

US EPA ARCHIVE DOCUMENT

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

ACTION MEMORANDUM/ENFORCEMENT

DATE: September 28, 2001

SUBJECT: Request for a Removal Action at the Palos Verdes Shelf near Los Angeles, California

FROM: Frederick K. Schaufler, Remedial Project Manager
Site Cleanup Section 1 (SFD-7-1)

THROUGH: John Kemmerer, Chief
Superfund Cleanup Branch

TO: Keith Takata, Director
Superfund Division (SFD-1)

I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of the proposed removal action described herein for the Palos Verdes Shelf near Los Angeles, California. The proposed removal action will establish institutional controls (outreach & education, monitoring and enforcement) to address existing human health risks associated with the consumption of contaminated fish from the Palos Verdes Shelf.

There are no nationally significant or precedent-setting issues associated with this removal action.

II. CONDITIONS and BACKGROUND

Site Status: Proposed as addition to Montrose NPL Site
CERCLIS ID: CAD009112087
Site ID: CA
Category of Removal: Non-Time Critical

The Palos Verdes Shelf is located within the Southern California Bight (an area of the coastal Pacific Ocean between Point Conception and San Diego, California), offshore from Point Fermin to Point Vicente on the Palos Verdes peninsula (see Figure 1). The impacted portion of the Palos Verdes Shelf consists of sediments contaminated with 1,1,1-trichloro-2,2-bis

(p-chlorophenyl) ethane (DDT) and its metabolites (hereafter referred to collectively as DDT or Total DDT), and polychlorinated biphenyls (PCBs). The DDT- and PCB-contaminated sediments cover a 43 square kilometer (17 square-mile) area of the ocean floor on both the continental shelf and the continental slope, making this the largest known DDT-impacted sediment deposit in the country (and perhaps the world).

Since 1937, wastewaters have been discharged to the ocean off Palos Verdes peninsula from submarine outfalls of the Joint Water Pollution Control Plant (JWPCP), which is operated by the Los Angeles County Sanitation Districts (LACSD). Starting in 1947, Montrose Chemical Corporation of California, Inc., ("Montrose") produced DDT at a manufacturing plant in Los Angeles County. Wastes from the manufacturing process, containing DDT residues, were discharged to the JWPCP until 1971, and a large amount of the DDT was subsequently released with the effluent from the JWPCP to the ocean. Similarly, PCBs were discharged to the municipal sewage system from several sources within the Los Angeles area and subsequently released to the marine environment with wastewaters from the sewage treatment plant. Peak annual mass emissions of effluent solids (167,000 metric tons), DDT (21.1 metric tons), and PCBs (5.2 metric tons) occurred in 1971.

Montrose produced approximately 800,000 tons of DDT at its Los Angeles County manufacturing plant during its thirty-five years of operation. The Montrose DDT manufacturing plant operated twenty-four hours a day, seven days a week, three hundred and sixty five days a year, except for occasional plant shutdowns. From August 1947 until June 1971¹, Montrose discharged DDT-contaminated liquid process waste to the LACSD sanitary sewers, and during much of this time, the Montrose facility was the largest DDT manufacturing plant in the world. For most of this period, it appears that Montrose's discharge to the sanitary sewers averaged several hundred thousand gallons per day. In the late 1960's and early 1970's, LACSD conducted an investigation of sources of DDT and PCB's that were entering LACSD's sanitary sewer system. LACSD identified the Montrose DDT manufacturing operations at 20201 Normandie Avenue in Los Angeles county as the sole major source of DDT entering the LACSD sanitary sewer system. In 1969, LACSD estimated that the discharge from the Montrose plant was contributing 654 pounds of DDT per day to the LACSD system.² At the time Montrose ceased its discharge to the LACSD system, LACSD sampled the Montrose liquid process waste prior to its disposal at an area landfill and found 3,400 ppm of DDT in that waste. Based on this result and with information about the quantity of liquid waste being sent to the landfill by

¹ As the result of a lawsuit filed by the Environmental Defense Fund and action by LACSD, Montrose ceased discharging its process waste to the LACSD sanitary sewer system in mid-1971 and began shipping that waste to an area landfill.

² The City of Los Angeles issued a permit to Montrose in 1953 authorizing Montrose to discharge liquid wastes to the sanitary sewer. That permit prohibited Montrose from discharging toxic substances to the sewer in excess of "0 ppm."

Montrose, LACSD estimated that some 455 pounds of DDT per day were being sent by Montrose to the landfill. Montrose's own estimates show that 119 pounds of DDT per day were being sent to the landfill from Montrose's operations.

At the time LACSD initiated its investigation in the late 1960's, biologists had begun investigating the collapse, as the result of DDT-induced eggshell thinning, of long established bald eagle and peregrine falcon populations on the Channel Islands and of the brown pelican population along the coast of Los Angeles county. Significant DDT contamination was also documented in fish along and near the Palos Verdes Shelf during this period.

The Montrose plant stopped discharging process wastewater to the sewer in the early 1970s, and the manufacturing plant was closed and dismantled in 1983. Subsequent improvements to treatment processes and better source control have reduced mass emissions and the supply of PCBs to the marine environmental. In 1999, Montrose completed a CERCLA removal action to remove and dispose of 165 tons of DDT-contaminated sediment in a 3,600-foot reach of sewer line downgradient of where wastewater from the Montrose plant was discharged into the LACSD sewer line. Sample results of the sediment removed by Montrose indicated DDT concentrations in excess of 45% by weight and chlorobenzene concentration of up to 2,200 parts per million.³

Effluent particles containing DDT and PCBs accumulated in the so-called effluent-affected (EA) sediment over a large area of the Palos Verdes shelf and adjacent slope. The spatial distributions of DDT and PCB concentrations and contaminant masses in shelf and slope sediments were evaluated extensively as part of the natural resource trustees' (Trustees') site investigation for their Natural Resource Damage Assessment (NRDA). The footprint of the DDT-contaminated sediment, delineated using a mean concentration of 1 part per million (ppm) p,p'-DDE (dichloro-diphenyl-dichloroethane, the dominant DDT isomer present within this area) in the upper 4 centimeters (cm) of the sediment, covers a sea floor area exceeding 43 square kilometers (km²) that includes portions of the continental shelf and continental slope. The total volume of contaminated sediments present in 1992 on the Palos Verdes Shelf was estimated in the NRDA at 9 million cubic meters (about 12 million cubic yards), and the total mass of contaminants was estimated to be 110 tons of DDT and 11 tons of PCBs.

Environmental conditions on the Palos Verdes Shelf have also been characterized in numerous other studies, including LACSD's ongoing ocean monitoring program required under their NPDES discharge permit. The LACSD program provides data on 1) DDT and PCB levels in sediment and fish tissue, 2) benthic community structure, and 3) physical oceanography. Other local research scientists and organizations (including the Southern California Coastal Water Research Project (SCCWRP)) have provided data on sediment toxicity and water column concentrations of DDT and PCBs.

³ Chlorobenzene was a feedstock chemical used in the production of DDT.

Several studies addressing potential human health risks associated with consumption of contaminated fish from this area have been conducted by other agencies. The most comprehensive of these were the Santa Monica Bay Restoration Project's studies of seafood contamination and seafood consumption rates for recreational anglers. EPA used information from these studies in preparing its own human health risk evaluation, which concluded that cancer risks for adults consuming DDT- and PCB-contaminated fish at the Palos Verdes Shelf were as high as 2×10^{-3} and non-cancer hazard quotients were as high as 32. For breast-feeding infants whose mothers ate contaminated fish from the Palos Verdes Shelf, hazard quotients were as high as 370.

In 1985, the State of California issued a seafood consumption advisory for Southern California, which still includes a "do not eat" recommendation for white croaker caught in the area of Palos Verdes Shelf and limited consumption of several other fish. In 1990, the State established a commercial fishing ban for white croaker in a three-mile wide area off Palos Verdes. However, a 1997 study by Heal the Bay (a local environmental group) found that levels of DDT and PCBs in some white croaker purchased in retail markets (primarily Asian markets) were similar to those in fish caught over the Palos Verdes Shelf and greatly exceeded the U.S. Food and Drug Administration (FDA) limits for seafood. As of March 1998, and in response to concerns about white croaker being sold at commercial fish markets, the California Department of Fish and Game (CDFG) revised the white croaker bag limit for sportfishers from unlimited to a limit of 10 fish per day.

EPA issued an Engineering Evaluation/Cost Analysis (EE/CA) report in March 2000, including a human health risk evaluation and a draft streamlined ecological risk evaluation. The EE/CA relied upon data from several sources, including those noted above, and will serve as the basis for the subsequent remedial investigation (RI) and feasibility study (FS), which have not been started. EPA is currently continuing its evaluation of in situ capping and finalizing the ecological risk evaluation report.

A. DESCRIPTION OF THE PALOS VERDES SHELF

1. Removal Evaluation

Characterization at the Palos Verdes Shelf has involved sampling and analysis of sediments, fish tissue, water quality and benthic infauna. The principal contaminants of concern present in sediments, fish and surface waters at the Palos Verdes Shelf are DDT and PCBs. Because the impacts of these contaminants on human health (via consumption of contaminated fish) would continue to occur for several years even after any later selected sediment cleanup was completed, alternatives were developed both for sediment remediation and for near-term reduction of the potential consumption of contaminated fish.

In 1990, federal and state natural resource trustees (with the National Oceanic and Atmospheric Administration (NOAA) as the lead agency) initiated a CERCLA Natural Resource Damage Assessment for the Southern California Bight, including the Palos Verdes Shelf. As part of the NRDA, the U.S. Geological Survey (USGS) collected sediment cores in 1992-93 from 56 stations at the Palos Verdes Shelf, and samples from discrete 2 or 4 cm intervals were analyzed for Total DDT and Total PCBs, as well as several physical parameters. The results of this sampling indicated that DDT and PCBs were present throughout the effluent-affected sediment deposit and that trends in PCB levels tended to follow trends in DDT concentrations. The NRDA also found that the DDT and PCBs in contaminated sediments were entering the food web and posed a variety of threats to sediment dwelling organisms, fish and higher predator species (including some protected by state or federal endangered species laws).

After reviewing the NRDA expert reports issued in 1994 and other available information, EPA decided to initiate a non-time-critical removal action in July 1996 to evaluate risks posed by the contaminated sediments on the Palos Verdes Shelf and the feasibility of response actions that could reduce threats to human health and the environment.

2. Physical Location

The Palos Verdes Shelf lies approximately 1 to 3 miles offshore of the Palos Verdes peninsula, near the City of Los Angeles (see Figure 1). Portions of the Palos Verdes Shelf lie on the relatively flat continental shelf, which is about 1 to 2 miles wide in this area, with the remainder on the steeper continental slope. Water depths range from 30 meters (m) on the nearshore side to over 600 m in the areas of contaminated sediment further offshore. The JWPCP outfalls operated by LACSD discharge treated municipal and industrial wastewater at depths of approximately 60 m on the Palos Verdes Shelf, offshore from Whites Point.

The Palos Verdes peninsula is predominantly a residential area, particularly in the areas closest to the coast. To the southeast of the peninsula lie the ports of Los Angeles and Long Beach. The waters of the Southern California Bight are in a zone of coastal upwelling and high marine productivity which supports a diverse assemblage of marine plants, invertebrates, fish, marine mammals and birds. Diverse marine habitats and biological communities typify the Palos Verdes shelf and slope and include the following:

- Soft-bottom habitats typified by infaunal and epifaunal invertebrates and fish;
- Hard-bottom communities including nearshore rocky intertidal to subtidal areas, commonly associated with algal or kelp communities that have a wide variety of primarily epifaunal invertebrates and fish; and
- Pelagic habitats utilized mostly by plankton, fish, some invertebrates, seabirds and fish-

eating raptors, and marine mammals.

3. Characteristics of the Palos Verdes Shelf

The Palos Verdes Shelf is defined by the large area of DDT- and PCB-contaminated sediment on the ocean floor in the vicinity of the LACSD ocean outfall system, which currently discharges approximately 350 million gallons per day of treated municipal and industrial wastewater. Past discharges of industrial wastewaters to the LACSD sewer system have resulted in contamination of marine sediments in this area.

Elevated contaminant concentrations in surface (0-4 cm) sediments (defined as total DDT concentrations in sediments exceeding 1 ppm) occur over an area exceeding 43 km² that includes portions of the continental shelf and slope. The dominant DDT isomer present within this area is p,p'-DDE. The combined areas of the shelf and slope with surficial (top 0-4 cm) sediment concentrations of p,p'-DDE exceeding 5 ppm and 10 ppm are approximately 13 km² and 3 km², respectively (see Table 1).

Peak levels of DDT and PCB at the Palos Verdes Shelf exceed 250 and 20 ppm, respectively, based on the 1994 USGS report (Lee 1994). These areas of highest concentration are typically located about 1 foot below the sediment surface in the vicinity of the ocean outfall system. DDT and PCB concentrations in sediment surface layers (0-2 cm) are measured by LACSD on a biennial basis at the 30, 61 and 152 meter depths along a series of transects through the Palos Verdes Shelf. In 1998, DDT concentrations along the 61 m isobath ranged from 1.9 to 65.8 ppm and PCBs ranged from 0.4 to 8.2 ppm. Based on a 1994 study by SCCWRP, the mean DDT concentration in the Southern California Bight is 0.041 ppm and the mean PCB concentration is 0.013 ppm. Although the upper layers of sediment contain lower levels of DDT and PCBs, the concentrations are still significantly elevated with respect to background levels in the Southern California Bight.

The USGS studies show that the EA layer of contaminated sediments ranges in thickness from about 2 inches up to 2 feet. The total volume of contaminated sediments present in 1992 on the Palos Verdes Shelf was estimated by USGS to be about 10 million cubic meters. The total masses of DDT and PCBs within these sediments have been estimated at 100 and 10 metric tons, respectively. Most of this mass lies within the area of the Palos Verdes Shelf on the continental shelf.

DDT and PCB levels in fish tissue vary considerably, depending on the feeding mode of a particular fish and the extent of its home range. Apart from the annual LACSD monitoring of a limited number of fish species, the available data on DDT and PCB levels in fish tissue dates

back to the late 1980s and early 1990s. The most contaminated fish at the Palos Verdes Shelf, the white croaker, is a bottom-feeding fish with a relatively small home range, and it is monitored by LACSD at three locations (see Figure 3). In 1996, DDT and PCB levels in white croaker at these locations ranged from 0.47 to 59.6 ppm and 0.07 to 5.63 ppm, respectively. By comparison, the FDA action level for DDT is 5 ppm, and the FDA tolerance level for PCBs is 2 ppm.

The data on DDT and PCBs in the water column is very limited. In a 1999 study, water samples collected in 1997 from varying distances above the sea floor at a station northwest of the LACSD outfalls showed a distinct gradient in which concentrations in water were highest near the bottom and decreased with increasing distance from the bottom. Concentrations at the Palos Verdes Shelf were as high as 15.8 nanograms per liter (ng/L) for DDT and 1.14 ng /L for PCBs, more than an order of magnitude above the water quality standards.

This removal action will be the first removal undertaken at the Palos Verdes Shelf, although other response actions have occurred at and in the vicinity of the Montrose Plant Property (located at 20201 Normandie Avenue, Los Angeles County, California). In 1998, EPA issued a Record of Decision selecting response actions to address the release of hazardous substances to groundwater at and from the Montrose Plant Property, as well as at and from the adjacent Del Amo Superfund Site. EPA is currently implementing a time-critical removal action to address soil contamination present in a portion of the historic stormwater pathway in a residential area near the Montrose Plant Property. EPA is also continuing to investigate soil contamination at and adjacent to the Montrose Plant Property and dense non-aqueous phase liquid contamination found in the groundwater beneath the Montrose Plant Property.

4. Release or Threatened Release into the Environment of a Hazardous Substance, or Pollutant or Contaminant.

The substances of concern at the Palos Verdes Shelf include DDT, DDE, DDD and PCBs, all of which are "hazardous substances" as defined by Section 101(14) of CERCLA, 42 U.S.C. Section 9601(14), and 40 C.F.R. § 302.4 and Table 302.4.

The presence of DDT and PCBs in sediments and surface waters within the Palos Verdes Shelf, and the potential for the substances to migrate, constitutes an actual or threatened release of hazardous substances into the environment, as defined by Section 101(22) of CERCLA, 42 U.S.C. Section 9601(22). Migration of the contaminated sediment is possible via erosion, transport and redeposition of sediment particles, flux of contaminants from sediment into surface waters, and biological uptake and accumulation of DDT and PCBs in the food web.

The results of sediment sampling for DDE within the area are summarized in Table 1 (and presented in detail in the EE/CA report), with the sampling locations shown on Figure 2.

DDT was found at concentrations up to 253 ppm within the deposit of EA sediment, and PCB levels were as high as 20 ppm. The DDT and PCBs in these sediments are believed to have come primarily from the wastewater discharged via the outfall system. Thus, the location of the sediment with highest DDT and PCB levels is in the immediate vicinity of the outfall pipes themselves.

5. NPL Status

In August 1997, EPA issued a proposed rulemaking to amend the Montrose Chemical Superfund Site NPL listing (placed on the NPL in 1989) to formally include the Palos Verdes Shelf. It is the position of EPA that the Palos Verdes Shelf is already a part of the Montrose Superfund Site NPL listing. However, EPA has represented to the U.S. Court of Appeals for the D.C. Circuit, in litigation challenging the EE/CA approval memorandum, that EPA would not take action relying on this position until the rulemaking is completed. EPA is reviewing comments submitted on the proposed rulemaking and expects to issue a final rulemaking in 2002.

6. Maps, Pictures and other Graphic Representations.

Figure 1 is a general map of the area showing the location of the Palos Verdes Shelf, the approximate extent of the DDT- and PCB-contaminated sediment, and the location of the LACSD outfall system. Figure 2 is a map showing the locations where sediment samples (cores) were collected by USGS at the Palos Verdes Shelf and the areas of highest DDT contamination in sediment. Figure 3 is a map showing the locations where fish samples have been collected by LACSD. Figure 4 shows the area of the commercial fishing ban for white croaker, as well as the Palos Verdes Shelf boundaries. Figure 5 is a map showing the approximate area within which enforcement of the daily catch and possession limit for white croaker would be enforced under the proposed response action.

B. OTHER ACTIONS TO DATE

1. Previous Actions

No previous actions have been taken by any parties to remediate the offshore contaminated sediments. As part of the Montrose NPL Site work, a CERCLA removal action was completed in February 1999 to remove and dispose of DDT-contaminated sediment from a 3,600-foot reach of the LACSD sewer immediately downstream of the former Montrose facility. More than 165 tons of sediment were removed and incinerated off-site at a cost of approximately

\$1.83 million. In addition to the removal action just described, LACSD previously removed additional sediment (with much lower levels of DDT) from downstream segments of the sewers as part of their ongoing sewer maintenance program. These actions were undertaken in large part to prevent the further release of DDT-contaminated sewer sediments into the ocean.

In 2000, EPA conducted a pilot capping project at the Palos Verdes Shelf as part of the ongoing evaluation of in situ capping. Although the pilot capping project is providing information that is useful for the evaluation of capping as a response action, the area of the Palos Verdes Shelf that was completely or partially capped is too small to have any measurable effect on fish tissue concentrations in the area. The total cost of the pilot capping project is approximately \$5.3 million.

In July 1999, the California Department of Health Services (CDHS) began work on an EPA-funded pilot outreach program regarding the health risks associated with consumption of contaminated fish from the Palos Verdes Shelf area. The two primary goals of the pilot outreach program were 1) to identify health issues and concerns of agencies and organizations pertaining to commercial and sport fish contamination associated with the Palos Verdes Shelf and 2) to develop and evaluate a limited number of outreach/education materials and programs addressing those concerns. The pilot outreach program was carried out in conjunction with community-based organizations (CBOs) representing a variety of ethnic communities in the Los Angeles/Long Beach area. The results of the pilot outreach program have been applied in developing the scope of public outreach and education activities included as part of the institutional controls selected in this Action Memorandum. The total cost of the pilot outreach program was \$235,225.

2. Current Actions

Apart from the activities described above, the other significant activity related to (but distinct from) EPA's proposed institutional controls is the Trustees' work on natural resource restoration projects, specifically the planning for siting artificial reefs to promote the catch and consumption of clean fish. This Trustee effort (which began earlier this year) will involve a major fish sampling program, and EPA expects to collaborate with the Trustees on developing and implementing the sampling programs of both entities in order to improve efficiency, ensure consistency and avoid duplication of effort. Similarly, EPA will factor the data collection programs of LACSD and other entities such as SCCWRP into the design of its fish monitoring program.

C. STATE AND LOCAL AUTHORITIES' ROLES

1. State and Local Actions to Date

As described below, the actions taken by the state to date include fish consumption advisories for sport fishers, a commercial catch ban for white croaker and a daily white croaker catch limit for sport fishers.

In 1985, the State of California issued an interim health advisory recommending limitations on the consumption of sport fish and discouraging consumption of white croaker caught in Santa Monica Bay, on the Palos Verdes Shelf, and in the Los Angeles/Long Beach Harbor area because of DDT and PCB contamination. At that time, state agencies were directed to conduct a comprehensive study of chemical contaminants in sport fish and a risk assessment for their consumption. The study was completed by California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA) in September 1991 (Pollock et al., 1991). Based on this study, OEHHA issued a health advisory recommending, in part, that recreational anglers not consume white croaker caught in most areas offshore of Los Angeles County and Orange County, and that anglers greatly limit consumption of a number of other fish species caught on or in the vicinity of the Palos Verdes Shelf (see Table 2).

Following the initial health advisory in 1985, signs were posted by Los Angeles County at several fishing locations to warn anglers about the potential health risks. Over the years these signs stolen, vandalized or fell into disrepair. New signs were posted by the County in 1999 following a joint effort by EPA, the State, the Santa Monica Bay Restoration Project (SMBRP) and the County to develop an updated warning sign. At about the same time, similar signs were posted by the City of Long Beach at several fishing locations along the City's waterfront.

The state's fish consumption advisories have been included in the California sport fishing regulations since March 1, 1992, and both OEHHA and CDHS have produced and distributed related informational booklets in an effort to make anglers and consumers aware of the potential dangers. However, recreational anglers continue to catch and consume white croaker and other species possibly contaminated with DDT and PCBs in areas which are covered by the fish advisories.

In 1990, the CDFG closed commercial fishing of white croaker on the Palos Verdes Shelf because of the threat to human health posed by the DDT and PCB contamination (Section 7850 of the Fish and Game Code). The closure was adopted in Title 14 of the California Code of Regulations in May 1990 and became permanent in February 1991. The closure extends from Point Vicente to Point Fermin and from the shoreline out three miles (see Figure 4). Concerns exist, however, that some commercial fishing operations are not adhering to the commercial fishing closure. CDFG is the state agency with authority to enforce the closure, but the agency has very limited resources and competing priorities that severely limit its ability to enforce the closure. CDFG commercial catch data for 1993-96 indicate that over 100,000 pounds of white croaker per year were landed in the catch block areas located off Palos Verdes that are partially covered by the catch ban area (catch blocks 719, 720, 740, and 741). It is unclear whether the entire white croaker catch from these blocks was legal because portions of these blocks are

included in the area closed to commercial fishing by the CDFG regulation. The fact that the catch from these blocks represents more than 80% of the local white croaker catch underlines the importance of ensuring that commercial fisherman do not enter and fish for white croaker within the catch ban area, especially given the additional information that white croaker with significant DDT and PCB concentrations have been found in a number of fish markets in the Los Angeles area.

A 1997 study by Heal the Bay (Gold et al., 1997) found that levels of DDT and PCBs found in some white croaker purchased in retail markets (primarily Asian markets) were similar to those in fish caught over the Palos Verdes Shelf. As of March 1998, and in response to concerns about white croaker caught by sportfishermen being sold at commercial fish markets, the CDFG revised the white croaker bag limit from unlimited to a limit of 10 fish per day.

The Santa Monica Bay Restoration Project has supported outreach and education programs related to health risks posed by contaminated fish through its Public Involvement and Education (PIE) Fund, a program which provides funding to various groups to educate and involve the public in Bay resource and pollution prevention efforts. In 2000, PIE grants (approximately \$15,000 each) were awarded to two of the CBOs involved in the EPA-funded outreach & education pilot program described above to support their work on developing outreach materials.

EPA has been the lead agency at the Palos Verdes Shelf since the EE/CA Approval Memorandum was signed in 1996. EPA has kept the California Department of Toxic Substances Control (DTSC) (the support agency and lead state agency) apprised of its investigations and activities at the Palos Verdes Shelf, and both DTSC and the Regional Water Quality Control Board (RWQCB) have been actively involved in reviewing and commenting on documents prepared by EPA and its contractors. DTSC has reviewed the March 2000 EE/CA and related documents, including the Proposed Plan, and has expressed their support for the proposed response action.

EPA has provided periodic updates on Palos Verdes Shelf activities to local officials. Since the Palos Verdes Shelf lies offshore outside any city limits, local officials have had only limited involvement in activities related to the Palos Verdes Shelf. Los Angeles County agencies such as the Department of Health Services have played a more active, though still relatively limited, role in response activities to date. EPA has discussed the proposed removal action with both state and county officials, and they have not raised any objections or serious concerns about implementation of the proposed institutional controls.

2. Potential for Continued State/local Responses

State agencies such as CDFG, OEHHA and CDHS will continue to make information

about the fish consumption advisories available, but they lack the resources to actively distribute those materials or conduct a public education campaign based on them. Similarly, CDFG does not have the resources to provide any targeted enforcement effort regarding the commercial fishing ban, and local (county) agencies face similar constraints when it comes to conducting market checks. The SMBRP PIE grant program addresses a wide variety of needs related to water quality management in the Bay, and it is unlikely that substantial funds would be directed towards education efforts on fish contamination issues alone.

DTSC will continue to serve as a support agency to EPA for the Palos Verdes Shelf. More specifically, DTSC will review all documents related to the evaluation and possible implementation of in situ capping as a response action. However, EPA expects that DTSC will play a minor role in the implementation of institutional controls, relying instead on other state agencies (e.g., CDFG, CDHS, OEHHA) whose authorities and mission are more directly related to such controls.

EPA has briefed DTSC on the proposed removal action and will continue to keep the agency informed of its progress. While EPA does not anticipate needing significant assistance from DTSC in conducting the removal action (i.e., implementing the institutional controls), EPA does anticipate providing funds (either directly or indirectly) to other agencies such as CDHS, CDFG, OEHHA, SMBRP and County agencies for that purpose.

III. THREATS to PUBLIC HEALTH or WELFARE or the ENVIRONMENT, and STATUTORY and REGULATORY AUTHORITIES

DDT and its metabolites (referred to here collectively as "DDT") comprise a family of compounds, a number of which are considered to be extremely toxic. Similarly, PCBs comprise a family of toxic compounds. Both DDT and PCBs are of significant concern from a toxicological standpoint. DDT and PCBs are on the State of California's Proposition 65 list of pollutants known to cause cancer, and EPA's Integrated Risk Information System lists both DDT and PCBs as probable human carcinogens based on carcinogenicity in mammals in laboratory studies. Other health effects for DDT include impacts on the nervous system (e.g., excitability, tremors, and seizures), the liver (changes in liver enzymes), and reproduction and development of offspring. For PCBs, liver effects and skin irritations characterized by acne-like lesions and rashes are the only significant adverse noncancer health effects reported in PCB-exposed workers. Effects of PCBs in experimental animals include liver damage, skin irritations, low birth weights and other developmental effects, immunosuppression, and death.

Pursuant to Section 300.415(b)(2) of the National Contingency Plan ("NCP"), the following conditions necessary for initiating a removal action exist:

- a. Actual or potential exposure to hazardous substances by nearby populations, animals, or food

chain

There is a direct hazard to the public due to the presence of elevated levels of DDT and PCBs in seafood (fish). The most likely route of exposure to DDT and PCBs in these fish is through direct consumption or, for breast-fed infants, through ingestion of breast milk contaminated as a result of the mother's consumption of contaminated fish.

The current state fish consumption advisory for Southern California locations (including Palos Verdes) is shown in Table 2. In developing this advisory, OEHHA's 1991 risk calculations used an exposure scenario that assumed an ingestion rate of 23 grams per day (about one meal per week) and a lifetime exposure of 70 years. Using OEHHA's exposure scenario, a DDT level of 100 parts per billion (ppb) would be equivalent to a cancer risk of 1×10^{-5} (the trigger level used by OEHHA).

The EPA human health risk evaluation for Palos Verdes Shelf, issued in April 1999, calculated cancer risks and non-cancer hazards for both a reasonable maximum exposure (RME) scenario and a central tendency (CT) scenario. In the RME scenario, risks were calculated based on an assumed single species diet, whereas for the CT scenario a mixed species diet was used. The ingestion rate used for white croaker consumption in the RME scenario was 27.9 g/day (about 5-6 meals per month), with an exposure period of 30 years. The resulting estimate of cancer risk from DDT and PCBs in white croaker on the Palos Verdes Shelf was 1×10^{-3} . While white croaker was the fish species posing the highest level of risk, all eleven other species of fish evaluated posed a risk level exceeding the 10^{-6} threshold including two (surfperch and halibut) that equaled or exceeded 10^{-4} .

In the RME scenario, non-cancer hazard quotients exceeded a value of 1 for six of the eleven species of fish evaluated (a hazard quotient greater than 1 indicates a potential for adverse non-cancer health effects). Similar to the cancer risk estimates, the highest hazard quotients (HQs) were associated with white croaker (HQs of 17 for DDT and 32 for PCBs).

For the CT scenario, cancer risks were calculated using a mixed species diet, with a total fish consumption rate of 21.4 g/day (the median rate for all boat anglers). The resulting estimate of cancer risk from DDT and PCBs combined was 2×10^{-5} . HQs summed across all fish in the mixed species diet were less than 1 for both DDT and PCBs.

Finally, EPA also estimated the potential risks to breast-fed infants due to consumption of DDT and PCBs in breast milk. Assuming a maternal ingestion rate of one meal per month, infant HQs were calculated based on the mother's consumption of white croaker and kelp bass from the Palos Verdes Shelf. For white croaker, the HQs were 220 (for DDT) and 370 (for PCBs); for kelp bass consumption, they were 3 (for DDT) and 16 (for PCBs).

The risks cited above are based on ingestion rates for boat-based recreational anglers in

the Santa Monica Bay area and assume that anglers are catching their fish from the Palos Verdes Shelf area. This area is readily accessible by boat, and fish impacted by contaminants in the sediments at the Palos Verdes Shelf are also found in shallower water closer to the shore (i.e., inshore of the Palos Verdes Shelf boundaries as shown in Figure 1). Various studies have documented that ocean waters in this area are frequented by sport fishers on both private and party (i.e., commercial) boats.

The state of California has also established a commercial fishing ban for white croaker in the area of the Palos Verdes Shelf (see Figure 4). This closure was based on the presence of white croaker with contaminant levels of DDT and PCBs that exceeded the FDA limits for interstate commerce (the state uses the same limits for fish sold commercially in intrastate commerce). Substantial evidence, however, indicates that some commercial fishing operations are not adhering to the commercial fishing closure and that white croaker caught by sportfishermen are being sold at commercial fish markets, as well. A 1997 study by Heal the Bay found that levels of DDT and PCBs in some white croaker purchased in retail markets (primarily Asian markets) were similar to those in fish caught over the Palos Verdes Shelf. An April 2000 study by S.R. Hansen & Associates found similar instances of highly contaminated white croaker available for sale in fish markets in Los Angeles and Orange counties. Between 5% and 11% of the fish fillets sampled in the Hansen study exceeded the FDA limit for DDT⁴, with the highest DDT concentration being 42.4 ppm (some eight times the FDA limit). Actual human exposure from the consumption of this contaminated white croaker is likely to be significantly higher if the whole fish is consumed rather than just the fillet.

As noted earlier, CDFG commercial catch block data indicate that, historically, 80% of the white croaker landed commercially in the Los Angeles area was caught in blocks which include portions of the area closed to commercial fishing. Although the commercial white croaker catch from these blocks dropped significantly in 1998 (presumably in response to the publicity surrounding the Heal the Bay report), the figures reported for 1999 showed that the catch volume had rebounded to its prior levels.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from the Palos Verdes Shelf, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

⁴ PCB results were not reported in the Hansen study.

A. PROPOSED ACTION

1. Proposed Action Description

EPA plans to implement the following actions as institutional controls for the Palos Verdes Shelf:

- **Public Outreach and Education** – to increase awareness and understanding of the existing fish consumption advisories and fishing restrictions;
- **Monitoring** – to evaluate and track contaminant concentrations in fish (primarily white croaker) caught at or near the Palos Verdes Shelf as well as those sold in retail fish markets and served in restaurants; and
- **Enforcement** – to prevent commercial catch and sale of contaminated fish at and from the Palos Verdes Shelf.

The scope of these institutional controls, as described below and in more detail in Attachment G, has been modified from the alternative presented in the EE/CA report and March 2000 Proposed Plan in response to comments received during the public comment period. The modifications have resulted in an increased public outreach and education program and a much smaller enforcement program, particularly with respect to on-the-water patrols by CDFG wardens.

a. Public Outreach and Education

The outreach and education portion of the Institutional Controls response action is designed to improve public awareness and understanding of the health risks of eating contaminated fish and to build local capacity to address fish contamination issues. The proposed Public Outreach and Education (PO&E) program is more extensive than the program described in the Proposed Plan. It has been modified both in response to public comments on the Proposed Plan and in light of the experience and information gained during the EPA-sponsored outreach and education pilot project that was conducted by CDHS from July 1999 through December 2000.

The proposed PO&E Program will reach across the multi-cultural universe of fish-eating people in the Los Angeles/Orange County area to explain the health risks associated with DDT- and PCB-contaminated fish and enable consumers to make informed decisions about fish consumption. The program will be targeted to educate sport and subsistence fishers and fish consumers (particularly the young, elderly and child-bearing age women), as well as commercial anglers, wholesalers, and retail outlets (i.e., markets and restaurants). By providing resources for

the development and distribution of culture-specific materials while encouraging collaboration and cooperation among all stakeholders, EPA expects to establish a network of organizations with an expertise in the area of fish contamination and the ability to educate their constituencies on associated health issues.

EPA anticipates that the program will be carried out through funding provided to state, county and local agencies and community-based organizations. The Seafood Contamination Task Force (SCTF) established during the pilot outreach project will be expanded to adequate representation of impacted communities, as well as representation from the commercial fishing industry, fish markets and restaurants. The SCTF is expected to serve as a forum to share information with participants, establish program goals and schedules, determine roles and responsibilities, and discuss any issues or constraints encountered.

The PO&E activities conducted as part of the response action will be evaluated to assess effectiveness and provide a basis for making adjustments to the scope of future PO&E activities.

b. Monitoring

Periodic monitoring of contaminant levels in fish will be performed to evaluate the effectiveness of fishing restrictions and enforcement actions in eliminating the presence of contaminated fish in the public market and restaurants. This will involve i) a “fish-in-ocean” sampling program, in which contaminant data for white croaker from areas adjacent to the existing commercial closure area will be collected and used to determine whether the closure area should be enlarged or revised; and ii) the collection and chemical analyses of samples of locally caught fish from markets and restaurants within Los Angeles and Orange counties.

At the same time that EPA is conducting its fish sampling program, the Natural Resource Trustee agencies (the “Trustees”) expect to be implementing a similar effort as part of their planning process for the restoration of fishing resources that have been adversely impacted by the site. The primary purpose of the Trustees’ study is to measure the geographic pattern of contaminant levels in fish. The results of the study would be used to determine “clean” locations for fishers and to identify potential areas for siting restoration projects such as constructed reefs that would increase the supply of “clean” fish for local anglers. Because it is clearly evident that the objectives of both the Trustees and USEPA contain similar elements, efforts will be made to collaborate with the Trustees during implementation of the fish-in-ocean sampling program.

The fish-in-ocean sampling program will likely occur over a 2-year period, and will include multi-season sample collection. The marketplace monitoring program will be carried out over at least a five-year period, at which time the need for continued monitoring will be re-evaluated.

c. Enforcement

The enforcement component of this response action will be designed to meet two goals. First, the enforcement program must meet the performance standard of preventing, to the extent practicable, the commercial catch and sale of contaminated fish from the Palos Verdes Shelf. Second, the enforcement program must ensure that white croaker are not caught at or near the Palos Verdes Shelf in violation of the State of California regulations that i) prohibit such commercial catch of white croaker and ii) establish a daily white croaker catch and possession limit for sport fishers.

In order to attain the performance standard and meet the ARARs in an appropriate and efficient manner, EPA will develop the enforcement program using a phased approach. Early on EPA will conduct several investigations that will aid EPA in ultimately designing an effective enforcement program: 1) fish monitoring to determine whether species on the Palos Verdes Shelf, other than white croaker, contain unacceptable levels of DDT and PCBs and 2) investigation of the existing market structure for white croaker in the greater Los Angeles area.⁵

In the near term, the enforcement program will consist of additional, limited vehicular patrols of departure and unloading points. The additional enforcement activities will be accomplished through the use of existing staff from the CDFG Marine Enforcement Group. At this time, because of staff vacancies and a shortage of qualified game wardens, it is infeasible for CDFG to provide continuous coverage (i.e., boat patrols) of the Palos Verdes Shelf area by CDFG wardens, as proposed in EPA's March 2000 Proposed Plan. Therefore, the enforcement program will have to rely on the use of existing CDFG staff in primarily shore-based activities. EPA will provide the results from the proposed fish monitoring program for markets and restaurants to CDFG to assist them in targeting the use of their limited resources.

If problems with contaminated commercially-sold fish persist related to the Palos Verdes Shelf, EPA will seek to get additional CDFG personnel allocated to enforcement activities targeted to the Palos Verdes Shelf. While EPA can provide funds to the State of California for the enforcement program, it remains the responsibility of the state to designate sufficient personnel to implement the enforcement program. Based on currently available information, EPA believes that residents in the greater Los Angeles and Orange County area consume between 5,000 and 10,000 meals of white croaker per year where the white croaker exceeds the FDA action limit for DDT. Given this, EPA does not expect that the initial enforcement efforts will be sufficient over the long term. EPA looks forward to the continued support of the State of California in this effort.

⁵ Based on these investigations, additional components may be added to the enforcement program including but not limited to efforts to eliminate the interstate sale and shipment of contaminated fish and expansion (with appropriate state regulatory action) of commercial catch restrictions for the Palos Verdes Shelf (either with respect to area or species or both).

i) Commercial Ban Area Enforcement

The commercial ban area enforcement program will consist of CDFG conducting periodic inspections of the commercial ban area while performing routine patrols, as well as conducting limited shore-based inspections and spot checks at locations where commercial fishermen are expected to return.

ii) Sport Fishing Restriction Enforcement

Unlike the commercial fishing ban, the daily catch limit for white croaker is not limited to any specific area. Therefore, the sport fishing enforcement program will include limited CDFG inspections of sport fishers' catch at locations presumed to be within the area impacted by contaminated sediments at the Palos Verdes Shelf. Because sport fishermen vary their fishing locations, the enforcement program will occur within the area between and including Los Angeles Harbor (inside Los Angeles Harbor in the area of the Cabrillo fishing pier) and the northern end of Santa Monica Bay (includes the Santa Monica and Venice piers, Paradise Cove, and most of Point Dume Canyon) (see Figure 5).

Taking the actions described above will mitigate the public health threat posed by the consumption of contaminated fish and reduce the possibility that contaminated white croaker at or near the Palos Verdes Shelf are commercially harvested.

2. Contribution to Remedial Performance

There is no existing Record of Decision (ROD) for the Palos Verdes Shelf, and an RI/FS has not been initiated. However, the proposed removal action will not interfere with any likely remedial alternatives to address the contaminated sediments. The removal action is also appropriate because the consumption of contaminated fish poses a threat to human health that will persist for several years even after any sediment cleanup actions are taken, and thus the proposed institutional controls will be needed as a part of any remedial action.

3. Engineering Evaluation/Cost Analysis (EE/CA)

A copy of the March 2000 EE/CA is attached. The EE/CA describes and evaluates institutional controls, three in-situ capping alternatives and the no-action alternative. Although the EE/CA includes capping alternatives, the March 2000 Proposed Plan presented only the no-action and institutional controls alternatives, while noting that EPA was continuing its evaluation of capping.

The Response Summary, containing EPA's responses to public comments on the Proposed Plan, is attached. The comments submitted covered all the alternatives in the EE/CA

and included several significant comments on the institutional controls alternative. The proposed actions described in section VI(A) above have been modified from the Proposed Plan based on the public comments.

4. Applicable or Relevant and Appropriate Requirements ("ARARs")

Removal actions are required, to the extent practicable, considering the exigencies of the circumstances, to attain ARARs under federal or state environmental laws. In determining whether compliance with ARARs is practicable, the scope of the removal activity and the urgency of the situation were considered.

The following are identified as ARARs for the removal actions selected in this Action Memorandum:

California Department of Fish and Game Regulations Prohibiting the Commercial Catch of White Croaker on the Palos Verdes Shelf (State of California Fish & Game Code §7715(a) & (b); California Code of Regulations, Title 14, Section 104)

California Department of Fish and Game Regulations Establishing a 10-fish daily bag and possession limit for the sport take of White Croaker in California (California Code of Regulations, Title 14, Section 27.60)

FDA Tolerance Level of 2 ppm PCBs in the edible portion of fish (21 CFR §109(a)(7))

As part of the response action described above, EPA is waiving the ARARs for surface water quality standards (for DDT and PCBs) as they would otherwise apply to the removal action based on the waiver provision for interim measures. See 40 C.F.R. Section 300.415(J) and 40 C.F.R. Section 300.430(F)(ii)(C)(1). This means that EPA's response action, as selected by this Action Memorandum, would not be required to meet these two ARARs and also that EPA will continue to evaluate whether additional response actions (such as capping) could, if implemented, achieve the ARARs. EPA's waiver of the water quality standard ARARs as they would apply to the recommended removal action is based on the following:

i) the proposed removal action is intended to serve as an interim measure (with a limited duration of 10 years) while EPA completes its investigation of the Palos Verdes Shelf;

ii) the institutional controls which make up the proposed removal action will not affect environmental conditions on the Palos Verdes Shelf and will not cause any additional migration of contaminants found on the Palos Verdes Shelf; and

iii) the proposed removal action will not interfere with any final response action should any additional and final response action be selected by EPA. As discussed earlier, based on EPA's screening analysis, the only remaining cleanup action that EPA plans to continue to evaluate is the option of capping all or a portion of the contaminated sediments on the Palos Verdes Shelf (in this context, EPA would also continue to evaluate the no further action alternative as well). The proposed removal action would prevent or limit the catch and human consumption of contaminated fish but would not affect conditions at the Palos Verdes Shelf which cause the fish to become contaminated. As such, the proposed removal action would not preclude, delay or interfere with the implementation of any capping of the Palos Verdes Shelf contaminated sediments, should EPA subsequently select a cap as a further response action for the Palos Verdes Shelf.

In addition to the ARARs cited above, EPA has identified the FDA Action Level of 5 ppm DDT in the edible portion of fish⁶ as a "to be considered" criterion that will serve as a performance standard for the enforcement component of the institutional controls program.

5. Project Schedule

EPA has determined that conditions at the Palos Verdes Shelf meet the criteria for a non-time-critical removal. The schedule for implementing this removal action is based on the goal of beginning implementation of the institutional controls before the end of calendar year 2001. In order to achieve this goal, initial planning activities must begin in October 2001. The proposed institutional controls will be necessary as long as contaminants from the Palos Verdes Shelf continue to make fish unsafe to eat, which EPA estimates to be at least 10 years. Within that time period, EPA will determine whether additional response actions (such as capping) should be undertaken, including the need for continuing institutional controls.

B. ESTIMATED COSTS

This removal action will be conducted by several state and local agencies with EPA's oversight. The estimated total of annual extramural costs for the removal action would be approximately \$7,856,745 for a 10-year period (see Attachment G). These extramural costs would come out of the Palos Verdes Shelf special account (see Section VIII).

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR

⁶ See U.S. Food and Drug Administration *Compliance Policy Guides*, CPG 7141.01 Chapter 5. Foods, Section 575.100.

NOT TAKEN

Contaminated fish will most likely continue to be caught and consumed by recreational anglers and their families who are unaware of the potential health risks and/or don't understand the fish consumption advisories. Contaminated fish, particularly white croaker, will likely also continue to show up in commercial fish markets and restaurants. Delayed action will increase health risks to recreational anglers and their families, and those who purchase fish in retail markets and restaurants, through prolonged exposure to contaminants in fish.

VII. OUTSTANDING POLICY ISSUES

No outstanding policy issues have been identified at this time.

VIII. ENFORCEMENT

In 1990, the United States filed suit against Montrose Chemical Company (and its parent companies and related subsidiaries). The suit contained three claims: one for CERCLA natural resource damages (NRD) resulting from the ecological impacts of the DDT and PCBs found on the Palos Verdes Shelf and other marine areas off the Southern California coast, a second claim for Superfund costs incurred by EPA related to the onshore portions of the Montrose NPL Site, and a third for EPA's response costs related to its Palos Verdes Shelf investigation and any other response action determined to be necessary by EPA. The NRD claim and the EPA Palos Verdes Shelf claim were also brought against PCB contributors Westinghouse Electric Corporation (now CBS Corporation), Simpson Paper Company and Potlatch Corporation as well as the County Sanitation Districts of Los Angeles County (LACSD). In 1991, Montrose filed a third party complaint against 155 municipal entities (extending from the City of Los Angeles to Orange County) claiming that these entities were responsible for any and all costs and damages sought from Montrose.

The litigation with respect to the Palos Verdes Shelf has been resolved through a series of settlements (four in total), the last of which was entered by the District Court in March 2001. These settlements, including interest accrued to date, have provided funds in the amount of approximately \$77.5 million to cover EPA's costs with respect to the Palos Verdes Shelf (including the costs of implementing any selected removal or remedial action). These funds (with the exception of \$10 million held in a court registry account) are currently set aside in an EPA special account for Superfund activities related to the Palos Verdes Shelf. At this time, the Region does not expect to undertake any further enforcement action with respect to cost recovery for the Palos Verdes Shelf.

IX. RECOMMENDATION

This decision document represents the selected removal action for the Palos Verdes Shelf near Los Angeles, California, developed in accordance with CERCLA, as amended, and not inconsistent with the NCP. This decision is based on the administrative record for the Palos Verdes Shelf. Conditions at the Palos Verdes Shelf meet the NCP section 300.415(b)(2) criteria for a removal, and I recommend your approval of the proposed removal action.

Signed by Keith Takata on 9/28/01
Approval Signature

Date

Disapproval Signature

Date

US EPA ARCHIVE DOCUMENT

ATTACHMENT A - REFERENCES

Gold, M., J. Alamillo, S. Fleischli, J. Forrest, R. Gorke, L. Heibshi, and R. Gossett. 1997. *Let the Buyer Beware: A Determination of DDT and PCB Concentrations in Commercially Sold White Croaker*. Heal the Bay, Santa Monica, CA.

Lee, Homa J. 1994. *The Distribution and Character of Contaminated Effluent-Affected Sediment, Palos Verdes Margin, Southern California*. U.S. Geological Survey.

Pollock, G.A., I.J. Uhaa, A.M. Fan, J.A. Wisniewski, and I. Witherell. 1991. *A Study of Chemical Contamination of Marine Fish from Southern California: II. Comprehensive Study*. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. Sacramento, CA.

S.R. Hansen & Associates. 2000. *Evaluation of the Sale of White Croaker in Retail Fish Markets in Southern California*. Prepared for Ropes and Gray, Boston, MA.

ATTACHMENT B - TABLES AND FIGURES

- Table 1. Spatial Distribution of Surficial (0-4 cm) Sediment DDE Concentrations
- Table 2. Fish Consumption Advisories - Southern California Locations Between Point Dume and Dana Point
- Figure 1. Palos Verdes Shelf Location Map
- Figure 2. Peak Total DDT Determined Over a 4-cm Increment
- Figure 3. LACSD Fish Sampling Locations
- Figure 4. Boundaries of the White Croaker Commercial Fishery Closure Area
- Figure 5. Area of Focused Enforcement for Sportfishing Restrictions on White Croaker

Table 1.

**Spatial Distribution of Surficial (0-4 cm) Sediment DDE Concentrations
Palos Verdes Shelf, Los Angeles, CA**

DDE Concentration (ppm)	Area Exceeding this DDE Concentration (km ²)		
	Shelf	Slope	Total
1	13.8	29.3	43.1
5	6.1	7.5	12.6
10	1.9	1.5	3.4

NOTE: In a given category (shelf, slope or total), the areas exceeding 5 or 10 ppm are within the total area exceeding 1 ppm. For example, of the 13.8 km² exceeding 1 ppm DDE on the shelf, 6.1 km² also exceed 5 ppm.

Table 2.

**Fish Consumption Advisories
Southern California Locations Between Point Dume and Dana Point**

Twenty-four locations in this area of southern California have been tested. No consumption advisories based on chemicals were issued for the following locations: Santa Monica Pier, Venice Pier, Venice Beach, Marina del Rey, Redondo Beach, Emma/Eva oil platforms, Huntington Beach, Laguna Beach, Fourteen Mile Bank, Catalina (Twin Harbor), and Dana Point. Consumption advice for certain species of sport fish was issued for the other locations because of elevated DDT and PCB levels, as listed below.

The following guidelines apply to the specific advisories that follow:

1. Eating sport fish in amounts slightly greater than what is recommended should not present a health hazard if only done occasionally such as eating fish caught during an annual vacation.
2. Nursing and pregnant women and young children may be more sensitive to the harmful effects of some of the chemicals and should be particularly careful about following the advisories. Because contaminants take a long time to leave the body after they accumulate, women who plan on becoming pregnant should begin following the more restrictive consumption advice, a year before becoming pregnant. In this way, the levels of chemicals stored in the body can go down.
3. The limits given below for each species and area assume that no other contaminated fish is being eaten. If you consume several different listed species from the same area, or the same species from several areas, your total consumption still should not exceed the recommended amount. One simple approach is to just use the lowest recommended amount as a guideline to consumption.

Site	Fish Species	Recommendations*
Point Dume Malibu	White croaker	Do not consume
Malibu Pier	Queenfish	One meal a month
Short Bank	White croaker	One meal every two weeks
Redondo Pier	Corbina	One meal every two weeks
Point Vicente Palos Verdes – Northwest	White croaker	Do not consume
Whites Point	White croaker Sculpin Rockfishes Kelp bass	Do not consume One meal every two weeks+
Los Angeles/Long Beach Harbors (esp. Cabrillo Pier)	White croaker	Do not consume
	Queenfish Black croaker Surfperches	One meal every two weeks+

Los Angeles/Long Beach Breakwater (ocean side)	White croaker Queenfish Surfperches Black croaker	One meal a month+
Belmont Pier Pier J	Surfperches	One meal every two weeks
Horseshoe Kelp	Sculpin White croaker	One meal a month+
Newport Pier	Corbina	One meal every two weeks

+ Consumption recommendation is for all the listed species combined at the particular site.

* A meal for a 150-pound adult is about six ounces. Figure about one ounce of consumption for each 20 pounds of body weight.

Sites **bolded** are located on the Palos Verdes Shelf.

Source: California Sport Fish Consumption Advisories 1999. Office of Environmental Health Hazard Assessment, California Environmental Protection Agency. Internet address: <http://www.oehha.ca.gov/fish/general/99fish.html>.

ATTACHMENT C

ENGINEERING EVALUATION/COST ANALYSIS REPORT

March 2000

ATTACHMENT D - RESPONSE SUMMARY

ATTACHMENT E

EE/CA APPROVAL MEMORANDUM

July 1996

ATTACHMENT F

ADMINISTRATIVE RECORD INDEX