? N/A

(d) Shall a "Power On" Indicating Light be Provided on the Push-button Station? Yes

(e) Shall a Lock be Provided in Push-button Station to Prevent Unauthorized Personnel from Operating Crane? Yes

10. RUNWAY CONDUCTORS:

(a) What Is the Kind, Voltage, Frequency and Phase of the Electric Current Supply? 480 volts, 3 phase, 60 Hertz

(b) What Is the Location of the Electric Junction Box? On column N.9-1 near the roof

11. WILL CRANE BE REQUIRED TO PASS THROUGH ANY DOORS? N/A IF SO:

(a) What provision has been made for interlocking to prevent collisions? N/A

(b) Are there crane height and width limitations at the doors? N/A

(c) Door locations? N/A

(d) Are track switches required? Manual or electric? N/A

12 ARE LOWER LIMIT SWITCHES NECESSARY FOR THE HOISTS? Yes

13 WILL OCCASIONAL OIL OR GREASE DRIPS BE OBJECTIONABLE TO THE POINT OF REQUIRING OIL OR GREASE TIGHT GEAR CASES FOR TROLLEY AND BRIDGE DRIVE WHEEL GEARS? Yes

#N/A - INFORMATION NOT AVAILABLE. WILL FURNISH IF APPLICABLE
N/A - NOT APPLICABLE

San Diego Bay Council

A coalition of San Diego environmental organizations dedicated to protection and restoration of San Diego's coastal water resources

August 28, 2002

Mr. Tom Alo
Regional Water Quality Control Board
Transmitted via E-MAIL

RE: Bay Council Comments on Phase 2 Field Sampling Plan

Dear Tom:

The member organizations of the Bay Council appreciate the additional time to comment on the Shipyard Phase 2 work plan. Elaine Carlin, our consultant, has been out of town and so did not have a chance to review or comment on this document. However, based on our review we have the following recommendations for change and concerns about the Phase 2 work plan.

General objection to stalling the clean up decision in order to conduct expensive risk assessments

Unfortunately, we must begin by restating the same caveats that we have had about this process all along. As we have said before, conducting an outrageously expensive risk assessment, designed and executed in a manner that is heavily manipulated to retain uncertainty in the process is unnecessary, of questionable relevance, and is not supported by our organizations.

The law is clear. The presumption of cleanup is to background and background is defined by sediment contamination levels already established by the staff. This was, once again, underscored at the workshop. The shipyard's interest in quick resolution to this problem would be better served by applying the money spent on Exponent to removal of all contaminated sediments to background levels.

Any recalculation of background should be based on large data sets based on samples taken by independent agencies.

We are concerned about conducting additional testing of the background stations in order to recalculate the background levels already established by the staff. We are concerned about the lack of a clearly stated sampling and analysis objective or disclosure about how this data will be used once collected. We have made suggestions about how the background levels might be established or further refined but allowing additional testing by discharger consultants is not an appropriate action. We do support consideration of all the data sets that are available such as the Bay Protection and Toxic Cleanup data set. Again, we repeat our request that the input of Dr. Russell Fairy be solicited on

RECORD OF POSITION AND REQUEST FOR ELECTED OFFICIALS ON DUCK HUNTING IN SOUTH BAY

WHO	**Request made/Who**	**Letter received**
Governor Nichols	Yes/LH	No letter yet
Lt. Governor	Y-LH	Yes
Alpert	Peugh -	
Peace		
Wayne	Reznik -	
Kehoe	Peugh	
Vargas	LH	
Davis	Peugh	
Filner	LH	
Boxer	LH	
Feinstein	Ed -	
SAN DIEGO		
Mayor	LH-Tom Storey	
Peters	Eric -	
Frye	Y- LH	yes
Inzunza	Y- LH	
Atkins		
Stevens		
Police Chief	Y-LH	yes
CORONADO		Yes
Smisek		yes

establishing background levels for the Bay. The BPTCP data set is the largest on the Bay and it included both potential toxic sites and baywide conditions in its sampling design.

Uptake of contaminants by gobies should be analyzed in the Ecological Risk Assessment

There was much discussion at the workshop about the ecological receptors for the ecological risk assessment. It is clear that gobies (even though hard to catch) are the most direct link between toxic sediments and the higher trophic levels. Gobies also have the highest site fidelity of all the fish discussed. Therefore, we strongly recommend that they be added to the assessment. Phil Unit, bird curator of the Natural History Museum, should be contacted and this matter should be discussed with him. In our discussions with him he noted that the Bay's deep-diving birds that eat fish are loons (winter residents) and double-crested Cormorants. Although they eat fish out of the water column they could catch and consume gobies. Surf Scoter eat directly off the bottom (crustaceans etc...) and are also a potential receptor. It is also important to note that other sources state that gobies are consumed by terns. We know that nature is not wasteful and that **something** in the bay eats gobies and something else eats that, so a risk analysis should be conducted on a higher trophic level assuming 100% consumption of gobies. It is important to note that all the resource agencies agreed with this recommendation.

Human Health Risk Assessment

In all cases, the HRA must assume those consumption patterns and quantities for the subsistence and the most at-risk consumer of fish. We were very troubled to hear the representative of OEHHA state that the assessment should be conducted, not on how people **do** eat fish but on how they **should** eat fish. This is completely untenable. In San Diego, we are fortunate to have a large southeast asian immigrant community as well as indigenous, Latinos, and a large community from Africa. Stews, raw and whole fish consumption, and other non-fillet-only based consumption patterns can be found in these communities. These practices must be accounted for, not just judged as "improper" and dismissed. To the extent that whole fish examination could dilute the results, that must be considered. However, the converse could also be true. For example, contaminants at concentrate in fatty tissues and organs may be missed by fillet-only analysis.

Pore Water should be analyzed as a factor in assessing impacts to beneficial uses.

We believe that violations of water quality standards in pore water constitute a known impact to beneficial uses. We believe that part of the sampling design for phase 2 should include pore water analysis to determine where pore water exceeds water quality standards. It would be especially important to conduct pore water samples where the previous data was equivocal i.e. high chemistry and no toxicity.

Assess liver bile for PAH Metabolites

While fish histopathology on livers will show long-term and high level impacts of PAH exposure, bile analysis will show lower levels and recent exposure to PAH. This should be conducted on fish that are analyzed.

CVN HOMEP(IG PROGRAM

ID	Name	Duration	Predecessors	Original Start	Original Finish	Revised Start	Revised Finish	Actual Start	Actual Finish	Resource	Notes
208	P-701 PLANNING PHASE	43d		7/31/95	9/28/95	7/31/95	9/28/95	NA	NA		
209	NADEP vacates facilities	59ed		7/31/95	9/28/95	7/31/95	9/28/95	NA	NA	N	
210	P-701 planning phase complete	0ed	209	9/28/95	9/28/95	9/28/95	9/28/95	NA	NA		
211											
212	P-701 PERMITTING PHASE	332d		5/18/94	9/5/95	5/18/94	8/25/95	5/18/94	NA		
213	Prepare air emissions inventory	10.67ed		5/18/94	6/30/94	5/18/94	6/30/94	5/18/94	6/30/94	P	
214	Prepare exemption request for VOCs	12ed	213	7/1/94	8/31/94	7/1/94	8/19/94	7/1/94	8/19/94	N	
215	Review exemption request	31ed	214	8/31/94	9/30/94	8/31/94	9/19/94	8/19/94	NA	N,P,S	
216	Revise exemption request	31ed	215	9/30/94	10/31/94	9/30/94	10/20/94	NA	NA	N	
217	Review revised exemption request	32ed	216	10/31/94	11/30/94	10/31/94	11/21/94	NA	NA	N,P,S	
218	Submit exemption request to APCD	7ed	217	11/30/94	12/7/94	11/30/94	11/28/94	NA	NA	N	
219	APCD approves exemption for VOCs	270ed	218	12/7/94	9/5/95	12/7/94	8/25/95	NA	NA		
220	P-701 permitting phase complete	0ed	219	9/5/95	9/5/95	9/5/95	8/25/95	NA	NA		
221											
222	P-701 DESIGN PHASE	295d		4/22/94	6/9/95	4/22/94	6/9/95	4/22/94	NA		
223	Award A-E contract	0ed		4/22/94	4/22/94	4/22/94	4/22/94	4/22/94	4/22/94	S	
224	Design kick-off meeting	4ed	223	4/22/94	4/26/94	4/22/94	4/26/94	4/22/94	4/26/94	N,P,S	Lockwood
225	Prepare Prelim 15% design	7ed	223,224FS-4ed	4/22/94	5/20/94	4/22/94	5/20/94	4/22/94	5/20/94	S	Lockwood
226	Forward Prelim 15% design to NISCOM	11ed	225	5/20/94	5/23/94	5/20/94	7/5/94	5/20/94	7/5/94	S	
227	Forward Prelim 15% design to NAVFAC	2.67ed	225	5/20/94	5/27/94	5/20/94	5/31/94	5/20/94	5/31/94	S	
228	Architectectural Review Board presentation	1.67ed	225	5/20/94	5/27/94	5/20/94	5/26/94	5/20/94	5/26/94	N,P,S	Lockwood
229	NISCOM reviews Prelim 15% design	4.33ed	226	5/23/94	6/8/94	5/23/94	7/21/94	7/5/94	7/21/94		
230	Review Prelim 15% design	6.67ed	225	5/20/94	6/8/94	5/20/94	6/16/94	5/20/94	6/16/94	A,N,P,S	
231	Prelim 15% design review meeting	0.33ed	230,228	6/8/94	6/10/94	6/8/94	6/16/94	6/16/94	6/16/94	A,N,P,S	Lockwood
232	Prepare Final 15% design	2.33ed	231	6/10/94	6/17/94	6/10/94	6/24/94	6/16/94	6/24/94	S	Lockwood
233	NAVFAC prepares for NAVCOMPT submission	7.33ed	227	6/1/94	6/30/94	6/1/94	6/30/94	6/1/94	6/30/94		
234	NAVFAC submits FY96 program to NAVCOMPT	0ed	233	7/1/94	7/1/94	7/1/94	7/1/94	7/1/94	7/1/94		
235	NAVCOMPT reviews FY96 program	6.67ed	234	7/4/94	8/1/94	7/4/94	8/1/94	7/5/94	8/1/94		
236	NAVFAC issues Final Design authority	5.33ed	235	8/1/94	8/22/94	8/1/94	8/22/94	8/1/94	8/22/94		
237	Issue final design option to A-E	2ed	236	8/22/94	8/30/94	8/22/94	8/29/94	8/22/94	8/29/94	S	
238	Prepare 45% design	42ed	237,232,229	8/30/94	10/11/94	8/30/94	10/10/94	8/29/94	NA	S	Lockwood
239	Forward 45% design to NISCOM	1ed	238	10/11/94	10/12/94	10/11/94	10/11/94	NA	NA	S	
240	NISCOM reviews 45% design	55ed	239	10/12/94	12/5/94	10/12/94	12/5/94	NA	NA		
241	Review 45% design	56ed	238	10/11/94	12/5/94	10/11/94	12/5/94	NA	NA	A,N,P,S	
242	45% design review meeting	7ed	241,240	12/5/94	12/12/94	12/5/94	12/12/94	NA	NA	A,N,P,S	Lockwood
243	Prepare Pre-100% design	42ed	242	12/12/94	1/23/95	12/12/94	1/23/95	NA	NA	S	Lockwood
244	Review Pre-100% design	7ed	243	1/23/95	1/30/95	1/23/95	1/30/95	NA	NA	S	
245	Prepare 100% design	14ed	243,244FS-7ed	1/23/95	2/6/95	1/23/95	2/6/95	NA	NA	S	Lockwood
246	Forward 100% design to NISCOM	1ed	245	2/6/95	2/7/95	2/6/95	2/7/95	NA	NA	S	
247	NISCOM reviews 100% design	20ed	246	2/7/95	2/27/95	2/7/95	2/27/95	NA	NA		
248	Review 100% design	53ed	245	2/6/95	3/31/95	2/6/95	3/31/95	NA	NA	A,N,P,S	
249	100% design review meeting	7ed	248,247	3/31/95	4/7/95	3/31/95	4/7/95	NA	NA	A,N,P,S	Lockwood
250	Prepare Pre-Final design	21ed	249	4/7/95	4/28/95	4/7/95	4/28/95	NA	NA	S	Lockwood
251	Review Pre-Final design	4ed	250	4/28/95	5/2/95	4/28/95	5/2/95	NA	NA	S	
252	Prepare Final design	14ed	250,251FS-4ed	4/28/95	5/12/95	4/28/95	5/12/95	NA	NA	S	Lockwood
253	Prepare "SAT TO" letter	14ed	252	5/12/95	5/26/95	5/12/95	5/26/95	NA	NA	N,P	
254	Approve design	28ed	252,253FS-14ed	5/12/95	6/9/95	5/12/95	6/9/95	NA	NA	S	
255	P-701 design phase complete	0ed	254	6/9/95	6/9/95	6/9/95	6/9/95	NA	NA		
256											
257	P-701 CONSTRUCTION PHASE	798d		6/9/95	7/1/98	6/9/95	7/1/98	NA	NA		
258	Request NAVSEA revalidation	24ed	255	6/9/95	7/3/95	6/9/95	7/3/95	NA	NA	S	
259	NAVSEA issues revalidation	21ed	258	7/3/95	7/24/95	7/3/95	7/24/95	NA	NA	P	
260	Request NAVFAC Advertising Authority	24ed	255	6/9/95	7/3/95	6/9/95	7/3/95	NA	NA	S	
261	NAVFAC issues Advertising Authority	21ed	260	7/3/95	7/24/95	7/3/95	7/24/95	NA	NA		
262	Forward bid package to Contracts	1ed	261,259	7/24/95	7/25/95	7/24/95	7/25/95	NA	NA	S	
263	Advertise contract	1ed	262	7/25/95	7/26/95	7/25/95	7/26/95	NA	NA	S	
264	Print bid package	34ed	263	7/26/95	8/29/95	7/26/95	8/29/95	NA	NA	S	
265	Forward bid package to NISCOM	3ed	264	8/29/95	9/1/95	8/29/95	9/1/95	NA	NA	S	For IDS design
266	Open bids	45ed	264	8/29/95	10/13/95	8/29/95	10/13/95	NA	NA	S	
267	Request funds from NAVFAC	3ed	266	10/13/95	10/16/95	10/13/95	10/16/95	NA	NA	S	
268	Check contractor responsibility	12ed	266	10/13/95	10/25/95	10/13/95	10/25/95	NA	NA	S	
269	Legislature enacts MCON auth & appr laws	0ed	268	11/1/95	11/1/95	11/1/95	11/1/95	NA	NA		
270	NAVFAC issues funds	7ed	269,267	11/1/95	11/8/95	11/1/95	11/8/95	NA	NA		
271	Forward funds to Contracts	1ed	270	11/8/95	11/9/95	11/8/95	11/9/95	NA	NA	S	
272	Request CHINFO notification by NAVFAC	4ed	271,268	11/9/95	11/13/95	11/9/95	11/13/95	NA	NA	S	
273	NAVFAC issues CHINFO notification	1ed	272	11/13/95	11/14/95	11/13/95	11/14/95	NA	NA		
274	Award contract	0ed	273,210,219	11/14/95	11/14/95	11/14/95	11/14/95	NA	NA	S	
275	Start construction	15ed	274	11/14/95	11/29/95	11/14/95	11/29/95	NA	NA		
276	Demolish Building 29	84ed	275	11/29/95	2/21/96	11/29/95	2/21/96	NA	NA		
277	Construct Low Bay	496ed	275	11/29/95	4/8/97	11/29/95	4/8/97	NA	NA		
278	Install Low Bay cranes	84ed	277	4/8/97	7/1/97	4/8/97	7/1/97	NA	NA		
279	Construct High Bay	580ed	275	11/29/95	7/1/97	11/29/95	7/1/97	NA	NA		
280	Install High Bay cranes	84ed	279	7/1/97	9/23/97	7/1/97	9/23/97	NA	NA		
281	Construct remaining portions of facility	721ed	275	11/29/95	11/19/97	11/29/95	11/19/97	NA	NA		
282	Complete construction	0ed	276,278,280,281	9/23/97	9/23/97	9/23/97	11/19/97	NA	NA		
283	Outfit	365ed	278	7/1/97	7/1/98	7/1/97	7/1/98	NA	NA	P	
[illegible]	P-701 Initial Operating Capability	0ed	282,283	7/1/98	7/1/98	7/1/98	7/1/98	NA	NA		

033219

ENCL (8)

EHC 000121

PAH Analysis

It appears that no EqP will be established for PAH as there are no water quality criteria for PAH. The lack of a formal WQC is not excuse to drop analysis of a toxic substance that has severely contaminated and degraded our waterways. There are numbers that should be used for this analysis or very protective numbers could be developed to be used for this purpose. We do know that at levels very much lower than the levels measured at the shipyard sites substantial increase in contamination related injuries were observed in some fish. Effects were shown at 1,000 ppb, far lower than the levels found at the Shipyard sites. (Johnson, Collier, Stein; *An analysis in support of sediment quality thresholds for polycyclic aromatic hydrocarbons (PAHs) to protect estuarine fish*; Aquatic Conservation" Marine and Freshwater Ecosystems; February 17, 2002)

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http://zoology.muohio.edu/oris/TahoePoster.pdf Tahoe-PAH toxicity UV
http://www.afsc.noaa.gov/abl/OilSpill/pstoxici.htm fish embryo PAH toxicity
http://www.cefas.co.uk/publications/tech110.pdf biomarkers for PAH marine environment
http://www.cerc.cr.usgs.gov/pubs/BEST/synthesis.htm biomarkers
http://es.epa.gov/ncer/progress/grants/97/endocrine/zacharewski99.html endocrine disruption

These PAH related impacts are potentially a very serious impact to beneficial uses.

Any impacts to RARE species must be elevated as a concern.

One of the many problems with risk assessment is that it assumes exposure as if this exposure were the only exposure in an otherwise pristine environment. That, sadly, is far from the truth. The cumulative and incremental risk must be the concern and for rare and endangered species, it is even more significant since those are the species that are already close to the brink of extinction from the cumulative impacts. The explanation given by Exponent that they are considering the impact to an individual and therefore will be protective is not satisfactory. If this is like the many other risk assessments conducted, this is not an either/or analysis. There will be varying levels of impact shown and some controversial, arbitrary "level of significance" established. Given the precarious state of the rare species in the bay the standard should be that **any** impact is significant because it adds to an already unacceptable cumulative burden.

Thank you for the opportunity to comment on this important matter.

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ENCLOSURE 6: MONORAIL SYSTEM
Crane Number: CIF-0071-MONO-6
Capacity: 1 Ton

The operating instructions shall include wiring diagrams, control diagrams, and control sequence for each principal item of equipment. Operating instructions shall be printed or engraved, and shall be framed under glass or in approved laminated plastic and posted where directed by the Contracting Officer. Operating instructions shall be attached to or posted adjacent to each principal item of equipment including start up, proper adjustment, operating, lubrication, shut-down, safety-precautions, procedure in the event of equipment failure, and other items of instruction as recommended by the manufacturer of each item of equipment. Operating instructions exposed to the weather shall be made of weather-resisting materials or shall be suitably enclosed to be weather protected. Operating instructions shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling.

#N/A - INFORMATION NOT AVAILABLE. WILL FURNISH IF APPLICABLE
N/A - NOT APPLICABLE

Sincerely,

Laura Hunter
Environmental Health Coalition

Bruce Reznik
San Diego Baykeeper

Jim Peugh
San Diego Audubon Society

Marco Gonzalez
Surfrider Foundation, San Diego Chapter

Ed Kimura
San Diego Chapter of the Sierra Club

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10. Furnish six (6) sets of operation and maintenance manuals in hardback binders or an approved equivalent. Furnish one complete manual sixty (60) days prior to the on-site performance test and furnish the remaining manuals before the contract is completed.

Inscribe the following identification on the cover: the words OPERATION AND MAINTENANCE MANUAL, the name and location of the equipment, the name of the Contractor, and the contract number. The manual shall include the names, addresses, and telephone numbers of each subcontractor installing equipment, and of the local representatives for each item of equipment. The manual shall have a table of contents and be assembled to conform to the table of contents with the tab sheets placed before instructions covering the subject. The instructions shall be legible and easily read, with large sheets of drawings folded in. The manual shall include: wiring and control diagrams with data to explain detailed operation and control of each item of equipment; a control sequence describing start-up, operating and shut-down; description of the function of each principal item of equipment; the procedure for starting; the procedure for operating; shut-down instructions; installation instructions; maintenance instructions; lubrication schedule including type, and grade of lubricant, temperature range, and frequency; safety precautions, diagrams, and illustrations; test procedures; performance data; and parts list. The parts lists for equipment shall indicate the sources of supply, recommended spare parts, and the service organization which is reasonable convenient to the project site. The manual shall be complete in all respects for equipment, controls, accessories, and associated appurtenances provided.

11. Furnish the services of instructors to give full instruction to the designated Government personnel in the adjustment, operation, and maintenance, including pertinent safety requirement. Instructors shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work. Instruction shall be given during the first regular work week after the equipment or system has been accepted and turned over to the Government for regular operation. Five (5) man-days (8 hours per day) of instructions shall be furnished with approximately half of the time for class room instructions. Use other time for instructions with the equipment or system. When significant changes or modifications in the equipment or system are made under the terms of the contract, provide additional instructions to acquaint the operating personnel with changes or modifications.

#N/A - INFORMATION NOT AVAILABLE. WILL FURNISH IF APPLICABLE
N/A - NOT APPLICABLE

San Diego Bay Council

A coalition of San Diego environmental organizations dedicated to protection and restoration of San Diego's coastal water resources

August 28, 2002

Mr. Tom Alo
Regional Water Quality Control Board
Transmitted via E-MAIL

RE: Bay Council Comments on Phase 2 Field Sampling Plan

Dear Tom:

The member organizations of the Bay Council appreciate the additional time to comment on the Shipyard Phase 2 work plan. Elaine Carlin, our consultant, has been out of town and so did not have a chance to review or comment on this document. However, based on our review we have the following recommendations for change and concerns about the Phase 2 work plan.

General objection to stalling the clean up decision in order to conduct expensive risk assessments

Unfortunately, we must begin by restating the same caveats that we have had about this process all along. As we have said before, conducting an outrageously expensive risk assessment, designed and executed in a manner that is heavily manipulated to retain uncertainty in the process is unnecessary, of questionable relevance, and is not supported by our organizations.

The law is clear. The presumption of cleanup is to background and background is defined by sediment contamination levels already established by the staff. This was, once again, underscored at the workshop. The shipyard's interest in quick resolution to this problem would be better served by applying the money spent on Exponent to removal of all contaminated sediments to background levels.

Any recalculation of background should be based on large data sets based on samples taken by independent agencies.

We are concerned about conducting additional testing of the background stations in order to recalculate the background levels already established by the staff. We are concerned about the lack of a clearly stated sampling and analysis objective or disclosure about how this data will be used once collected. We have made suggestions about how the background levels might be established or further refined but allowing additional testing by discharger consultants is not an appropriate action. We do support consideration of all the data sets that are available such as the Bay Protection and Toxic Cleanup data set. Again, we repeat our request that the input of Dr. Russell Fairy be solicited on

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ENCLOSURE 6: MONORAIL SYSTEM
Crane Number: CIF-0071-MONO-6
Capacity: 1 Ton

CRANE DATA SUPPLEMENT

MILCON P-701 GENERAL DESIGN REQUIREMENT FOR MONORAIL CRANES IN THE CONTROLLED INDUSTRIAL FACILITY.

Crane for which this supplement applies is:

1 Ton High Bay, Contaminated Hose Hydro

1. Crane shall be designed for CMAA Class C Service.

2. Crane shall be designated SPS.

3. All drive motors shall be wound rotor AC operating at 480 volts, 3 phase, 60 hertz.

4. Crane motion shall have 2 speed points of 33 and 100 percent of maximum speed.

5. Crane motion shall be pendant controlled and be of dead man type.

6. The Hose Hydro service crane shall have equal hoist and traverse speeds so that the hose sections may be lifted without dragging the hose. This crane shall be operated froma fixed station located near the Hose Hydro trough on the goround floor and from a plug-in pendant.

7. Crane supporting structure shall be designed to withstand a test load of 1.3 times the rated capacity of the crane. Crane support structure is to be provided by crane manufacturer. Crane rail is to be provided by the crane manufacturer.

8. All welds on crane shall be continuous. All crevices in weldments shall be seal welded. All crane surfaces shall be smooth to the touch to facilitate cleaning or decontamination.

9. All nonoperating exposed surfaces shall be painted. Surface preparation techniques shall result in the removal of all oil, grease, rust, scale and foreign matter. The paint system shall be Epoxy-Polyamide conforming to Mil-P-24441. Minimum dry film thickness shall be 3.5 mils.

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N/A - NOT APPLICABLE

establishing background levels for the Bay. The BPTCP data set is the largest on the Bay and it included both potential toxic sites and baywide conditions in its sampling design.

Uptake of contaminants by gobies should be analyzed in the Ecological Risk Assessment

There was much discussion at the workshop about the ecological receptors for the ecological risk assessment. It is clear that gobies (even though hard to catch) are the most direct link between toxic sediments and the higher trophic levels. Gobies also have the highest site fidelity of all the fish discussed. Therefore, we strongly recommend that they be added to the assessment. Phil Unit, bird curator of the Natural History Museum, should be contacted and this matter should be discussed with him. In our discussions with him he noted that the Bay's deep-diving birds that eat fish are loons (winter residents) and double-crested Cormorants. Although they eat fish out of the water column they could catch and consume gobies. Surf Scoter eat directly off the bottom (crustaceans etc...) and are also a potential receptor. It is also important to note that other sources state that gobies are consumed by terns. We know that nature is not wasteful and that **something** in the bay eats gobies and something else eats that, so a risk analysis should be conducted on a higher trophic level assuming 100% consumption of gobies. It is important to note that all the resource agencies agreed with this recommendation.

Human Health Risk Assessment

In all cases, the HRA must assume those consumption patterns and quantities for the subsistence and the most at-risk consumer of fish. We were very troubled to hear the representative of OEHHA state that the assessment should be conducted, not on how people **do** eat fish but on how they **should** eat fish. This is completely untenable. In San Diego, we are fortunate to have a large southeast asian immigrant community as well as indigenous, Latinos, and a large community from Africa. Stews, raw and whole fish consumption, and other non-fillet-only based consumption patterns can be found in these communities. These practices must be accounted for, not just judged as "improper" and dismissed. To the extent that whole fish examination could dilute the results, that must be considered. However, the converse could also be true. For example, contaminants at concentrate in fatty tissues and organs may be missed by fillet-only analysis.

Pore Water should be analyzed as a factor in assessing impacts to beneficial uses.

We believe that violations of water quality standards in pore water constitute a known impact to beneficial uses. We believe that part of the sampling design for phase 2 should include pore water analysis to determine where pore water exceeds water quality standards. It would be especially important to conduct pore water samples where the previous data was equivocal i.e. high chemistry and no toxicity.

Assess liver bile for PAH Metabolites

While fish histopathology on livers will show long-term and high level impacts of PAH exposure, bile analysis will show lower levels and recent exposure to PAH. This should be conducted on fish that are analyzed.

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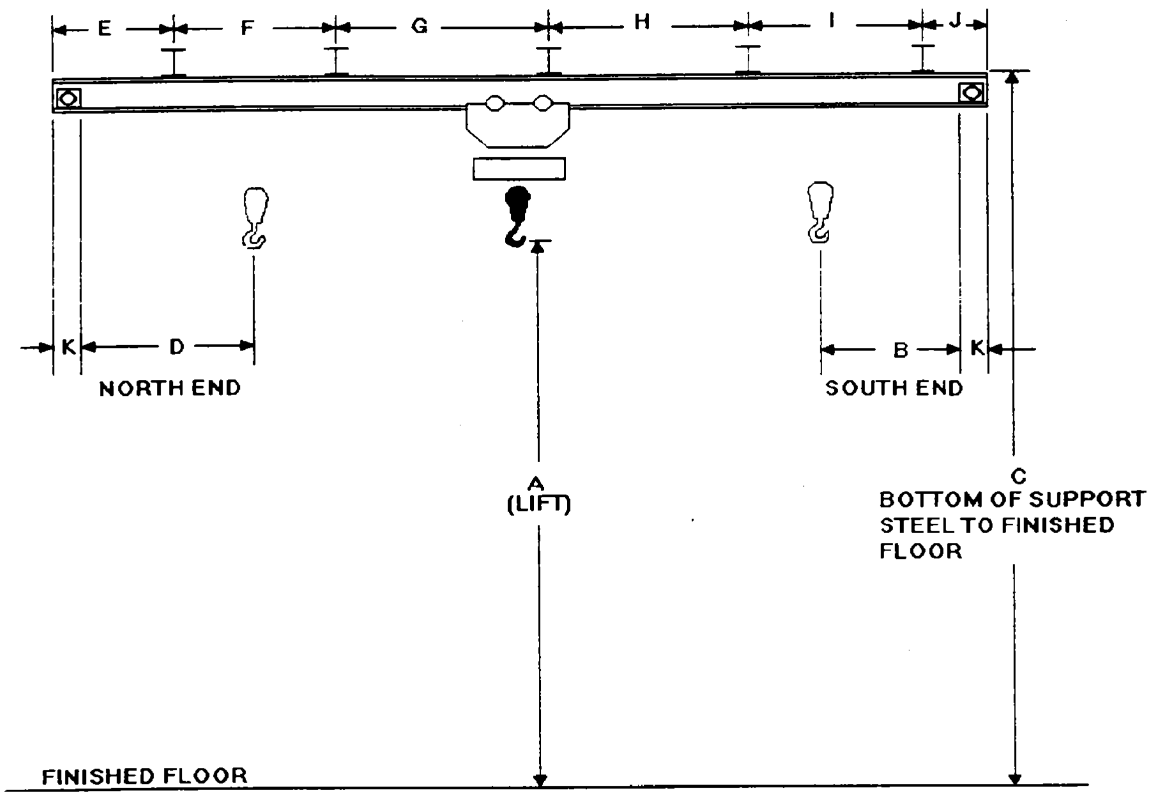
ENCLOSURE 6: MONORAIL SYSTEM
Crane Number: CIF-0071-MONO-6
Capacity: 1 Ton

CLEARANCE SKETCH

MONORAIL ELEVATION VIEW



A: 55 FT. 0 IN.
B: 2 FT. 3 IN.
C: 60 FT. 8 IN.
D: 2 FT. 3 IN.
E: 6 FT. 5 IN.

F: 9 FT. 7 IN.
G: 14 FT. 0 IN.
H: 9 FT. 4 IN.
I: 24 FT. 0 IN.
J: 6 FT. 3 IN.
K: 0 FT. 4 IN.

RUNWAY LENGTH: 69' - 7" OF STRAIGHT TRACK

#N/A - INFORMATION NOT AVAILABLE. WILL FURNISH IF APPLICABLE
N/A - NOT APPLICABLE

PAH Analysis

It appears that no EqP will be established for PAH as there are no water quality criteria for PAH. The lack of a formal WQC is not excuse to drop analysis of a toxic substance that has severely contaminated and degraded our waterways. There are numbers that should be used for this analysis or very protective numbers could be developed to be used for this purpose. We do know that at levels very much lower than the levels measured at the shipyard sites substantial increase in contamination related injuries were observed in some fish. Effects were shown at 1,000 ppb, far lower than the levels found at the Shipyard sites. (Johnson, Collier, Stein; *An analysis in support of sediment quality thresholds for polycyclic aromatic hydrocarbons (PAHs) to protect estuarine fish*; Aquatic Conservation" Marine and Freshwater Ecosystems; February 17, 2002)

There are a lot of impacts from PAH that are getting overlooked in the analysis in Phase 2. First, that PAH are toxic to fish embryos. Second, there is phototoxicity of PAH. When exposed to UV the toxicity of PAH increases for zooplankton, fish and fish larvae. This was a study at Lake Tahoe that took surface water samples to check the toxicity of the motorcraft PAH discharges. Third, there are new biomarkers for PAH. Fourth, there is evidence of endocrine disruption caused by PAH.

Here are the web sites covering these points:

http://www.rf.no/internet/student.nsf/wvPublNr/2000-040 biomarkers for PAH in fish
http://archive.greenpeace.org/~odumping/pahospar.html effect of PAH on fish embryos
http://zoology.muohio.edu/oris/TahoePoster.pdf Tahoe-PAH toxicity UV
http://www.afsc.noaa.gov/abl/OilSpill/pstoxici.htm fish embryo PAH toxicity
http://www.cefas.co.uk/publications/tech110.pdf biomarkers for PAH marine environment
http://www.cerc.cr.usgs.gov/pubs/BEST/synthesis.htm biomarkers
http://es.epa.gov/ncer/progress/grants/97/endocrine/zacharewski99.html endocrine disruption

These PAH related impacts are potentially a very serious impact to beneficial uses.

Any impacts to RARE species must be elevated as a concern.

One of the many problems with risk assessment is that it assumes exposure as if this exposure were the only exposure in an otherwise pristine environment. That, sadly, is far from the truth. The cumulative and incremental risk must be the concern and for rare and endangered species, it is even more significant since those are the species that are already close to the brink of extinction from the cumulative impacts. The explanation given by Exponent that they are considering the impact to an individual and therefore will be protective is not satisfactory. If this is like the many other risk assessments conducted, this is not an either/or analysis. There will be varying levels of impact shown and some controversial, arbitrary "level of significance" established. Given the precarious state of the rare species in the bay the standard should be that **any** impact is significant because it adds to an already unacceptable cumulative burden.

Thank you for the opportunity to comment on this important matter.

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14 IS RADIO INTERFERENCE SUPPRESSION REQUIRED? Yes

15 IS FUNGUS RESISTANCE TREATMENT OF ELECTRICAL COMPONENTS REQUIRED? Yes

16 IS ANY SPECIAL PAINTING REQUIRED? Yes. See Note 9 of Crane Data Supplement, Page 7

17 WILL THE CRANE BE ERECTED BY THE GOVERNMENT UNDER THE SUPERVISION OF A SUPERVISING ERECTOR FURNISHED BY THE CRANE MANUFACTURER OR WILL IT BE ERECTED BY THE CRANE MANUFACTURER? Crane Manufacturer

18 WHAT IS THE PLACE OF DELIVERY OR LOCATION OF THE FIELD WORK? Naval Air Station, North Island (San Diego, CA Region)

19. PROVIDE A FLOOR PLAN OF THE BUILDING IN THE AREA OF CRANE OPERATION SHOWING:

(a) Structural steel supports
(b) Maximum allowable load on supports
(c) Location of electrical junction box
(d) End approach to walls
(e) North arrow
(f) End approach to walls

See drawings S-24, S-26, and E-10

20 ARE THERE ANY SPECIAL REQUIREMENTS OR CIRCUMSTANCES NOT COVERED BY THE PRECEDING QUESTIONS OR THE CLEARANCE SKETCHES? See Crane Data Supplement, Page 7

21. FOR NEW BUILDINGS, PLEASE FORWARD A COMPLETE SET OF 100% BUILDING PLANS AND SPECIFICATIONS WHEN RETURNING COMPLETED INFORMATION FORM: #N/A

#N/A - INFORMATION NOT AVAILABLE. WILL FURNISH IF APPLICABLE
N/A - NOT APPLICABLE

Sincerely,

Laura Hunter
Environmental Health Coalition

Bruce Reznik
San Diego Baykeeper

Jim Peugh
San Diego Audubon Society

Marco Gonzalez
Surfrider Foundation, San Diego Chapter

Ed Kimura
San Diego Chapter of the Sierra Club

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(b) Location: At End of Bridge: N/A; At Middle of Bridge: N/A; Attached to Trolley: N/A; Remote Room (Specify): N/A; Other (Specify): See Note 6 of Crane Data Supplement Page 7.

(c) Shall Cab Be Open or Enclosed, Heated or Air Conditioned? N/A

(d) Shall a "Power On" Indicating Light be Provided on the Push-button Station? Yes

(e) Shall a Lock be Provided in Push-button Station to Prevent Unauthorized Personnel from Operating Crane? Yes

10. RUNWAY CONDUCTORS:

(a) What Is the Kind, Voltage, Frequency and Phase of the Electric Current Supply? 480 volts, 3 phase, 60 Hertz

(b) What Is the Location of the Electric Junction Box? On column N.9-1 near the roof

11. WILL CRANE BE REQUIRED TO PASS THROUGH ANY DOORS? N/A IF SO:

(a) What provision has been made for interlocking to prevent collisions? N/A

(b) Are there crane height and width limitations at the doors? N/A

(c) Door locations? N/A

(d) Are track switches required? Manual or electric? N/A

12 ARE LOWER LIMIT SWITCHES NECESSARY FOR THE HOISTS? Yes

13 WILL OCCASIONAL OIL OR GREASE DRIPS BE OBJECTIONABLE TO THE POINT OF REQUIRING OIL OR GREASE TIGHT GEAR CASES FOR TROLLEY AND BRIDGE DRIVE WHEEL GEARS? Yes

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RECORD OF POSITION AND REQUEST FOR ELECTED OFFICIALS ON DUCK HUNTING IN SOUTH BAY

WHO	Request made/Who	Letter received
Governor Nichols	Yes/LH	No letter yet
Lt. Governor	Y-LH	Yes
Alpert	Peugh -	
Peace		
Wayne	Reznik -	
Kehoe	Peugh	
Vargas	LH	
Davis	Peugh	
Filner	LH	
Boxer	LH	
Feinstein	Ed -	
SAN DIEGO		
Mayor	LH-Tom Storey	
Peters	Eric -	
Frye	Y- LH	yes
Inzunza	Y- LH	
Atkins		
Stevens		
Police Chief	Y-LH	yes
CORONADO		Yes
Smisek		yes

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CVN HOMEP(IG PROGRAM

ID	Name	Duration	Predecessors	Original Start	Original Finish	Revised Start	Revised Finish	Actual Start	Actual Finish	Resource	Notes
208	P-701 PLANNING PHASE	43d		7/31/95	9/28/95	7/31/95	9/28/95	NA	NA		
209	NADEP vacates facilities	59ed		7/31/95	9/28/95	7/31/95	9/28/95	NA	NA	N	
210	P-701 planning phase complete	0ed	209	9/28/95	9/28/95	9/28/95	9/28/95	NA	NA		
211											
212	P-701 PERMITTING PHASE	332d		5/18/94	9/5/95	5/18/94	8/25/95	5/18/94	NA		
213	Prepare air emissions inventory	10.67ed		5/18/94	6/30/94	5/18/94	6/30/94	5/18/94	6/30/94	P	
214	Prepare exemption request for VOCs	12ed	213	7/1/94	8/31/94	7/1/94	8/19/94	7/1/94	8/19/94	N	
215	Review exemption request	31ed	214	8/31/94	9/30/94	8/31/94	9/19/94	8/19/94	NA	N,P,S	
216	Revise exemption request	31ed	215	9/30/94	10/31/94	9/30/94	10/20/94	NA	NA	N	
217	Review revised exemption request	32ed	216	10/31/94	11/30/94	10/31/94	11/21/94	NA	NA	N,P,S	
218	Submit exemption request to APCD	7ed	217	11/30/94	12/7/94	11/30/94	11/28/94	NA	NA	N	
219	APCD approves exemption for VOCs	270ed	218	12/7/94	9/5/95	12/7/94	8/25/95	NA	NA		
220	P-701 permitting phase complete	0ed	219	9/5/95	9/5/95	9/5/95	8/25/95	NA	NA		
221											
222	P-701 DESIGN PHASE	295d		4/22/94	6/9/95	4/22/94	6/9/95	4/22/94	NA		
223	Award A-E contract	0ed		4/22/94	4/22/94	4/22/94	4/22/94	4/22/94	4/22/94	S	
224	Design kick-off meeting	4ed	223	4/22/94	4/26/94	4/22/94	4/26/94	4/22/94	4/26/94	N,P,S	Lockwood
225	Prepare Prelim 15% design	7ed	223,224FS-4ed	4/22/94	5/20/94	4/22/94	5/20/94	4/22/94	5/20/94	S	Lockwood
226	Forward Prelim 15% design to NISCOM	11ed	225	5/20/94	5/23/94	5/20/94	7/5/94	5/20/94	7/5/94	S	
227	Forward Prelim 15% design to NAVFAC	2.67ed	225	5/20/94	5/27/94	5/20/94	5/31/94	5/20/94	5/31/94	S	
228	Architectectural Review Board presentation	1.87ed	225	5/20/94	5/27/94	5/20/94	5/26/94	5/20/94	5/26/94	N,P,S	Lockwood
229	NISCOM reviews Prelim 15% design	4.33ed	226	5/23/94	6/8/94	5/23/94	7/21/94	7/5/94	7/21/94		
230	Review Prelim 15% design	6.67ed	225	5/20/94	6/8/94	5/20/94	6/16/94	5/20/94	6/16/94	A,N,P,S	
231	Prelim 15% design review meeting	0.33ed	230,228	6/8/94	6/10/94	6/8/94	6/16/94	6/16/94	6/16/94	A,N,P,S	Lockwood
232	Prepare Final 15% design	2.33ed	231	6/10/94	6/17/94	6/10/94	6/24/94	6/16/94	6/24/94	S	Lockwood
233	NAVFAC prepares for NAVCOMPT submission	7.33ed	227	6/1/94	6/30/94	6/1/94	6/30/94	6/1/94	6/30/94		
234	NAVFAC submits FY96 program to NAVCOMPT	0ed	233	7/1/94	7/1/94	7/1/94	7/1/94	7/1/94	7/1/94		
235	NAVCOMPT reviews FY96 program	6.67ed	234	7/4/94	8/1/94	7/4/94	8/1/94	7/5/94	8/1/94		
236	NAVFAC issues Final Design authority	5.33ed	235	8/1/94	8/22/94	8/1/94	8/22/94	8/1/94	8/22/94		
237	Issue final design option to A-E	2ed	236	8/22/94	8/30/94	8/22/94	8/29/94	8/22/94	8/29/94	S	
238	Prepare 45% design	42ed	237,232,229	8/30/94	10/11/94	8/30/94	10/10/94	8/29/94	NA	S	Lockwood
239	Forward 45% design to NISCOM	1ed	238	10/11/94	10/12/94	10/11/94	10/11/94	NA	NA	S	
240	NISCOM reviews 45% design	55ed	239	10/12/94	12/5/94	10/12/94	12/5/94	NA	NA		
241	Review 45% design	56ed	238	10/11/94	12/5/94	10/11/94	12/5/94	NA	NA	A,N,P,S	
242	45% design review meeting	7ed	241,240	12/5/94	12/12/94	12/5/94	12/12/94	NA	NA	A,N,P,S	Lockwood
243	Prepare Pre-100% design	42ed	242	12/12/94	1/23/95	12/12/94	1/23/95	NA	NA	S	Lockwood
244	Review Pre-100% design	7ed	243	1/23/95	1/30/95	1/23/95	1/30/95	NA	NA	S	
245	Prepare 100% design	14ed	243,244FS-7ed	1/23/95	2/6/95	1/23/95	2/6/95	NA	NA	S	Lockwood
246	Forward 100% design to NISCOM	1ed	245	2/6/95	2/7/95	2/6/95	2/7/95	NA	NA	S	
247	NISCOM reviews 100% design	20ed	246	2/7/95	2/27/95	2/7/95	2/27/95	NA	NA		
248	Review 100% design	53ed	245	2/6/95	3/31/95	2/6/95	3/31/95	NA	NA	A,N,P,S	
249	100% design review meeting	7ed	248,247	3/31/95	4/7/95	3/31/95	4/7/95	NA	NA	A,N,P,S	Lockwood
250	Prepare Pre-Final design	21ed	249	4/7/95	4/28/95	4/7/95	4/28/95	NA	NA	S	Lockwood
251	Review Pre-Final design	4ed	250	4/28/95	5/2/95	4/28/95	5/2/95	NA	NA	S	
252	Prepare Final design	14ed	250,251FS-4ed	4/28/95	5/12/95	4/28/95	5/12/95	NA	NA	S	Lockwood
253	Prepare "SAT TO" letter	14ed	252	5/12/95	5/26/95	5/12/95	5/26/95	NA	NA	N,P	
254	Approve design	28ed	252,253FS-14ed	5/12/95	6/9/95	5/12/95	6/9/95	NA	NA	S	
255	P-701 design phase complete	0ed	254	6/9/95	6/9/95	6/9/95	6/9/95	NA	NA		
256											
257	P-701 CONSTRUCTION PHASE	798d		6/9/95	7/1/98	6/9/95	7/1/98	NA	NA		
258	Request NAVSEA revalidation	24ed	255	6/9/95	7/3/95	6/9/95	7/3/95	NA	NA	S	
259	NAVSEA issues revalidation	21ed	258	7/3/95	7/24/95	7/3/95	7/24/95	NA	NA	P	
260	Request NAVFAC Advertising Authority	24ed	255	6/9/95	7/3/95	6/9/95	7/3/95	NA	NA	S	
261	NAVFAC issues Advertising Authority	21ed	260	7/3/95	7/24/95	7/3/95	7/24/95	NA	NA		
262	Forward bid package to Contracts	1ed	261,259	7/24/95	7/25/95	7/24/95	7/25/95	NA	NA	S	
263	Advertise contract	1ed	262	7/25/95	7/26/95	7/25/95	7/26/95	NA	NA	S	
264	Print bid package	34ed	263	7/26/95	8/29/95	7/26/95	8/29/95	NA	NA	S	
265	Forward bid package to NISCOM	3ed	264	8/29/95	9/1/95	8/29/95	9/1/95	NA	NA	S	For IDS design
266	Open bids	45ed	264	8/29/95	10/13/95	8/29/95	10/13/95	NA	NA	S	
267	Request funds from NAVFAC	3ed	266	10/13/95	10/16/95	10/13/95	10/16/95	NA	NA	S	
268	Check contractor responsibility	12ed	266	10/13/95	10/25/95	10/13/95	10/25/95	NA	NA	S	
269	Legislature enacts MCON auth & appr laws	0ed	268	11/1/95	11/1/95	11/1/95	11/1/95	NA	NA		
270	NAVFAC issues funds	7ed	269,267	11/1/95	11/8/95	11/1/95	11/8/95	NA	NA		
271	Forward funds to Contracts	1ed	270	11/8/95	11/9/95	11/8/95	11/9/95	NA	NA	S	
272	Request CHINFO notification by NAVFAC	4ed	271,268	11/9/95	11/13/95	11/9/95	11/13/95	NA	NA	S	
273	NAVFAC issues CHINFO notification	1ed	272	11/13/95	11/14/95	11/13/95	11/14/95	NA	NA		
274	Award contract	0ed	273,210,219	11/14/95	11/14/95	11/14/95	11/14/95	NA	NA	S	
275	Start construction	15ed	274	11/14/95	11/29/95	11/14/95	11/29/95	NA	NA		
276	Demolish Building 29	84ed	275	11/29/95	2/21/96	11/29/95	2/21/96	NA	NA		
277	Construct Low Bay	498ed	275	11/29/95	4/8/97	11/29/95	4/8/97	NA	NA		
278	Install Low Bay cranes	84ed	277	4/8/97	7/1/97	4/8/97	7/1/97	NA	NA		
279	Construct High Bay	580ed	275	11/29/95	7/1/97	11/29/95	7/1/97	NA	NA		
280	Install High Bay cranes	84ed	279	7/1/97	9/23/97	7/1/97	9/23/97	NA	NA		
281	Construct remaining portions of facilitiy	721ed	275	11/29/95	11/19/97	11/29/95	11/19/97	NA	NA		
282	Complete construction	0ed	276,278,280,281	9/23/97	9/23/97	9/23/97	11/19/97	NA	NA		
283	Outfit	365ed	278	7/1/97	7/1/98	7/1/97	7/1/98	NA	NA	P	
[illegible]	P-701 Initial Operating Capability	0ed	282,283	7/1/98	7/1/98	7/1/98	7/1/98	NA	NA		

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ENCL (8)

PAH Analysis

It appears that no EqP will be established for PAH as there are no water quality criteria for PAH. The lack of a formal WQC is not excuse to drop analysis of a toxic substance that has severely contaminated and degraded our waterways. There are numbers that should be used for this analysis or very protective numbers could be developed to be used for this purpose. We do know that at levels very much lower than the levels measured at the shipyard sites substantial increase in contamination related injuries were observed in some fish. Effects were shown at 1,000 ppb, far lower than the levels found at the Shipyard sites. (Johnson, Collier, Stein; *An analysis in support of sediment quality thresholds for polycyclic aromatic hydrocarbons (PAHs) to protect estuarine fish*; Aquatic Conservation" Marine and Freshwater Ecosystems; February 17, 2002)

There are a lot of impacts from PAH that are getting overlooked in the analysis in Phase 2. First, that PAH are toxic to fish embryos. Second, there is phototoxicity of PAH. When exposed to UV the toxicity of PAH increases for zooplankton, fish and fish larvae. This was a study at Lake Tahoe that took surface water samples to check the toxicity of the motorcraft PAH discharges. Third, there are new biomarkers for PAH. Fourth, there is evidence of endocrine disruption caused by PAH.

Here are the web sites covering these points:

http://www.rf.no/internet/student.nsf/wvPublNr/2000-040 biomarkers for PAH in fish
http://archive.greenpeace.org/~odumping/pahospar.html effect of PAH on fish embryos
http://zoology.muohio.edu/oris/TahoePoster.pdf Tahoe-PAH toxicity UV
http://www.afsc.noaa.gov/abl/OilSpill/pstoxici.htm fish embryo PAH toxicity
http://www.cefas.co.uk/publications/tech110.pdf biomarkers for PAH marine environment
http://www.cerc.cr.usgs.gov/pubs/BEST/synthesis.htm biomarkers
http://es.epa.gov/ncer/progress/grants/97/endocrine/zacharewski99.html endocrine disruption

These PAH related impacts are potentially a very serious impact to beneficial uses.

Any impacts to RARE species must be elevated as a concern.

One of the many problems with risk assessment is that it assumes exposure as if this exposure were the only exposure in an otherwise pristine environment. That, sadly, is far from the truth. The cumulative and incremental risk must be the concern and for rare and endangered species, it is even more significant since those are the species that are already close to the brink of extinction from the cumulative impacts. The explanation given by Exponent that they are considering the impact to an individual and therefore will be protective is not satisfactory. If this is like the many other risk assessments conducted, this is not an either/or analysis. There will be varying levels of impact shown and some controversial, arbitrary "level of significance" established. Given the precarious state of the rare species in the bay the standard should be that **any** impact is significant because it adds to an already unacceptable cumulative burden.

Thank you for the opportunity to comment on this important matter.

Formal Positions expressed in letter are of signatory organizations only.

ENCLOSURE 6: MONORAIL SYSTEM
Crane Number: CIF-0071-MONO-6
Capacity: 1 Ton

The operating instructions shall include wiring diagrams, control diagrams, and control sequence for each principal item of equipment. Operating instructions shall be printed or engraved, and shall be framed under glass or in approved laminated plastic and posted where directed by the Contracting Officer. Operating instructions shall be attached to or posted adjacent to each principal item of equipment including start up, proper adjustment, operating, lubrication, shut-down, safety-precautions, procedure in the event of equipment failure, and other items of instruction as recommended by the manufacturer of each item of equipment. Operating instructions exposed to the weather shall be made of weather-resisting materials or shall be suitably enclosed to be weather protected. Operating instructions shall not fade when exposed to sunlight and shall be secured to prevent easy removal or peeling.

#N/A - INFORMATION NOT AVAILABLE. WILL FURNISH IF APPLICABLE
N/A - NOT APPLICABLE

Sincerely,

Laura Hunter
Environmental Health Coalition

Bruce Reznik
San Diego Baykeeper

Jim Peugh
San Diego Audubon Society

Marco Gonzalez
Surfrider Foundation, San Diego Chapter

Ed Kimura
San Diego Chapter of the Sierra Club

Formal Positions expressed in letter are of signatory organizations only.

10. Furnish six (6) sets of operation and maintenance manuals in hardback binders or an approved equivalent. Furnish one complete manual sixty (60) days prior to the on-site performance test and furnish the remaining manuals before the contract is completed.

Inscribe the following identification on the cover: the words OPERATION AND MAINTENANCE MANUAL, the name and location of the equipment, the name of the Contractor, and the contract number. The manual shall include the names, addresses, and telephone numbers of each subcontractor installing equipment, and of the local representatives for each item of equipment. The manual shall have a table of contents and be assembled to conform to the table of contents with the tab sheets placed before instructions covering the subject. The instructions shall be legible and easily read, with large sheets of drawings folded in. The manual shall include: wiring and control diagrams with data to explain detailed operation and control of each item of equipment; a control sequence describing start-up, operating and shut-down; description of the function of each principal item of equipment; the procedure for starting; the procedure for operating; shut-down instructions; installation instructions; maintenance instructions; lubrication schedule including type, and grade of lubricant, temperature range, and frequency; safety precautions, diagrams, and illustrations; test procedures; performance data; and parts list. The parts lists for equipment shall indicate the sources of supply, recommended spare parts, and the service organization which is reasonable convenient to the project site. The manual shall be complete in all respects for equipment, controls, accessories, and associated appurtenances provided.

11. Furnish the services of instructors to give full instruction to the designated Government personnel in the adjustment, operation, and maintenance, including pertinent safety requirement. Instructors shall be thoroughly familiar with all parts of the installation and shall be trained in operating theory as well as practical operation and maintenance work. Instruction shall be given during the first regular work week after the equipment or system has been accepted and turned over to the Government for regular operation. Five (5) man-days (8 hours per day) of instructions shall be furnished with approximately half of the time for class room instructions. Use other time for instructions with the equipment or system. When significant changes or modifications in the equipment or system are made under the terms of the contract, provide additional instructions to acquaint the operating personnel with changes or modifications.

#N/A - INFORMATION NOT AVAILABLE. WILL FURNISH IF APPLICABLE
N/A - NOT APPLICABLE

Draft

Field Sampling Plan Addendum for the NASSCO and Southwest Marine Detailed Sediment Investigation

Prepared for

NASSCO and Southwest Marine
San Diego, California

Draft

Field Sampling Plan Addendum for the NASSCO and Southwest Marine Detailed Sediment Investigation

Prepared for

NASSCO and Southwest Marine
San Diego, CA

Prepared by

Exponent
15375 SE 30th Place, Suite 250
Bellevue, WA 98007

August 2002

Doc. no. 8601731.002 1201 0802 DN14

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Tables are presented at the end of the main text.

Acronyms and Abbreviations

BSAF	biota-sediment accumulation factor
CAS	Columbia Analytical Services
CWEFTD	California Wildlife Exposure Factor and Toxicity Database
EPA	U.S. Environmental Protection Agency
FSP	field sampling plan addendum
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
QAPP	quality assurance project plan
Regional Board	San Diego Regional Water Quality Control Board
TRG	tissue residue guideline

Introduction

Phase 2 sampling and analysis at the NASSCO and Southwest Marine shipyards will be conducted as part of an ongoing investigation into sediment conditions and potential biological effects at these shipyards. The first round of sampling and analysis (Phase 1) was conducted in August 2001, and Phase 2 will use the data collected during Phase 1 to generate additional information regarding specific types of potential adverse effects. The work plan (Exponent 2001) outlines the types of analyses to be conducted in both Phase 1 and Phase 2. This Phase 2 field sampling plan addendum (FSP) provides additional detail on how Phase 2 will be conducted, including identification of indicator chemicals, sampling locations, sampling methods, and analytical methods.

Since the project work plan was produced, the San Diego Regional Water Quality Control Board (Regional Board) has specified additional studies to be conducted as part of Phase 2. The overall scope of Phase 2 studies is now as follows:

- Sediment coring to determine depth distributions of indicator chemicals and to determine sediment engineering properties relevant to potential remedial options
- Sediment pore water analysis to evaluate equilibrium partitioning of indicator chemicals as an additional method of identifying potential adverse effects on aquatic life

needs to be done where chem. high but not tox - partially make up for the bad ref. sites

- Supplementary surface sediment chemistry analyses to accompany pore water analyses and to further characterize conditions between the shipyard leaseholds and the navigation channel
- Reference area surface sediment to better define reference conditions
- Fish histopathology measurements to evaluate potential adverse effects on fish at the shipyards

- Tissue chemistry analyses on fish and invertebrates to evaluate potential adverse effects on aquatic-dependent wildlife and on human health
- A survey of eelgrass (*Zostera marina*) distribution and chemical analyses of eelgrass to evaluate potential adverse effects on eelgrass and on sea turtles.

Table 1 summarizes the Phase 2 analyses with respect to the corresponding beneficial uses to be protected. Sediment cores for analysis of chemical concentrations and engineering properties are not listed in Table 1; data from these analyses will be used to develop cleanup volumes and to select effective remedial approaches.

Each of these components is described in following sections of this FSP, which describe the indicator chemicals for Phase 2, sample collection methods, and sample analysis methods. The final section of this FSP describes the anticipated schedule for Phase 2 fieldwork, laboratory work, and data analysis and reporting.

Indicator Chemicals

The results of Phase 1 data analyses allow the refinement of both the locations and the chemicals to be analyzed during Phase 2. During Phase 2, chemical analyses of pore water and associated sediment will be conducted to determine the potential adverse effects on bottom-dwelling (benthic) aquatic life, and chemical analyses of tissue will be conducted to determine the potential adverse effects on other aquatic life and on aquatic-dependent wildlife and human health. Selection of indicator chemicals for pore water analyses and for tissue analyses are described in the following sections. The list of chemicals to be analyzed in Phase 2 sediment samples will consist of the combination of all indicator chemicals for either pore water or tissue analyses.

representation

Indicator Chemicals for Pore Water Analyses

Pore water analyses will be used to develop candidate sediment cleanup criteria that are based on the partitioning of chemicals between sediment and the surrounding pore water. The partitioning relationships that will be developed using Phase 2 data can then be used to predict pore water chemical concentrations at all locations at which surface sediment samples have been analyzed. The predicted pore water chemical concentrations will then be compared to established marine water quality criteria to determine the potential for adverse effects to aquatic life. Indicator chemicals will be selected for pore water analyses according to whether they meet the following conditions:

- There is a marine water quality criterion established for the chemical

may not be a WQ but still bad.

- The chemical concentration at the shipyard exceeds background (Robertus 2002a, pers. comm.) or Phase 1 reference area conditions
- The chemical is associated with potential adverse effects on aquatic life, as indicated by the Phase 1 toxicity tests and benthic macroinvertebrate analyses.

Water Quality Criteria

The U.S. Environmental Protection Agency (EPA) (U.S. EPA 1999; 40 CFR §131.38 [2000]) and California Environmental Protection Agency (SWRCB 2001) have established federal and state water quality criteria for chronic exposures of marine organisms to 21 priority pollutants, and corresponding criteria for 20 priority pollutants for the state of California. These water quality criteria will be used to evaluate measured and predicted pore water concentrations. Among the group of chemicals potentially associated with shipyard operations, and measured in Phase 1, the federal and state water quality criteria include values for metals and total polychlorinated biphenyls (PCBs). The California Department of Toxic Substances Control recommends that pore water analyses include measurements of butyltins (HERD 1999), and effects-based screening values are available in the literature (Weston 1996). Metals, butyltins, and total PCBs (the sum of Aroclors®) therefore make up the pool of candidate analytes for pore water analyses.

Exceedance of Background or Reference Area Conditions

To determine whether each of the candidate pore water analytes was actually present at the shipyards at concentrations of potential concern, the concentrations of these analytes in shipyard sediments (from Phase 1 sampling) were compared to background chemical conditions established by the Regional Board (Robertus 2002a, pers. comm.). This comparison was undertaken to determine if any of the candidate analytes was consistently below the defined background levels. All of the metals and total PCBs exceeded the defined background level at one or more shipyard stations, and so none of the candidate analytes are excluded from Phase 2 pore water analyses based on a straightforward comparison to defined background chemical conditions.

Association with Potential Adverse Effects

The exceedances of background levels for metals and total PCBs were compared to the locations of potential adverse effects, as measured by Phase 1 toxicity tests and benthic macroinvertebrate analyses. This analysis was performed to evaluate whether exceedances of background levels are found more frequently at stations with some indication of adverse biological effects than at stations with no indication of adverse biological effects. If exceedance of background levels is clearly related to potential biological effects for some analytes, but not for others, then the latter group is of less value as indicator chemicals for Phase 2 pore water analyses (there is no apparent value in measuring chemicals that are unrelated to adverse effects).

The results of this analysis are shown in Table 2. This table illustrates, for example, that the background arsenic concentration was exceeded at 17 percent of the stations with amphipod survival lower than reference conditions, whereas the background arsenic concentration was exceeded at ~~58 percent of the sta~~tions that had amphipod survival equivalent to reference conditions. Overall, the results of this analysis show that there is no analyte for which there is a strong and clear association between exceedance of the defined ~~background~~ chemical concentration and potential adverse biological effects. Thus, it is not possible to draw distinctions between chemicals with regard to their potential association with adverse biological effects. There is no individual or group of chemicals with such an association that is notably weaker than that for other chemicals (because all of the associations are weak). The apparent lack of any relationships between potential biological effects and concentrations of shipyard chemicals in the sediment does not provide strong support for either including or excluding any of the candidate chemicals for pore water analysis. Given the equivocal nature of these results, none of the candidate pore water analytes will be excluded from Phase 2 pore water analyses based on their lack of association with potential adverse effects.

So what this tells us.

But what about the station selection

Indicator Chemicals for Tissue Analyses

Screening level assessments of potential risk to human health and ecological receptors were conducted using Phase 1 data to identify candidate indicator chemicals for Phase 2. The methods and results for each of these risk assessments are described in the following sections.

Screening-Level Human Health Risk Assessment

The results of Phase 1 tissue bioaccumulation tests were evaluated with respect to tissue residue guidelines (TRGs) to determine the potential for risks to human consumers of shellfish collected from the shipyards. The Phase 1 tissue bioaccumulation results are reported in Exponent (2002), and TRG values were obtained from OEHHA (1999). The maximum chemical concentration observed in any *Macoma* tissue sample was compared to the corresponding TRG to produce a protective estimate of human health risk. At the direction of Regional Board staff (Alo 2002a, pers. comm.), non-site-specific biota-sediment accumulation factors (BSAFs) compiled by Bechtel (2001) were also used for the risk assessment. These BSAF values were applied to the maximum concentration of each chemical observed at either shipyard in Phase 1, and the resulting predicted tissue concentration compared to the TRG.

The results of this screening-level human health risk assessment are summarized in Table 3. This analysis identifies arsenic, copper, mercury, zinc, several high molecular weight polycyclic aromatic hydrocarbon (PAH) compounds (benz[a]anthracene, chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, indeno[1,2,3-cd]pyrene, and dibenz[a,h]anthracene), and PCBs as indicator chemicals for Phase 2 tissue analyses. Rather than analyzing for just a subset of PAH compounds, Phase 2 tissue will be analyzed for all of the PAH compounds. Tissue samples to be used for the human health risk assessment will also be analyzed for inorganic arsenic if the total arsenic exceeds the TRG of 1 ppm. At the direction of Regional Board staff (Alo 2002b, pers. comm.), Phase 2 tissue samples will also be analyzed for butyltins.

Screening-Level Ecological Risk Assessment

The receptors that were evaluated in the Phase 1 risk assessment were the brown pelican, least tern, western grebe, surf scoter, and California sea lion (Exponent 2002). Bioaccumulation tests using site sediment were conducted during Phase 1 to provide site-specific estimates of tissue bioaccumulation. However, at the direction of Regional Board staff (Alo 2002a, pers. comm.), the bioaccumulation test data were not used for this screening-level ecological risk assessment for species other than the surf scoter. Instead, according to the direction of Regional Board staff, non-site-specific BSAFs were used for the risk assessment (Bechtel 2001). The screening assessment also employed conservative estimates of exposure and effects parameters to ensure that risk to receptors was not underestimated. The exposure and effects parameters used were as follows:

- Body weight: The minimum adult body weight of each species was used in exposure modeling. Body weights were derived when possible from the California Wildlife Exposure Factor and Toxicity Database (CWEFTD, http://www.oehha.ca.gov/cal_ecotox/). Alternate information sources, such as scientific papers, technical monographs, or other compendia of body weights, were used if exposure information for the selected receptor species was not included in the California database.

- Food ingestion rate: Food ingestion rates were also obtained from the CWEFTD, when possible, or derived from body weights using allometric scaling equations, such as those in U.S. EPA (1993a) or Nagy et al. (1999).

- Prey tissue concentrations: For surf scoter, prey tissue concentrations were estimated using the Phase 1 *Macoma* bioaccumulation data. For all other receptors, prey tissue data were extrapolated from chemical concentrations in sediments using BSAF values reported in the screening ecological risk assessment for shoreline sediments of the Naval Amphibious Base in Coronado, California (Bechtel 2001). In all cases, the maximum chemical concentrations in *Macoma* or in shipyard sediment was used to model exposure concentrations. Separate evaluations were performed for the NASSCO and Southwest Marine shipyards and the reference area.

- Area and time use factors: No adjustments were made to exposure estimates to reflect site size in relation to receptor foraging area or seasonal occurrence in San Diego Bay.

- Exposure estimates were compared to toxicity reference values to determine hazard quotients. Toxicity reference values for the Phase 1 assessment were obtained from the CDTSC (2000) database.

The body weights and food ingestion rates used are shown in Table 4. Toxicity reference values and the hazard quotient for each receptor and location are shown in Table 5.

The results of the screening ecological risk assessment indicate that total PCBs, several metals, and several PAH compounds should be considered as indicator chemicals at the shipyards. Fish tissue will therefore be analyzed for these chemicals (including all metals and all PAH compounds) during Phase 2 (Table 6).

Sampling and Analysis

Detailed procedures for Phase 2 sample collection, handling, and shipping are described in this section.

Station Locations

Sampling stations will be located throughout the shipyard leaseholds, in the bay between the leaseholds and the shipping channel, and at the Bight '98 reference stations. Sampling locations at the shipyards have been chosen to provide representative coverage of the site, including areas of the highest concentrations of particular chemicals. A total of 30 shipyard stations will be sampled in Phase 2. The proposed locations of the Phase 2 shipyard stations are shown in Figure 1. The important characteristics of each station, and the types of samples to be collected for chemical analyses at each station, are summarized in Table 7. Exponent's field team leader will determine the exact locations of the stations near the site and at the reference areas depending on the conditions encountered in the field. If riprap or other debris impedes the sampling equipment, then the station will be relocated. Also, the level of vessel activity (i.e., number and frequency of boats moving through the proposed sampling area) and space limitations for trawls and nets may influence the location of biota stations. The water depth at each station will be recorded at the time of sampling.

The number and type of samples to be collected during the Phase 2 sampling event are summarized below and in Table 8:

- **Subsurface Sediment Samples for Chemical Analysis**—Samples of subsurface sediment will be collected from 18 stations near the NASSCO site and from 18 stations near the Southwest Marine site. One core will be collected at each station. The target penetration depth for each core will be 10 ft or until refusal. A maximum of five 2-ft sediment horizons (i.e., 0–2, 2–4, 4–6, 6–8, and 8–10 ft) will be collected from each core. Subsamples from these intervals will be analyzed for the chemical compounds and conventional analytes listed in Table 6.

- **Subsurface Sediment Samples for Engineering Properties**—Samples of subsurface sediment will be collected from cores (0–10 ft or until refusal) at five stations at each site. Target locations for engineering measurements are Stations SW01, SW10, SW17, SW24, SW31, NA06, NA09, NA17, NA13, and NA24. Samples for the measurement of engineering properties will be taken from the same horizons used for chemical analyses. Subsamples from these intervals will be analyzed for the following engineering properties:
  - Grain-size distribution (pipette method [U.S. EPA 1986b])
  - Water content
  - Angularity and hardness
  - Specific gravity
  - Plasticity (Atterberg limits).
- **Shipyard Surface Sediment Samples for Chemical Analysis**—A sample of the 0–2 cm sediment interval will be collected at two nearshore stations within the NASSCO leasehold, at two stations underneath the NASSCO dry dock, at five stations outside the NASSCO leasehold near the ship channel (in association with cores), and at seven stations outside the Southwest Marine leasehold. These surface sediment samples will be analyzed for the metals and organic compounds listed in Table 6.
- **Reference Area Surface Sediment Samples for Chemical Analysis**—Surface sediment (0–2 cm) will be collected at 12 Bight '98 sampling stations to better define reference conditions throughout San Diego Bay. This set of stations includes the five reference stations that were sampled during Phase 1. The locations of these stations are shown in Figure 2. Samples from these stations will be analyzed for the complete list of Phase 1

chemicals. These surface sediment samples will be analyzed for the metals and organic compounds listed in Table 6.

- **Pore Water Samples**—A sample of pore water in the 0–2 cm sediment interval will be collected for chemical analysis from five stations at the NASSCO site, from eight stations at the Southwest Marine site, and from one station in each of the five reference areas that were sampled in Phase 1. Surface sediment for chemical analysis will also be collected in conjunction with each of the pore water samples. Pore water and associated surface sediment will be analyzed for the chemical compounds and conventional analytes listed in Table 6.

- **Fish and Invertebrate Tissue Samples**—Fish and invertebrate tissue will be collected for histopathological and chemical analyses. Histopathological examinations will be conducted on four different tissues of one of a set of target fish species. Chemical analyses of tissues will be conducted to support both ecological and human health risk assessments. Chemical analyses will be conducted on whole body tissue of appropriate prey species to evaluate potential ecological risks to bird and mammal receptors. Chemical analyses will be conducted on both entire fish and edible tissues of fish and invertebrates to evaluate potential risks to human health. Tissue samples will be analyzed for chemical compounds, lipids, and percent solids, as listed in Table 6. An attempt will be made to collect fish and invertebrates from locations within each shipyard with both high and low chemical concentrations (e.g., near shore and near the leasehold boundary). Spatial difference in organism preference and limitations in the spatial resolution of collection methods such as trawling may, however, limit the number of different locations at which organisms can be collected. Tissue samples will also be collected from a reference location in the vicinity of Reference Stations 2240, 2241, 2243, and 2244.

- **Eelgrass Samples**—One eelgrass sample will be collected for chemical analysis from one location at each site (if eelgrass is present) and at one reference area (target is Reference Station 2243). Samples will be analyzed for chemical compounds as listed in Table 6.

In addition, surface sediment samples collected outside the leaseholds and analyzed for metals during Phase 1 (Stations SW12, SW19, SW26, NA02, NA13, NA14, and NA21) are also being analyzed for butyltins, PCBs, polychlorinated terphenyls, PAH, and petroleum hydrocarbons. These samples were collected in August 2001 and stored at −20°C. Analysis of organic compounds was initiated in July 2002, within the 1-year holding time (U.S. EPA 1995). These additional analytical results will be reported with the Phase 2 data.

Phase 2 Sampling Procedures

In this section, procedures are described for collecting samples during the Phase 2 field event.

Subsurface Sediment Collection

Subsurface sediment core samples for both chemical testing and analysis of engineering properties will be collected using either a piston core or vibratory core device. A minimum diameter of 3 in. will be used for all core liners. Core lengths of approximately 10 ft are required for chemical analysis and engineering properties testing. (Core penetration during previous sampling at the shipyards was generally 8 ft or less, and concentrations equivalent to background were found in the deepest section of most cores.) Shorter core lengths will be accepted if multiple attempts at coring a sampling location do not provide the required core length. A Lexan® core liner will be used in the corer. Prior to sampling, all core liners will be washed in sequence with a standard detergent (e.g., Alconox®), rinsed with site water, and then air-dried. During storage and transport, decontaminated core liners will be capped at both ends to prevent contamination.

While the corer is being lowered in the water column, its position will be monitored with sonar. When the inlet of the corer is approximately 2 m above the sediment, the lowering of the corer will be stopped, the boat location will be confirmed, and the angle of the hydrowire will be determined. When the angle of the hydrowire is less than 5 degrees, the corer will be lowered into the sediment at a rate of 30 cm/s or less. If the weather is windy, the lowering rate will be increased to maintain at least a 10:1 ratio between the vertical speed of the corer and the horizontal drift speed of the boat. Cable will be released through the winch until there is slack in the line. If the boat drifts significantly (e.g., because of windy conditions), slack in the line will be permitted only briefly to prevent pulling the corer out at an angle.

The corer will be retrieved at a controlled rate to minimize agitation of the core. Retrieval will be stopped as soon as the top of the corer reaches the water surface. A plug may then be inserted in the bottom end of the corer to prevent the core from slipping out when the corer is raised out of the water. The corer will be brought onboard the sampling vessel and immediately stabilized to prevent it from tipping or falling. Care will be taken at all times to keep the corer in a vertical position.

After the corer is secured onboard the sampling vessel, the Lexan® liner that contains the sample will be removed from the corer barrel and inspected. Each core will be evaluated for acceptability using the following criteria:

- At least 5 cm of overlying water is present
- The overlying water is not excessively turbid
- The sediment surface is relatively undisturbed
- At least 80 percent core recovery relative to penetration is achieved.

Exponent's field team leader will evaluate the acceptability of all sediment cores collected. If a sediment core fails to meet any of the above criteria, it will be rejected. If less than 80 percent core recovery relative to penetration is achieved, the core sample recovered will be retained but considered insufficient and another attempt to recover a sediment core at the same location will be conducted. If the specified penetration depth is not achieved after two attempts, the station may be relocated slightly. If the slight relocation of the station does not improve the penetration depth, the station may be temporarily abandoned and Exponent's project manager will be notified. Sampling information will be recorded for all acceptable cores on a Station Core Log form (Appendix B).

After all acceptable cores are onboard the sampling vessel, both ends of the cores will be securely capped; labeled with the station identifier, core section, and sediment orientation; and fastened in an upright position. The overlying water will be siphoned or drained off. The core liner will then be laid out horizontally and cut lengthwise, and the core will be split open. Cores will be inspected for predominant physical characteristics, photographs will be taken of the undisturbed sediment, and sediment characteristics will be described on a Field Sediment Core form (Appendix B).

Cores designated for chemical analysis will be sectioned into a maximum of five 2-ft intervals. Sediment touching the sides of the core tube will be excluded from each sample. The sediment from each 2-ft core section will be homogenized to achieve a uniform texture and color using a stainless-steel or Teflon® spoon. Equipment used for homogenizing the sample (i.e., stainless-steel bowls and spoons) will be scrubbed with Alconox®, rinsed with site seawater, rinsed with solvents (e.g., acetone and hexane), air-dried, and rinsed with laboratory-grade distilled/ deionized water. If there is a significant lapse of time between decontamination of the sample homogenizing equipment and collection of the sample, then the decontaminated sample homogenizing equipment will be covered with foil to protect it from additional contamination. Any excess solvent rinsates will be collected in a container, and the small volume collected will be allowed to evaporate. The homogenized sample from each section will be subsampled and transferred to precleaned glass containers with Teflon®-lined lids. Immediately after sample containers are filled, they will be placed in a cooler on ice. Samples will be stored at 4±2°C.

Cores designated for analysis of engineering properties will be sectioned into a maximum of five intervals. The sediment from each section will be transferred to precleaned plastic containers. Samples for analysis of engineering properties will be stored at ambient temperature.

Surface Sediment Collection

Surface sediment samples (0–2 cm) will be collected using a stainless-steel 0.1-m^2 van Veen grab sampler in accordance with standard methods used by U.S. EPA (1986a). Before sampling begins at a station, the van Veen grab sampler will be scrubbed with Alconox®, rinsed with site seawater, rinsed with solvents (e.g., acetone and hexane), air-dried, and rinsed with site seawater. Equipment used for compositing the sediment samples (i.e., stainless-steel bowls and spoons) will follow the same basic decontamination sequence except that the final rinse will be with laboratory-grade distilled/deionized water. If there is a significant lapse of time between decontamination of the sample compositing equipment and collection of the sample, then the decontaminated sample compositing equipment will be covered with foil to protect it from additional contamination. Any excess solvent rinsates will be collected in a container, and the small volume collected will be allowed to evaporate.

After a sediment sample is retrieved and judged to be acceptable for chemical analyses (see discussion below), the overlying water will be siphoned off and the upper 2 cm of sediment will be collected in accordance with U.S. EPA (1986a) guidelines. Stainless-steel or Teflon® spatulas and spoons will be used to collect the sediment. A stainless-steel ruler will be used to ensure that the sampling criterion for adequate penetration depth is met and that the correct amount (i.e., 2 cm) of sediment has been removed. Sediment touching the sides of the grab sampler will not be collected.

Material collected in the grab sampler will be evaluated for acceptability according to whether the following criteria are met:

- The sampler is not overfilled
- Overlying water is present
- The overlying water is not excessively turbid
- The sediment surface is relatively undisturbed
- A sediment penetration depth of at least 5 cm is attained.

Exponent's field team leader will evaluate all samples collected. If a sample fails to meet the above criteria, it will be rejected and discarded away from the station.

Surface Sediment for Chemical Analysis

One whole sediment sample will be collected for chemical analyses at each station. The surface (top 2 cm) sediment will be collected from multiple grab samples, if necessary, and the sediment will be composited. The sediment sample at each station will be composited in a decontaminated stainless-steel bowl and covered with aluminum foil until a sufficient volume of sediment is collected for chemical analysis. Sediment in the bowl will then be mixed using a large stainless-steel spoon to achieve a uniform texture and color before subsamples are taken and transferred to precleaned glass containers with Teflon®-lined lids. Immediately after sample containers are filled, they will be placed in a cooler on ice. Samples will be stored at 4±2°C.

Surface Sediment for Pore Water Analysis

At each sampling station, approximately three grab samples will be collected for pore water extraction. Pore water will be extracted by centrifugation (U.S. EPA 2001) onboard the sampling vessel. Double centrifugation may be performed both to remove colloidal material (U.S. EPA 2001) and to minimize the sample volume to be shipped to the laboratory. When the sampler is on deck, a cookie cutter device will be used to remove the upper 2 cm of the grab sample, and the sediment will be placed into Teflon® containers so that each container is approximately two-thirds full. When sufficient sediment is obtained to load these containers and create a balanced mass, the centrifuge will be started and spun for 15 minutes at a *g*-force of 980 to 1,225 (depending on the centrifuge used). The overlying water will then be poured into glass collection containers and cooled to ~4°C with ice. The containers with plugs of sediment will then be placed back in the centrifuge and cycled for an additional 15 minutes. If significant quantities of pore water need to be obtained, the spinning time on subsequent samples will be extended to 30 minutes. Sediment pore water samples will not be filtered prior to analysis.

One sediment sample will be collected for chemical analyses at each station. The surface (top 2 cm) sediment will be collected from multiple grab samples, and the sediment will be composited. The sediment sample at each station will be composited in a decontaminated stainless-steel bowl and covered with aluminum foil until a sufficient volume of sediment is collected for chemical analysis. Sediment in the bowl will then be mixed using a large stainless-steel spoon to achieve a uniform texture and color before subsamples are taken and transferred to precleaned glass containers with Teflon®-lined lids. Immediately after all sample containers are filled, they will be placed in a cooler on ice. Samples will be stored at 4±2°C.

Survey of Eelgrass Distribution

The presence and distribution of eelgrass along the shoreline at both shipyards will be evaluated from a small boat. The location and boundary of each eelgrass bed will be recorded using a differentially corrected global positioning system and marked on a site map.

Tissue Sample Collection

Fish will be collected from the shipyards and from a reference location for the following three purposes:

- Histopathological examination to determine potential effects on aquatic life
- Chemical analysis of tissue (whole body) to determine potential effects on aquatic-dependent wildlife
- Chemical analysis of tissue (fillets and whole body) to determine potential effects on human health.

Hook-and-line fishing, otter trawls, beam trawls, and possibly other types of nets will be used to obtain the fish for these analyses. Fish will be collected from each of the shipyard leaseholds and from a location in the vicinity of Reference Stations 2240, 2241, 2243, and 2244. Every attempt will be made to ensure that all of the collected fish are mature, of the same species, and of similar length/weight. The characteristics of all retained fish will be described on a Field Fish Data form (Appendix B).

Sample processing will be conducted in accordance with SOP 115 (Appendix C, Exponent 2001). The following information will be recorded as soon as possible after sample collection for each fish:

- Species identification
- Total length and weight
- Sex and reproductive state (if possible)
- Visible presence of gross abnormalities.

After length and weight measurements have been made, whole fish will be wrapped in foil (dull side against fish skin) and double-bagged in two plastic Ziploc® bags containing a sample identification label. Composite samples will be bagged together to represent one sample for analytical purposes. Samples will be stored at 4±2°C and shipped on ice to the analytical laboratory by overnight delivery. If tissue samples must be held more than 24 hours, they will be frozen prior to shipping.

needs to be gobies

Fish Tissue for Histopathology

The primary target species for histopathological analyses are the white croaker (*Genyonemus lineatus*) and the black croaker (*Cheilotrema saturnum*), as specified by Regional Board staff (Robertus 2002b, pers. comm.). Alternate species that could be used to evaluate histopathological effects are the goby (Gobiidae), barred sand bass (*Paralabrax nebulifer*), and the spotted sand bass (*Paralabrax maculatofasciatus*). Histopathological analyses will consist of examination of fish gill, liver, kidney, and gonad. Gills will be examined to provide an indication of overall fish health. Liver, kidney, and gonad will be examined to provide an indication of exposure to different classes of chemicals. These tissues are generally considered to be most sensitive to PAHs, metals, and PCBs, respectively. Up to 50 fish for

Try X too small

look for abnormalities

histopathological analyses will be collected from areas of low and high chemical concentrations in each shipyard. Up to 50 fish for histopathological analyses will be collected from a reference area. Tissue for histopathological examination will be removed from the fish in the field immediately after the fish are collected. Specific procedures for necropsy, tissue processing, and histopathology are provided in Appendix A.

Whole fish & need to do prey species

Fish Tissue to Evaluate Ecological Risk

— need gobies as a prey item for this species.

Two different fish species will be targeted to evaluate potential risks to aquatic-dependent wildlife. A larger species will be targeted to represent potential prey to sea lions and brown pelicans, and a smaller species will be targeted to represent potential prey to the smaller fish-eating birds. The larger species may be the same as the species selected for histopathological analyses (e.g., white or black croaker, barred or spotted sand bass). The target smaller species is the Pacific sardine (*Sardinops sagax caerulea*). Alternate species are small perch, herring, Northern anchovy, and topsmelt. Five individual fish of both large and small species will be collected from regions of high and ~~low~~ chemical concentrations at each of the shipyards and from a reference location. Compositing will ~~be~~ performed only if necessary to obtain sufficient tissue mass to perform chemical analyses.

Kinds of ~~representativ~~ representative need to use Gobie.

eat in the water col
eat plant matter & in water colum.

Fish Tissue to Evaluate Human Health Risk

The target species for evaluation of potential risks to human health, with the exception of the goby, are the same species used to evaluate histopathology. Alternate species that could be analyzed to assess potential risks to human health include the barred and spotted sand bass as well as black and barred surfperch, halibut, corbina, Scorpaenidae (scorpionfish, rockfish, and bocaccio), and turbot. Both whole bodies and fillets will be analyzed from five individual fish from regions of both high and low chemical concentrations at each of the shipyards, and from a reference location. Fish of equivalent size will be used for histopathological and chemical analyses, within the constraints imposed by fish availability. Fillets will be analyzed either with or without the skin, depending on the consumption recommendations of OEHHA for the species used. If OEHHA has not provided a consumption recommendation for the species used, fillets will be analyzed with the skin on (U.S. EPA 1993b). The age of the filleted fish will be evaluated by collecting and analyzing otoliths or scales, depending on the species. Collection methods will be consistent with the methods described in Stehr et al. (1994).

Invertebrate Tissue

A variety of different crab traps will be used to obtain up to three samples of crab or lobster tissue from each of the sites and one sample in the vicinity of Reference Stations 2240, 2241, 2243, and 2244 for chemical analysis. Different kinds of traps will be used to accommodate the various types of substrate (i.e., silty and sandy) that will be encountered at the sites and the reference areas. A van Veen grab sampler will be used to obtain up to three samples of benthic mussels from each of the sites and one sample in the vicinity of Reference Stations 2240, 2241, 2243, and 2244 for chemical analysis. Crabs, lobsters, and benthic mussels will be washed in the field to remove all sediment.

Sample processing will be conducted in accordance with SOP 116A (Appendix C, Exponent 2001). The following information will be recorded as soon as possible after sample collection for each crab collected:

- Species identification
- Carapace width and weight
- Sex and reproductive state (if possible)
- Visible presence of gross abnormalities.

The crabs will be killed by freezing in the field and the whole invertebrates will be placed in a glass jar or wrapped in foil (dull side against invertebrate shell) and double-bagged in two plastic Ziploc® bags containing a sample identification label. Chemical analyses will be performed on the soft tissue of the crabs. Composite samples will be bagged together to represent one sample for analytical purposes. Immediately after sample containers are filled, they will be placed in a cooler on ice. Samples will be stored and shipped at 4±2°C.

Eelgrass Collection

A van Veen grab sampler or diver will be used to obtain samples of eelgrass from within the shipyards and from one reference area (Reference Station 2243) for chemical analysis. The eelgrass blades will be analyzed as collected, including attached sediment and epifauna.

The following information will be recorded as soon as possible after sample collection for each sample of eelgrass collected:

- Confirmatory species identification
- Total wet weight
- Presence of parasites or anomalies.

After the weight measurement has been made, whole eelgrass blades with no root material will be wrapped in foil (dull side against the eelgrass) and double-bagged in two plastic Ziploc® bags containing a sample identification label. Immediately after the sample bags are filled, they will be placed in a cooler on ice. Samples will be stored and shipped at 4±2°C.

Chemical Analyses

Chemical analysis of sediment, pore water, tissue (i.e., whole fish, fish fillets, mussels, and crabs), and eelgrass samples will be completed by Columbia Analytical Services (CAS), located in Kelso, Washington. The samples will be analyzed for the indicator chemicals listed in Table 6. Analyses and associated quality assurance and quality control procedures will be completed as described in the quality assurance project plan (QAPP; Exponent 2001, Appendix B). Methods of analysis and measurement quality objectives are provided in Table B-4 of the QAPP.

Fish, mussels, and crabs will be sent whole to the laboratory. CAS will fillet the fish as necessary, shuck the mussels, and remove the edible soft tissue from the body and claws of the crabs and/or lobsters. Edible tissue will be removed from mussels. The tissue from each sample will be homogenized prior to analysis and will be stored frozen (−20°C) at the laboratory.

Eelgrass samples will be homogenized at the laboratory using a blender. If necessary, the samples will be chopped with a stainless-steel knife prior to homogenization to reduce the length of fibers. Samples for analysis of metals will be air-dried at 60°C prior to homogenization. Eelgrass samples will be analyzed using the methods indicated for tissue samples in Table B-4 of the QAPP. The measurement quality objectives for tissue, including holding times, will also apply to the eelgrass. The eelgrass samples will be stored frozen (−20°C) at the laboratory until they are processed for analysis. Any unused portions will be stored frozen.

The procedures and requirements described in the QAPP will apply to all phases of project quality assurance management; sample collection, handling, and analysis; data validation and management; and data interpretation for the Phase 2 study described in this FSP.

Schedule

Sampling for the Phase 2 investigation at the NASSCO and Southwest Marine sites is anticipated to occur in September or October 2002. The Phase 2 sampling event is estimated to require 20 days. The sequence of sample collection will be arranged to maximize efficiency while minimizing potential cross-sample contamination. The actual sequence in which the stations will be visited will be determined in the field by Exponent's field team leader.

Laboratory analyses are expected to be completed approximately 6 weeks following completion of the fieldwork.

Data validation and preparation of a data report are expected to be completed approximately 4 weeks following receipt of all of the laboratory data by Exponent. Submission of this data report to the Regional Board will mark the completion of Phase 2 of this study.

Development and evaluation of candidate cleanup levels, development of alternate cleanup areas and volumes, evaluation of remedial technologies, and evaluation of technological and economic feasibility of alternate cleanup options will be carried out following Phase 2.

References

Alo, T. 2002a. Personal communication (e-mail to D. Nielsen, Exponent, Bellevue, WA, dated July 3, 2002, regarding screening ecological risk assessment). Regional Water Quality Control Board, San Diego, CA.

Alo, T. 2002b. Personal communication (telephone conversation with D. Nielsen, Exponent, Bellevue, WA, on August 12, 2002, regarding Phase 2 sampling). Regional Water Quality Control Board, San Diego, CA.

Bechtel. 2001. Preliminary final screening-level ecological risk assessment for the shoreline sediments (including offshore portions of IRP sites 3 and 2/4), Naval Amphibious Base, Coronado, California. Prepared for Southwest Division, Naval Facilities Engineering Command. Bechtel National, Inc., San Diego, CA.

CDTSC. 2000. Human and Ecological Risk Division (HERD) ecological risk assessment Note 4. Issued December 8, 2000. Available from: http://www.dtsc.ca.gov/ScienceTechnology/eco.html. Accessed on July 3, 2002. California Department of Toxic Substance Control.

Exponent. 2001. Work plan for the NASSCO and Southwest Marine detailed sediment investigation. Prepared for NASSCO and Southwest Marine, San Diego, CA. Exponent, Bellevue, WA.

Exponent. 2002. Technical Memorandum 4: Phase 1 bioaccumulation data, ecological receptor species, and receptor parameters for the NASSCO and Southwest Marine detailed sediment investigation. Prepared for NASSCO and Southwest Marine, San Diego, CA. Exponent, Bellevue, WA.

HERD. 1999. HERD ecological risk assessment (ERA) note number 3. California Department of Toxic Substances Control, Human and Ecological Risk Division.

Nagy, K.A., I.A. Girard, and T.K. Brown. 1999. Energetics of free-ranging mammals, reptiles, and birds. Ann. Rev. Nutr. 19:247-277.

OEHHA. 1999. Prevalence of selected target chemical contaminants in sport fish from two California lakes: Public health designed screening study. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Pesticide and Environmental Toxicity Section, Sacramento, CA.

Robertus, J. 2002a. Personal communication (letter to M. Chee, NASSCO, San Diego, CA, and S. Halvax, Southwest Marine, San Diego, CA, dated March 6, 2002, regarding background reference conditions for assessment and remediation of contaminated sediments at NASSCO and Southwest Marine shipyards). San Diego Regional Water Quality Control Board, San Diego, CA.

Robertus, J. 2002b. Personal communication (letter to M. Chee, NASSCO, San Diego, CA, and S. Halvax, Southwest Marine, San Diego, CA, dated July 2002 regarding assessment of bioaccumulation and risk to fish health from sediment contaminants at NASSCO and Southwest Marine shipyards). San Diego Regional Water Quality Control Board, San Diego, CA.

Stehr, C.M., M.S. Myers, and M.L. Willis. 1994. Collection of fish tissues for the national benthic surveillance project: necropsy procedure, tissue processing, and diagnostic procedure of histopathology. pp. 63–69. In: Sampling and analytical methods of the National Status and Trends Program national benthic surveillance and mussel watch projects, 1984–1992. Vol. 2. NOAA technical memorandum NOS ORCA 71. G.G. Lauenstein and A.Y. Cantillo (eds). National Oceanic and Atmospheric Administration, Coastal Monitoring and Bioeffects Assessment Division, Office of Ocean Resources Conservation and Assessment, National Ocean Service.

SWRCB. 2001. California ocean plan 2001. California Environmental Protection Agency, State Water Resources Control Board, Sacramento, CA.

U.S. EPA. 1986a. General QA/QC considerations for collecting environmental samples in Puget Sound. U.S. Environmental Protection Agency Region 10, Office of Puget Sound, Puget Sound Estuary Program, Seattle, WA.

U.S. EPA. 1986b. Recommended protocols for measuring conventional sediment variables in Puget Sound. U.S. Environmental Protection Agency Region 10, Office of Puget Sound, Puget Sound Estuary Program, Seattle, WA.

U.S. EPA. 1993a. Wildlife exposures factors handbook. EPA/600/R-93/187a. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC.

U.S. EPA. 1993b. Fish field and laboratory methods for evaluating the biological integrity of surface waters. EPA/600/R-92/111. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC.

U.S. EPA. 1995. QA/QC guidance for sampling and analysis of sediments, water, and tissues for dredged material evaluations. Chemical evaluations. EPA/823/B-95/001. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

U.S. EPA. 1999. National recommended water quality criteria—correction. EPA 822-Z-99-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

U.S. EPA. 2001. Methods for collection, storage, and manipulation of sediments for chemical and toxicological analyses. Technical Manual. Revised Draft. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

Weston. 1996. Recommendations for screening values for tributyltin in sediments at Superfund sites in Puget Sound, Washington. Prepared for U.S. Environmental Protection Agency, Seattle, WA. Roy F. Weston, Inc., Seattle, WA.

Figures

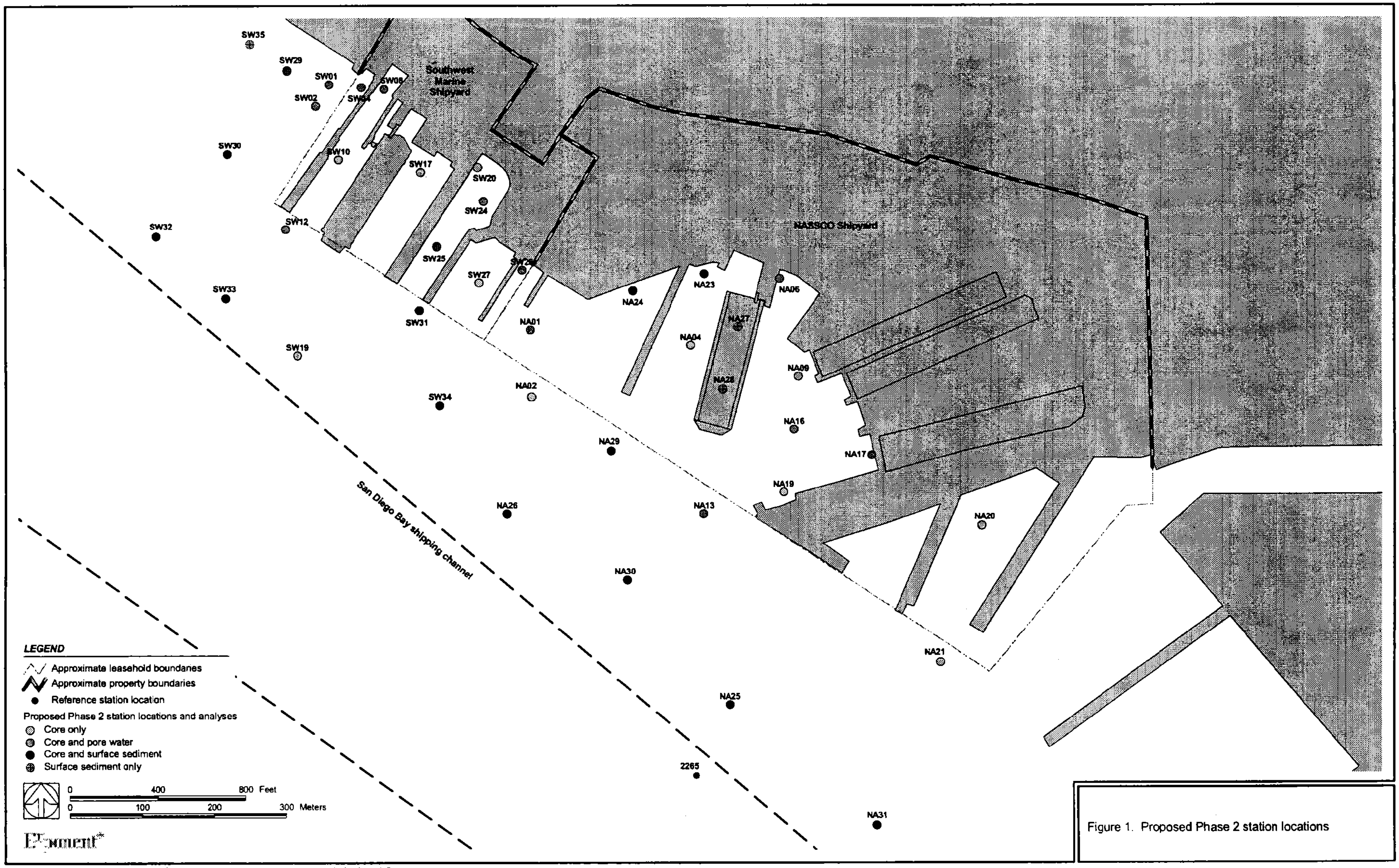

Figure 1. Proposed Phase 2 station locations

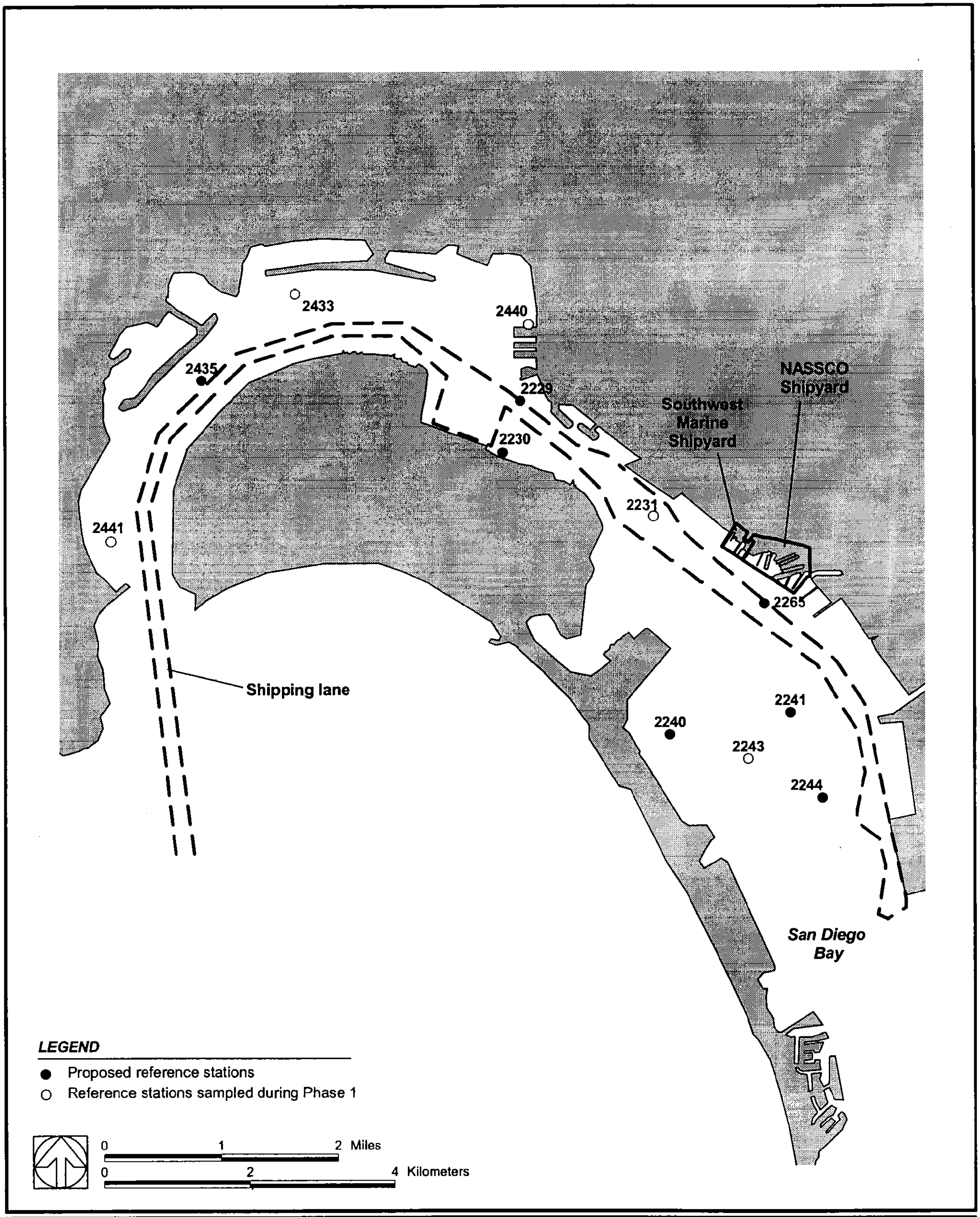

Figure 2. Proposed Phase 2 reference station locations

Exponent®

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Tables

Table 1. Phase 2 analyses in relation to beneficial uses

Analysis	Beneficial Use Aquatic Life	 Aquatic-dependent Wildlife	 Human Health
Pore water and associated sediment chemistry	X		
Tissue chemistry of fish and invertebrates		X	X
Fish histopathology	X		
Eelgrass chemistry	X	X	

Table 2. Proportion of stations above background conditions

	Amphipod Survival		Bivalve Normality		Echinoderm Fertility		Pooled Toxicity (per work plan Table 4-2)[a]		Benthic Macroinvertebrates: Differences from Reference[b]	
Chemical	With Biological Effects	Without Biological Effects	With Biological Effects	Without Biological Effects	With Biological Effects	Without Biological Effects	With Biological Effects	Without Biological Effects	Different from Reference	Not Different from Reference
Arsenic	0.17	0.58	0.58	0.44	0.25	0.54	0.29	0.57	0.54	0.47
Cadmium	1.00	0.92	0.92	0.94	1.00	0.92	1.00	0.91	1.00	0.88
Chromium	1.00	0.92	0.92	0.94	1.00	0.92	1.00	0.91	0.85	1.00
Copper	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lead	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Mercury	1.00	0.92	0.92	0.94	1.00	0.92	1.00	0.91	0.85	1.00
Nickel	0.33	0.67	0.75	0.50	0.50	0.62	0.29	0.70	0.54	0.65
Silver	1.00	0.96	1.00	0.94	1.00	0.96	1.00	0.96	0.92	1.00
Zinc	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Total PCBs	1.00	0.96	1.00	0.94	1.00	0.96	1.00	0.96	0.92	1.00

[a] High or medium likelihood of effects are considered an effect for this analysis.

[b] Major, moderate, or minor differences are all considered a difference for this analysis.

Table 3. Human health screening

Chemical	Maximum *Macoma* Tissue Concentrations (ppb)	Tissue Concentrations Predicted Using BSAF and Maximum Sediment Concentrations (ppb)	Human Health Tissue Residue Guidelines (ppb)
Metals			
Arsenic	3,800 [a]	3,000	1,000
Cadmium	60 [a]	2,000	3,000
Chromium	760 [b]	10,000	10,000
Copper	8,100 [b]	2,500,000	120,000
Mercury	26 [a]	3,900	300
Nickel	630 [b]	4,100	67,000
Selenium	500 [a]	300	2,000
Silver	77 [b]		17,000
Zinc	4,600 [b]	5,500,000	1,000,000
Organometallic Compounds			
Tributyltin	740 [b]		1,000
Polycyclic Aromatic Hydrocarbons			
Naphthalene	6 *U*[b]	3,400	67,000
Acenaphthene	6 *U*[b]		200,000
Fluorene	6 *U*[b]	7,500	130,000
Anthracene	44 [b]	25,000	1,000,000
Fluoranthene	300 [b]	30,000	130,000
Pyrene	470 [b]	20,000	67,000
Benz[a]anthracene	120 [b]	27,000	28
Chrysene	220 [b]	47,000	280
Benzo[b]fluoranthene	350 [b]	29,000	28
Benzo[k]fluoranthene	270 [b]	31,000	28
Benzo[a]pyrene	200 [b]	38,000	2.8
Indeno[1,2,3-cd]pyrene	44 [b]	16,000	28
Dibenz[a,h]anthracene	5.6 [b]	4,700	8.1
Polychlorinated Biphenyls			
PCBs[c]	310 [b]	94,000	20

Note: *U* - undetected at the detection limit shown
BSAF - biota-sediment accumulation factor

Boxed values exceed the tissue residue guideline for human health.

[a] OEHHA (1999).

[b] Calculation based on OEHHA (1999).

[c] Expressed as the sum of Aroclors® 1248, 1254, and 1260, as in OEHHA (1999).

Table 4. Receptor parameters

Receptor	Body Weight (kg)	Food Ingestion Rate (kg/day wet weight)[a]
Piscivorous Birds		
California brown pelican	2.85 [b]	0.922 [c]
California least tern	0.036 [d]	0.0317 [e]
Western grebe	0.808 [f]	0.248 [g]
Mollusc-Eating Bird		
Surf scoter	0.859 [h]	0.43 [i]
Marine Mammal		
California sea lion	45 [j]	3.95 [k]

[a] Moisture content of food is assumed to be 85 percent for surf scoter, based on measured moisture content of *Macoma*, and 75 percent for all other receptors (Bechtel 2001).

[b] Mean female weight minus 1 standard deviation, from Dunning (1993).

[c] Calculated using Nagy (1999) equation for pelecaniformes.

[d] Minimum weight of 150 adult birds (no gender differences) from Texas, Nebraska, and Massachusetts, from Thompson et al. (1997).

[e] Calculated using Nagy (1999) equation for charadriformes.

[f] Minimum adult female weight from Storer and Neuchterlein (1992).

[g] Calculated using Nagy (1999) equation for all birds.

[h] Average adult female weight from Morrier et al. (1997), as cited in Savard et al. (1998).

[i] Calculated using (1999) equation for all birds.

[j] Minimum adult female weight, from Whitaker (1997).

[k] Calculated using Nagy (1999) equation for carnivorous mammals.

Table 5. Hazard quotients

	Units	TRVs (mg/kg-day)		Hazard Quotient: Reference					Hazard Quotient: NASSCO					Hazard Quotient: Southwest Marine				
		Avian	Mammalian	Brown Pelican	Least Tern	Western Grebe	Surf Scoter	California Sea Lion	Brown Pelican	Least Tern	Western Grebe	Surf Scoter	California Sea Lion	Brown Pelican	Least Tern	Western Grebe	Surf Scoter	California Sea Lion
Total PCBs	μg/kg	0.09	0.36	24	66	23		1.6	61	167	58		4.2	269	730	250	1.7	18
Metals																		
Arsenic	mg/kg	5.5	0.32															
Cadmium	mg/kg	0.08	0.06	1.0	2.8				1.7	4.6	1.6			8.1	22	7.7		2.9
Chromium	mg/kg	0.13 [a]	1.3 [b]	11	29	10	1.8		23	62	22	1.4		26	70	24	2.9	
Copper	mg/kg	2.3	2.7	15	41	14		3.5	120	330	116		28	350	960	330	1.8	82
Lead	mg/kg	0.014	0.0015	29	80	28	37	74	50	140	47	29	130	180	500	174	68	460
Mercury (total)	mg/kg	0.039	0.027	3.5	9.4	3.3		1.4	26	72	25		10	32	88	31		13
Nickel	mg/kg	1.4	0.13												2.6			2.7
Selenium	mg/kg	0.23	0.05		1.1					1.1					1.1		1.1	
Zinc	mg/kg	17	9.6	2.7	7.3	2.5	2.5	1.3	17	47	16	16	8.4	103	280	98	1.3	50
PAHs																		
Acenaphthylene	μg/kg	0.13 [c]	1.3 [d]						1.2	3.4	1.2			3.0	8.3	2.9		
Anthracene	μg/kg	5 [e]	50 [f]											1.6	4.5	1.6		
Benz[a]anthracene	μg/kg	0.13 [c]	1.3 [d]	2.2	6.0	2.1			17	46	16			66	180	63		1.8
Benzo[a]pyrene	μg/kg	0.13 [c]	1.3	2.4	6.4	2.2			29	78	27			93	250	88		2.5
Benzo[b]fluoranthene	μg/kg	0.13 [c]	1.3 [d]	2.4	6.4	2.2			30	83	29			73	200	69	1.3	2.0
Benzo[ghi]perylene	μg/kg	0.13 [c]	1.3 [d]	1.7	4.6	1.6			13	36	13			29	78	27		
Benzo[k]fluoranthene	μg/kg	0.13 [c]	1.3 [d]	2.4	6.4	2.2			19	51	18			76	210	72	1.0	2.1
Chrysene	μg/kg	0.13 [c]	1.3 [d]	3.0	8.3	2.9			20	55	19			120	310	110		3.1
Dibenz[a,h]anthracene	μg/kg	0.13 [c]	1.3 [d]						4.2	11	4.0			12	31	11		
Fluoranthene	μg/kg	0.13 [c]	1.3 [d]	5.6	15	5.3			36	97	34			74	200	71	1.1	2.0
Fluorene	μg/kg	5 [e]	50 [f]												1.3			
Indeno[1,2,3-cd]pyrene	μg/kg	0.13 [c]	1.3 [d]	1.7	4.6	1.6			19	51	18			39	110	37		1.1
Naphthalene	μg/kg	5 [e]	50															
Phenanthrene	μg/kg	5 [e]	50 [f]											1.6	4.2	1.5		
Pyrene	μg/kg	0.13 [c]	1.3 [d]	6.1	17	5.8			34	92	32			49	130	46	1.8	1.3
Butyltins																		
Tributyltin	μg/kg	0.73	0.25															
Dibutyltin	μg/kg	0.73	0.25															

Note: PAH - polycyclic aromatic hydrocarbon
PCB - polychlorinated biphenyl
TRV - toxicity reference value

[a] Mammal TRV with 0.1 uncertainty factor from Table 3-2 of Bechtel (2001).

[b] Mammal TRV from Table 3-2 of Bechtel (2001).

[c] Mammal TRV for benzo[a]pyrene with 0.1 uncertainty factor from Table 3-2 of Bechtel (2001).

[d] Mammal TRV for benzo[a]pyrene from Table 3-2 of Bechtel (2001).

[e] Mammal TRV for naphthalene with 0.1 uncertainty factor from Table 3-2 of Bechtel (2001).

[f] Mammal TRV for naphthalene from Table 3-2 of Bechtel (2001).

Table 6. Chemical analyses to be completed for Phase 2

Chemical Analyses	Pore Water	Surface Sediment Associated with Pore Water Samples	Surface Sediment (Bight '98 Reference Stations)	Subsurface Sediment Cores	Additional Surface Sediment	Fish and Invertebrate Tissue	Eelgrass
Conventional Wet Chemistry							
Total organic carbon		X	X	X	X		
Grain size distribution (sand, silt, clay)		X	X	X	X		
Solids		X	X	X	X	X	X
Lipids						X	
Dissolved organic carbon	X						
Metals							
Arsenic	X	X	X	X	X	X[a]	X
Cadmium	X	X	X	X	X	X	X
Chromium	X	X	X	X	X	X	X
Hexavalent chromium	X	X					
Copper	X	X	X	X	X	X	X
Lead	X	X	X	X	X	X	X
Mercury	X	X	X	X	X	X	X
Nickel	X	X	X	X	X	X	X
Selenium	X	X	X	X	X	X	X
Silver	X	X	X	X	X	X	X
Zinc	X	X	X	X	X	X	X
Organometallic Compounds							
Butyltin	X	X	X	X	X	X	X
Dibutyltin	X	X	X	X	X	X	X
Tributyltin	X	X	X	X	X	X	X
Polycyclic Aromatic Hydrocarbons							
Naphthalene			X	X	X	X	X
2-Methylnaphthalene			X	X	X	X	X
Acenaphthylene			X	X	X	X	X
Acenaphthene			X	X	X	X	X
Fluorene			X	X	X	X	X
Phenanthrene			X	X	X	X	X
Anthracene			X	X	X	X	X
Fluoranthene			X	X	X	X	X
Pyrene			X	X	X	X	X
Benz[a]anthracene			X	X	X	X	X
Chrysene			X	X	X	X	X
Benzo[b]fluoranthene			X	X	X	X	X
Benzo[k]fluoranthene			X	X	X	X	X
Benz[a]pyrene			X	X	X	X	X
Indeno[1,2,3-cd]pyrene			X	X	X	X	X
Dibenz[a,h]anthracene			X	X	X	X	X
Benzo[ghi]perylene			X	X	X	X	X

Table 6. (cont.)

Chemical Analyses	Pore Water	Surface Sediment Associated with Pore Water Samples	Surface Sediment (Bight '98 Reference Stations)	Subsurface Sediment Cores	Additional Surface Sediment	Fish and Invertebrate Tissue	Eelgrass
Petroleum Hydrocarbons							
Gasoline-range organics			X	X	X		
Diesel-range organics			X	X	X		
Residual-range organics			X	X	X		
Polychlorinated Biphenyls							
Selected polychlorinated biphenyl congeners[b]			X	X	X	X	X
Aroclor® 1016	X	X	X	X	X	X	X
Aroclor® 1221	X	X	X	X	X	X	X
Aroclor® 1232	X	X	X	X	X	X	X
Aroclor® 1242	X	X	X	X	X	X	X
Aroclor® 1248	X	X	X	X	X	X	X
Aroclor® 1254	X	X	X	X	X	X	X
Aroclor® 1260	X	X	X	X	X	X	X
Aroclor® 1268	X	X	X	X	X	X	X
Polychlorinated Terphenyls							
Aroclor® 5032			X	X	X		
Aroclor® 5442			X	X	X		
Aroclor® 5460			X	X	X		

[a] Tissue samples will be analyzed for inorganic arsenic if total arsenic exceeds 1 ppm.

[b] IUPAC congeners 18, 28, 37, 44, 49, 52, 66, 70, 74, 77, 81, 87, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 177, 180, 183, 187, 189, 194, 201, and 206, and total homologs for each chlorination level.

Table 7. Station characteristics and sample types

Station	Core for Chemical Analysis	Pore Water	Additional Surface Sediment	Core for Engineering Properties	Description/Rationale
NA01	X				Core to capture any gradient from SW28 across the middle part of the leasehold toward the boundary and Station NA02.
NA02	X				Core to determine depth distribution of concentrations near the westernmost part of the NASSCO leasehold boundary. This location provides increased spatial resolution in this area, and has relatively low concentrations of shipyard chemicals in surface sediment.
NA04	X	X			Chemical and engineering cores to provide spatial resolution in this area where the leasehold is relatively wide, and shipbuilding activities are conducted nearby. Pore water sample to represent relatively high TBT concentrations.
NA06	X	X		X	Chemical and engineering cores to characterize sediment near shore and to determine depth distributions of relatively high PCB, copper, and mercury concentrations. Pore water to evaluate partitioning with relatively high PCB, copper, and mercury concentrations, and moderate TBT concentrations.
NA09	X			X	Core to determine depth distribution of chemicals near shore in an area of shipbuilding activity with relatively high chromium and mercury. Pore water sample to represent high chromium and mercury concentrations.
NA13	X	X		X	Cores and pore water to provide an assessment of conditions near the leasehold boundary in the region off the main area of shipbuilding activity at NASSCO.
NA16	X	X			Core to provide spatial resolution in the center of the NASSCO leasehold in the region of the main shipbuilding activities. Pore water to represent moderate concentrations of metals, PCB, and TBT.
NA17	X	X		X	Core to determine depth distribution of chemicals near shore in an area of shipbuilding activity with relatively high copper, lead, zinc, and TBT. Pore water sample to represent high copper, lead, zinc, and TBT concentrations.
NA19	X				Core to determine depth distribution of chemicals in an area of shipbuilding activity with a local peak in the zinc distribution. Pore water sample to represent relatively high zinc concentrations.
NA20	X				Core to determine depth distribution in area of potential disturbance and with relatively low concentrations of most shipyard chemicals.
NA21	X				Core to provide spatial resolution of the vertical distribution of chemicals near NASSCO's southern leasehold boundary.
NA23[a]	X		X		Core to determine depth distribution in a nearshore area away from most shipbuilding activities. Surface sediment sample to allow comparison of core intervals with surface sediment, as for other cores that have been placed at Phase 1 sampling stations.
NA24[a]	X		X	X	Chemical and engineering cores to determine depth distribution of chemicals and physical properties in a nearshore area away from most shipbuilding activities. Surface sediment sample to allow comparison of core intervals with surface sediment, as for other cores that have been placed at Phase 1 sampling stations.

Table 7. (cont.)

Station	Core for Chemical Analysis	Pore Water	Additional Surface Sediment	Core for Engineering Properties	Description/Rationale
NA25[a]	X		X		Core to extend spatial coverage toward channel from outermost Phase 1 station. Surface sediment sample to allow comparison of core intervals with surface sediment, as for other cores that have been placed at Phase 1 sampling stations.
NA26[a]	X		X		Core to extend spatial coverage toward channel from outermost Phase 1 station. Surface sediment sample to allow comparison of core intervals with surface sediment, as for other cores that have been placed at Phase 1 sampling stations.
NA27			X		Surface sediment to characterize conditions below the NASSCO drydock.
NA28			X		Surface sediment to characterize conditions below the NASSCO drydock.
NA29[a]	X		X		Core and surface sediment to provide increased spatial resolution of potential cleanup boundary in the area near the NASSCO leasehold boundary.
NA30[a]	X		X		Core and surface sediment to provide increased spatial resolution of potential cleanup boundary in area beyond shipyards.
NA31[a]	X		X		Core and surface sediment to extend spatial coverage to the south of NASSCO out to the shipping channel.
SW01	X	X		X	Chemical and engineering cores to determine depth distribution of chemicals and physical properties in a nearshore area with high copper, mercury, zinc, and PCBs. Pore water sample to represent high copper, mercury, zinc, and PCB concentrations.
SW02	X	X			Core to determine depth distributions of chemicals in an area with high concentrations of copper, lead, mercury, and zinc. Pore water sample to represent high copper, lead, mercury, and zinc.
SW04	X	X			Core to determine depth distributions of chemicals in an area with high concentrations of arsenic, copper, lead, zinc, and TBT. Pore water sample to represent high arsenic, copper, lead, zinc, and TBT.
SW08	X	X			Core to determine depth distributions of chemicals in an area with high concentrations of copper, lead, mercury, zinc, TBT, PCB, and PAH. Pore water sample to represent high copper, lead, mercury, zinc, TBT, and PCB.
SW10	X			X	Chemical and engineering cores to provide spatial resolution between the shoreline and the outer leasehold boundary, in a location with high PAH and moderately high zinc concentrations.
SW12	X	X			Core to determine depth distributions of concentrations near the outermost part of the Southwest Marine leasehold boundary. Pore water sample to represent relatively low concentrations of metals in surface sediment.
SW17	X			X	Chemical and engineering cores to characterize nearshore sediments in this part of the Southwest Marine leasehold.
SW19	X				Core to provide spatial coverage out to the channel in this part of the study area, and to determine the depth distribution of the local peak in surface sediment mercury.

Table 7. (cont.)

Station	Core for Chemical Analysis	Pore Water	Additional Surface Sediment	Core for Engineering Properties	Description/Rationale
SW20	X				Core to determine depth distributions of concentrations in this nearshore area with relatively high concentrations of zinc and PAH.
SW24	X	X		X	Chemical and engineering cores to determine depth distributions of chemicals and physical properties in a location with high mercury and PAH concentrations and moderate PCB concentrations. Pore water sample to represent high mercury and moderate PCB concentrations.
SW25	X	X			Core to provide spatial resolution in the mid- to outer region of this part of the Southwest Marine leasehold, and to capture any gradient away from Stations SW20 and SW24.
SW27	X				Core to provide spatial resolution in this part of the Southwest Marine leasehold, and to capture any gradient away from Station SW28.
SW28	X	X			Core to determine depth distributions of chemicals and physical properties in this location with high PCB and high PAH concentrations. Pore water sample to represent high PCB concentrations.
SW29[a]	X		X		Core and surface sediment to provide increased spatial resolution of potential cleanup boundary in area beyond shipyards.
SW30[a]	X		X	X	Core and surface sediment to provide increased spatial resolution of potential cleanup boundary in area beyond shipyards. Engineering properties to provide measurement of physical sediment conditions in this general region outside the shipyards
SW31[a]	X		X	X	Chemical and engineering cores to determine depth distribution of chemicals and physical properties near the leasehold boundary in this region of the Southwest Marine leasehold. Surface sediment sample to allow comparison of core intervals with surface sediment, as for other cores that have been placed at Phase 1 sampling stations.
SW32[a]	X		X		Core and surface sediment to extend spatial coverage to the southwest of Southwest Marine, out to the shipping channel.
SW33[a]	X		X		Core and surface sediment to extend spatial coverage out from the Southwest Marine leasehold to the shipping channel.
SW34[a]	X		X		Core and surface sediment to provide increased spatial resolution of potential cleanup boundary in area beyond shipyards.
SW35[a]			X		Surface sediment to extend spatial coverage along the shoreline to the northwest of Southwest Marine.

Note: PAH - polycyclic aromatic hydrocarbon
PCB - polychlorinated biphenyl
TBT - tributyltin

[a] New stations.

Table 8. Summary of Phase 2 stations by study site

Sample Type	Number of Stations			Samples per Station	Number of Samples		
	NASSCO	Southwest Marine	Reference		NASSCO	Southwest Marine	Reference
Chemical Analysis							
Subsurface sediment cores[a] (chemistry)	18	19	0	5	90	95	0
Surface sediment (chemistry; metals and organics)	9	7	12	1	9	7	12
Surface sediment (pore water and sediment chemistry [metals, butyltins, and PCBs])	5	8	5	1	5	8	5
Fish tissue for human health risk assessment (fillets)	1–2[b,c]	1–2[b,c]	1	5	5–10	5–10	5
Fish tissue for human health and ecological risk assessment (whole body)—species 1	1–2[b]	1–2[b]	1	5	5–10	5–10	5
Fish tissue for ecological risk assessment (whole body)—species 2	1–2[b]	1–2[b]	1	5	5–10	5–10	5
Benthic mussel tissue—five individuals (or composites) per location	1–2[b]	1–2[b]	1	5	5–10	5–10	5
Crab tissue—five individuals (or composites) per location	1–2[b]	1–2[b]	1	5	5–10	5–10	5
Eelgrass tissue	1	1	1	1	1	1	1
Engineering Properties							
Subsurface sediment cores[d] (engineering properties)	5	6	0	2	10	12	0
Histopathological Analysis							
Fish tissue—one species, 50 fish at each location	1–2[b]	1–2[b]	2	50	50–100	50–100	100
Age Determinations							
Otoliths or fish scales	1–2[b,c]	1–2[b,c]	2	50	50–100	50–100	50–100

[a] A maximum of five sections will be collected from each core.

[b] Depending on organism availability and collection method used.

[c] Chemical analyses of fish fillets and age determinations will be made on fish used for histopathological analyses.

[d] Two sections per core assumed; final decision will be made pending results of Phase 1.

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Appendix A

Collection and Analysis of Fish Tissues from San Diego Harbor

Collection and Analysis of fish tissues from San Diego Harbor: necropsy procedure, tissue processing, and diagnostic procedure of histopathology

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DRAFT - July 18, 2002

Procedures in this project will generally follow those described by Stehr et al. (1994), with several modifications:

Recording of Field Data: For each fish collected for pathological examination, the following information will be recorded on a data sheet (1 sheet per fish):

1. Unique sample number assigned to the fish
2. Capture date
3. Capture time
4. Location of capture (when this is the same for several fish; an abbreviation defined on the first fish in a group may be used on subsequent fish)
5. Whether fish were selected or randomly captured from the wild
6. Whether fish were selected or randomly netted from the holding tank for necropsy
7. Pathologist initials
8. Recorder initials
9. Species identification
10. Fork length (mm)
11. Body weight (g)
12. Gonad weight (g)
13. Liver weight (g)
14. Gross lesions (scored as none, mild, moderate, or severe) - caudal fin fraying: caudal fin reddening, other fin fraying, fin base reddening, focal skin reddening, diffuse skin reddening, cutaneous copepod, and other gross lesions
15. Gender
16. Gonad fullness (juvenile, or fullness from 0-25%, 26-50%, 51-75%, 76-100%)
17. Gonad development (juvenile, unripe, ripe, spawned out)
18. Number of *Anisakis* parasites in the body cavity
19. Ascites volume (fluid in the body cavity)
20. Location and description of other gross lesions
21. Check-off for when each organ for histopathology is in formalin - gonad, liver, and spleen
22. Check-off for when the otoliths are collected for age determination
23. Initials by recorder after final check that all specimens have been collected and all needed data recorded

Necropsy procedure: Fish will be killed with an overdose of anesthesia (MS-222, Finquel®, approximately 300 mg/L) and by exsanguination during the necropsy. Because different fish will be used for health assessment than for contaminant determination, tools for the fish health assessment will be wiped clean between fish with a paper towel. Necropsies will be performed on a vessel in San Diego Harbor; after capture, fish will be held in fresh seawater no longer than 5 hours before they are subjected to necropsy.

Observation and collection of external lesions - immediately after the fish is anesthetized, it will be weighed, measured (fork length), and examined and scored for external lesions. All lesions will be recorded on a unique data sheet for each fish. Nodular lesions will be dissected and preserved in 10 % neutral buffered formalin; ulcers and frayed fins will not be preserved.

Observation and collection of internal lesions - because bile can begin to digest tissues before they are preserved, bile will be aspirated from the gallbladder using a needle and syringe. Gonad and liver will be removed, weighed, examined for lesions, and a 1-cm-thick wedge of each organ will be preserved in 10% neutral buffered formalin. A single-edged razor blade will be used to cut a routine section for liver histology (no thicker than 10 mm) from the central longitudinal axis of the liver. Sharp scissors will be used to cut a routine section for gonad histology (no thicker than 15 mm) from the cranial half of the gonad. The remainder of the gonad and liver will be examined for lesions; any lesions outside the routinely sampled area will also be trimmed and preserved in formalin. Other organs will be briefly examined, and any lesions will be trimmed and preserved in formalin.

Processing and analyzing histopathology tissues:

Each fish will be randomly assigned a unique number for processing and examination of all organs. In this way, the pathologist will have no knowledge of the site of capture during microscopic examination and lesion scoring. Organs will be trimmed to a thickness of less than 3 mm, processed routinely into paraffin, sectioned at 4 - 5 microns thickness, stained with hematoxylin and eosin, and coverslipped. Slides will be examined using a binocular light microscope and any changes in the tissues will be recorded and entered into a computer spreadsheet. Changes will be scored semiquantitatively on a scale from 0 (none), 1 (mild), 2 (moderate), or 3 (severe). To ensure consistency of diagnostic criteria, Dr. Marty will perform all histopathologic examinations and "type specimens" of each scored lesion will be assigned and described; Appendix 1 contains an example of the type specimen summary sheet and descriptive criteria for liver lesions. This type of analysis has been used in several peer-reviewed publications describing results from both laboratory- and field-based studies (Kocan et al. 1996; Marty et al. 1998; Hedrick et al. 1999; Marty et al. 1999; Hedrick et al. 2000).

Literature cited

Hedrick, R.P., T.S. McDowell, M. Gay, G.D. Marty, M.P. Georgiadis, and E. MacConnell. 1999. Comparative susceptibility of rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*) to *Myxobolus cerebralis* the cause of salmonid whirling disease. Dis. Aquat. Org. 37:173-183.

Hedrick, R.P., T.S. McDowell, G.D. Marty, K. Mukkatira, D.B. Antonio, K.B. Andree, Z. Bukhari, and T. Clancy. 2000. Ultraviolet irradiation inactivates the waterborne infective stages of *Myxobolus cerebralis*: a treatment for hatchery water supplies. Dis. Aquat. Org. 42:53-59.

Kocan, R.M., G.D. Marty, M.S. Okihiro, E.D. Brown, and T.T. Baker. 1996. Reproductive success and histopathology of individual Prince William Sound herring 3 years after the *Exxon Valdez* oil spill. Can. J. Fish. Aquat. Sci. 53(10):2388-2393.

Marty, G.D., E.F. Freiberg, T.R. Meyers, J. Wilcock, T.B. Farver, and D.E. Hinton. 1998. Viral hemorrhagic septicemia virus, *Ichthyophonus hoferi*, and other causes of morbidity in Pacific herring *Clupea pallasi* spawning in Prince William Sound, Alaska, USA. Dis. Aquat. Org. 32(1):15-40.

Marty, G.D., M.S. Okihiro, E.D. Brown, D. Hanes, and D.E. Hinton. 1999. Histopathology of adult Pacific herring in Prince William Sound, Alaska, after the *Exxon Valdez* oil spill. Can. J. Fish. Aquat. Sci. 56(3):419-426.

Stehr, C.M., M.S. Myers, and M.L. Willis. 1994. Collection of fish tissues for the national benthic surveillance project: necropsy procedure, tissue processing, and diagnostic procedure of histopathology. In: Sampling and analytical methods of the National Status and Trends Program national benthic surveillance and mussel watch projects, 1984-1992, Vol. 2, edited by G.G. Lauenstein and A.Y. Cantillo, National Oceanic and Atmospheric Administration, Coastal Monitoring and Bioeffects Assessment Division, Office of Ocean Resources Conservation and Assessment, National Ocean Service, NOAA technical memorandum NOS ORCA; 71, pp. 63-69.

Appendix 1. Summary of type specimens for liver scores used during histopathologic examination ("type specimens" are good examples of each lesion score). Abbreviations are explained on the next pages. Scored lesions and type specimens will be modified, as needed, to fit the range of changes observed in the fish captured in San Diego Harbor. This example was originally constructed for use with Rock Sole collected from Puget Sound, Washington. Lesions may be added or deleted, as needed, with the species sampled from San Diego Harbor.

LIVER (Summary of type specimens)

Lesion Abbreviation	None score = 0	Mild score = 1	Moderate score = 2	Severe score = 3
Atly				
Art				
GD				
LMA				
LGR				
LIP				
FPL				
PVL				
NPM				
MEG				
HV				
FN				
SCN				
SH				
CBH				
PCL				
PMD				
BDM				

Liver Scores

Quality Control/Quality Assurance

1. Atly = Autolysis. Changes in membrane integrity begin immediately after death, and are often aided by leakage of bile onto cells.
    1. score = 0; no membrane changes, erythrocytes stained intensely.
    2. score = 1; loss of membrane integrity; hepatocytes had fragmented nuclei and pale basophilic cytoplasm; changes were probably due to autodigestion from leakage of bile.
    3. score = 2; none were moderate.
    4. score = 3; none were severe.

2. Art = Artifact. Tissue changes that were not inherent in the tissue sampled. Sources of artifact included handling at necropsy, processing, sectioning, and staining. Artifact is scored on the basis that it impedes interpretation of tissue morphology. Examples of artifact include splits, bubbles, or knife marks in tissues.
    1. score = 0; sections had no tissue alterations that would impede analysis or photography of any part of the sections.
    2. score = 1; tissue alterations were present, but most areas could still be photographed without artifact, and analysis for lesions was unaffected.
    3. score = 2; tissue alteration prevented analysis for lesions in some areas and photography would be unacceptable anywhere.
    4. score = 3; tissue alterations were too extensive for histopathologic analysis.

Physiological condition

1. GD = glycogen depletion. A lesion in hepatocytes; hepatocytes normally have abundant cytoplasmic glycogen stores characterized by a large volume of clear, irregular, poorly demarcated vacuoles (= glycogen vacuoles).
    a. score = 0; hepatocytes had abundant glycogen vacuoles.
    a. score = 1; glycogen vacuoles were smaller, but still larger than nuclei.
    b. score = 2; glycogen vacuoles were smaller than or about equal to nuclear diameter.
    c. score = 3; glycogen vacuoles were absent for most hepatocytes.

Lesions

1. LMA = liver macrophage aggregates. A lesion in the hepatic stroma or capsule. Macrophage aggregates were pigmented yellow-brown to green-brown, and occasionally contained lymphocytes.
    a. score = 0; no macrophage aggregates.
    b. score = 1; sections had <7 MAs greater than 60 μm in diameter per 100×field.
    c. score = 2; sections had ≥7 but <14 MAs greater than 60 μm in diameter per 100×field.
    d. score = 3; sections had ≥ 14 MAs greater than 60 μm in diameter per 100×field.

2. LGR = liver/hepatic granulomas (or focal granulomatous inflammation). Focal hepatic granulomatous inflammation, composed of nonpigmented macrophages, was distributed throughout the parenchyma, commonly associated with portal tracts. LGR did NOT include inflammation scored as part of the *Myxidium* scores [see below], or pigmented macrophage aggregates scores as part of the LMA score [see above].
   1. score = 0; no granulomatous inflammation.
   2. score = 1; the sections have <1 focus of granulomatous inflammation per 100×field, and total area is <1 mm^2.
   3. score = 2; the sections have several foci of granulomatous inflammation, totaling ≥1 mm^2 but <3 mm^2.
   4. score = 3; foci of granulomatous inflammation total >3 mm^2.

3. LIP = lipidosis. A change/lesion in hepatocytes; excess lipid appears as clear, round, well-demarcated, cytoplasmic vacuoles (= lipid vacuoles). Pathologic change is more likely when the vacuoles are significantly larger than nuclei. When nearly all hepatocytes are uniformly affected and vacuoles are about the size of nuclei, the change may be normal in association with egg production.
   1. score = 0; hepatocytes had no lipid vacuoles.
   2. score = 1; less than 33% of hepatocytes in the section had lipid vacuoles.
   3. score = 2; 34-66% of hepatocytes in the section had lipid vacuoles, or up to 100% of hepatocytes had vacuoles that were rarely larger than nuclei.
   4. score = 3; more than 66% of hepatocytes in the section had lipid vacuoles.

4. FPL = focal/multifocal parenchymal leukocytes. Leukocyte aggregates were usually less than 500 μm in diameter and were composed mostly of lymphocytes and sometimes macrophages.
   1. score = 0; no focal parenchymal leukocytes.
   2. score = 1; <1 focus of parenchymal leukocytes per 100×field.
   3. score = 2; 1-2 foci of parenchymal leukocytes per 100×field.
   4. score = 3; none were severe

5. PVL = perivascular leukocytes (lymphocytes and plasma cells). A lesion of the connective tissue (adventitia) surrounding blood vessels. Lymphocytes within the tunica intima and tunica media were NOT included in this category.
   1. score = 0; <3 lymphocytes or plasma cells in the adventitia of any vessel in the section.
   2. score = 1; 3 - many lymphocytes or plasma cells in the adventitia of at least one vessel in the section, but leukocytes do not extend into the surrounding parenchyma or the muscular tunics of the vessel.
   3. score = 2; perivascular leukocytes extend into the surrounding parenchyma.
   4. score = 3; none were severe.

6. NPM = hepatocellular nuclear pleomorphism (= anisokaryosis). This diagnosis was used

when the largest hepatocyte nuclei were at least 2×the diameter of the smallest hepatocyte nuclei. Size of cytoplasm was about equal for all hepatocytes in the section [enlarged cells were scored as megalocytes in the MEG category.]

1. score = 0; sections had no enlarged hepatocyte nuclei.
2. score = 1; <2 enlarged hepatocyte nuclei per 100×field.
3. score = 2; 2-10 enlarged hepatocyte nuclei per 100×field.
4. score = 3; >10 enlarged hepatocyte nuclei per 100×field.

7. MEG = megalocytic hepatosis (= hepatocellular megalocytosis). This diagnosis was used when the largest hepatocytes were at least 2×the diameter of the smallest hepatocytes. Sections in which hepatocyte nuclei were enlarged, but total cell size was not changed, were scored as pleomorphic nuclei (NPM above). This score does NOT include neoplasms or foci of cellular alteration.
    1. score = 0; sections had no enlarged hepatocytes.
    2. score = 1; <2 enlarged hepatocytes per 100×field.
    3. score = 2; 2-10 enlarged hepatocytes per 100×field.
    4. score = 3; >10 enlarged hepatocytes per 100×field.

8. HV = hydropic vacuolation. This lesion was diagnosed based on the description of Stehr et al. 1998 (Dis. Aquat. Org. 32:119-135). Both hepatocytes and biliary epithelial cells are included in this diagnosis. Affected cells contain a single, large vacuole that is well-demarcated but has an irregular margin; cells have minimal remaining cytoplasm. These vacuoles were not easily differentiated from cytoplasmic glycogen (small, multiple, vacuoles with irregular margins; abundant glycogen and moderate HV sometimes occurred in the same liver), but they were easily differentiated from lipid (variably sized, single or multiple vacuoles, with smooth rounded margins). In moderate and severe cases, cells with hydropic vacuolation were often grouped into larger foci (e.g., ductular patterns).
    1. score = 0; each 100×field had <3 cells with hydropic vacuolation.
    2. score = 1; each 100×field had 3-10 cells with hydropic vacuolation.
    3. score = 2; each 100×field had 11-25 cells with hydropic vacuolation.
    4. score = 3; each 100×field had >25 cells with hydropic vacuolation.

9. FN = focal necrosis. A lesion primarily of hepatocytes. Affected cells had hypereosinophilic coagulated cytoplasm, and pyknotic, karyorrhectic, or karyolytic nuclei.
    1. score = 0; No necrotic cells in the section.
    2. score = 1; total area of necrosis was ≤400 μm in diameter.
    3. score = 2; total area of necrosis was >400 μm but ≤1 mm in diameter.
    4. score = 3; total area of necrosis was >1 mm in diameter.

10. SCN = single cell necrosis. A lesion of hepatocytes. Affected cells had pyknotic nuclei and condensed cytoplasm that often stained more deeply eosinophilic than normal cells. Because of cytoplasmic collapse, individual necrotic cells were sometimes surrounded by a

clear ring or halo. SCN must be differentiated from artifact. Even slightly rough handling results in cells with dark-staining cytoplasm, but nuclei were not pyknotic and cytoplasm tends to stain basophilic.

1. score = 0; <3 necrotic cells in the section.
2. score = 1; <1 necrotic cell per 400×field.
3. score = 2; 1-2 necrotic cells per 400×field.
4. score = 3; >2 necrotic cells per 400×field.

11. SH = spongiosis hepatis. Foci varied from 50 to 500 μm in diameter. Affected foci were characterized by narrow net-like connective tissue surrounded spaces filled with proteinaceous fluid and small numbers of lymphocytes. Foci of SH were often associated with bile ducts.
    1. score = 0; sections had no foci of spongiosis.
    2. score = 1; 1 to 3 foci of spongiosis per section.
    3. score = 2; 4 to 8 foci of spongiosis per section, or at least one focus greater than 1.5 mm in diameter.
    4. score = 3; >8 foci of spongiosis per section.

12. CBH = cholangitis/biliary hyperplasia. Cholangitis had lymphocytic exocytosis, with variable amounts of bile ductule hyperplasia and fibrosis. Bile ducts with luminal parasites (e.g., *Myxidium*) were NOT included in CBD.
    1. score = 0; no cholangitis or biliary hyperplasia.
    2. score = 1; ≤2 foci of cholangitis or biliary hyperplasia, and foci were ≤400 μm in diameter.
    3. score = 2; >2 foci of cholangitis or biliary hyperplasia, or foci were >400 μm in diameter.
    4. score = 3; none were severe.

13. PCL = pericholangial leukocytes (lymphocytes, plasma cells, and macrophages). A lesion of the connective tissue (adventitia) surrounding bile ducts. Leukocytes within the bile duct epithelium or lumen were NOT included in this category (they were included in the CBH category). This lesion was scored only in the absence of cholangitis (i.e., leukocytes with cholangitis were included in the CBH score and not also scored in PCL).
    1. score = 0; <3 leukocytes around every bile duct in the section.
    2. score = 1; 3 - many lymphocytes or plasma cells surround at least on bile duct in the section, but leukocytes do not extend into the surrounding parenchyma.
    3. score = 2; pericholangial leukocytes extend into the surrounding parenchyma.
    4. score = 3; none were severe.

14. PMD = myxosporean plasmodium (*Myxidium* sp.). Plasmodia were large structures, up to 1 mm in diameter, composed of multiple pseudopodia, each about 80 μm in diameter. Plasmodia occasionally contained sporogonic phases of *Myxidium* sp.
    1. score = 0; sections had no plasmodia.

2. score = 1; 1 or 2 plasmodia per section.
3. score = 2; 3,4, or 5 plasmodia per section.
4. score = 3; >5 plasmodia per section, and may be associated with inflammation.

15. BDM = bile duct myxosporeans (*Myxidium* sp.). The bile ducts sometimes contained multicellular organisms that were oval to spherical 15 to 30 μm in diameter, with one to six nuclei. Spores were observed only rarely. Spores began to mature within elongate eosinophilic structures, about 40x15 μm. Mature spores had 2 distinct polar capsules and a sporoplasm within an oval, bivalved capsule, about 15x10 μm. Myxosporean stages within plasmodia are NOT included in this score (they are in the PMD score).
    1. score = 0; bile ducts contained no myxosporeans.
    2. score = 1; bile ducts contained 1-25 myxosporeans, but no associated inflammation or epithelial hyperplasia.
    3. score = 2; bile ducts contained >25 myxosporeans, but no associated inflammation or marked epithelial hyperplasia.
    4. score = 3; bile ducts contained >25 myxosporeans, with associated inflammation or marked epithelial hyperplasia.

16. FCA = foci of cellular alteration. Score = number of foci per section. FCA were also classified by type as follows:
    1. Bcf = basophilic cell focus
    2. Ccf = clear (=vacuolated) cell focus
    3. Ecf = eosinophilic cell focus

17. NEO = neoplasia. Score = number of neoplasms per section. Neoplasms were also classified as follows:
    1. Hepatocellular adenoma
    2. Hepatocellular carcinoma
    3. Biliary adenoma
    4. Biliary carcinoma

Liver lesions scored for location, not severity:

18. FBG = foreign body granuloma (probably secondary to *Anisakis* or an unidentified parasite). A lesion of the hepatic stroma or capsule. The granulomas were composed of concentric layers of intensely eosinophilic material (fibrin?) and small (about 8 ×5 μm), oval, deeply basophilic nuclei. Many of the granulomas contained hyaline material that probably was degenerating parasite cuticle. Some granulomas contained clumped, amorphous, brown-green material or refractile yellow material. Location was designated at none (0), parenchyma (P), capsule/margin (M), or both parenchyma and margin (B).

19. ANI = *Anisakis* nematode parasites. Scoring was the same as for FBG.

Sample #: ____________

Capture Date: Capture Time: Capture: R (Random) S (Selected)

Location of Capture: ________________________________

Species: WC / BC / BSB / SSB / ____________ Necropsy order: R (Random) S (Selected)

Fork length: ____________ mm

Body weight: ____________ g Necropsy start time: ____________

Gill weight: ____________ g Pathologist: ________ initials

Liver weight: ____________ g Recorder: ________ initials

Kidney weight: ____________ g

Gonad weight: ____________ g

GROSS LESIONS:	None	Mild	Mod.	Sev.
Caudal Fin Fraying:	0	1	2	3
Caudal Fin Reddening:	0	1	2	3
Other Fin Fraying:	0	1	2	3
Fin Base Reddening:	0	1	2	3
Focal Skin Reddening:	0	1	2	3
Diffuse Skin Reddening:	0	1	2	3
Cutaneous copepod:	0	1	2	3
____________:	0	1	2	3
Ichthyophonus?:	0	1		
Gonad Fullness:	0	1	2	3 Juvenile
Gonad development:	juvenile	unripe	ripe	spawned out

ORGAN	*In Formalin*
Gill	________
Liver	________
Kidney	________
Gonad	________

Otolith ________

Sex: M | F

# of Anisakis: ______ Ascites volume: ________ mL

Other Gross Findings:

0.5-1.0 mm white foci (Ichthyophonus?) in:

FINAL CHECK:

____

Initials

Appendix B

Field Forms

STATION CORE LOG

Exponent®

Cruise ________ Station ________ Core ________ Date ________ Gear ________

Cast No.	Start Time	End Time	Water Depth ( )	Core Penetration Depth (cm)	Retrieved Core Length (cm)	Overlying Water	Coordinates	
							Latitude	Longitude

Texture:	Cobble	Gravel	Sand	Silt	Clay
Color:	Black	Brown		Grey	Green
Odor:	Normal	Sewage	H_2S	Petroleum	None

Comments

____

____

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____

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____

____

Photo: Roll ________ No. ________

Initials ________

FIELD SEDIMENT CORE FORM

Exponent®

Sheet ___ of ___

Client/Owner ______________________ Station Number __________

Contract No. ______________________________________

Date ____________________

Field Scientist ______________________________________

Contractor/Operator ______________________________________

Core Type/Method ______________________________________

Sample No.	Photo No.	Odor	Sheen			-H20 Breaks	Depth Scale	Unified Symbol	Sediment Description	Comments