# PUBLIC NOTICE

US Army Corps
of Engineers
New York District
Jacob K. Javits Federal Building
New York, N.Y. 10278-0090
ATTN: Regulatory Branch

In replying refer to :
Public Notice Number: 92-09020-OD
Issue Date: 03 April 1997
Expiration Date: 03 May 1997

To Whom It May Concern:

The New York District U. S. Army Corps of Engineers has received an application for a Department of the Army permit pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403), Section 404 of the Clean Water Act (33 U.S.C. 1344), and Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972, as amended (33 U.S.C. 1413).

APPLICANT: **EXXON Company, USA**
**P.O. Box 9000**
**Bayonne, New Jersey 07002**

ACTIVITY: **Maintenance dredge with subsequent ocean disposal and barge overflow**

WATERWAY: **Kill Van Kull**

LOCATION: **City of Bayonne, Hudson County, New Jersey**

A description and plans of the applicant's proposed activity are enclosed to assist in your review.

The decision whether to issue a Department of the Army permit will be based on an evaluation of the probable impact, including cumulative impacts, of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefits which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, consideration of property ownership and, in general the needs and welfare of the people.

The U.S. Army Corps of Engineers is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the U.S. Army Corps of Engineers to

determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing to collect additional information and to determine the overall public interest of the proposed activity.

ALL COMMENTS REGARDING THE PERMIT APPLICATION MUST BE PREPARED IN WRITING AND MAILED TO REACH THIS OFFICE BEFORE THE EXPIRATION DATE OF THIS NOTICE, SHOWN ON THE COVER PAGE, otherwise, it will be presumed that there are no objections to the activity.

Any person may request, in writing, before this public notice expires, that a public hearing be held to collect additional information necessary to consider this application. Requests for public hearings shall state, with particularity, the reasons why a public hearing should be held and why the comments can not be submitted by mail. It should be noted that information submitted by mail is considered just as carefully in the permit decision process and bears the same weight as that furnished at a public hearing. These requests can be mailed to return address on the cover page or FAXED to Mr. Mark Roth at (212) 264-4260.

Our preliminary determination is that the activity for which authorization is sought herein, is not likely to affect any Federally endangered or threatened species or their critical habitat. However pursuant to Section 7 of the Endangered Species Act (16 U.S.C. 1531), the District Engineer is consulting with the appropriate Federal agency to determine the presence or absence of and potential impacts to listed species in the project area or their critical habitat.

Based upon a review of the latest published version of the National Register of Historic Places, there are no known sites eligible for, or included in, the Register within the permit area. Presently unknown archaeological, scientific, prehistorical or historical data may be lost by work accomplished under the required permit.

Reviews of the activity pursuant to Section 404 of the Clean Water Act will include application of the guidelines promulgated by the Administrator, U.S. Environmental Protection Agency, under authority of Section 404(b) of the Clean Water Act and the applicant will obtain a water quality certificate or waiver from the appropriate state agency in accordance with Section 401 of the Clean Water Act prior to a final permit decision.

CENAN-OP-RW
PUBLIC NOTICE NO. 92-09020-OD

Pursuant to Section 307(c) of the Coastal Zone Management Act of 1972 as amended (16 U.S.C. 1456(c)), for activities under consideration that are located within the coastal zone of a state which has a Federally approved coastal zone management program, the applicant has certified in the permit application that the proposed activity complies with, and will be conducted in a manner that is consistent with, the approved state coastal zone management program. By this public notice, we are requesting the state's concurrence with, objection to, or waiver of the applicant's certification. No final permit decision will be made until one of these actions occur.

For activities within the coastal zone of the State of New Jersey, the applicant's certification and accompanying information is available from the New Jersey Department of Environmental Protection, Bureau of Coastal Project Review, Room 702, L & I Building, CN 401, New Jersey 08625, Telephone Number (609) 292-2121. Comments regarding the applicant's certification should be so addressed.

In addition to any required water quality certificate and coastal zone management program concurrence, the applicant has obtained or requested the following governmental authorization for the activity under consideration:

**Waterfront Development Permit from the New Jersey Department of Environmental Protection**

It is requested that you communicate the foregoing information concerning the activity to any persons known by you to be interested and who did not receive a copy of this notice.

If you have any questions concerning this application, you may contact this office at (212) 264-0184 and ask for Mr. Mark Roth. Comments or questions may be FAXED to Mr. Mark Roth at (212) 264-4260.

for Joseph J. Seebode
Chief, Regulatory Branch

Attachments

## DESCRIPTION OF WORK

The applicant, EXXON Company, USA, proposes to maintenance dredge two areas at their existing Kill Van Kull facility in the City of Bayonne, Hudson County, New Jersey using a clamshell bucket. A total of approximately 106,000 cubic yards of material would be dredged from the facility's two distinct berthing areas; approximately 52,000 cubic yards of material in Reach A and approximately 54,000 cubic yards of material in Reach B. Proposed project depths would range from 15 to 40 feet below the plane of Mean Low Water plus two feet of allowable overdepth. Barge overflow is contemplated to maximize the efficiency of dredging and disposal operations. All of the dredged material would be disposed of in the Atlantic Ocean at the Mud Dump Disposal Site (MDDS) off of Sandy Hook, New Jersey.

The purpose of the project is to reestablish previous depths of water to maintain safe navigational access to the applicant's existing petroleum product handling facility.

Any permit issued for the proposed work, would authorize, on an initial basis only, the dredging and disposal as specified in this notice to be completed prior to closure of the MDDS, subject to available capacity.

The dredged material would be transported by dump scows to the MDDS and deposited using the bottom dumping process.

The MDDS was formally designated by the U.S. Environmental Protection Agency (EPA). The MDDS has an area of 2 square miles and an average depth of 64 feet, having its corner points located at:

| LATITUDE | LONGITUDE |
|---|---|
| 40° 23′ 48" North | 73° 51′ 28" West |
| 40° 21" 48" North | 73° 50′ 00" West |
| 40° 21′ 48" North | 73° 51′ 28" West |
| 40° 23′ 48" North | 73° 50′ 00" West |

It is estimated that since 1976 approximately 6.0 million cubic yards of material have been disposed of annually at the MDDS.

As stated in the Ocean Dumping Regulations [40 CFR 227.16(b)] "...alternative methods of disposal are practicable when they are available at reasonable incremental cost and energy expenditures which need not be competitive with the costs of ocean dumping, taking into account the environmental impacts associated with the

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use of alternatives to ocean dumping...." The New York District of the U.S. Army Corps of Engineers has evaluated the practicability of potential disposal alternatives in a 1989 report entitled "Managing Dredged Material: An Evaluation of Disposal Alternatives in the New York - New Jersey Metropolitan Region." The alternatives considered include land disposal, use as sanitary landfill cover, disposal in subaqueous borrow pits (and possible capping with clean material), creation of islands and/or wetlands, disposal on beaches or wetlands, transport and placement in deep mines, and incineration. Of these, only land disposal is considered a potentially viable alternative at the present time for the particular material proposed for disposal.

The applicant has evaluated methods of upland disposal of the dredged material as an alternative to ocean disposal. They state that there is no vacant land on their property or in the vicinity of the project area upon which the dredged material could be temporarily stored while chemically/physically treating for beneficial reuse, dewatered, or permanently disposed. Therefore, it would become necessary to transport this material by truck in a semi-fluid state to any upland destination. Even if it were physically and economically feasible to dispose of the dredged material, only one upland containment facility (construction of a parking field) is presently in operation requiring physical/chemical modification prior to placement as the parking field's foundation. It has a limited capacity, most of which is dedicated to other dredging projects which failed to satisfy Ocean Dumping Regulations.

The New Jersey Department of Environmental Protection will be contacted by the applicant with a view toward identifying suitable sites that could be used for disposal of dredged material in lieu of ocean disposal.

TESTING-GENERAL COMMENTS

The two proposed dredging areas were treated separately for the purpose of sampling and testing the material to be dredged. Based upon an analysis of 5 sediment samples submitted by the applicant, the grain size characteristics of the proposed dredged material from Area A are as follows: 2.6% sand, 71.6% silt and 25.8% clay. Based upon an analysis of 9 sediment samples, grain size characteristics of the proposed dredged material from Area B are as follows: 8.6% sand, 68.3% silt and 23.1% clay. Results of the sediment testing from each discrete area will follow general comments about testing.

Based on the grain size distributions of proposed maintenance dredging material and in accordance with 40 CFR 227 further chemical and biological testing is required to determine the suitability of the sediment for ocean disposal.

Liquid Phase Chemistry: Under the authority of 40 CFR 227, liquid phase chemical analysis was performed on both dredging areas for the constituents listed in Table 1 of this public notice. Please note in reading Table 1 that detection limits have been listed for only those constituents which the laboratory reported as non-detected (ND) in the concentration column, which occurred at concentrations below the method detection limit. (This reporting convention was similarly applied in reporting the results of Bioaccumulation Potential testing discussed below).

Expected concentrations of chemical constituents in the water column following disposal, after allowing for initial mixing, were calculated using the Automated Dredging and Disposal Alternatives Management System (ADDAMS), a mixing model developed by the U.S. Army Corps of Engineers Waterways Experimental Station (WES) and described in the implementation manual entitled "Ecological Evaluation of Proposed Discharge of Dredged Material Into Ocean Water" (commonly referred to as the National "Green Book"), published in February 1991 by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency. The model predicted that chemical constituents in the water column following disposal of the dredged material will dilute to concentrations below Federal marine acute water quality criteria within the initial four hour period and will not exceed the boundaries of the disposal site [40 CFR 227.29 (a)].

Bioassay Results (Toxicity): In accordance with 40 CFR 227 of the Ocean Dumping Regulations, bioassays were performed to assess the toxicities of the solid, liquid and suspended particulate phases of the proposed dredged material disposal. Bioassays were performed using appropriate sensitive marine organisms as discussed below. The bioassay testing conformed to procedures outlined in the 1991 National Green Book and the 1992 Regional Testing Manual. The results of bioassay tests conducted on both reaches of proposed dredged sediments are presented in Table 2 of this public notice.

Solid Phase Bioassay: The solid phase is the whole test sediment before it has undergone processing that might alter its chemical or toxicological properties.

For the solid phase bioassay, 10-day toxicity was determined by exposing a filter feeding mysid shrimp *(Mysidopsis bahia)* and a deposit feeding, burrowing amphipod *(Eohaustorius estuarius)* to composites of sediment from each sampling point and comparing mortalities in those treatments to mortalities experienced after exposure to a reference sediment. The reference sediment represents existing background conditions in the vicinity of the dumpsite, removed from the influence of any disposal operation. Results are evaluated for biologically and statistically significant differences in mortality between treatments. The 1991 National Green Book indicates that dredged material does not meet the whole sediment toxicity criterion when mortality in the test treatments is a) statistically significant and greater than in the reference sediment and (b) exceeds mortality in the reference treatment by at least 10% for mysid shrimp and 20% for amphipod species. The whole sediment toxicity criterion was not exceeded for either organism in either reach of the proposed project.

Liquid and Solid Phase Bioassay: The suspended particulate phase also contains the **liquid phase** of the dredged material. The **suspended particulate phase** (SPP) is considered to be the supernatant liquid remaining after one hour of undisturbed settling of the mixture resulting from a vigorous 30 minute agitation of one part bottom sediment from the dredging site with four parts water collected from the dredging site. Disposal site water or clean sea water is substituted where dredging site water is incompatible with test organism survival.

For the liquid and suspended phase bioassay tests, those concentrations of SPP resulting in 50% mortality (LC50s), were determined for the three animal species tested- a crustacean (*M. bahia*), a finfish (*Menidia beryllina*), and the planktonic larvae of a bivalve (*Mytilus edulis*). The median effective concentration (EC50), based on normal larval development to the D-cell stage, was also calculated for *Mytilus edulis*. The limiting permissible concentration (LPC) of SPP is calculated by multiplying the LC50 or EC50 of the most sensitive organism by a safety factor of 100. In other words, 0.01 of the toxic concentration (LC50 or EC50) of the most sensitive organism tested. The LPC for Area A was calculated at 0.171% and was obtained from the LC50 of *Menidia beryllina*, while the LPC for Area B was calculated at 0.156% and was obtained from the LC50 of *Menidia beryllina*.

In accordance with the provisions of 40 CFR 227.27 (a)(2), the material can be considered suitable for ocean disposal if the concentration of the SPP of the dredged material, after allowance for initial mixing, will not exceed the LPC beyond the boundaries of the disposal site within the first four hours following dumping or at any point in the marine environment after the first four hours.

Initial mixing evaluations were conducted using the ADDAMS mixing model. Results of the analysis indicate that the LPC for both reaches will be met for the proposed dredged material.

Bioaccumulation Potential: An estimate of bioaccumulation potential was made by analyzing the concentrations of contaminants in tissue of organisms surviving 28-day exposure to composited sediments and comparing them to tissue levels of organisms exposed to reference sediment (a reference sediment represents existing background conditions in the vicinity of the dumpsite, removed from the influence of any disposal operation). Results are evaluated for biologically and statistically significant differences in mortality between treatments. Bioaccumulation potential was analyzed in two organisms, a burrowing, deposit-feeding polychaete [a worm (*Nereis virens*)] and a filter-feeding bivalve [a clam (*Macoma nasuta*)].

Based on the requirements of 40 CFR 227.6 and 227.27, bioaccumulation analyses was performed for the chemical constituents listed in Table 3 of this public notice. All constituents identified in worm and clam tissue for both dredging areas were compared to existing Food and Drug Administration (FDA) action levels for poisonous or deleterious substances in fish and shellfish for human food, regional disposal criteria, background concentrations and risk-based criteria.

Total DDT steady state concentrations in worm tissue from Reach A was above regional disposal criteria for unrestricted ocean disposal. Dredged material that results in such tissue concentrations is subsequently capped.

Concentrations of dioxin above the regional Category I Criteria values [1 pptr (parts per trillion) for 2,3,7,8-TCDD], but less than regional Category III Criteria value, were measured in the tissues of organisms exposed to proposed dredged material from Reach A. As per New York/New Jersey Harbor Regional Ocean Disposal Criteria for dredged material containing dioxin, dredged material that results in such tissue concentrations is capped. In this case, possible sources of capping material are the Sandy Hook Federal Channel and the Ambrose Federal Channel.

Based on the results of the testing performed, the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency have determined that the proposed maintenance material from Reach A is considered Category II dredged material and is suitable for ocean disposal with subsequent capping. Their determination for the proposed dredged material from Reach B is considered Category I, and is suitable for unrestricted ocean disposal. The proposed dredged material from both reaches contains none of the constituents prohibited in 40 CFR 227.6 as other than trace contaminants, and meets the LPC requirements of 40 CFR 227.27.

TABLE 1. RESULTS OF CHEMICAL ANALYSIS OF SITE WATER AND ELUTRIATE

| | SITE WATER | | ELUTRIATE | |
|---|---|---|---|---|
| CONSTITUENTS | DETECTION LIMITS | CONCENTRATION | DETECTION LIMITS | CONCENTRATION |
| | | | | |
| **Metals** | ppb (ug/L) | ppb (ug/L) | ppb (ug/L) | ppb (ug/L) |
| Ag | | 0.049 | | 0.346 |
| Cd | | 0.308 | | 0.042 |
| Cr | | 1.270 | | 5.110 |
| Cu | | 2.957 | | 8.293 |
| Hg | | 0.014 | | 0.169 |
| Ni | | 1.397 | | 3.480 |
| Pb | | 2.150 | | 10.400 |
| Zn | | 14.033 | | 13.400 |
| | | | | |
| **Pesticides** | pptr (ng/L) | pptr (ng/L) | pptr (ng/L) | pptr (ng/L) |
| Aldrin | 4.433 | ND | 4.597 | ND |
| a-Chlordane | | 0.105 | | 1.266 |
| trans Nonachlor | 4.482 | ND | | 0.111 |
| Dieldrin | | 0.791 | | 1.598 |
| 4,4'-DDT | | 0.412 | | 0.374 |
| 2,4'-DDT | 4.810 | ND | 4.989 | ND |
| 4,4'-DDD | | 0.190 | | 3.381 |
| 2,4'-DDD | | 0.540 | | 4.589 |
| 4,4'-DDE | | 0.496 | | 5.457 |
| 2,4'-DDE | 5.502 | ND | | 0.947 |
| **Total DDT** | | **6.793** | | **17.243** |
| Endosulfan I | 9.243 | ND | 9.586 | ND |
| Endosulfan II | | 0.347 | | 0.383 |
| Endosulfan sulfate | | 0.335 | | 0.359 |
| Heptachlor | | 7.294 | | 0.765 |
| Heptachlor epoxide | | 0.113 | | 0.463 |
| | | | | |
| **Industrial Chemicals** | pptr (ng/L) | pptr (ng/L) | pptr (ng/L) | pptr (ng/L) |
| PCB 8 | 3.444 | ND | | 6.226 |
| PCB 18 | 5.942 | ND | 6.162 | ND |
| PCB 28 | | 2.702 | | 4.766 |
| PCB 44 | 3.932 | ND | | 3.770 |
| PCB 49 | 5.013 | ND | | 3.458 |
| PCB 52 | 3.948 | ND | | 6.358 |
| PCB 66 | | 0.420 | | 3.379 |
| PCB 87 | | 0.447 | | 1.471 |
| PCB 101 | | 0.193 | | 4.524 |
| PCB 105 | 4.579 | ND | | 0.918 |
| PCB 118 | | 0.186 | | 3.193 |
| PCB 128 | 4.186 | ND | | 0.361 |
| PCB 138 | | 0.294 | | 2.569 |
| PCB 153 | | 0.141 | | 4.599 |
| PCB 170 | | 0.190 | | 1.833 |
| PCB 180 | | 0.096 | | 1.960 |
| PCB 183 | | 0.112 | | 1.538 |
| PCB 184 | | 0.320 | 5.627 | ND |
| PCB 187 | | 0.040 | | 1.229 |
| PCB 195 | | 0.067 | | 0.434 |
| PCB 206 | 4.490 | ND | | 0.683 |
| PCB 209 | 4.522 | ND | | 0.959 |
| **Total PCB** | | **90.526** | | **132.032** |

ND = Not detected
Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT
Total PCB = sum of congeners reported x 2
Concentrations shown are the mean of three replicate analyses.
Means were determined using conservative estimates of concentrations of constituents that were at concentrations below the detection limit.

TABLE 1. RESULTS OF CHEMICAL ANALYSIS OF SITE WATER AND ELUTRIATE

| | SITE WATER | | ELUTRIATE | |
|---|---|---|---|---|
| CONSTITUENTS | DETECTION LIMITS | CONCENTRATION | DETECTION LIMITS | CONCENTRATION |
| | | | | |
| **Metals** | ppb (ug/L) | ppb (ug/L) | ppb (ug/L) | ppb (ug/L) |
| Ag | | 0.053 | | 0.216 |
| Cd | | 0.056 | 0.010 | ND |
| Cr | | 0.980 | | 3.170 |
| Cu | | 2.753 | | 2.940 |
| Hg | | 0.010 | | 0.062 |
| Ni | | 1.367 | | 0.881 |
| Pb | | 1.923 | | 2.767 |
| Zn | | 13.433 | | 8.247 |
| | | | | |
| **Pesticides** | pptr (ng/L) | pptr (ng/L) | pptr (ng/L) | pptr (ng/L) |
| Aldrin | 4.433 | ND | 4.656 | ND |
| a-Chlordane | | 0.155 | | 0.948 |
| trans Nonachlor | 4.482 | ND | | 0.164 |
| Dieldrin | | 0.759 | | 1.679 |
| 4,4'-DDT | | 0.573 | | 0.309 |
| 2,4'-DDT | 4.810 | ND | 5.064 | ND |
| 4,4'-DDD | | 0.214 | | 2.269 |
| 2,4'-DDD | | 0.351 | | 1.281 |
| 4,4'-DDE | | 0.561 | | 3.697 |
| 2,4'-DDE | 5.502 | ND | | 0.492 |
| **Total DDT** | | **6.855** | | **10.579** |
| Endosulfan I | 9.243 | ND | 9.730 | ND |
| Endosulfan II | | 0.216 | | 0.413 |
| Endosulfan sulfate | | 0.252 | | 0.282 |
| Heptachlor | | 6.186 | | 0.668 |
| Heptachlor epoxide | | 0.051 | | 0.271 |
| | | | | |
| **Industrial Chemicals** | pptr (ng/L) | pptr (ng/L) | pptr (ng/L) | pptr (ng/L) |
| PCB 8 | 3.444 | ND | | 4.699 |
| PCB 18 | 5.942 | ND | 6.255 | ND |
| PCB 28 | | 2.490 | | 4.828 |
| PCB 44 | | 0.783 | | 3.402 |
| PCB 49 | | 0.861 | | 2.701 |
| PCB 52 | | 0.334 | | 4.953 |
| PCB 66 | | 0.579 | | 2.600 |
| PCB 87 | | 0.383 | | 1.629 |
| PCB 101 | | 0.222 | | 3.694 |
| PCB 105 | 4.579 | ND | | 0.803 |
| PCB 118 | | 0.256 | | 2.711 |
| PCB 128 | 4.186 | ND | | 0.313 |
| PCB 138 | | 1.169 | | 2.510 |
| PCB 153 | | 0.162 | | 3.765 |
| PCB 170 | | 0.292 | | 1.212 |
| PCB 180 | | 0.151 | | 1.541 |
| PCB 183 | | 0.115 | | 2.228 |
| PCB 184 | | 0.270 | 5.712 | ND |
| PCB 187 | | 0.030 | | 0.981 |
| PCB 195 | | 0.046 | | 0.351 |
| PCB 206 | 4.490 | ND | | 0.447 |
| PCB 209 | 4.522 | ND | | 0.758 |
| **Total PCB** | | **70.612** | | **116.184** |

ND = Not detected
Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT
Total PCB = sum of congeners reported x 2
Concentrations shown are the mean of three replicate analyses.
Means were determined using conservative estimates of concentrations of constituents that were at concentrations below the detection limit.

# EXXON USA - Reach A

## TABLE 2. TOXICITY TEST RESULTS

### Suspended Particulate Phase

| Test Species | Test Duration | LC50/EC50 | | LPC (a) |
|---|---|---|---|---|
| *Menidia beryllina* | 96 hours | (b) | 17.10% | 0.171 |
| *Mysidposis bahia* | 96 hours | (b) | 27.4% | 0.274 |
| *Mytilus edulis (larval survival)* | 48 hours | (b) | 19.6% | 0.196 |
| *Mytilus edulis (larval normal develop.)* | 48 hours | (c) | 18.8% | 0.188 |

(a) Limiting Permissible Concentration (LPC) is the LC 50 or EC 50 times 0.01.
(b) Median Lethal Concentration (LC50) resulting in 50% mortatlity at test termination.
(c) Median Effective Concentration (EC50) based on normal development to the D-cell, prodissoconch 1 stage.



### Whole Sediment (10 days)

| Test Species | % Survival in Reference | % Survival in Test | % Difference Reference -Test | Is difference statistically significant? (a=0.05) |
|---|---|---|---|---|
| *Eohaustorius estuarius* | 58.00% | 67.00% | 0.00% | NO |
| *Mysidposis bahia* | 94.00% | 89.00% | 5.00% | NO |

# EXXON USA - Reach B

## TABLE 2. TOXICITY TEST RESULTS

### Suspended Particulate Phase

| Test Species | Test Duration | LC50/EC50 | | LPC (a) |
|---|---|---|---|---|
| *Menidia beryllina* | 96 hours | (b) | 15.60% | 0.156 |
| *Mysidposis bahia* | 96 hours | (b) | 67.40% | 0.674 |
| *Mytilus edulis (larval survival)* | 48 hours | (b) | 19.70% | 0.197 |
| *Mytilus edulis (larval normal develop.)* | 48 hours | (c) | 19.0% | 0.19 |

(a) Limiting Permissible Concentration (LPC) is the LC 50 or EC 50 times 0.01.
(b) Median Lethal Concentration (LC50) resulting in 50% mortatlity at test termination.
(c) Median Effective Concentration (EC50) based on normal development to the D-cell, prodissoconch 1 stage.

### Whole Sediment (10 days)

| Test Species | % Survival in Reference | % Survival in Test | % Difference Reference -Test | Is difference statistically significant? (a=0.05) |
|---|---|---|---|---|
| *Eohaustorius estuarius* | 58.00% | 63.00% | 0.00% | NO |
| *Mysidposis bahia* | 94.00% | 95.00% | 0.00% | NO |

TABLE 3. 28 DAY BIOACCUMULATION TEST RESULTS: CHEMICAL ANALYSIS OF TISSUE
Wet weight concentrations

| CONSTITUENTS | *Macoma nasuta* | | | | *Nereis virens* | | | |
|---|---|---|---|---|---|---|---|---|
| | REFERENCE | | TEST | | REFERENCE | | TEST | |
| | DETECTION LIMITS | CONCEN TRATIO | DETECTION LIMITS | CONCEN TRATIO | DETECTION LIMITS | CONCEN TRATIO | DETECTION LIMITS | CONCEN TRATIO |
| **Metals** | ppm (mg/kg) | ppm (mg/kg) | ppm (mg/kg) | ppm (mg/kg) | ppm (mg/kg) | ppm (mg/kg) | ppm (mg/kg) | ppm (mg/kg) |
| Ag | | 0.055 | | • 0.078 | | 0.029 | | 0.039 |
| As | | 3.204 | | 3.018 | | 3.266 | | 2.182 |
| Cd | | 0.035 | | 0.033 | | 0.121 | | 0.098 |
| Cr | | 0.355 | | • 0.552 | | 0.426 | | 0.193 |
| Cu | | 14.236 | | 13.968 | | 3.500 | | 3.874 |
| Hg | | 0.037 | | 0.039 | | 0.015 | | 0.011 |
| Ni | | 0.981 | | 1.053 | | 0.245 | | 0.255 |
| Pb | | 0.563 | | • 0.895 | | 0.731 | | 0.642 |
| Zn | | 19.460 | | 14.860 | | 13.480 | | 12.700 |
| **Pesticides** | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) |
| Aldrin | 0.512 | ND | 0.489 | • ND | 0.138 | ND | 0.140 | ND |
| a-Chlordane | | 0.099 | | • 0.223 | | 0.373 | | • 1.034 |
| trans Nonachlor | | 0.118 | | 0.093 | | 0.663 | | • 1.006 |
| Dieldrin | | 1.173 | | 0.724 | | 1.240 | | 1.434 |
| 4,4'-DDT | | 0.199 | | 0.210 | | 0.161 | | • 0.240 |
| 2,4'-DDT | | 0.058 | | 0.112 | | 0.158 | | 0.161 |
| 4,4'-DDD | | 0.618 | | • 0.977 | | 12.589 | | 13.472 |
| 2,4'-DDD | | 0.032 | | • 0.546 | | 7.883 | | 5.621 |
| 4,4'-DDE | | 7.250 | | 2.988 | | 0.232 | | • 2.350 |
| 2,4'-DDE | 0.232 | ND | 0.221 | ND | 0.116 | ND | 0.117 | ND |
| **Total DDT** | | **8.273** | | **4.943** | | **21.081** | | **21.901** |
| Endosulfan I | 0.395 | ND | | 0.104 | 0.361 | ND | 0.364 | ND |
| Endosulfan II | 0.409 | ND | | 0.064 | 0.289 | ND | 0.292 | ND |
| Endosulfan sulfate | | 0.068 | | • 0.155 | | 0.272 | 0.154 | ND |
| Heptachlor | 0.509 | ND | 0.485 | • ND | 0.138 | ND | 0.140 | ND |
| Heptachlor epoxide | | 0.062 | 0.444 | • ND | | 0.075 | | 0.088 |
| | | | | | | | | |
| **Industrial Chemicals** | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) |
| PCB 8 | | 0.157 | | • 0.269 | | 0.168 | | • 0.206 |
| PCB 18 | | 0.142 | | 0.185 | | 0.119 | | • 1.519 |
| PCB 28 | | 0.050 | | • 1.005 | | 0.296 | | • 2.811 |
| PCB 44 | 0.376 | ND | | • 0.396 | | 0.183 | | • 1.653 |
| PCB 49 | | 0.009 | | • 0.780 | | 0.659 | | • 2.633 |
| PCB 52 | | 0.100 | | • 1.184 | | 3.364 | | • 5.939 |
| PCB 66 | | 0.043 | | • 1.145 | | 0.799 | | • 2.286 |
| PCB 87 | | 0.035 | | • 0.310 | | 0.666 | | • 1.135 |
| PCB 101 | | 0.179 | | • 1.018 | | 6.001 | | 6.680 |
| PCB 105 | | 0.008 | | • 0.245 | | 3.354 | | 3.245 |
| PCB 118 | | 0.069 | | • 0.703 | | 5.838 | | 6.615 |
| PCB 128 | | 0.030 | | • 0.119 | | 1.710 | | 1.616 |
| PCB 138 | | 0.162 | | • 0.669 | | 8.210 | | 8.251 |
| PCB 153 | | 0.121 | | • 1.022 | | 7.608 | | 6.968 |
| PCB 170 | | 0.202 | | • 0.283 | | 1.319 | | • 2.417 |
| PCB 180 | | 0.008 | | • 0.266 | | 2.771 | | 3.198 |
| PCB 183 | | 0.114 | | 0.056 | | 0.948 | | 1.159 |
| PCB 184 | 0.420 | ND | 0.400 | • ND | | 0.622 | | • 1.794 |
| PCB 187 | | 0.024 | | • 0.188 | | 1.623 | | 2.035 |
| PCB 195 | | 0.004 | | • 0.051 | | 0.289 | | • 0.408 |
| PCB 206 | | 0.001 | | • 0.069 | | 0.446 | | • 0.637 |
| PCB 209 | | 0.014 | | • 0.072 | | 0.347 | | • 0.501 |
| **Total PCB** | | **3.235** | | • **20.722** | | **94.677** | | **127.413** |
| 1,4-Dichlorobenzene | | 3.233 | | 3.644 | | 2.524 | | 2.528 |

TABLE 3. (Continued)

| CONSTITUENTS | *Macoma nasuta* | | | | *Nereis virens* | | | |
|---|---|---|---|---|---|---|---|---|
| | REFERENCE | | TEST | | REFERENCE | | TEST | |
| | DETECTION LIMITS | CONCEN TRATION | DETECTION LIMITS | CONCEN TRATION | DETECTION LIMITS | CONCEN TRATION | DETECTION LIMITS | CONCEN TRATION |
| **PAH's** | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) |
| Naphthalene | | 0.705 | | * 1.348 | | 2.801 | | 3.237 |
| Acenaphthalene | 4.259 | ND | | * 0.386 | | 0.193 | | * 0.516 |
| Acenaphthene | 5.857 | ND | | * 4.650 | | 0.535 | | * 1.866 |
| Flourene | 5.239 | ND | | * 1.584 | | 0.536 | | 0.795 |
| Phenanthrene | | 0.335 | | * 3.407 | | 0.339 | | * 1.451 |
| Anthracene | 3.805 | ND | | * 3.574 | | 0.583 | | * 1.022 |
| Fluoranthene | | 0.413 | | * 13.186 | | 0.684 | | * 15.798 |
| Pyrene | | 0.307 | | * 19.711 | | 0.642 | | * 24.325 |
| Benzo(a)anthracene | | 0.191 | | * 8.268 | | 0.427 | | * 1.984 |
| Chrysene | | 0.325 | | * 13.388 | | 0.772 | | * 9.992 |
| Benzo(b)fluoranthene | | 0.212 | | * 9.220 | 1.377 | ND | | * 1.925 |
| Benzo(k)fluoranthene | | 0.081 | | * 3.216 | 1.215 | ND | | * 0.763 |
| Benzo(a)pyrene | | 0.459 | | * 7.219 | 1.407 | ND | | * 1.636 |
| Indeno(1,2,3-cd)pyrene | 3.604 | ND | | 1.832 | 1.273 | ND | | 0.260 |
| Dibenzo(a,h)antracene | 3.423 | ND | | 0.536 | 0.932 | ND | | 0.297 |
| Benzo(g,h,i)perylene | | 1.125 | | * 2.762 | 1.425 | ND | | * 0.875 |
| **Total PAH's** | | **8.715** | | * **94.288** | | **11.328** | | * **66.740** |
| | | | | | | | | |
| **Dioxins** | pptr(ng/kg) | pptr(ng/kg) | pptr(ng/kg) | pptr(ng/kg) | pptr(ng/kg) | pptr(ng/kg) | pptr(ng/kg) | pptr(ng/kg) |
| 2378 TCDD | 0.540 | ND | 0.600 | ND | | 0.112 | | * 1.540 |

ND = Not detected

Total PAH = Sum of all PAH's.

Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT

Total PCB = 2(x), where x = sum of PCB congeners

Concentrations shown are the mean of 5 replicate analyses in wet weight.

For values reported as ND (not detected), one-half of the detection limit is used in the calculation of the mean concentration.

* = Statistically significant at the 95% confidence level.

TABLE 3. 28 DAY BIOACCUMULATION TEST RESULTS: CHEMICAL ANALYSIS OF TISSUE
Wet weight concentrations

| CONSTITUENTS | *Macoma nasuta* | | | | *Nereis virens* | | | |
|---|---|---|---|---|---|---|---|---|
| | REFERENCE | | TEST | | REFERENCE | | TEST | |
| | DETECTION LIMITS | CONCEN TRATIO | DETECTION LIMITS | CONCEN TRATIO | DETECTION LIMITS | CONCEN TRATIO | DETECTION LIMITS | CONCEN TRATIO |
| **Metals** | ppm (mg/kg) | ppm (mg/kg) | ppm (mg/kg) | ppm (mg/kg) | ppm (mg/kg) | ppm (mg/kg) | ppm (mg/kg) | ppm (mg/kg) |
| Ag | | 0.055 | | 0.075 | | 0.029 | | 0.034 |
| As | | 3.204 | | 3.130 | | 3.266 | | 2.284 |
| Cd | | 0.035 | | 0.046 | | 0.121 | | 0.073 |
| Cr | | 0.355 | | 0.572 | | 0.426 | | 0.322 |
| Cu | | 14.236 | | 13.866 | | 3.500 | | 5.476 |
| Hg | | 0.037 | | 0.039 | | 0.015 | | 0.016 |
| Ni | | 0.981 | | 1.075 | | 0.245 | | 0.430 |
| Pb | | 0.563 | | • 0.898 | | 0.731 | | 0.623 |
| Zn | | 19.460 | | 16.733 | | 13.480 | | 12.484 |
| **Pesticides** | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) |
| Aldrin | 0.512 | ND | 0.528 | • ND | 0.136 | ND | 0.132 | ND |
| a-Chlordane | | 0.099 | | • 0.254 | | 0.373 | | • 0.852 |
| trans Nonachlor | | 0.118 | | • 0.154 | | 0.663 | | • 0.905 |
| Dieldrin | | 1.173 | | 1.003 | | 1.240 | | 1.291 |
| 4,4'-DDT | | 0.199 | | 0.174 | | 0.161 | | 0.159 |
| 2,4'-DDT | | 0.058 | | • 0.261 | | 0.158 | 0.089 | ND |
| 4,4'-DDD | | 0.618 | | • 1.061 | | 12.589 | | 13.086 |
| 2,4'-DDD | | 0.032 | | • 0.282 | | 7.883 | | 5.272 |
| 4,4'-DDE | | 7.250 | | 4.634 | | 0.232 | | • 2.317 |
| 2,4'-DDE | 0.232 | ND | 0.238 | • ND | 0.116 | ND | | 0.124 |
| **Total DDT** | | 8.273 | | 6.530 | | 21.081 | | 21.003 |
| Endosulfan I | 0.395 | ND | | 0.095 | 0.361 | ND | | 0.182 |
| Endosulfan II | 0.409 | ND | | • 0.326 | 0.289 | ND | | 0.713 |
| Endosulfan sulfate | | 0.068 | | • 0.254 | | 0.272 | | • 0.606 |
| Heptachlor | 0.509 | ND | 0.524 | • ND | 0.138 | ND | | 0.030 |
| Heptachlor epoxide | | 0.062 | | • 0.351 | | 0.075 | | 0.060 |
| | | | | | | | | |
| **Industrial Chemicals** | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) |
| PCB 8 | | 0.157 | | • 0.442 | | 0.170 | | 0.240 |
| PCB 18 | | 0.142 | | • 0.242 | | 0.119 | | • 1.492 |
| PCB 28 | | 0.050 | | • 1.226 | | 0.296 | | • 2.960 |
| PCB 44 | 0.376 | ND | | • 0.567 | | 0.183 | | • 1.804 |
| PCB 49 | | 0.009 | | • 1.092 | | 0.659 | | • 2.782 |
| PCB 52 | | 0.100 | | • 1.613 | | 3.364 | | • 5.699 |
| PCB 66 | | 0.043 | | • 1.520 | | 0.799 | | • 2.366 |
| PCB 87 | | 0.035 | | • 0.334 | | 0.666 | | • 1.421 |
| PCB 101 | | 0.179 | | • 1.453 | | 6.001 | | 6.596 |
| PCB 105 | | 0.008 | | • 0.293 | | 3.354 | | 3.128 |
| PCB 118 | | 0.069 | | • 0.874 | | 5.838 | | 6.773 |
| PCB 128 | | 0.030 | | • 0.133 | | 1.710 | | 1.482 |
| PCB 138 | | 0.162 | | • 0.769 | | 8.210 | | 7.960 |
| PCB 153 | | 0.121 | | • 1.210 | | 7.608 | | 7.617 |
| PCB 170 | | 0.202 | | 0.213 | | 1.319 | | 1.869 |
| PCB 180 | | 0.008 | | • 0.301 | | 2.771 | | 3.010 |
| PCB 183 | | 0.114 | | 0.066 | | 0.948 | | 1.065 |
| PCB 184 | 0.420 | ND | 0.432 | • ND | | 0.622 | | 0.707 |
| PCB 187 | | 0.024 | | 0.246 | | 1.623 | | 1.999 |
| PCB 195 | | 0.004 | | • 0.065 | | 0.289 | | • 0.376 |
| PCB 206 | | 0.001 | | • 0.077 | | 0.446 | | 0.531 |
| PCB 209 | | 0.014 | | • 0.071 | | 0.347 | | • 0.438 |
| **Total PCB** | | 3.235 | | • 26.399 | | 94.681 | | • 124.628 |
| 1,4-Dichlorobenzene | | 3.233 | | 4.922 | | 2.524 | | 2.696 |

TABLE 3. (Continued)

| CONSTITUENTS | *Macoma nasuta* | | | | *Nereis virens* | | | |
|---|---|---|---|---|---|---|---|---|
| | REFERENCE | | TEST | | REFERENCE | | TEST | |
| | DETECTION LIMITS | CONCENTRATION | DETECTION LIMITS | CONCENTRATION | DETECTION LIMITS | CONCENTRATION | DETECTION LIMITS | CONCENTRATION |
| **PAH's** | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) |
| Naphthalene | | 0.705 | | * 1.704 | | 2.801 | | * 4.293 |
| Acenaphthalene | 4.259 | ND | | * 0.460 | | 0.193 | | * 0.841 |
| Acenaphthene | 5.857 | ND | 5.834 | * ND | | 0.535 | | * 7.359 |
| Flourene | 5.239 | ND | | * 2.020 | | 0.536 | | * 2.932 |
| Phenanthrene | | 0.335 | | * 13.142 | | 0.339 | | * 6.792 |
| Anthracene | 3.805 | ND | | * 3.255 | | 0.583 | | * 1.712 |
| Fluoranthene | | 0.413 | | * 17.520 | | 0.684 | | * 21.853 |
| Pyrene | | 0.307 | | * 25.494 | | 0.642 | | * 33.815 |
| Benzo(a)anthracene | | 0.191 | | * 11.323 | | 0.427 | | * 2.239 |
| Chrysene | | 0.325 | | * 18.254 | | 0.772 | | * 10.440 |
| Benzo(b)fluoranthene | | 0.212 | | * 11.916 | 1.377 | ND | | * 2.463 |
| Benzo(k)fluoranthene | | 0.081 | | * 3.752 | 1.215 | ND | | * 0.809 |
| Benzo(a)pyrene | | 0.459 | | * 9.479 | 1.407 | ND | | * 1.650 |
| Indeno(1,2,3-cd)pyrene | 3.604 | ND | | * 2.302 | 1.273 | ND | | 0.346 |
| Dibenzo(a,h)antracene | 3.423 | ND | | 0.680 | 0.932 | ND | | 0.385 |
| Benzo(g,h,i)perylene | | 1.125 | | * 3.404 | 1.425 | ND | | * 1.084 |
| **Total PAH's** | | 8.715 | | * 130.539 | | 11.326 | | * 99.012 |
| | | | | | | | | |
| **Dioxins** | pptr(ng/kg) | pptr(ng/kg) | pptr(ng/kg) | pptr(ng/kg) | pptr(ng/kg) | pptr(ng/kg) | pptr(ng/kg) | pptr(ng/kg) |
| 2378 TCDD | 0.540 | ND | 0.520 | ND | | 0.112 | | * 0.912 |

ND = Not detected

Total PAH = Sum of all PAH's.

Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT

Total PCB = 2(x), where x = sum of PCB congeners

Concentrations shown are the mean of 5 replicate analyses in wet weight.

For values reported as ND (not detected), one-half of the detection limit is used in the calculation of the mean concentration

* = Statistically significant at the 95% confidence level.

TABLE 3. 28 DAY BIOACCUMULATION TEST RESULTS: CHEMICAL ANALYSIS OF TISSUE
Wet weight concentrations

| CONSTITUENTS | *Macoma nasuta* | | | | *Nereis virens* | | | |
|---|---|---|---|---|---|---|---|---|
| | REFERENCE | | TEST | | REFERENCE | | TEST | |
| | DETECTION LIMITS | CONCEN TRATIO | DETECTION LIMITS | CONCEN TRATIO | DETECTION LIMITS | CONCEN TRATIO | DETECTION LIMITS | CONCEN TRATIO |
| **Metals** | ppm (mg/kg) | ppm (mg/kg) | ppm (mg/kg) | ppm (mg/kg) | ppm (mg/kg) | ppm (mg/kg) | ppm (mg/kg) | ppm (mg/kg) |
| Ag | | 0.055 | | 0.075 | | 0.029 | | 0.034 |
| As | | 3.204 | | 3.130 | | 3.266 | | 2.284 |
| Cd | | 0.035 | | 0.046 | | 0.121 | | 0.073 |
| Cr | | 0.355 | | 0.572 | | 0.426 | | 0.322 |
| Cu | | 14.236 | | 13.866 | | 3.500 | | 5.476 |
| Hg | | 0.037 | | 0.039 | | 0.015 | | 0.016 |
| Ni | | 0.981 | | 1.075 | | 0.245 | | 0.430 |
| Pb | | 0.563 | | • 0.898 | | 0.731 | | 0.623 |
| Zn | | 19.460 | | 16.733 | | 13.480 | | 12.484 |
| **Pesticides** | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) |
| Aldrin | 0.512 | ND | 0.528 | • ND | 0.136 | ND | 0.132 | ND |
| a-Chlordane | | 0.099 | | • 0.254 | | 0.373 | | • 0.852 |
| trans Nonachlor | | 0.118 | | • 0.154 | | 0.663 | | • 0.905 |
| Dieldrin | | 1.173 | | 1.003 | | 1.240 | | 1.291 |
| 4,4'-DDT | | 0.199 | | 0.174 | | 0.161 | | 0.159 |
| 2,4'-DDT | | 0.058 | | • 0.261 | | 0.158 | 0.089 | ND |
| 4,4'-DDD | | 0.618 | | • 1.061 | | 12.589 | | 13.086 |
| 2,4'-DDD | | 0.032 | | • 0.282 | | 7.883 | | 5.272 |
| 4,4'-DDE | | 7.250 | | 4.634 | | 0.232 | | • 2.317 |
| 2,4'-DDE | 0.232 | ND | 0.238 | ND | 0.116 | ND | | 0.124 |
| **Total DDT** | | 8.273 | | 6.530 | | 21.081 | | 21.003 |
| Endosulfan I | 0.395 | ND | | 0.095 | 0.361 | ND | | 0.182 |
| Endosulfan II | 0.409 | ND | | • 0.326 | 0.289 | ND | | 0.713 |
| Endosulfan sulfate | | 0.068 | | • 0.254 | | 0.272 | | • 0.606 |
| Heptachlor | 0.509 | ND | 0.524 | • ND | 0.138 | ND | | 0.030 |
| Heptachlor epoxide | | 0.062 | | • 0.351 | | 0.075 | | 0.060 |
| | | | | | | | | |
| **Industrial Chemicals** | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) |
| PCB 8 | | 0.157 | | • 0.442 | | 0.170 | | 0.240 |
| PCB 18 | | 0.142 | | • 0.242 | | 0.119 | | • 1.492 |
| PCB 28 | | 0.050 | | • 1.226 | | 0.296 | | • 2.960 |
| PCB 44 | 0.376 | ND | | • 0.567 | | 0.183 | | • 1.804 |
| PCB 49 | | 0.009 | | • 1.092 | | 0.659 | | • 2.782 |
| PCB 52 | | 0.100 | | • 1.613 | | 3.364 | | • 5.699 |
| PCB 66 | | 0.043 | | • 1.520 | | 0.799 | | • 2.366 |
| PCB 87 | | 0.035 | | • 0.334 | | 0.666 | | • 1.421 |
| PCB 101 | | 0.179 | | • 1.453 | | 6.001 | | 6.596 |
| PCB 105 | | 0.008 | | • 0.293 | | 3.354 | | 3.128 |
| PCB 118 | | 0.069 | | • 0.874 | | 5.838 | | 6.773 |
| PCB 128 | | 0.030 | | • 0.133 | | 1.710 | | 1.482 |
| PCB 138 | | 0.162 | | • 0.769 | | 8.210 | | 7.960 |
| PCB 153 | | 0.121 | | • 1.210 | | 7.608 | | 7.617 |
| PCB 170 | | 0.202 | | 0.213 | | 1.319 | | 1.869 |
| PCB 180 | | 0.008 | | • 0.301 | | 2.771 | | 3.010 |
| PCB 183 | | 0.114 | | 0.066 | | 0.948 | | 1.065 |
| PCB 184 | 0.420 | ND | 0.432 | • ND | | 0.622 | | 0.707 |
| PCB 187 | | 0.024 | | 0.246 | | 1.623 | | 1.999 |
| PCB 195 | | 0.004 | | • 0.065 | | 0.289 | | • 0.376 |
| PCB 206 | | 0.001 | | • 0.077 | | 0.446 | | 0.531 |
| PCB 209 | | 0.014 | | • 0.071 | | 0.347 | | • 0.438 |
| **Total PCB** | | 3.235 | | • 26.399 | | 94.681 | | • 124.628 |
| 1,4-Dichlorobenzene | | 3.233 | | 4.922 | | 2.524 | | 2.696 |

TABLE 3. (Continued)

| CONSTITUENTS | *Macoma nasuta* | | | | *Nereis virens* | | | |
|---|---|---|---|---|---|---|---|---|
| | REFERENCE | | TEST | | REFERENCE | | TEST | |
| | DETECTION LIMITS | CONCENTRATION | DETECTION LIMITS | CONCENTRATION | DETECTION LIMITS | CONCENTRATION | DETECTION LIMITS | CONCENTRATION |
| **PAH's** | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) | ppb (ug/kg) |
| Naphthalene | | 0.705 | | * 1.704 | | 2.801 | | * 4.293 |
| Acenaphthalene | 4.259 | ND | | * 0.460 | | 0.193 | | * 0.841 |
| Acenaphthene | 5.857 | ND | 5.834 | * ND | | 0.535 | | * 7.359 |
| Flourene | 5.239 | ND | | * 2.020 | | 0.536 | | * 2.932 |
| Phenanthrene | | 0.335 | | * 13.142 | | 0.339 | | * 6.792 |
| Anthracene | 3.805 | ND | | * 3.255 | | 0.583 | | * 1.712 |
| Fluoranthene | | 0.413 | | * 17.520 | | 0.684 | | * 21.853 |
| Pyrene | | 0.307 | | * 25.494 | | 0.642 | | * 33.815 |
| Benzo(a)anthracene | | 0.191 | | * 11.323 | | 0.427 | | * 2.239 |
| Chrysene | | 0.325 | | * 18.254 | | 0.772 | | * 10.440 |
| Benzo(b)fluoranthene | | 0.212 | | * 11.916 | 1.377 | ND | | * 2.463 |
| Benzo(k)fluoranthene | | 0.081 | | * 3.752 | 1.215 | ND | | * 0.809 |
| Benzo(a)pyrene | | 0.459 | | * 9.479 | 1.407 | ND | | * 1.650 |
| Indeno(1,2,3-cd)pyrene | 3.604 | ND | | * 2.302 | 1.273 | ND | | 0.346 |
| Dibenzo(a,h)antracene | 3.423 | ND | | 0.680 | 0.932 | ND | | 0.385 |
| Benzo(g,h,i)perylene | | 1.125 | | * 3.404 | 1.425 | ND | | * 1.084 |
| **Total PAH's** | | 8.715 | | * 130.539 | | 11.326 | | * 99.012 |
| | | | | | | | | |
| **Dioxins** | pptr(ng/kg) | pptr(ng/kg) | pptr(ng/kg) | pptr(ng/kg) | pptr(ng/kg) | pptr(ng/kg) | pptr(ng/kg) | pptr(ng/kg) |
| 2378 TCDD | 0.540 | ND | 0.520 | ND | | 0.112 | | * 0.912 |

ND = Not detected

Total PAH = Sum of all PAH's.

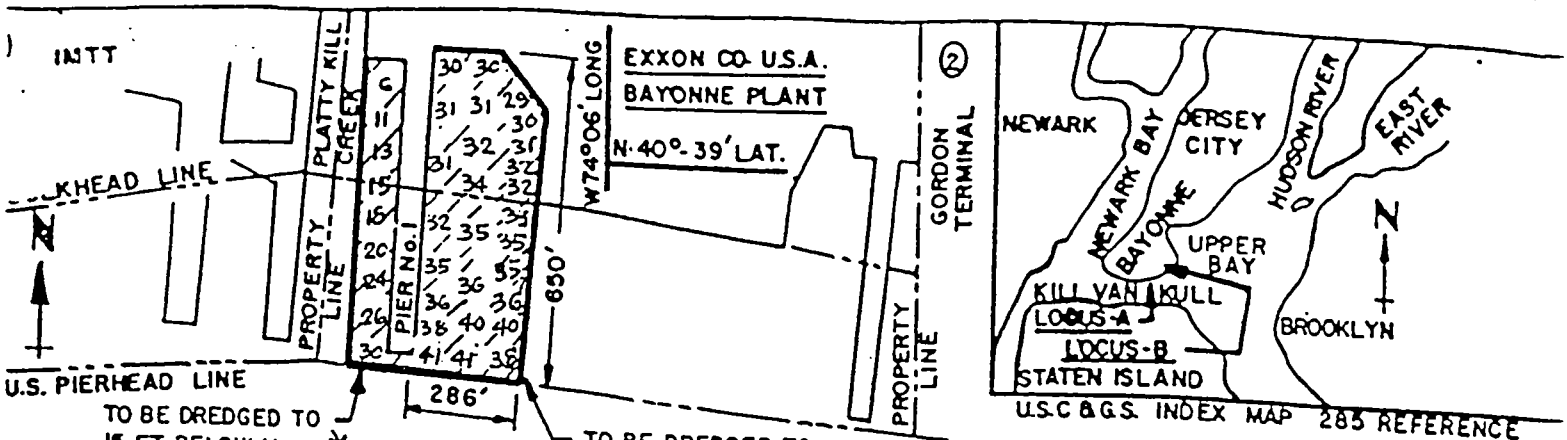
Total DDT = sum of 2,4'- and 4,4'-DDD, DDE, and DDT

Total PCB = 2(x), where x = sum of PCB congeners

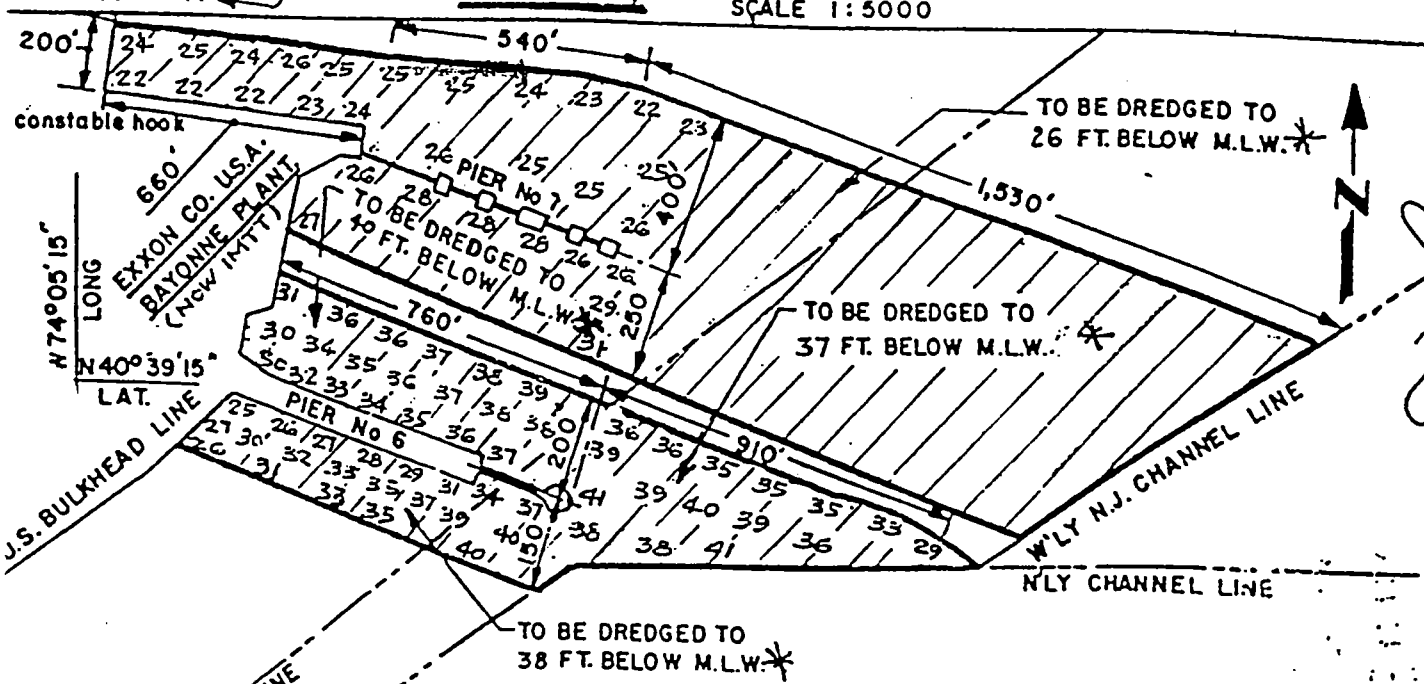
Concentrations shown are the mean of 5 replicate analyses in wet weight.

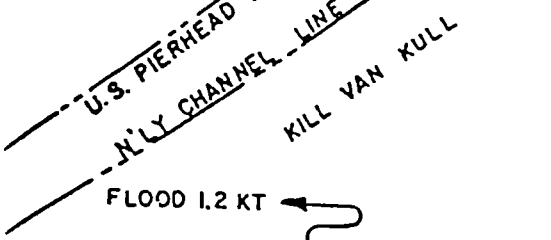
For values reported as ND (not detected), one-half of the detection limit is used in the calculation of the mean concentration.

* = Statistically significant at the 95% confidence level.




## VICINITY MAP




## PLAN "B"

PURPOSE: MAINTENANCE OF BERTHING AREAS.

APPROX. 100,000 CUBIC YARDS TOTAL FROM BOTH PLAN "A" AND PLAN "B" TO BE REMOVED AND DEPOSITED AT APPROVED MUD DUMPING SITE.

DREDGED MATERIAL WILL BE TRANSPORTED BY DUMP SCOWS AND DEPOSITED BY BOTTOM DUMPING.

DONALD M. PETROW, P.E. LIC # 15154 6/22/92

LIC # 15154 MARCH 1992

= INDICATES DREDGING TO GUARANTEED DEPTH MINIMUM. ADDITIONAL 2 FT. OVERDREDGE REQUESTED

SOUNDINGS IN FEET TO MEAN LOW WATER DATUM.

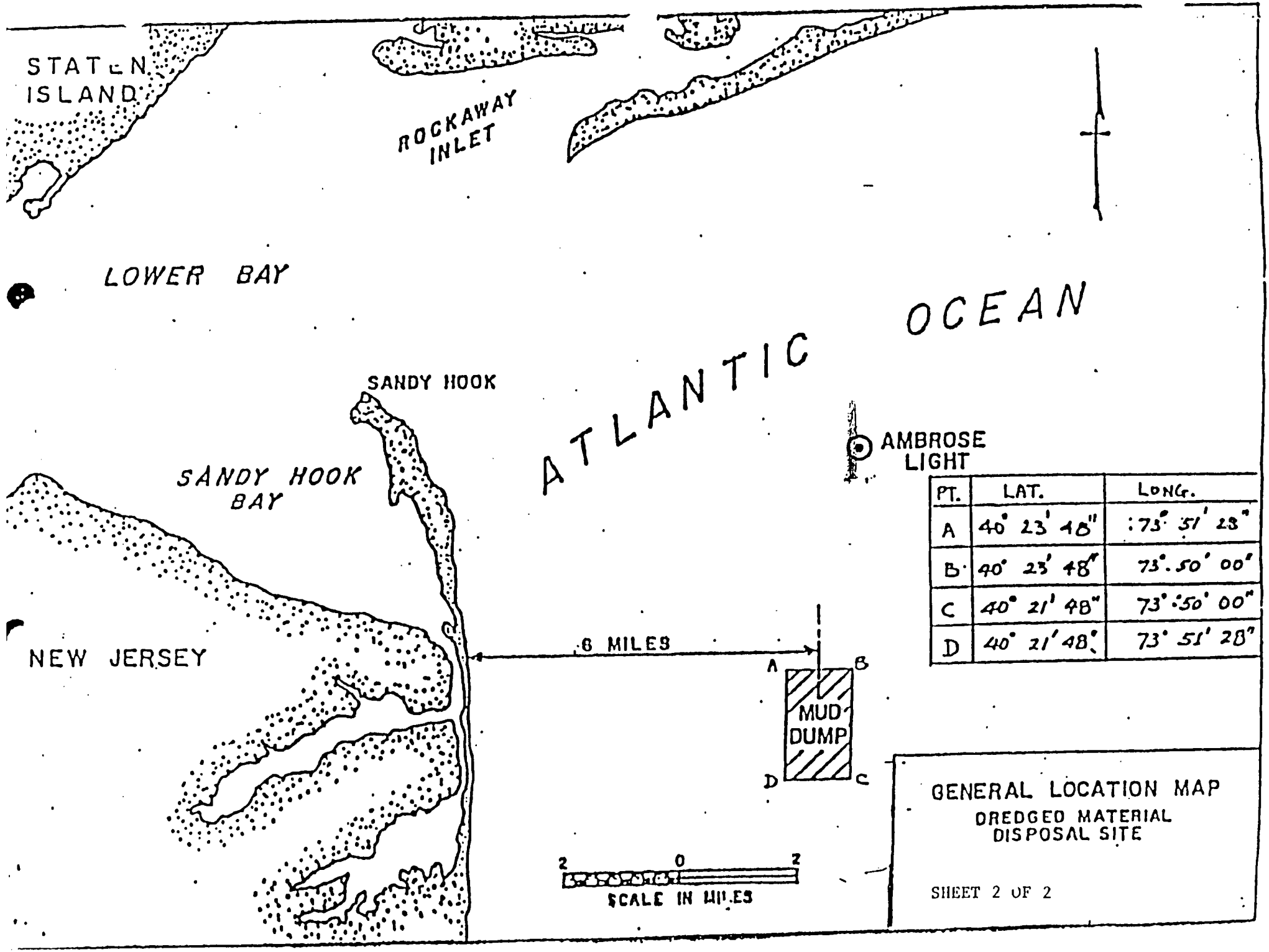
# PROPOSED DREDGING IN KILL VAN KULL AT BAYONNE

COUNTY OF HUDSON, STATE OF NEW JERSEY

APPLICATION BY — EXXON COMPANY, U.S.A.

ADJACENT PROPS

SHEET 1 OF 2 DATE: JUNE 92




| PT. | LAT. | LONG. |
|---|---|---|
| A | 40° 23' 48" | 73° 51' 28" |
| B | 40° 23' 48" | 73° 50' 00" |
| C | 40° 21' 48" | 73° 50' 00" |
| D | 40° 21' 48" | 73° 51' 28" |

# GENERAL LOCATION MAP

## DREDGED MATERIAL DISPOSAL SITE

SHEET 2 OF 2