Response Summary

The purpose of the Response Summary is to provide EPA's responses to the comments EPA received from the public on EPA's proposed plan and administrative record file for the Palos Verdes Shelf. The comment period was announced on March 29, 2000 and began on March 29, 2000. The comment period was originally scheduled to end on April 28, 2000, a duration of 30 days. However, in response to a request from the public, EPA extended the comment period to May 15, 2000 (i.e., an overall duration of 47 days).

EPA held four formal public meetings on the proposed plan: on April 11th at Long Beach State University in Long Beach; on April 15th at the Cabrillo Marine Aquarium in San Pedro; on April 19th at the Knob Hill Community Center in Redondo Beach; and on April 26th at the Palos Verdes Intermediate School in Palos Verdes Estates. These meetings were divided into two parts. In the first part, EPA explained its proposed response action (i.e., the institutional controls), answered questions and provided an opportunity for formal public comment on the proposed plan. In the second part of each meeting, EPA presented an overview of its plans for a pilot capping project that would be conducted in the summer and fall of 2000. The entire proceedings for the first part of each meeting were transcribed by a court reporter and are being included in the final administrative record.

EPA received two kinds of comments: 1) written comments received during the public comment period, and 2) oral comments received at the public meetings. EPA is required by law to consider and address those comments that are pertinent and significant to the selection of the response action and the proposed plan. EPA is not required to address comments that pertain to the allocation of liability for the response action or to potential enforcement actions to implement the selected response action, as these are independent of the selection of the response action. EPA does have the discretion to address comments with limited pertinence if doing so would nonetheless address the concerns of a significant segment of the public.

EPA is not required to re-print the comments received verbatim and may paraphrase where appropriate. However, all written and oral comments are included in their entirety in the final administrative record, which is available to the public. In many cases in this response summary, EPA has included large segments of the original comments.

Responses to Comments

Mary Frampton, Conserve Our American Shores Today (COAST)

Comment #1: EPA should do whatever it can to correct the mess at Palos Verdes. Can we fix it?

Response: The institutional controls being selected by EPA are intended to address the human health risks by reducing the likelihood of people consuming contaminated fish from the area. However, these controls will not eliminate or mitigate the environmental conditions that cause those fish to become contaminated in the first place. EPA is continuing to evaluate options for physical cleanup actions at Palos Verdes Shelf and will provide the public with the results of that evaluation and an opportunity to comment on any proposed cleanup actions.

Neil Guglielmo and Nick Guglielmo, commercial fishermen, San Pedro CA

Comment #2: No white croaker are being caught with gill nets in the contaminated area of the Palos Verdes Shelf. Roundhaul nets are the source of the contaminated white croaker from the Palos Verdes Shelf area (and from Santa Monica Bay) to local retail markets.

Response: Comment noted. EPA will convey this information to the appropriate agencies, including California Dept. of Fish and Game, for consideration in implementation of the enforcement program.

Mark Gold, Heal the Bay

Heal the Bay urges the EPA to implement a comprehensive institutional controls program as soon as possible. However, the public outreach program as proposed is inadequate in a variety of ways:

Comment #3: A successful, long-term risk communication program targeting consumers of contaminated white croaker would be far more expensive than suggested. This program should be a multi-media effort using television and radio public service announcements, print ads, and point-of-purchase efforts at sporting goods/sportfishing stores and bait shops. Many of these media components would have to be produced in multiple languages to effectively communicate the health risks of consuming contaminated fish.

Response: EPA generally agrees with this comment. The revised institutional controls program places greater emphasis on public education and risk communication

activities than the other key components (monitoring and enforcement) and includes a much larger initial budget for those activities. Communication activities will use a variety of media and materials appropriate to reaching specific target audiences, such as sport fishers. The pilot outreach and education program used materials that, in some cases, were prepared in seven languages (Korean, Tagalog, Cambodian, Vietnamese, Spanish, English, and Chinese). Such a multi-lingual approach will be continued in the full-scale program.

Comment #4: Working with community-based organizations (CBOs) is a critical component of the public outreach effort, and the proposed 10-year funding for this activity ($57,000) is unrealistic. CBOs should be provided funds on an annual basis to perform different outreach efforts for targeted audiences. EPA should also consider involving education centers (such as local aquariums) as well as grocer and restaurant associations in this effort. The program will not be successful without full participation of the critical CBOs and trade associations.

Response: EPA agrees that participation of the CBOs and trade associations in the outreach programs is important, and the Agency will actively seek their involvement. The proposed 10-year budget of $57,000 will be increased as appropriate to adequately support the CBOs. EPA will also seek to continue the involvement of local entities, such as the Cabrillo Marine Aquarium and others identified during the pilot outreach project, in the full-scale program.

Comment #5: Heal the Bay strongly supports the clean fish certification program. There needs to be a program set up to accurately track contaminated fish back to the area where it was caught, including investigation and periodic spot inspections of vessels that catch white croaker and commercial distributors.

Response: The monitoring and enforcement components of the institutional controls program will include random testing of white croaker fish both at markets and restaurants, as well as spot checks on the required documentation of the sources from which these retail outlets purchase their fish. This effort will become more frequent in instances where contaminated fish are found in the marketplace. EPA also anticipates conducting spot checks of DDT and PCB levels in white croaker obtained directly from commercial fishing vessels and commercial distributors. These EPA activities will be designed and conducted in coordination with the California Department of Health Services' Food and Drug Branch and local entities, such as the Los Angeles County Department of Health Services, that conduct inspections and have primary jurisdiction over ensuring quality of seafood available in markets, restaurants, and various wholesale establishments.

A formal clean fish certification program is beyond the scope of the selected Institutional controls program, although the data from EPA's planned monitoring of fish from locations along the coast will be useful for such a program. EPA will, however, continue to work with the appropriate agencies, retail groups and commercial fishermen to assess the interest in such a program and, if appropriate, assist them in getting such a clean fish certification program established.

Comment #6: There should be an educational effort aimed at retailers who sell white croaker.

Response: As stated previously, the revised Institutional controls program will include greater emphasis on outreach and education and will include retailers as a specific target audience. Identification of target retailers will be based on the results of the pilot outreach program, as well as on resources available through various public agencies. For example, the County of Los Angeles, Department of Health Services maintains a database of market and restaurant establishments within Los Angeles County that handle seafood. The outreach program for retailers will seek to make sure they are aware of the public and regulatory agency concerns about contaminated fish (particularly white croaker) and of the need for maintaining the required documentation regarding the sources of fish they sell/serve in their establishments.

Comment #7: An effective enforcement program that provides a significant deterrent to illegal white croaker fishing does not require two wardens for 24 hours a day, 365 days a year for 10 years.

Response: Comment noted. The revised Institutional controls program will provide increased support for public outreach and education, and less emphasis, at least initially, on such labor-intensive enforcement activities as on-the-water warden patrols that would likely be difficult to implement at this time due to a statewide shortage of trained and qualified game wardens that could be hired by the State of California, Department of Fish and Game. Once the Institutional controls program is underway, EPA will regularly assess the effectiveness of the enforcement program to determine whether an increase (or decrease) in such activities is indicated. However, EPA does not expect that the initial enforcement program will be sufficient over the long term to prevent the commercial catch and sale of contaminated white croaker from the Palos Verdes Shelf.

Comment #8: Heal the Bay continues to advocate a clear and larger delineation of the closure area for commercial white croaker fishing, particularly with respect to the southern boundary of the existing closure area. The fishing ban should be

expanded to include the Cabrillo Harbor area of San Pedro Bay and part of the soft-bottom habitat to a depth of 300 feet just south of Palos Verdes. Justification for the expansion of the boundary must be based on additional monitoring of white croaker in these areas.

Response: Comment noted. EPA believes that, in the first instance, expansion of the boundary for commercial fishing closure area should be based on a recommendation from the California Office of Environmental Health Hazard Assessment (OEHHA). EPA's institutional controls will include a monitoring program that will provide OEHHA and EPA with the necessary data to determine if such a recommendation is appropriate.

Robert W. Horvath, Los Angeles County Sanitation Districts

The Districts agree with the goal of reducing the consumption of contaminated white croaker but disagree with the efficiency and practicality of some of EPA's proposed enforcement strategies.

Comment #9: Recruiting a large dedicated staff of California Dept. of Fish and Game (CDFG) game wardens to patrol the Palos Verdes Shelf by boat and conduct spot checks at boat landings would be expensive and appear heavy-handed. The Districts believe any illegal commercial fishing with gill nets on the Palos Verdes shelf should be readily apparent and easily enforceable by existing CDFG forces due to the nets typically being marked by surface buoys, the cumbersome nature of deploying and recovering commercial gear, and the conspicuous appearance of commercial boats that might be involved.

Response: Comment noted. Although EPA does not necessarily agree with the Districts' presumption that any illegal fishing would be easily enforceable, full-time game warden patrolling as described in the Proposed Plan is no longer a starting point for enforcement activities under the revised institutional controls program. However, EPA does not expect that the initial level of enforcement activity will be sufficient to prevent the commercial catch and sale of white croaker at and from the Palos Verdes Shelf. EPA will consider this comment as EPA periodically evaluates and adjusts the enforcement program.

Comment #10: As to illegal sale of contaminated white croaker to local markets and restaurants by recreational fisherman, the Districts believe these fish emanate from a very discrete source that could be eliminated by a much smaller and more focused enforcement effort than that proposed by EPA. White croaker are not a surf zone fish and therefore are not caught from the beaches along the Palos Verdes peninsula. There are no piers on the peninsula. Thus virtually all of the white

croaker caught from or near the shore come from the western portion of the Los Angeles Harbor breakwater and/or the adjacent Cabrillo Beach fishing pier

Response: See response above. EPA plans to intensify sport fisher and pier education and outreach efforts in the areas described by the Districts, including increased multi-lingual signage.

Comment #11: If the fishing of white croaker were banned from these two structures, enforcement would be relatively easy as both sites have discrete access points that are in immediate proximity to each other. The need for enforcement could be eliminated altogether if both the breakwater and pier were fenced off thus banning all fishing from either structure. This action would provide further benefit by eliminating the public safety hazard associated with walking out on the highly exposed breakwater.

Response: Comment noted. The Districts' suggestion will be communicated to the appropriate authorities/land owners. However, EPA is not seeking to establish restrictions on fishing opportunities or activities beyond those set by state or local authorities. Instead, EPA's goal is to promote informed decision making by fish consumers and compliance with existing restrictions.

Comment #12: Another possibility to consider would be to have a CDFG game warden or seasonal aid offer to purchase recreationally caught white croaker from fisherman as they stepped off either the Cabrillo Beach pier or breakwater. The price offered could be slightly under what a market or restaurant would illegally offer. This alternative would require a limited waiver or modification in California Fish and Game law regarding the sale of recreationally-caught fish.

Response: While implementation of this idea may be successful in limiting white croaker fish consumption, a buy-back program may be difficult and problematic to actually implement. EPA's revised Institutional controls program will instead focus on educating sport fishers and consumers about potential adverse effects of contaminated white croaker consumption and what steps they can take to minimize the chances that they are catching and/or eating contaminated fish.

Comment #13: It is unclear to the Districts how greater field enforcement coverage of daily limits for white croaker recreational fishing from sport or private boats would cause any reduction in contaminated fish subsequently getting to markets or restaurants. Furthermore, it seems extremely unlikely that anyone who can pay the cost of their own boat or passage on a sport boat would be inclined to keep white croaker

for the purpose of illegally selling them. In fact most people who can afford to fish from boats do not consider white croaker adequately desirable even for their own consumption. Therefore greater enforcement efforts in this area would appear to be a waste of resources.

Response: The revised Institutional controls program places greater emphasis on monitoring and public outreach and education, and less emphasis at the outset on actual enforcement activities. Nonetheless, contaminated white croaker have turned up repeatedly in commercial fish markets, and EPA's Institutional controls program will seek to determine the source of any such fish and prevent those type of problems from occurring in the future. EPA believes that, at some point, this may require greater field enforcement activity than currently exists.

Alan Miller, Ph.D., CSU Long Beach

Comment #14: My preferred option is institutional controls, with these suggested modifications: 1) there should be more funding for the public educational effort and 2) there should be some other creatures on the chlorinated hydrocarbon watch list besides white croaker. I would suggest mussels (already covered by mussel watch?) and the intertidal snails, Tegula spp, which are also consumed by some ethnic groups in large numbers.

Response: In EPA's selected institutional controls, funding for the public educational effort has been increased. EPA agrees that additional fish beyond white croaker are affected by chlorinated hydrocarbon contamination (i.e., DDT and PCBs) in offshore waters of the Palos Verdes Shelf, as evidenced by the existing fish consumption advisories, and the outreach program will cover all fish listed in the advisories. At the moment, there is very limited DDT and PCB-contamination data on which to make an assessment of the potential risk posed by consumption of mussels and snails caught in the area of Palos Verdes Shelf. However, EPA agrees that seafood other than just fish are a potential source of contamination and will consider adding such organisms to the monitoring program as well as addressing them in the outreach and education activities.

Anna Harllowe, Ecology Center of Southern California

Comment #15: We agree that institutional controls are obviously better than the no-action alternative. However, we feel strongly that proposing to waive the ARARs for surface water quality standards for DDT and PCBs constitutes an abandonment of human health concerns. EPA justifies the waiver on the basis that the proposed action is an "interim measure."

Response: The institutional control measures proposed by EPA do not constitute an abandonment of human health concerns. In fact, EPA's institutional control measures are designed to significantly reduce the exposure of humans to DDT and PCBs through the fish consumption pathway. The proposed waiver of the ARAR for surface water quality standards applies only to the selection of this institutional controls response action and is needed because the institutional controls themselves will not change site conditions and thus will not result in achieving water quality standards. This does not mean, however, that EPA has abandoned any intent to achieve water quality standards or reduce water quality impacts through future cleanup actions. EPA is continuing to evaluate cleanup alternatives such as capping, and as part of that evaluation we are looking at whether it will be possible to meet water quality standards in the long term.

Clifford C. Gemeinhardt, Wilmington, CA

Comment #16: Enforcement of the fishing ban is not good because it requires costly game wardens and cannot find all those in violation anyway.

Response: Comment noted. The proposed initial enforcement budget has been reduced in favor of more public outreach and monitoring activities. Enforcement activity can be increased if we find through the monitoring program that contaminated fish are continuing to enter the market place despite our efforts to educate store and restaurant owners, commercial wholesalers and fishermen. Based on available information, EPA expects that the enforcement program will need to be expanded over time.

Comment #17: The public outreach and education program should be used to notify people on a limited basis. It is costly to print and distribute thousands of posted notices.

Response: Public outreach is typically the most cost effective method for reducing human health risk in the short term. As part of the EPA-funded pilot outreach project, the California Dept. of Health Services is evaluating the effectiveness of various outreach methods (printed material, videos, etc.). The results of this evaluation will be factored into design of a full-scale program, which EPA anticipates will use a variety of media (radio, TV and printed material) to educate a wide audience of fishermen and consumers representing several distinct ethnic groups .

Comment #18: Fish monitoring is nearly impossible to do and is also costly.

Response: EPA believes that fish monitoring can be done in way that provides useful and reliable information on which fish are contaminated and where contaminated fish are likely to be caught. Laboratory methods have improved over the years and can be relied upon to produce accurate measurements of contaminant levels in fish. Although monitoring is not inexpensive, the information generated is useful and necessary for designing the outreach, education and enforcement programs.

Stanley D. Mosler, CPA, Palos Verdes, CA

Comment #19: The applicable standard for deciding whether to implement a response action should be a cost-benefit analysis of the proposed spending versus the lives saved. I have followed this issue over the years and cannot recall a single death attributed to eating contaminated croaker.

Response: The criteria and standards that EPA must apply in selecting and implementing a Superfund response action are contained in various Federal and state statutes, regulations and guidelines. A cost-benefit analysis per se is not required under the Superfund statute, although EPA does look at the cost-effectiveness of different response action alternatives. However, cost is only one of several factors that EPA considers in selecting a response action. EPA's primary consideration remains protecting human health and the environment. As a general matter, EPA does not wait until someone has suffered adverse health effects or died before deciding whether to undertake cleanup actions.

Comment #20: The applicable standard of review should be lives saved or public benefit from spending this money on alternative projects, including those other than environmental contamination. It is obvious that spending the proposed funds on almost anything else would provide a greater benefit to society. There is no benefit to the proposed project!

Response: The funding for this project and any further cleanup actions at the Palos Verdes Shelf will come from several settlements EPA has negotiated with potentially liable parties. Per the terms of the settlements, the funds are "earmarked" specifically for reducing exposure to DDT and PCB contamination on the Palos Verdes Shelf. The benefits of reducing exposure will likely include the avoidance of cancer cases and other adverse health effects associated with exposure to DDT and PCBs, with a resulting increase in quality of life for the fish-eating population of the Los Angeles area.

Comment #21: The best solution to the Palos Verdes problem is to do nothing. The problem will resolve itself naturally in time.

Response: Given the documented presence of contaminated fish in the waters in and around the Palos Verdes Shelf, and the fact that these fish have been and will continue to be there for a long time, EPA believes that actions need to be taken in the near term to prevent the consumption of contaminated fish. Furthermore, based on the available evidence, EPA believes that it will be, at a minimum, several decades before the problem is resolved "naturally." It is important to note that the principle discharge of DDT to the Palos Verdes shelf ceased in the early 1970s and that unacceptable levels of DDT remain in certain fish at the Palos Verdes shelf some thirty years later.

Dawn Coats, Ventura, CA

Comment #22: Palos Verdes shelf has been designated as a superfund cleanup site due to DDT's and PCB's being released into our ocean and the EPA wants to leave it there for 10 years and study how much damage it can do?? Too many times we sit idly by and wait until something becomes a drastic problem before we take action. Wouldn't it seem more economically and environmentally sound to exercise proactive measures and remove the situation NOW. Is this site expected to correct itself or cease if we stand by and study it? Or maybe we're expecting it to release "acceptable levels of contamination"?

Response: As EPA noted in the Proposed Plan, the institutional controls will be implemented for a period of 10 years, while EPA continues its investigation of cleanup actions. However, this was not meant to imply that no further cleanup action would be taken during that 10-year period. EPA undertook a pilot capping project in the latter half of 2000, and will be using results of that study in deciding (possibly within the next year) whether or not to propose a full-scale capping project.

Even if EPA were to undertake a cleanup action right now to cap or remove the contaminated sediment, fish that are currently contaminated would continue to carry that body burden of contaminants for several years. The institutional controls program will be needed in some form until contaminated fish are no longer present at the site, and that was part of the rationale in designating a 10-year implementation period.

Phillip Cutler, Costa Mesa, CA

Comment #23: The efficacy of the plan is questionable, primarily because it doesn't really eliminate the problem. Wouldn't it be advisable to first do some innovative and relatively inexpensive research that has the potential to not only solve the problem

but others of similar nature? For example, the use of organisms to biodegrade pollutants has been demonstrated for other contaminants. If such organisms exist for DDT, perhaps their capacity for biodegrading DDT could be enhanced, either with or without capping.

Response: EPA recognizes that the institutional controls will not eliminate the contaminated sediments that are the source of the fish contamination problem, and the Agency is continuing its evaluation of alternatives to partially or completely cleanup up the area of contaminated sediments. In the interim, EPA believes that the proposed institutional controls can be effective and are necessary for addressing the human health risk associated with the consumption of contaminated fish.

There has been substantial research performed to assess the impact of biodegradation (as well as a number of other factors) on the fate of DDT and PCBs on the Palos Verdes Shelf. There does appear to be some limited DDT biodegradation occurring in the sediments; however, that biodegradation is proceeding very slowly, and it is not uniform throughout the contaminated sediment deposit. In addition, enhancing biodegradation of any contaminant typically requires modifying and controlling the environment where biodegradation is occurring, something that is extremely difficult at the Palos Verdes Shelf where the contaminated sediments lie in roughly 200 feet of water and cannot be contained in any practical way (except by placing a cap over them). In any case, EPA will consider results from the entire body of research on biodegradation in making future decisions concerning remediation of the Palos Verdes Shelf.

Marvin Sachse

Comment #24: Has a long term trend been established identifying the DDT/PCBs bioaccumulating in white croaker? Are the concentrations increasing or decreasing over time?

Response: Temporal trends in fish tissue concentrations were assessed by EPA in the course of preparing the Human Health Risk Evaluation report. EPA concluded that, while significant decreases in tissue concentrations occurred from 1970 to the early 1980s (when discharges of DDT and PCBs were dramatically reduced), predicting future trends was more difficult and no uniform trend was apparent. A long-term record of white croaker tissue chemistry can be found in many of the LACSD Annual Ocean Monitoring Reports. The analysis of current and long-term data from the latest annual monitoring report available (LACSD 2000) shows that PCBs and DDTs in white croaker are highly variable over time and space; the highest concentrations and greatest variability among samples is found

near the outfall pipes. In addition, changes in fish tissue lipid levels affect the bioaccumulation of these lipid-soluble chemicals, independent of environmental exposure.

Montrose Chemical Corporation of California, Aventis Crop-Science USA Inc., Atkemix Thirty-seven, Inc., and Chris-Craft Industries, Inc.

Comment #25: There is no risk to human health or the environment that would trigger EPA's CERCLA authority or warrant EPA response actions at the Palos Verdes Shelf.

Response: On the contrary, EPA's human risk assessment and related information clearly demonstrate that the cancer risk and non-cancer health hazards associated with consumption of contaminated fish could pose a significant risk to human health, and thus a response action under CERCLA is justified. The fish consumption advisories issued by the State of California, which are based on the State's earlier, independent human health risk assessment, are further evidence that the health risks are significant. The same is true of the State's commercial fishing ban for white croaker on the Palos Verdes Shelf, which is based on data showing that DDT and PCB levels in white croaker exceed the Food and Drug Administration (FDA) limits for these contaminants.

Comment #26: The vast majority of contaminated sediments is sequestered beneath about a foot of relatively clean sediment, out of reach of the food web and cut off from the regional ecosystem.

Response: Although surface sediments contain generally lower concentrations of DDT and PCBs than deeper sediments, there is evidence that the buried contaminants are migrating up to contaminate surface layers. There is evidence of both physical mixing and bioturbation of shelf sediments. In addition, upper sediments, although lower in DDT and PCBs than deeper sediments, are still considered contaminated relative to background conditions in the Southern California Bight, and the DDT and PCBs in the upper sediments continue to enter the food web and affect the marine ecosystem.

Comment #27: The white croaker, the only fish found to contain DDT concentrations above the limit for DDT set by the FDA, is a fish that is not targeted by the anglers who

travel in boats to the Palos Verdes Shelf. In our interviews with 468 anglers over the course of a year at boat ramps north and south of Palos Verdes Shelf, no consumption of Palos Verdes Shelf white croaker could be confirmed.

Response: While the FDA limit of 5 parts per million (ppm) DDT in seafood is used as one criterion for determining whether white croaker or other fish are acceptable for commercial sale, it is not intended to define a "safe" level of contamination for local catch and consumption of fish. In the past, the State of California has used a trigger level of 0.1 ppm for DDT or PCBs in fish tissue to decide whether a fish consumption advisory is warranted. Consequently, white croaker is not the only fish of concern; in fact, the State's fishing advisory in the area of the Palos Verdes Shelf includes sculpin, rockfishes and kelp bass.

The 1994 SMBRP seafood consumption study documented that local sport fishers (including boat-based anglers) consume white croaker and other fish evaluated in EPA's human health risk assessment. Although the Commentors state that their study could not confirm the consumption of white croaker, it clearly documented that sport fishers are catching white croaker off the Palos Verdes peninsula. Further documentation of the catch and consumption of white croaker in the Los Angeles area can be found in Puffer et al (1982) and Stull et al (1987).

One of the principal authors of the study referred to by (and performed for) the Commentors was Dr. Milton Love. In several works published prior to his work for the Commentors, Dr. Love concluded that white croaker are the "mainstay" of pier, barge and small boat sport fishers in central and southern California. Dr. Love also states that white croaker tend to be abundant around sewer outfalls. In addition, Dr. Love states that "there is a pretty sizable commercial fishery" for white croaker in California, including Southern California (see Love 1996 and Love et al., 1983).

Comment #28: An analysis by our risk assessment team indicated that, for 95% of anglers, the risk from Palos Verdes Shelf white croaker is no greater than 2×10^{-6}. Based on a year-long study by our consultants of fishing activity on the Palos Verdes Shelf, only about 116 anglers might catch a white croaker. Even if they all ate the white croaker they catch, a risk of 2×10^{-6} applied to a population of 116 persons does not result in single actual cancer.

Response: Comment noted. While EPA does consider overall population risk as one aspect of risk characterization, the Agency typically bases its decisions about response actions at Superfund sites based on the risks to individuals. In particular, EPA is concerned about the risks for (and protection of) individuals at the high end of the exposure range (i.e., the reasonable maximum exposure, or RME, scenario). For

example, EPA's risk evaluation for Palos Verdes Shelf used white croaker consumption rates based on the data for those anglers who reported eating white croaker, not on the white croaker consumption rate for all anglers regardless of whether they actually reported eating white croaker. This approach is consistent with EPA Superfund guidance for conducting risk assessments for hazardous waste sites.

Comment #29: EPA concocted fictitious and inflated risks to human health (and the environment) by using "streamlined" approaches that abandoned both empirical data and common sense. EPA predicted significant risk to anglers only when assuming they would eat wildly unrealistic amounts of white croaker (more than a ton), all containing very high levels of DDT that occur infrequently (21.3 ppm) for their entire fishing careers (30 years). Furthermore, EPA failed to provide information related to the likelihood that the assumed conditions will occur to allow interpretation of a conditional risk estimate in the proper context.

Response: EPA strongly disagrees with the Commentors' characterization of the Agency's risk assessment. The EPA Human Health Risk Evaluation used both point estimate (i.e., deterministic) and Monte Carlo (i.e., probabilistic) approaches to estimate and characterize potential risks to anglers consuming fish from the Palos Verdes Shelf. In the RME scenario, the consumption rate for white croaker was the equivalent of about 6 meals (less than 2 pounds) per month (which was based on the amount of white croaker anglers reported consuming) for a period of 30 years (which is less than the "entire fishing career" of many anglers). The white croaker DDT concentrations used in the risk calculations were derived from LACSD data for white croaker caught offshore of the Palos Verdes peninsula between Bluff Cove and White's Point during the time period 1996 to 1998. Consistent with Agency guidance, EPA used a DDT tissue concentration (21.3 ppm) that is the 95 percent upper confidence limit on the arithmetic average of the white croaker DDT data.

EPA's risk evaluation also included a substantial discussion of the uncertainty associated with the risk estimates. Further, the Monte Carlo probabilistic analysis provided risk characterization information and insight into the uncertainty and variability of the estimates of risk. The 90-95th percentile of the output distribution is typically used as a predictor of risk to the exposed individual and yielded results similar to the point estimate method.

Comment #30: EPA's institutional controls proposal assumes the presence of a white croaker fishery in a distant offshore area where virtually no fishing for white croaker occurs. The proposed warden force is comparable in size to the entire staff of the

northern district of CDFG, which extends from Santa Barbara to the Oregon border and 200 miles out to sea, covering an area of 108,000 square miles. The proposal is grossly out of proportion to the level of effort and manpower necessary to effectively patrol the Palos Verdes Shelf. Even in the absence of effective institutional controls, there is no evidence of a white croaker fishery at the Palos Verdes Shelf, and no present risk to human health. The only possible justification for institutional controls is to ensure against future risk (which would only arise if current fishing patterns and consumption habits change). Much less extensive institutional controls alone could readily safeguard against the possibility of future risks. The continuing decline in fish tissue DDE levels and ongoing natural processes that are continuing to bury and degrade the DDE indicate that even controls to guard against potential future risk would be of limited duration.

Response: EPA has reduced the scope of the enforcement component of the institutional controls program, with a corresponding shift in emphasis to public outreach and education. However, EPA disagrees with the Commentors' contentions that such controls are only needed to address future risks and that the DDE levels in sediments and fish will reach acceptable levels in the near future.

The commercial fishing ban extends only to 3 miles offshore (the limit of the State's authority) and is restricted to the vicinity of the Palos Verdes peninsula; this is not what EPA considers to be "distant offshore areas." White croaker are readily caught in these nearshore waters, and the bulk of the commercial white croaker catch in the Los Angeles area comes from the fishing blocks that are partially covered by the catch ban area.

The burial and degradation of DDT-contaminated sediments and trends in fish tissue concentrations cannot be reliably extrapolated into the future. For example, it is possible that the reduction in sediment supply from the Portugese Bend landslide, implementation of full secondary treatment for the JWPCP, and continuing sediment erosion could act to expose contaminants to the sediment surface to a higher degree in the future than occurs today. Trends in fish tissue concentrations of DDT have been examined by LACSD as part of their routine monitoring. Samples collected over the last 15 years show variable periods of relatively higher or lower levels of bioaccumulation but no site-wide long term trends. In the area near the White's Point outfalls (where concentrations are generally higher than in other areas of the Palos Verdes Shelf), the trends in DDT and PCB levels appear to be slightly upward based on the latest data from LACSD. EPA will nonetheless continue to track contaminant levels in fish to assess the need for any changes in the content and scope of the institutional controls program.

EPA also strongly disagrees with Commentors' contention that there is no commercial fishery at or near the Palos Verdes Shelf. An expert retained by the Commentors has recognized and documented the existence of a commercial white croaker fishery in Los Angeles County (see response to comment #27). This expert has also indicated that white croaker tend to be prevalent around sewer outfalls. In addition, the Commentors have correctly noted in a later comment (see comment #48) that the coastal waters off Los Angeles support the largest white croaker population in the Southern California Bight. The LACSD outfalls on the Palos Verdes Shelf are one of three major outfalls along the Los Angeles area coast. Historically, substantial commercial fishing for white croaker did occur at and near the Palos Verdes Shelf (see Stull et al (1987) and California DFG catch block data for 1990-1999). California DFG catch block data continues to show that the vast majority of commercially caught white croaker landed in the Los Angeles area is caught in catch blocks that include or are adjacent to portions of Palos Verdes Shelf covered by the CDFG commercial catch ban. In 1999, some 87,000 pounds of white croaker were caught in these fishing blocks.

Comment #31: Based on over 2,000 visits to Southland retail markets, our consultants have demonstrated that there is no indication that consumers could even purchase white croaker with concentrations of DDT exceeding the FDA action limit on a routine basis for many years. These findings demonstrate that contaminated white croaker is not generally offered for sale by retail markets, as assumed by EPA in the EE/CA Report. The mean concentration of DDT in white croaker purchased during these surveys was 1.5 ppm, which is 1/14th of the concentration used by EPA in its human health risk assessment. Therefore the risk associated with eating store-bought white croaker on a regular basis is 1/14th of that calculated by EPA in its risk assessment (assuming that white croaker is eaten in the same amounts and for the same number of years).

Response: Data collected by the Commentors' consultants clearly demonstrates that contaminated white croaker are found in retail fish markets. This conclusion is also supported by the 1997 study by Heal the Bay. The FDA limit in and of itself is not an appropriate basis on which to decide whether those fish are "safe" to eat. The mean DDT concentration reported by the Commentors is more than 10 times the trigger level used by the State in deciding whether a fish consumption advisory should be issued. Using EPA's fish consumption scenario, white croaker with DDT levels at 1.5 ppm would still pose an unacceptable health risk to humans (e.g., a cancer risk from DDT alone of 1×10^{-4}). The Commentors also fail to indicate that their investigators found that when white croaker was being sold in local markets, a substantial quantity of white croaker was on display (30-90 pounds).

Comment #32: Recreational fishing for white croaker at the Palos Verdes Shelf is insignificant and occurs, if at all, in waters less than 30 meters deep, which is in shore of the effluent-affected sediments containing DDT and PCB residues. There was no evidence from our studies that fishermen at the Palos Verdes Shelf were targeting the species, nor were they accidentally catching white croaker in large quantities. White croaker in the shallow waters inshore of the Palos Verdes Shelf had DDT and PCB concentrations five and six times below the concentrations for white croaker caught further offshore over the effluent-affected sediments.

Response: Even white croaker with DDT and PCB levels that are five and six times lower than the concentrations found in white croaker over the effluent-affected sediments should not be considered clean fish, as those levels are still high enough to cause adverse health effects. Thus a recreational fishermen in these nearshore waters may still be catching contaminated fish. The fact that the Commentors' study did not find any fishermen coming to fish for white croaker off the Palos Verdes peninsula may be nothing more than an indication that fishermen are aware of the contamination problems in this area. But such findings are inconsistent with the prior work of the expert retained by the Commentors, Dr. Milton Love, as well as other independent published scientific work (see Stull et al., 1987 and Puffer et al., 1982).

Comment #33: In May 1999, California Proposition 65 warning letters were sent on behalf of the DDT defendants to 13 markets identified as having sold at least one white croaker with DDT exceeding the FDA action limit. The results of our follow-up surveys of these markets demonstrate that the availability of white croaker can be controlled by the issuance of warning letters combined with sporadic surveillance monitoring of fish markets. Any recalcitrant markets could be the object of publicized enforcement actions if necessary. This approach would provide a simple means to eliminate any regular consumption of store-bought white croaker containing elevated DDT.

Response: EPA believes that this portion of the study commissioned by the Commentors is neither credible nor reliable. The Hansen report (April 11, 2000) states that one round of Proposition 65 letters was sent out (April-May 1999) and that "no other enforcement or followup activities occurred." In fact, as the result of an EPA investigation, EPA determined that a second round of Proposition 65 letters was sent out in December 1999. The sole author of the Commentors' study, Dr. Hansen, testified under oath that he was not aware that this second round of letters had been issued when he issued his report in April 2000 and that the statement in his report that no other followup activities occurred was incorrect. See deposition of Stephen Hansen, United States v. Montrose Chemical (May 22, 2000) at 87-88. Dr. Hansen's report was reissued in the summer of 2000 and that

revised report discloses that a second round of Proposition 65 letters was sent out in December 1999; however, the report does not explain the omission of these facts from the April 2000 report. Given these circumstances and the total lack of written information about the design and protocols under which the study was conducted, EPA gives very little weight to the conclusions of the study as summarized by the Commentors in the comment above.

Direct market and restaurant outreach and education can be an effective approach to encourage and ensure that such businesses purchase white croaker and other fish from licensed sources. As part of the outreach program, EPA will notify and educate markets and other retail outlets regarding the risks associated with contaminated white croaker caught in the vicinity of Palos Verdes Shelf, and the quality of white croaker will be monitored. However, EPA does not believe that retail merchants alone should bear the burden of ensuring that contaminated white croaker or other seafood is not being offered for sale to the public. Similarly, the Agency does not want to undertake actions with respect to markets that are so "broad brush" and indiscriminately heavy handed that they ultimately deny the public the opportunity to purchase clean fish of their choice or dissuade them from including fish in their diet.

Comment #34: Based on the risk assessment prepared by our consultants, health effects are not expected in nursing infants of women who eat white croaker or kelp bass from the Palos Verdes Shelf. The doses to the nursing infants of women who eat white croaker or kelp bass from Palos Verdes Shelf were at or within safe levels.

Response: Both the EPA's risk assessment and the Commentors' risk assessment relied on the same cancer potency factors and reference doses to estimate potential adverse health effects to a nursing infant that would be caused by a given DDT dose. The differences in the two risk assessment lie in the exposure assumptions used to estimate that dose to a nursing infant. EPA's risk assessment used standard default exposure parameters as published by the State of California and the Federal Government. EPA's risk assessment concludes that there are potential adverse health effects to nursing infants. The Commentors' risk assessment, on the other hand, used the results of dose modeling in anglers at the end of the fishing careers to extrapolate to nursing mothers. It is not made clear to the reader why this assumption should necessarily be correct. The Commentors' risk assessment also suggests that potential adverse non-cancer health effect are in fact predicted for some fraction of the population (those greater than the 95^{th} percentile) since the hazard quotient of 1 is predicted for 95% of the population. EPA's position is that the health of this individuals at the upper end of the exposure range should be protected, not just the lower 95% of the population.

Comment #35: The concentrations of DDT in white croaker caught by LACSD over the effluent-affected sediment have been declining, indicating that any future risks from these fish will be even lower than today. Our analysis of data for the period 1988 - 1997 shows a decreasing trend in lipid-normalized DDT concentrations, and thus any risk from consuming fish caught over the effluent-affected sediments will be even lower in the future. EPA's risk assessment did not take these trends into account, and its failure to do so is completely arbitrary.

Response: There is no justification to project previous declines of fish contamination levels (during the 1970s) into the future. Rather, current levels of contamination were used in the risk assessment. No long term site-wide trends in fish tissue DDT concentrations (1985 - 1999) were apparent as part of the analysis of LACSD's monitoring data (LACSD 2000). Both the percent lipids and organochlorine tissue concentrations show peaks in 1995 and 1996, but do not precisely co-vary. As a result, lipid-normalized contaminants do not show significant downward trends since 1985 (LACSD 1999).

Donald Reish, Cal State University, Long Beach

Comment #36: According to my information, the DDT concentrations in the white croaker will not be monitored. Since the major concern at this time is especially minority people eating white croaker, it is vitally important that the DDT concentration in the white croaker be analyzed periodically - both before and after capping. Only the geological and chemical characteristics will be monitored. It is important that the birds be monitored because that is the primary concern of the people.

Response: EPA's institutional controls do in fact include a significant monitoring effort to track contaminant levels in white croaker, and such data will also be generated by other organizations (e.g., LACSD and the Trustees). EPA agrees that DDT and PCB concentrations should be monitored regularly, regardless of whether capping occurs or not. The pilot capping project focused on monitoring geological and chemical characteristics because our objective was to assess short-term impacts (i.e., impacts that won't result in biological changes in the near term). A full-scale capping project would incorporate biological monitoring, including the resulting impact on bird populations.

Comment #37: I think that it would be a better expenditure of money if EPA would hire additional wardens to patrol the area and prevent people from catching croakers. Also educating these fishermen as to the danger of eating white croaker.

Response: EPA agrees that educating fishermen is an important activity and it will be a part of the public outreach and education program. However, EPA's enforcement efforts will begin with limited shore-based inspections, due in part to the limited number of wardens available.

NOTE: The comments on ecological risk and capping on the following pages are not relevant to the institutional controls program proposed by EPA. EPA is responding to these comments because they relate analyses contained in the EPA EE/CA report (March 2000) and/or ecological risk evaluation. EPA's evaluation of capping portions of and ecological risks at the Palos Verdes Shelf have not been completed and are continuing. As a result, should EPA propose a cap as a response action for the Palos Verdes Shelf, EPA may alter or supplement the responses set out below should the same or a similar comment be submitted during the public comment period for that proposed response action.

ECOLOGICAL RISK COMMENTS:

Montrose Chemical Corporation of California, Aventis Crop-Science USA Inc., Atkemix Thirty-seven, Inc., and Chris-Craft Industries, Inc.

Comment #38: The ecosystem of the Palos Verdes Shelf has experienced remarkable recovery over the last few decades, as documented by ocean monitoring by the Los Angeles County Sanitation District (LACSD) and others. Fish tissue concentrations of DDT have declined dramatically since the 1970s and continued to decline in the 1990s (Hansen report). The fish populations at the Palos Verdes Shelf are successfully reproducing; there is no evidence to the contrary (Giesy report). The animals that live in the sediment on the Palos Verdes Shelf are not being harmed by the DDT present there (Giesy report). The benthic community is rich in species diversity and population numbers relative to healthy benthic communities in pristine areas, such as Half Moon Bay in Northern California (Blake report). Eagles and falcons on the Channel Islands are not being harmed by DDE in the Palos Verdes Shelf sediments. DDT residues in these birds come primarily from DDT that was used to spray crops in the 1950s and 1960s.

Response: While it is true that contaminant concentrations in surface sediment and fish tissues in the area of the Palos Verdes Shelf have decreased, primarily in the period from the mid-70s to the early 1980s, the area still exhibits substantial evidence of contamination with contaminant remobilization from buried layers. The fact that the benthic community is much healthier now that it was 30 years ago does not preclude the very likely possibility that this community is continuing to play a significant role in the movement of DDT and PCBs from the sediments into the food web. The fish in the area of the Palos Verdes Shelf remain the most

contaminated as compared to other Southern California Bight locations. DDT residues in Channel Island raptors cannot be traced in a manner that excludes the Palos Verdes Shelf source.

There is very little evidence that any of the DDT present in Palos Verdes Shelf sediments originated from agricultural sources. EPA acknowledges that some small amount of the DDT found on the Palos Verdes Shelf could have come from other sources such as pesticide formulators (e.g., Stauffer's Dominguez Hills facility) or from vector control operations. However, the vast majority of facts demonstrates that the Montrose Chemical DDT manufacturing operations at 20201 Normandie Avenue constituted the sole principle source of DDT released to and now found on the Palos Verdes Shelf. Montrose discharged hundreds of thousands of gallons of wastewater per day to the sanitary sewer which was then released from the LACSD outfalls on the Palos Verdes Shelf. This wastewater contained high levels of DDT. Montrose's discharge occurred seven days a week, fifty-three weeks a year for over twenty years.

Comment #39: EPA measured the toxicity of Palos Verdes Shelf sediments by comparing DDT concentrations to threshold levels (referred to in the report as sediment effects concentrations, or SECs) derived by MacDonald from a literature review that did not attempt to isolate the impact of DDT from that of other contaminants present in the sediment. However, MacDonald's work did not include the results of laboratory spiking studies by Chapman, whose results showed a threshold value for toxicity of DDT that was several times higher than MacDonald's SEC values. Using MacDonald's SEC values, EPA predicted that 34 of 42 sediment sampling locations would pose at least some risk to benthic organisms. However, if Chapman's results were used, none of the stations would be expected to pose any risk of toxicity due to DDT.

Response: MacDonald's SEC values were developed for Palos Verdes Shelf sediments and are representative of effects to the local benthic communities. The values are highly predictive of toxicity in Shelf sediments to Shelf organisms. Other, laboratory studies may yield different results for any variety of reasons but the MacDonald values are specific to the Palos Verdes field condition and most appropriate for this evaluation. However, EPA will consider the incorporation of values from Chapman's report during its overall, final evaluation of ecological risk.

Comment #40: EPA's reliance on the study by Zeng to quantify the concentrations of DDT in the water column above the Palos Verdes Shelf sediments is unjustified. Zeng measured DDT levels of up to 15.8 parts per trillion (ppt) in near-bottom water samples; however, he testified that Palos Verdes Shelf sediments may be

contributing as little as one percent to these water column concentrations. Until EPA can determine how much of the DDT in the water column is emitted from the Palos Verdes Shelf sediments as opposed to other sources, the agency cannot use water column data to justify any removal action.

Response: Water column data are just one piece of evidence for the contributions from Palos Verdes Shelf sediments to the biota. It is reasonable to measure waterborne concentrations in close proximity to the source with the acknowledgment that constituents are diluted into an unconfined body of water where true sources cannot be easily determined. Increased DDT concentrations in the immediate vicinity of Palos Verdes Shelf sediments offer strong circumstantial evidence for a Palos Verdes Shelf source to the waterborne contamination. Zeng et al. (1999a,b) showed the improbability of other sources and concluded that sediments near the JWPCP outfall are the main source for DDTs and PCBs in the water column. With respect to the institutional controls to address human health risks, EPA is not relying on water column data to satisfy the statutory criteria for undertaking a response action.

Comment #41: Bioturbation is not moving DDE from the depths assumed by EPA into the water column. This deep bioturbation process could not happen and, at the same time, leave metals behind in place, since both metals and DDE adhere to sediment particles. The metals profiles in the sediment are intact, providing direct refutation of the deep bioturbation hypothesis. In addition, the oxygen profiles in the Palos Verdes Shelf sediment show that oxygen is depleted at about 4 to 6 centimeters; animal mixing below that layer would have the effect of introducing oxygen into the deeper layer (Van Cappellen report).

Response: Zeng et al (1999b) offers a reasonable explanation of the transfer of DDTs from the sediments with apparently unchanging metals stratigraphy. Metals emissions in the JWPCP outfall have not decreased in the last 30 years at anything near the rate of the DDTs decrease. Newer sediments are thus relatively enriched with metals in comparison to DDTs and transfers of these constituents to the overlying water is consistent with observed sediment concentration profiles.

Oxygen introduction to surface sediments via bioturbation is highly localized at burrow locations. Significant bioturbation can occur without generalized oxidation of surface sediments.

Comment #42: In evaluating biodegradation, EPA ignores the fact that the USGS in 1992 measured about ten tons of DDMU (a breakdown product of DDE) in the Palos Verdes Shelf sediments. The presence of this large amount of DDMU in and of itself demonstrates the quantitative importance of DDE biodegradation at the

Palos Verdes Shelf. Additional rate information submitted with these comments (Deming report) show the quantitative importance of biodegradation to the breakdown of DDE at the Palos Verdes Shelf. The rates of biodegradation of DDE observed in experiments using Palos Verdes Shelf sediments readily account for the fate of DDE in the Palos Verdes Shelf sediments and can fully explain the losses observed over recent years.

Response: Biodegradation of DDE in sediment will be evaluated as part of the ongoing consideration of future response actions (such as capping) and as part of preparing the final Ecological Risk evaluation report. However, biodegradation of sediment DDE to date has not resulted in a subsequent decrease in fish tissue concentrations (LACSD 2000).

Comment #43: The Draft Ecological Risk Report omits information that the benthic infauna at the Palos Verdes Shelf are abundant and diverse, and that surface sediment quality and infaunal assemblages have improved dramatically over 26 years of monitoring by LACSD.

Response: Environmental improvements over time at the Palos Verdes Shelf and the nature of the existing benthic infaunal community have been noted in the draft Ecological Risk report. The discussion of improvements to benthic infaunal community structure will be reviewed and revised, as appropriate.

Comment #44: Although claiming to address the sustainability of white croaker, the Draft Ecological Risk Report fails to mention information showing that the coastal waters off Los Angeles support the largest population of white croaker in the Southern California Bight. Similarly, the Draft Ecological Risk Report did not address the data of Dr. Spies showing that DDT had no significant effect on the reproductive success of Palos Verdes Shelf kelp bass.

Response: Such information on fish health and abundance will be noted in the revised document, as appropriate.

Comment #45: The Draft Ecological Risk Report contains miscalculations inflating pore water concentrations and hazard quotients for stations 574 and 552.

Response: Agreed, when pore water concentrations for stations 574 and 552 were recalculated, the values were lower than those presented. Although this reduces the hazard quotient, it may only be significant to the risk estimation for PCBs at station 574. Station 574 PCB HQ would decrease from 1.5 to 0.96, whereas DDT

HQs at both station are >1. Therefore, this change should be corrected, but it would not substantially alter the risk characterization.

Comment #46: The Draft Ecological Risk Report uses the wrong toxicity value for DDE in evaluating the toxicity based on pore water and sediment DDE concentrations. The report uses the toxicity value for DDT (which is more toxic than DDE) instead, resulting in an overestimation of risk.

Response: It is true that DDE makes up a large proportion (roughly 70%) of the total DDT (tDDT) in Palos Verdes Shelf sediments. However, the benchmark for tDDT was derived from data specific to the Palos Verdes Shelf and would thus account for the ratio of DDE to tDDT in the sediments. Furthermore, the researchers who developed this site-specific value (MacDonald 1997) indicated that the benchmark they derived for DDE should not be utilized due to insufficient data for comparisons to an independent data set. Therefore, it is appropriate to use the tDDT benchmark. See discussion on pages 55-56 of the draft Ecological Risk Report.

Comment #47: The Draft Ecological Risk Report uses predicted pore water concentrations based on equilibrium partitioning theory to evaluate risk to benthic organisms. However, the partition coefficient for DDT that is used in the report is almost twice as low as the coefficient EPA's contractor used in earlier work done for the Navy. Since the pore water concentration (and thus the potential risk) is inversely proportional to the partition coefficient, the use of a lower coefficient results in a higher estimation of risk. No rationale is given for using this lower coefficient. The Draft Ecological Risk Report also fails to discuss pore water measurements in Palos Verdes Shelf sediments made by a government consultant (Eganhouse) that indicate the partition coefficient is one to two orders of magnitude higher for Palos Verdes Shelf than the values represented in the literature. If the pore water measurements made by Eganhouse had been used instead of calculated values, the estimated risks would have been much lower.

Response: The draft Ecological Risk Report uses a $\log_{10} K_{ow}$ value of 6.53 for DDT (pg. 48), which is the value recommended in the EPA report of Karickhoff and Long (1995). Additionally, the equation used to predict K_{oc} from $\log_{10} K_{ow}$ (pg. 43) was developed for sediments by DiToro et al. (1991), and is the standard equation recommended in risk assessment guidance literature (Sample et al. 1997, Suter et al. 2000). The draft Ecological Risk Report uses predicted pore water concentrations in estimating risk because, as stated on page 25, "[n]o reliable pore water data are available for use in this evaluation." Nonetheless, EPA will

review the available pore water data as part of its continuing work on the evaluation of ecological risk and incorporate such data as appropriate.

Comment #48: The benthic effects quotient used in the Draft Ecological Risk Report to compare and contrast Palos Verdes Shelf benthic communities with reference stations is invalid and meaningless because it does not meet certain key principles for sampling, design and statistical analysis (Gallagher report).

Response: The Gallagher report presents one opinion of a set of principles to be used in developing benthic effects indices. However, it does not invalidate the use of the quotient. In fact, several of the indices used in the quotient development are standard ecological measures of diversity and abundance. It is valid to discuss the different types of indices available and some of the pros and cons of their use. Additional discussion to that effect can be added to the Ecological Risk Evaluation. Such discussion will not change the conclusions of the assessment.

Comment #49: The Draft Ecological Risk Report mischaracterizes the findings of three recent papers (two from SCCWRP and one from Dr. Steven Bay) in stating that, of the 24 stations examined on the Palos Verdes Shelf, more than half are experiencing loss of biodiversity, three are exhibiting a loss of community function, and only five have a benthic condition that falls within the range of regional reference sites (Anderson report). There is strong evidence that the benthic community on the Palos Verdes Shelf is similar to other regions of the Southern California Bight and most if not all stations would represent a benthic response index (BRI) near or at reference conditions.

Response: The final Ecological Risk Evaluation will discuss benthic community diversity in terms of regional and local conditions with these and other reports used as evidence. However, the Commentors should note that the Draft Ecological Risk Evaluation report discusses the change in Palos Verdes Shelf benthic communities over time and describes evidence for continuing disturbance to infauna but less so for epifauna. The infauna are those benthos most continuously exposed to contaminated sediments. The Palos Verdes Shelf epifauna and infaunal assemblages of the 1970s were characterized as unusually low in diversity but epifauna have since increased in diversity to a point now that is typical for Southern California (Stull 1995, as quoted in the Ecological Risk report). Still, in a comparison of 251 sites, the Palos Verdes Shelf area was singled out as having altered diversity, deviating from the reference condition, for benthic infauna (Bergen et al. 1997).

Comment #50: The benthic community data upon which the Draft Ecological Risk Report relies grossly under reported the number of species residing in the sediment and their abundance. The data used is based on animal counts made by LACSD using a 1 mm mesh sieve, which lets 84 percent of the Palos Verdes Shelf benthic fauna pass through. Using a finer sieve on sediment collected in 1997 (which is more recent and therefore more representative than the data upon which EPA relied), we have identified many more species in Palos Verdes Shelf sediment and found that the benthic community at the Palos Verdes Shelf is comparable to the benthic community at relatively pristine locations such as Half Moon Bay and the Santa Maria Basin (Blake report).

Response: The Palos Verdes Shelf macro-invertebrate community has been classified as having a uniquely low diversity based on trawl samples. The micro-invertebrate infaunal community has been compared among sites based on the 1 mm sieve standard. The conclusions in the draft Ecological Risk Report are accurately characterized and quantified.

Comment #51: The Draft Ecological Risk Report uses the results of bioassay tests by others to support the proposition that Palos Verdes Shelf sediments are generally toxic to benthic invertebrates and that the cause of toxicity is DDT. However, the report is selective in the data presented and inaccurate in how those data are interpreted, resulting in an over-estimation of risk. The report fails to mention that other species were tested in the studies cited and were found to be unaffected by Palos Verdes Shelf sediments. The report also fails to note that much of the toxicity that was observed in these studies was attributed to other causes (e.g., hydrogen sulfide). In addition, the Draft Ecological Risk Report does not discuss other studies performed on Palos Verdes Shelf sediments that show that the Palos Verdes Shelf sediments are non-toxic to benthic invertebrates.

Response: The results of standard, laboratory toxicity testing to evaluate probably levels of toxicity of Palos Verdes Shelf sediments from tDDT is just one more piece of evidence in the overall risk assessment. Compounding ambient toxicity, such as hydrogen sulfide, will be noted, as appropriate, in EPA's revisions to the eco risk report. The risk assessment utilized conservative estimates of risk. However, the variability in toxic effect levels among species can be added to the discussion of sediment toxicity.

Comment #52: The use of EPA's chronic water quality criterion to assess harm to benthically-coupled fish is inappropriate because this criterion was established to protect invertebrates (brown shrimp) - not fish. The use of a criterion not based on DDT toxicity to fish results in an estimate of risk that exceeds any risk to which fish

might be exposed. The Draft Ecological Risk Report apparently anticipated and intended this result as the report states "[i]n vertebrate species are generally more susceptible than fish to effects associated with the exposure to DDT in the water column." No attempt was made to adjust for this difference in toxicity to brown shrimp versus shrimp.

Response: There are no screening benchmarks for DDT that are specific to fish; however, the values used in the draft Ecological Risk Report are those recommended by EPA (2000) for the State of California Rule. As indicated in the Draft Ecological Risk Report (pg. 48-49), the chronic saltwater benchmark of 0.001 µg/L is based on a residue value protective of birds (this refers to the brown pelican study by Anderson et al. 1975). Instead of using this value, which is highly conservative for fish, the acute benchmark of 0.13 µg/L was multiplied by an established acute to chronic factor resulting in a benchmark of 0.0072 µg/L, which is less conservative than the benchmark recommended in EPA (2000). Although it is true that the acute benchmark was based on data for invertebrate species, it is assumed to be protective of both benthic invertebrates and fish. This assumption, as well as the associated uncertainties (i.e., may overestimate risk because invertebrates may be more sensitive than fish) are discussed in the Draft Ecological Risk Report (pg. 64 and pg. 68). Moreover, conservative estimates are appropriate for screening-level assessments. The assessment could be made more apparent by presenting benchmark values, assumptions, and uncertainties in tabular form.

Comment #53: The benchmark value of 50 ppb DDT in fish is not based on cause and effect laboratory studies. The benchmark is based on fish collected in Long Island Sound in an area where the reproduction of the osprey was reportedly poor, but there are no ospreys being studied at the Palos Verdes Shelf, and the Draft Ecological Risk Report does not explain how the sensitivity of ospreys in Long Island Sound to DDT is relevant to the health of aquatic feeding birds off the California Coast. There are toxicity criteria developed by EPA for the brown pelican (150 ppb DDT in prey fish), as well as a study that establishes a benchmark for bald eagles of 180 ppb, but these values were (for unexplained reasons) not used.

Response: We agree that there are data for the brown pelican that are specific to Southern California. In fact, these data were used to establish water quality criteria for aquatic organisms (EPA 2000) and are based on Anderson et al. (1975). As the commentor indicates, the benchmark for pelican exposure in 150 ppb DDT in prey. However, the use of 50 ppb DDT, which was developed for another area, is appropriate for a screening-level assessment in that it accounts for all potentially sensitive species. It is also notable that although brown pelican reproduction has

improved in the area, bald eagles are a still unable to fledge young, suggesting that these species may be more sensitive to DDT than brown pelicans. This further supports the use of a lower benchmark. Uncertainties associated with the benchmark and comparison to the use of 150 ppb value are described on page 70 of the Draft Ecological Risk Report. Although hazard quotients would be lower, they would still range from 3 to 28 suggesting risk to avian predators. Section 8.3 of the assessment should be updated with a more detailed justification of the benchmark value.

Comment #54: There is no evidence to support the notion that DDE in the Palos Verdes Shelf sediments is being transported, whether physically or biologically, to the eagles, peregrine falcons and sea lions of the Channel Islands or contributing to any substantial fraction of the DDE in them. Therefore, there is no basis to include either eagles or peregrine falcons in any assessment of the ecological risk presented by the DDE residues at the Palos Verdes Shelf.

Response: The transport and accumulation of DDT and DDE in channel island raptor and marine mammal populations must be viewed as a regional, cumulative impact in which the Palos Verdes Shelf plays a major role. It is not possible to absolutely trace the contaminants to specific populations in the broader Southern California Bight area.

Comment #55: There is strong evidence that sea lions do not forage significantly on the Palos Verdes Shelf. Since fish such as white croaker and Dover sole are not an important part of the sea lion diet, sea lions are not likely to be accumulating DDT from sediments of the Palos Verdes Shelf.

Response: See response above.

Comment #56: Bald eagles on Catalina Island forage exclusively along the shores of the island (Giesy report), and thus white croaker, Dover sole and similar benthic species of fish that feed near the sediments of the Palos Verdes Shelf are not a significant part of the diet of bald eagles on Santa Catalina Islands.

Response: See response to comment #54.

Comment #57: The most important seabird prey items of the peregrine falcon are Cassin's auklets, western gulls and California gulls. Palos Verdes Shelf is not an important foraging area of the population of these birds on the northern Channel Islands

(Giesy report). Moreover, seabirds eaten by peregrine falcons are open water foragers and their diets do not include benthic invertebrates or bottom fishes. Therefore, there is no biological link between peregrine falcons and the Palos Verdes Shelf sediments.

Response: See response to comment #54 above.

Comment #58: The ration of DDT to PCBs in the eagles, falcons and sea lions is similar to the ratio associated with agricultural runoff and significantly different from the ratio in the benthic fishes collected near the LACSD outfall on the Palos Verdes Shelf (Giesy and Knezovich reports). A DDT:PCB ratio of between 2:1 and 5:1 reflects a general Southern California Bight signature, reflecting the influence of agricultural runoff. The DDT:PCB ratio for bottom dwelling fish such as white croaker with the LACSD zone closest to the outfall is approximately 15:1, whereas the DDT:PCB ratio during the past 10 years in the eggs of bald eagles residing on Santa Catalina Island is 3.6:1. Similarly, the average DDE:PCB ratio for peregrine falcons collected from the Channel Islands between 1988 and 1992 was 3.6:1.

Response: See response to comment #58 above. Although the DDT to PCB ratio in bald eagle and peregrine falcon eggs collected in the Channel Island is different from that of white croaker collected near the outfall, this is not surprising given the feeding habits of the birds. Neither peregrine falcons nor bald eagles would be expected to feed on white croaker (a benthic fish). It is not assumed that these contaminant ratios continue through the food chain, unchanged. They will be influenced by the changing balance of food organisms but do not preclude the possibility that the DDT portion of the ratio is still accounted for by Palos Verdes Shelf sources.

CAPPING COMMENTS:

Montrose Chemical Corporation of California, Aventis Crop-Science USA Inc., Atkemix Thirty-seven, Inc., and Chris-Craft Industries, Inc.

Comment #59: EPA has not established the feasibility of capping the Palos Verdes Shelf. In fact, EPA's capping proposal is inherently dangerous and likely to make matters worse. Some of the potential adverse effects could result in currently buried DDT compounds (primarily DDE) and PCBs being reintroduced into the water column.

Response: In the summer of 2000, EPA undertook a pilot capping project designed to further evaluate the feasibility of capping, and the results of the project, which addressed

several issues including the one noted in this comment, will be considered before EPA decides whether or not to propose a full-scale cap.

Comment #60: The area to be capped is on an active seismic fault, the Palos Verdes Fault Line. One of the key risks with respect to the feasibility of capping is the potential failure of the cap during an earthquake. The existing analysis of seismic stability conducted by the Corps is very preliminary, and additional studies would have to be done before a decision to actually proceed with a cap could be made. Studies by our consultants show that the proposed cap will liquefy under moderate to small earthquakes (Kavazanjian report), with the potential to cause en masse failure of Palos Verdes Shelf sediments in a catastrophic underwater landslide.

Response: The Army Corps of Engineers studies indicate the existing sediments with a cap layer less than 60 cm thick on the flatter slopes would be stable during the design earthquake, and the sediments on the steeper slopes will not be stable. Based on this analysis and other considerations, EPA does not believe at this time that capping is feasible for the contaminated sediments on the steeper shelf break and continental slope. We agree that these conclusions need to be reviewed during our ongoing evaluation of capping and additional studies be made as necessary to address this seismic stability issue.

Comment #61: The existing analysis concludes that the cap should be less than 60 centimeters thick in order to be considered seismically safe. However, based on the Corps' previous experience with capping at other sites, attempting to construct even a 45 cm thick cap at the Palos Verdes Shelf would result in substantial areas with thicknesses greater than 60 cm. The Corps' assumption that the variability in cap thickness could be limited to plus or minus 10 cm is unfounded based on the results of other Corps capping projects.

Response: The Army Corps of Engineers studies that suggest the cap thickness be limited to 60 cm for seismic stability will be reviewed as part of the ongoing evaluation of in situ capping. The pilot capping project will provide additional information on the tolerances that can be obtained by the hopper dredge placement method.

Comment #62: EPA has also failed to consider the potential damage to the kelp beds inshore of the area to be capped. These kelp beds are very sensitive to turbid water conditions. Dumping barge loads of cap material in the open ocean will reduce clarity and create turbid conditions. This turbidity will move away from the barge once the capping material hits the bottom, in what is referred to as a density flow.

The potential impacts of these density flows and associated turbidity on the kelp beds has not been considered by EPA.

Response: The pilot capping project included an evaluation of the potential to adversely impact kelp beds, based on measurement of the formation, travel and fate of the turbidity plume that is formed when sediment is discharged from the hopper dredge.

The results of this aspect of the pilot capping project will be considered in the evaluation of environmental effects of capping, both to kelp and the associated benthic community.

Comment #63: Another biological impact of capping that EPA ignored is the burial and destruction of the invertebrate community living in the Palos Verdes Shelf sediments. With the food source reduced, white croaker and other benthic feeders will move to the adjacent uncapped areas of contaminated sediment, thus reducing any potential decrease in tissue concentrations.

Response: See the response above regarding adjacent benthic communities. For existing Palos Verdes Shelf sediments, it is assumed that the benthic community will be temporarily disturbed and altered by capping, and such tradeoffs will be discussed as part of evaluating the overall effectiveness of capping to reduce expose to contaminants in the sediment. The cap itself will be recolonized within a matter of years by many if not most of the same organisms that are currently present, and fish such as white croaker will return to feed upon them in what will be a clean, rather than contaminated, environment.

Comment #64: EPA also failed to consider that density currents formed during capping could flow over the shelf break and onto the unstable PV slope, generating large-scale underwater landslides.

Response: The pilot capping project has provided an opportunity to study and document whether or not density currents are formed during the discharge of capping material from the hopper dredge. This results of this aspect of the project will be factored into the ongoing evaluation of capping.

Comment #65: The slope of the Palos Verdes Shelf is as high as 2.7 to 7.4 percent. Corps guidance on capping dredge spoil mounds says placement on steep bottom slopes (than about 1 degree or 1.67%) should generally be avoided for a capping project.

Response: In the area of the Palos Verdes Shelf that is currently under consideration for capping (i.e., the flatter continental shelf out to a depth of about 70 meters), the slope of the ocean floor varies from less than 1 degree to approximately 3 degrees. The pilot capping project included an evaluation of placement of capping material on a range of slopes (<1 deg to 3.2 deg) on the Palos Verdes Shelf. Although some of the Palos Verdes Shelf may have slopes that exceed the value cited in the Corps guidance, this does not automatically mean that capping is infeasible in those areas. The results of the pilot project will help to determine the appropriate maximum bottom slope for capping on Palos Verdes Shelf.

Comment #66: Corps guidance says capping in water deeper than 40m is an "unproven management method."

Response: During the pilot capping project, various methods were used for cap placement in water depths between 40 and 70 meters. The pilot project thus provides a basis for determining whether capping is a feasible management method for contaminated sediments at these water depths.

Comment #67: Capping will disrupt the microbes that are currently biodegrading DDE.

Response: Capping will disrupt all benthic organisms, including the bacterial community. However, capping is designed to isolate the contaminants from the biota. As such, capping effectiveness will be judged against all other potential reductions in exposure, including in-situ degradation. It is unlikely that capping would stop such bacterial processes. Reductive dechlorination of DDE to DDMU is an anaerobic process not likely to be stopped by the presence of cap sediments.

Comment #68: The Corps estimates that the cap will reduce the release of DDT from the sediments by about 2 pounds annually. DDT in river runoff and ambient ocean currents vastly exceeds 2 pounds per year. Thus a cap will not produce any measurable decrease in the DDT levels in fish, birds or mammals. Since the proposed cap covers only a small portion of the site (less than 18%), the cap will not likely result in any measurable added decrease in white croaker DDT levels over and above those reductions occurring naturally.

Response: Most of the mass of DDT at Palos Verdes Shelf is on the shelf and that mass of DDT exceeds all other So. California Bight sources. Extensive, comparative sampling programs show that the highest So. California Bight sediment DDT concentrations occur on the Palos Verdes Shelf (Schiff 1998). The Corps' estimate of 2 pounds of DDT release is for the diffusive flux of porewater DDT;

exposure from the bulk sediment of the Palos Verdes Shelf to benthic infauna, epifauna, and fish takes place through bioturbation, uptake and dispersal of biota, sediment resuspension, and consumption of benthos. An effective cap of Palos Verdes Shelf sediments would likely have a very significant effect on these sources of exposure from DDT to the So. California Bight environment.

Comment #69: The USGS describes the PV slope as being carved by numerous canyons and much more prone to failure than the slope directly west of Los Angeles or south of the Malibu Mountains. There is no indication in the Army Corps report that they considered these dramatic new findings.

Response: As EPA continues its evaluation of the feasibility of capping, the Agency will consider this and any other new information pertaining to the geologic history and slope stability of the Palos Verdes Shelf.

Comment #70: The geotechnical data presented in the Corps report is insufficient for even a general feasibility study, let alone for a final report upon which an actual decision to cap up to 7.6 square kilometers may be made. No project-specific geotechnical investigation has ever been conducted, nor is one planned either for the pilot capping study or for full-scale cap placement.

Response: The 1999 Corps report is not the "final report" on which EPA's decision as to whether or not propose, much less select, a cap will be based. The size and depth of the Palos Verdes Shelf make normal marine geotechnical investigations using closely spaced borings with undisturbed sampling, etc., difficult. The pilot capping project will provide additional geotechnical data on the Palos Verdes Shelf and on caps placed there, and EPA will determine whether and when any additional should be collected with respect to proposing or selecting a cap. For example, if EPA decides to proceed with a full-scale cap, the final design process may include further characterization of the surface and underlying sediments and geologic formations using such techniques as borings, other in-situ measurements and laboratory testing.

Comment #71: The Corps report's conclusion that the shelf sediments can support a cap is not based on adequate data, such as the shear strength of the bed sediments. The data used by the Corps is from a limited number of sediment samples collected with gravity corers that missed up to nine centimeters of the upper sediment layer, which is considered to be the weakest and most prone to failure. In situ measurements of sediment shear strength need to be taken before the feasibility assessment can be considered complete (Kavazanjian report).

Response: As part of the pilot capping project, the strength and other characteristics of cap layer were evaluated, and this information will be considered as EPA moves ahead with its ongoing evaluation of capping.

Comment #72: The Corps incorrectly assumed that the Palos Verdes Shelf sediments are "overconsolidated" (implying that they are inherently stable) when the actual data indicate that the Palos Verdes Shelf sediment is "quick," i.e., extremely sensitive to sliding and failing under both static and seismic conditions. A characteristic of quick sediments is that have a liquid limit greater than the natural water content; the Corps report notes this in Appendix B, however the report fails to evaluate the potential for flow failure of these "quick" sediments.

Response: The characteristics of the sediment and the potential for slope failure will be reviewed in the ongoing evaluation.

Comment #73: The Corps overestimated the in-place relative density of the cap and in doing so, the seismic stability of the cap. Our consultant estimates that the relative density of a cap placed using "conventional" methods will be about 40 percent (rather than 55 percent, as the Corps assumed).

Response: The pilot capping project will provide site-specific data on the relative density of the capping material placed by dropping it from a hopper dredge.

Comment #74: The Corps report inadequately addressed the potential adverse effects that could occur if the cap liquefies during an earthquake, including creation of conduits between the capped sediment and the water column, mixture of the cap with the underlying sediments, sand boils, and flow failure. In lieu of the analyses done by Headland, et al., in the 1994 capping feasibility study prepared by the Corps, the Corps is now relying on the WESHAKE computer model to predict the effects of an earthquake, but without providing any uncertainty analysis. In addition, the Corps report makes no mention of the recent discovery of a previously unidentified scissor fault across the lower Palos Verdes slope and its potential implications for capping.

Response: The next phase of the work will review recent geologic studies and the potential of liquefaction, its effects and related slope stability.

Comment #75: Individual barge drops are likely to impact the bottom in a sediment/water mixture resembling a discharge jet that creates scouring and resuspension. Our calculations indicate that this jet will likely scour several to tens of centimeters of sediment, increasing the likelihood of generating a density current. The resuspended material may settle on top of the cap, defeating the entire purpose of capping.

Response: The pilot capping project looked at this issue, and our preliminary conclusion is that scouring/resuspension of the contaminated sediment was restricted to the upper 10 centimeters or less when the cap material was placed on exposed sediment (i.e., for the initial load). This depth of scour decreased when subsequent loads were placed on areas that already had a layer of cap material present. Some of the resuspended sediment mixed in with the initial layer of cap material, but a clean layer of cap material was eventually established. More information on this issue will be included in the pilot project report.

Comment #76: In the analysis of future rate of loss of DDE from the sediments, the Corps report relies on the assumption that there will be no further sediment deposition on the Palos Verdes Shelf. However, in 1996, the NOAA studies were revised, in part, to specify that the long-term deposition of sediment on the Palos Verdes Shelf will occur at the rate of at least 1 to 2 millimeters per year.

Response: The comment is noted. The Corps' assumption of no net deposition was used in order to generate a conservative estimate of the required cap thickness. To the extent there is deposition on the order noted by the commentor, this additional sediment will serve to increase the long-term effectiveness of the cap and offset any periodic erosion that might occur.

Comment #77: The Corps report assumed that biological mixing generates a 15cm well-mixed layer at the surface of the sediments, together with an additional 15 cm biodiffusion layer, despite any evidence that such layers exist in the sediment.

Response: The Corps' assumption of a 15cm well-mixed layer and a total biodiffusion depth of 30 cm was based upon discussion with local experts and was used in order to generate a conservative estimate of the required cap thickness. It is not inconsistent with depths of biological mixing that have been observed within marine sediments. The pilot capping project will provide more site-specific information on the depth of biological mixing (bioturbation). To the extent that bioturbation depths are less than that assumed by the Corps, the long-term effectiveness of the cap will be greater than predicted.

Donald Reish, Cal State University, Long Beach

Comment #78: Dumping sand as the capping sediment would change the nature of the environment from a silt-clay sediment to a sandy sediment. Many benthic organisms are very sensitive to changes in the sediment characteristics. In addition, dumping sand would kill the existing fauna and settlement and ecological stability would take a few years. The benthic fauna would be different and because it would be a sandy environment rather than a silt-clay bottom, benthic productivity would be reduced since sandy environments are not as productive.

Response: EPA agrees that a change in the grain size of the bottom sediments can result in a change in the benthic community structure, that capping could smother the existing fauna, and that sandy sediments may be less "productive" than the existing organically-enriched silt-clay sediments. As discussed in the Corps report on capping options for Palos Verdes Shelf, it is fully expected that recolonization will at least a few years to occur. EPA will weigh these types of tradeoffs in evaluating capping alternatives, including the pros and cons of different types of cap material (i.e., the clean sediments used to construct the cap).

Comment #79: It is quite possible that the sediment being dumped would drop as a unit and cause a crater to form on the bottom. This would bring DDT and PCB laden [sediment], which is now buried, to the surface.

Response: The preliminary results of EPA's pilot capping project suggest that this type of adverse effect can be avoided with proper placement techniques. Nonetheless, EPA will conduct a careful evaluation of this issue as part of its ongoing evaluation of capping.

Comment #80: Since many animals, such as clams and polychaetes, burrow as deep as 2.5 feet, they can bring contaminated sediment to the surface.

Response: EPA agrees that such "deep burrowers" can bring contaminated sediment to the surface. The key issue for predicting cap performance is not so much the presence of such organisms but rather their density. A relatively small number of such organisms would not be likely to significantly affect cap performance.

Comment #81: It has been shown that the area is improving biologically. Birds, such as the pelican, are reproducing successfully.

Response: The area has certainly improved since the major DDT and PCB discharges ceased in the early 1970s, and birds such as the brown pelican have recoverd from the severe reproductive failures of earlier days. Nonetheless, bald eagles and peregrine falcons still cannot reproduce successfully on the Channel Islands without human intervention due to the ongoing exposure to DDT. As described in EPA's reports, there are also other indicators of significant remaining risks to the environment and to human health.

Comment #82: It has been shown many times after marine ecological disasters, that Mother Nature does a much better job of recovering the area than humans. I think it would be best for all aspects of the environment to let Mother Nature do her job.

Response: EPA will continue to evaluate the "no action" alternative concurrent with our evaluation of capping alternatives to provide a baseline for assessing the risk reduction benefits of any capping project.