CHEMICAL ANALYSIS, TOXICITY EVALUATION AND BIOACCUMULATION EXPOSURE OF SEDIMENTS FROM **HUMBOLDT BAY:**

BASELINE SURVEY III

Fiscal Year 1995

FINAL REPORT

Prepared for:

U.S. ARMY ENGINEERING DISTRICT
SAN FRANCISCO CORPS OF ENGINEERS
San Francisco, California

Prepared by:

TOXSCAN INC. and KINNETIC LABORATORIES, INC.
Watsonville, California

FEBRUARY 1996

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BASELINE SURVEY III

1.0 Introduction

Under Contract No. DACW07-92-D-002 from San Francisco District, Army Corps of Engineers (SFACOE), ToxScan, Inc. collected and analyzed sediment samples from **Humboldt Bay** for FY 1995, **Baseline Survey III** as per the project Scope of Services (**Appendix A**). Sediments were sampled by Kinnetic Laboratories, Inc., and returned to the ToxScan, Inc. laboratory at Watsonville, CA where they were assigned laboratory number **T-12046** for physical, chemical and bioassay analyses. Bioaccumulation exposures were performed on the sediment composites, but the exposed tissues were not analyzed. Samples collected, composites and analyses are summarized in **Table 1**.

2.0 Methods

2.1 Sediment Collection

Sediment samples from **Humboldt Harbor** were collected March 30, 1995 through April 4, 1995 from the F/V Sally Kay. Thirty five discrete samples from six areas in Humboldt Harbor were collected using Vibra-core and Smith-MacIntyre Grab sampling equipment. Materials from individual sites with fine grained material were composited for analysis, and discrete samples from each site were archived. A grab sample was obtained from the reference area with a Smith-MacIntyre grab. Samples were held at 4°C until delivery to the ToxScan laboratory in Watsonville on April 4, 1995.

Sample location target positions were taken from the project Scope of Services. Core and grab samples were taken as close to target locations as possible. Sample locations are plotted and labelled in **Figures 1** through **4**. The details of each sample (time collected, depth, and location) are summarized in **Table 2** and documented in the field log sheets presented in **Appendix B**.

Horizontal positioning was established with a Trimble series 4000 Differential GPS navigation system with base stations set on Army Corps of Engineers survey markers. Vertical measurements were provided by a JVC 90 series dual frequency fathometer calibrated by leadline to 0.1 foot at the expected depth range. Tidal stage was determined using "Tide.1" software (Micronautics Inc.) and verified daily with USGS benchmarks.

The vibra-core consists of a vibrating aluminum head and a ten foot long aluminum core tube. The core tube is capped with a stainless steel cutting tip and a stainless steel core catcher. The vibra-core is lowered slowly into the sediment; the vibration allows entry into the sediment from the mudline to the sample depth. If a sample was not obtained on the first attempt, core attempts were repeated until a sample was secured. The Smith-Macintyre grab consists of a set of spring-loaded galvanized steel jaws, triggered by impact with the sediment surface, which collects sediment to 6" below the mudline.

All sample contacting surfaces of the Vibra-Core and sample handling equipment were cleaned between each site using the following EPA approved method:

1. Wash with 2% Micro Laboratory Soap.
2. Rinse three times with reagent grade deionized water.
3. Rinse with 2N nitric acid.
4. Rinse three times with clean water.
5. Rinse with reagent grade acetone.
6. Rinse with reagent grade hexanes and allow to air dry.
5. Store in cleaned containers until use.

The Smith-MacIntyre Grab was cleaned using steps 1 and 2 above.

2.1.1 Sample Handling. Vibracore and Smith Macintyre grab samples were taken during this project. Handling procedures for each sample type are summarized below:

Vibracore Samples. Each core sample was measured for total core length. If the core achieved penetration to project dredge depth the desired sample (from dredge depth to sediment surface) was extruded into the compositing container.

Grab Samples. Each grab sample was evaluated for grain size, composition, and penetration. Grabs which had "washed out", or which were determined to have insufficient penetration, were rejected.

The individual samples and area composites were placed in appropriate containers in precleaned coolers, on ice, to reduce the temperature to the prescribed 4°C. All samples were transported to ToxScan's chemistry and bioassay facilities in Watsonville under chain of custody at the prescribed temperature. Subsamples of the four composites were subsequently shipped at temperature under chain of custody to Alta Analytical Laboratory Inc., El Dorado Hills, CA for tetra to octa chlorinated dioxins and furans analysis.

2.2 Water Collection

Reference water for bioassay tests was collected at mid depth at the reference site using an EPA protocol-cleaned peristaltic pump and cleaned silicon and teflon hoses. The hose was lowered into the water at one end of the reference site, and the vessel drifted with the current through the reference site while sampling. The water was pumped into 5-gallon cubitainers which were then stored at 4°C until delivery to the ToxScan laboratory in Watsonville.

2.3 Chemical and Physical Sediment Analysis

Sediment samples for chemical and physical analysis were collected in glass containers; samples for grain size analysis were collected in polyethylene containers. Prior to analysis, samples were stored in the laboratory at 4°C. Analyses were conducted according to the following methods:

Sediment Grain Size was determined using the methods described in Plumb (1981).

Interstitial Water Salinity and Total Ammonia values were determined for centrifuge-extracted sediment pore waters by salinometer-calibrated refractometer (YSI Model 33 Conductivity/Salinity Meter and Atago S-10 or S-28 Hand Held Refractometer), and by pH meter / ammonia probe (Fisher Accumet Model 925 with Orion Ammonia Electrode Model 95-12). One hundred to two hundred grams of sediment were centrifuged at 7,000 to 8,000 rpm until supernatant was clear (15 - 30 minutes).

Total and Water Soluble Sulfides. This method was adapted from EPA Method 376.1 (EPA 1983) and Standard Method 4500-S^{-2}-E (APHA 1992). Sediment samples were mixed with O_2-free DIW, and treated in a manner similar to aqueous samples. Hydrogen sulfide present in aqueous samples was purged into a zinc acetate trap using nitrogen gas. The sample pH was adjusted to about 4 if total sulfide was to be determined, or left unadjusted for free sulfide determinations. The zinc sulfide precipitate in the trap was oxidized with a known and excess amount of iodine, and the unreacted iodine was back-titrated with thiosulfate.

Oil and Grease, Total Petroleum Hydrocarbon. Samples were acidified to a low pH and extracted with fluorocarbon-113 in a separatory funnel. The fluorocarbon layer was separated from each sample, passed over sodium sulfate and collected for analysis of Oil and Grease using an Infrared spectrophotometer scanning the wavelengths from 3200 to 2700 cm^{-1}. To determine Total Petroleum Hydrocarbons, this above extract was passed through silica gel which extracted the vegetable oil fractions; the remaining petroleum fraction was then analyzed by Infrared spectrophotometric techniques as described below.

Total Organic Carbon (TOC). Analysis for total organic carbon followed the method of Gaudette, et al. (1974). One-to-two grams of sediment were placed in a 500 ml flask to which 10 ml of potassium dichromate ($K_2CR_2O_7$) had been added. Twenty ml of concentrated sulfuric acid (H_2SO_4) was then added while the flask was swirled. After 30 minutes, the sample was diluted to a volume of 200 ml with de-

ionized water (DIW), and 10 ml of phosphoric acid (H_3PO_4) and 0.2 g of sodium fluoride (NaF) were added. After more swirling, 15 drops of diphenylamine indicator was added and the sample was titrated with 0.5N ferrous ammonium sulfate.

Metals. Analyses for metals employed combinations of the following Varian spectrophotometers: SpectrAA 400P or 400Z with GTA 96 a Graphite Furnace and autosampler; or a SpectrAA 10 with VOA 76 hydride—cold vapor generator and flame autosamplers. Sample preparation prior to analysis by atomic absorption was accomplished by guidelines specified by Chapter 3, Sections 3.2 and 3.3, 7000 series (EPA 1986).

Organotins. Organotin species analysis was by the method of Uhler and Durrel (1989). Speciation was done by a n-pentyl derivatization using a Gas Chromatograph with a Flame Photometric Detector. A sediment sample was mixed with 5 ml of hydrobromic acid (HBr), converting cationic butyltins to the bromide complexes, which were then extracted with a toluene-tropolone mixture. Following this extraction a n-pentylmagnesium bromide was used to convert the butyltins to the n-pentyl derivatives. This extract was cleaned by passing it through a Florisil/Silica chromatograph column and then injected into the Gas Chromatograph with a FPD detector where butyltins were quantified.

Chlorinated Pesticides and PCB's. Analyses for these constituents were determined by Method 8080 (EPA 1986). A solid sample was mixed with anhydrous sodium sulfate, placed in an extraction thimble and extracted using acetone and hexane in a Soxhlet extractor. The extract was then dried, concentrated, and underwent a Florisil clean-up. The extract was analyzed by gas chromatograph with an electron capture detector.

Polynuclear Aromatic Hydrocarbons and Phthalates. Analyses for semivolatile compounds were by GC-MS techniques, following Method 8270 (EPA 1986). A solid sample was mixed with anhydrous sodium sulfate and sonicated in methylene chloride. The extract was concentrated and then cleaned up by gel permeation chromatography. The extracted sample was analyzed by gas chromatograph/ mass spectroscopy. The EPA 8270 method was modified slightly by the use of Varian Selective Ion Storage technique which eliminates interfering ions from the sample spectrum.

Dioxins and Furans. Sediment samples were analyzed for tetra to octa chlorinated dioxins and furans using EPA Method 8290. These analyses were performed by Alta Analytical Laboratory, Inc., El Dorado Hills, CA.

2.4 Bioassay and Bioaccumulation Test Procedures

Biological assessments of the Humboldt Bay sediments are summarized in **Table 3**.

2.4.1 Suspended Particulate Phase (SPP) Bioassays

Suspended particulate phase elutriates were prepared by procedures outlined in the "Green Book" (EPA/USACE 1991) using reference site water and test sediments. The test protocol for bivalves was as specified by ASTM (1989). Three concentrations (100%, 50%, 10%) of suspended particulate phase were tested. The lower concentrations were evaluated only if the 100% concentrations produced >50% inhibition of development. Three species were tested in suspended particulate phase bioassays: The larvae of a marine bivalve (the bay mussel, *Mytilus edulis*), a mysid (*Holmesimysis costata*), and a marine teleost fish (the speckled sanddab, *Citharichthys stigmaeous*).

Elutriate sanddab bioassays were performed at the Davenport laboratory, and elutriate bioassays with mysids and bivalve larvae were performed at the Watsonville laboratory. The positioning of test containers and other conditions in the laboratories were designed for uniform exposure to the controlled laboratory environment. Five replicates of test treatments were randomly assigned (complete random design) to the test containers by use of a random numbers generating program.

The sediment samples were placed in cleaned 5-gallon polyethylene buckets with laboratory seawater for elutriate preparation. The sediment to water ratio was 1:4 as specified in the Green Book. The mixtures were agitated by vigorous aeration for 30 minutes. After a one-hour settling period, the elutriates were siphoned off and used as suspended particulate phase media.

2.4.1.1 Bivalve Larvae (*Mytilus edulis*)

Mussels were induced to spawn by high-temperature stimulation. Eggs and sperm were collected in separate basins filled with aerated seawater at 20°C. Egg density was determined by microscopically counting several 1-ml aliquots taken from the well-mixed egg basin. Fertilization was accomplished by addition of an appropriate amount of sperm suspension, and confirmed by microscopic examination.

The control exposure, performed for quality assurance purposes, used seawater from our laboratory system. Five replicate dishes were used for each test exposure. Temperature, dissolved oxygen, pH and salinity were monitored in each test concentration and in controls at the beginning and end of the test.

Larvae were tested in 250 ml polyethylene beakers containing approximately 200 ml of test solution. After fertilization was confirmed an aliquot containing approximately 6000 fertilized eggs was pipetted into each test beaker. Gentle aeration was provided throughout the 48-hour duration of the test. Five extra beakers were prepared in addition to those required for test and control replicates. These

"extra" test containers were not incubated for 48 hours, but rather they were evaluated immediately after inoculation to provide the "initial recovery" data used to establish the mean number of embryos added to each experimental beaker.

At the end of the 48-hour exposure period the contents of each dish were poured through a 45μ nytex screen. Surviving larvae were retained on the screen. The test beaker was rinsed three times with seawater and each successive rinse was poured through the screen to ensure complete transfer of larvae. Larvae were quantitatively transferred from the screen into a graduated cylinder and the volume was adjusted with a seawater-formalin mixture. Contents of the cylinder were mixed by inversion to ensure uniform distribution of larvae, and a 1 ml aliquot was transferred to a Sedgwick-Rafter counting slide for microscopic evaluation. Larvae were scored for evidence of internal tissue inside a complete larval shell. Larvae which had a complete larval shell containing tissue were counted as normal, whereas empty shells and larvae with incomplete shells were scored as abnormal. Data were reported as percent of initial embryos which survived, and percent of survivors which showed normal development, as calculated below.

The raw data resulting from these bioassays included the following:

- Counts of embryos added to five replicate test containers which were <u>not</u> incubated for 48 hours (= initial recovery).
- Counts of normal and abnormal embryos from test containers (five replicates per sample, reference and control) which <u>were</u> incubated for 48 hours.

The results were calculated from these data as follows:

$$\%\ Survival = \frac{No.\ normal\ larvae\ recovered}{N} \times 100$$

$$\%\ Normal = \frac{No.\ normal\ larvae}{No.\ normal\ larvae + No.\ abnormal\ larvae} \times 100$$

where N = the mean initial number of embryos added (from initial recovery data).

For each test chamber other than controls, % survival data were adjusted to correct for mortality observed in the control exposures by use of **Abbott's correction**:

$$\textit{Corrected Sample \% Survival} = 100 - \left(\frac{\textit{mean \% control survival - \% sample survival}}{\textit{mean \% control survival}} \times 100\right)$$

Percent normal development data were similarly adjusted.

For the bioassay to be considered a valid test, an average of at least 70% of the exposed embryos must survive in the controls; abnormals were counted as mortalities as per the Testing Guidelines contained in SFACOE Public Notice No. 93-2: Response to Comments on Public Notice 92-5.

Following the Scope of Services, the 100% elutriate concentrations were evaluated initially. If Abbott's-corrected survival or normal development values were $\geq$50%, no further evaluations were performed. If these values were $\leq$50%, the 10% and 50% elutriate exposures were evaluated and EC_{50} and/or LC_{50} calculations were made using the Trimmed Spearman-Karber method. For LC_{50} calculations, abnormal larvae and calculated mortalities were added; whereas for EC_{50} calculations, separate abnormality counts were used, as per Public Notice 93-2 (see above).

A reference toxicant bioassay was also performed for quality assurance purposes, to verify the health and sensitivity of the test organism population. The reference toxicant used was cupric sulfate ($CuSO_4 \cdot 5H_2O$) dissolved in laboratory seawater. A second reference toxicant test was performed using ammonia as the toxicant.

2.4.1.2 Mysid (*Holmesimysis costata*)

Adult mysids (*Holmesimysis costata*) were collected from kelp beds near Monterey, California. The animals were gently aggregated with a dip net, corralled into a submerged bucket without removing them from the water and transported directly to the bioassay lab. In transit, holding tank temperatures were maintained within 2°C of the ambient temperature at sampling. Gentle aeration was supplied from a bottle of compressed oxygen. Throughout testing, the mysids were fed about 50 brine shrimp (*Artemia salina*) nauplii per mysid per day to prevent mortality from starvation and cannibalism.

Mysids were tested in one-liter polycarbonate tanks containing one liter of test solution. To initiate testing, mysids were sorted into groups of 10 in small containers with very small volumes of seawater. Mysids were transferred to the test containers by submerging the containers and slowly tipping the animals into the test medium. During the bioassays, the number of survivors of the original 10 animals per tank were recorded as experimental data at 4, 8, 24, 48, 72, and 96 hours after test initiation. At each of these checkpoints, dead animals (i.e., those nonresponsive to mechanical stimulus) were removed from the test containers.

A reference toxicant bioassay was also performed on the mysids for quality assurance purposes, to verify the health and sensitivity of the test organism population. The reference toxicant used was Sodium Dodecyl Sulfate (SDS) dissolved in laboratory seawater.

2.4.1.3 Teleost Fish (*Citharichthys stigmaeus*)

Speckled sanddabs were collected by otter trawl from Tomales Bay and kept in holding tanks until transported to the laboratory via overnight delivery. They were allowed to acclimate to laboratory conditions prior to testing. Fish were fed a high protein pellet food during the holding period until 48 hours before test initiation; they were not fed thereafter.

Sanddabs were tested in 10-liter aquaria and were individually transferred from holding tanks to aquaria to start the test. During the bioassays, the number of survivors of the original 10 animals per tank was recorded as experimental data at 4, 8, 24, 48, 72, and 96 hours after test initiation. At each of these checkpoints, dead animals (i.e., those nonresponsive to mechanical stimulus) were removed from the test containers.

A reference toxicant bioassay was also performed on the sanddabs for quality assurance purposes, to verify the health and sensitivity of the test organism population. The reference toxicant used was Sodium Dodecyl Sulfate (SDS) dissolved in laboratory seawater. A second reference toxicant test was performed using copper as the toxicant.

2.4.1.4 Initial Mixing Calculations

In cases where an EC_{50} or LC_{50} was obtained, calculations of initial mixing were made using standardized formulae developed by the USACOE and EPA (EPA/ACOE 1977).

2.4.2 Solid Phase (SP) Static Bioassay (Amphipod)

Solid phase static bioassays were conducted on the harbor sediments simultaneously with control and reference sediments. The amphipod *Rhepoxynius abronius* was tested following procedures outlined in ASTM (1990).

Salinity and total ammonia measurements were made on sediment interstitial water as received; in addition, a final pore-water ammonia measurement was taken from one replicate of each test sediment at test termination. Pore waters were extracted by centrifugation. Interstitial water salinity was measured using a salinometer-calibrated refractometer. Interstitial water ammonia concentrations were measured with an ammonia probe calibrated to three concentration standards (see Sediment Chemical and Physical Analysis- Section 2.3).

In each test, five replicates of each station and reference treatment were randomly assigned to test jars. A 2-cm deep layer of appropriate sediment was added to each jar on the day prior to test initiation, and each test jar was provided with aeration via pasteur pipet. Each test was started on the following day by randomly assigning 20 amphipods to each jar, and continued for 10 days under static conditions with constant illumination and aeration. Daily measurements of environmental test conditions (temperature, salinity, pH, dissolved oxygen) were made in each test container, and the number of animals which had appeared on the sediment surface was noted.

At the end of the ten day exposure period, the contents of each jar were poured through a 0.5 mm sieve and the number of surviving amphipods counted. Survivors from each replicate were transferred into bowls containing control sediment and monitored for their ability to rebury within one hour. Test data for each replicate therefore include number of survivors and number of survivors able to rebury.

Reference toxicant bioassays were performed with each batch of test animals to verify the health and sensitivity of the test organism population. The reference toxicant used was cadmium chloride ($CdCl_2$) dissolved in laboratory seawater.

2.4.3 Solid Phase (SP) Flow-through Bioassays (Mysid Shrimp and Polychaete Worm)

Solid phase flow-through bioassays with mysids and worms were conducted on the harbor sediments simultaneously with control and reference sediments. Control sediments were collected from Tomales Bay. Testing for both species was performed at the Davenport facility where continuously flowing seawater is available, using testing procedures in EPA/COE (1991).

Mysids (*Holmesimysis costata*) were collected from kelp beds near Monterey, California. The animals were gently aggregated with a dip net, corralled into a submerged bucket without removing them from the water and transported directly to the bioassay lab. In transit, holding tank temperatures were maintained within 2°C of the ambient temperature at sampling. Gentle aeration was supplied from a bottle of compressed oxygen. Throughout testing, the mysids were fed about 50 brine shrimp (*Artemia salina*) nauplii per mysid per day to prevent mortality from starvation and cannibalism.

Polychaete worms (*Nephtys caecoides*) were collected from Tomales Bay and shipped overnight to the bioassay laboratory. They were kept in holding tanks with home sediment and overlying seawater until test initiation.

All sediments were sieved through a 1.0 mm screen to remove indigenous fauna, and a 3.0 cm layer of appropriate sediment was added to each test container. Tanks were then filled with lab seawater, and either twenty polychaete worms (*Nephtys caecoides*) or twenty mysids (*Holmesimysis costata*) were added to each container. Worms were tested in 31 L glass aquaria; mysids were tested in 1.5 L polycarbonate tanks fitted with small, screened drain holes. The small mysid containers were suspended

above the larger worm containers such that when the flow-through seawater system was activated, seawater passed through the mysid tanks, overflowed through the screened drain holes into the worm tanks, then drained to sea.

Solid Phase flow-through bioassays continued for 10 days. At least twice each day, environmental systems were checked for proper functioning. Once each day, the salinity and temperature of the system were measured. Dissolved oxygen and pH values of each tank were measured twice daily.

After the 10-day bioassay period, the contents of each tank were gently washed with seawater through a 0.5-mm nylon screen. The animals were retrieved from the screen and counted. Test data were the number of survivors of each species.

A reference toxicant bioassay was also performed on the mysids for quality assurance purposes, to verify the health and sensitivity of the test organism population. The reference toxicant used was Sodium Dodecyl Sulfate (SDS) dissolved in laboratory seawater. A second reference toxicant test was performed using ammonia as the toxicant.

2.4.4 Bioaccumulation Exposure

Clams (*Macoma nasuta*) and polychaete worms (*Nephtys caecoides*) were exposed to test and control sediments in an array of 31-liter flow-through glass aquaria, as follows: Five replicates of each harbor composite, reference composite and control sediments were randomly assigned to the test tanks. The control sediment was collected from Tomales Bay, CA. Sediments were screened through a 1.0 mm screen to remove indigenous fauna, and a 3.0 cm layer was added to each tank. Tanks were filled with water and 30 clams and 40 worms were added to each. After a one-hour settling time, the flow-through seawater system was activated and adjusted to a flow rate equivalent to 5 tank/volume changes per 24 hours (6.5 liters/hour).

Bioaccumulation exposures continued for 28 days. At least twice each day, environmental systems were checked for proper function. Each tank was monitored daily for temperature and D.O., and the seawater system was monitored daily for salinity and pH.

3.0 Results

Sediment physical, chemical and bioassay analyses are summarized in **Table 1**. Twelve samples from North Bay, Entrance and Bar were screened and analyzed for particle size distribution (PSD) only. Thirty-one samples were analyzed for bulk sediment chemistry: 26 discrete samples plus five harbor composites (SAMTB, EKUP, EKEX, FLTB, REF). Bioassay testing and bioaccumulation exposures were performed on the five composites and on the control sediment; subsamples of these sediments were analyzed for tetra to octa chlorinated dioxins and furans.

3.1 Sediment Physical Analysis

The particle size distributions of the sediment samples and composites are summarized in **Table 4**; details of grain size analyses are presented in **Appendix C**. Except for station NB9, the North Bay, Entrance and Bar samples each contained at least 90% coarse sediments by weight ($\Phi \leq 4$); NB9 contained 11.7% fines. Coarse sediment composition of the three harbor composites were as follows: Samoa Turning Basin (SAMTB) = 79.3%; Eureka Upper Channel (EKUP) = 35.1%; Eureka Upper Channel Extension (EKEX) = 15.9; and Field's Landing Lower Channel and Turning Basin (FLTB) = 16.9%. The disposal site reference (REF) composite contained 4.3% coarse sediments.

3.2 Bulk Sediment Chemistry

Results of bulk sediment chemical analyses of the Humboldt Harbor sediment samples and composites are summarized in **Table 4**. The laboratory reports are presented in **Appendix C**, and the laboratory QA plan summary is presented in **Appendix D**. Chains of Custody are Presented in **Appendix F**. The discussion below is generally limited to analyses of the harbor and reference composites; please refer to **Appendix C** for results of analyses of the individual samples.

Metals. The Humboldt Harbor sediment composites were analyzed for ten metals. Metals concentrations in the Harbor composites were similar to those found in the Reference composite. Within the Harbor composites, composite SAMTB tended to have the lowest metals concentrations. Individual accounts of the ten metals analyzed in these sediments are as follows:

- Arsenic concentrations ranged from 3.7 ppm to 4.9 ppm in the harbor composites. None of the harbor composites exceeded the 5.2 ppm found in the reference composite.

- Cadmium concentrations ranged from 0.1 ppm to 0.2 ppm in the harbor composites. SAMTB, EKEX and FLTB exceeded (by 2.0x) the 0.1 ppm found in the reference composite. Cadmium concentrations found in these sediments were near the detection limit.

- Chromium concentrations ranged from 120 ppm to 130 ppm in the harbor composites. Harbor composites EKUP and EKEX exceeded (by 1.1x) the 120 ppm found in the reference composite.

- Copper concentrations ranged from 11 ppm to 30 ppm in the harbor composites. Only harbor composite EKEX exceeded (by 1.1x) the 28 ppm found in the reference composite.
- Lead concentrations ranged from 4.9 ppm to 15 ppm in the harbor composites. EKUP (1.5X) and EKEX (1.1X) exceeded the 10 ppm found in the reference composite.
- Mercury concentrations ranged from 0.096 ppm to 0.13 ppm in the harbor composites. Only EKEX exceeded (by 1.1x) the 0.12 ppm found in the reference composite.
- Nickel concentrations ranged from 86 ppm to 130 ppm in the harbor composites. None of the harbor composites exceeded the 130 ppm found in the reference composite.
- Selenium concentrations ranged from 0.1 ppm to 0.2 ppm in the harbor composites. None of the harbor composites exceeded the 0.2 ppm found in the reference composite.
- Silver concentrations ranged from 1.3 ppm to 1.6 ppm in the harbor composites. None of the harbor composites exceeded the 1.7 ppm found in the reference composite.
- Zinc concentrations ranged from 44 ppm to 94 ppm in the harbor composites. EKUP (1.2x) and EKEX (1.4x) exceeded the 69 ppm found in the reference composite.

Butyltins. Three organotins (tri-, di-, and mono-butyltin) were measured in the Humboldt Harbor sediment composites. Composite EKEX contained 10 ppb tributyltin; a small amount (2 ppb) of dibutyltin was detected in the EKUP and EKEX composites. The reference sediment contained no detectable butyltins.

Semivolatiles. Phthalate esters and seventeen polynuclear aromatic hydrocarbons (PAHs) were measured in the Humboldt Harbor sediment composites. Several samples in this set were overdried during extraction. As a consequence the surrogate recoveries for nitrobenzene-d5 were below QC limits. The affected samples were re-extracted and reanalyzed. However, the second extraction took place between 9 and 11 days beyond the 14 day holding time. Both sets of data are reported in **Table 4** and in **Appendix C**. The results for the other analytes were comparable in the two analyses, except for individual sample SAM 6-B which had a much higher PAH content in the second extract. This inconsistency may be attributed to a lack of homogeneity in the sample.

Among the harbor composites, SAMTB consistently contained the lowest concentrations of semivolatiles, and EKUP the highest. Phthalate concentrations ranged from 200 to 1700 ppb in the harbor composites; EKUP (4.6x) and FLTB (3.5x) exceeded the 370 ppb measured in the reference composite. Total PAH concentrations ranged from 96 ppb (SAMTB) to 890 ppb (EKUP) in the harbor composites compared to 390 ppb detected in the reference sediment. PAH detections were as follows:

LPAHs. Six low molecular weight PAHs were detected in the harbor or reference composites. Total LPAH concentrations in the harbor samples ranged from 51 ppb (SAMTB) to 240 ppb (FLTB); the reference sample contained 230 ppb total LPAH.

- 2-methylnaphthalene concentrations ranged from 14 ppb to 77 ppb in the harbor composites; FLTB (1.1x) exceeded the 71 ppb detected in the reference composite.

- Naphthalene concentrations ranged from 13 ppb to 44 ppb in the harbor composites; EKUP (1.6x), EKEX (1.4X) and FLTB (1.2x) exceeded the 27 ppb detected in the reference composite.

- Acenaphthene was detected only in composite EKUP (13 ppb); none was detected in the reference sample.

- Fluorene concentrations ranged from <13 ppb to 32 ppb in the harbor composites; the concentrations in EKUP, EKEX and FLTB exceeded by 1.2x to 1.3x the 24 ppb found in the reference sample. None was detected in composite SAMTB.

- Phenanthrene concentrations ranged from 31 ppb to 110 ppb in the harbor composites; none of the harbor composites exceeded the 110 ppb detected in the reference composite.

- Anthracene was found (17 ppb) only in composite EKUP; it was not detected in the reference sample.

HPAHs. Nine high molecular weight PAHs (HPAHs) were detected in the harbor or reference composites. Total HPAH concentrations ranged from 60 ppb (SAMTB) to 620 ppb (EKUP) in the harbor composites, compared to 160 ppb in the reference sediment.

- Fluoranthene concentrations ranged from 20 ppb to 160 ppb in the harbor composites; except for SAMTB, each of the harbor composites exceeded (by 1.3 to 4.6x) the 35 ppb detected in the reference composite.

- Pyrene concentrations ranged from 25 ppb to 150 ppb in the harbor composites; except for SAMTB, each of the harbor composites exceeded (by 1.3 to 4.3x) the 35 ppb detected in the reference composite.

- Chrysene concentrations ranged from <13 ppb to 59 ppb in the harbor composites; EKUP (1.7x) and EKEX (1.2x) exceeded the 35 ppb detected in the reference composite.

- Benzo(a)anthracene concentrations ranged from <13 ppb to 41 ppb in the harbor composites; EKUP (2.6x) and EKEX (1.4x) exceeded the 16 ppb detected in the reference composite.

- Benzo(b)fluoranthene concentrations ranged from <13 ppb to 51 ppb in the harbor composites; EKUP (2.2x), EKEX (1.6x) and FLTB (1.1x) exceeded the 23 ppb detected in the reference composite.

- Benzo(k)fluoranthene concentrations ranged from <13 ppb to 29 ppb in the harbor composites; EKUP and EKEX exceeded the <13 ppb detected in the reference composite.

- Benzo(a)pyrene concentrations ranged from <13 ppb to 51 ppb in the harbor composites; EKUP, EKEX and FLTB exceeded the <13 ppb detected in the reference composite.

- Indeno[1,2,3-CD]pyrene concentrations ranged from <13 ppb to 32 ppb in the harbor composites; EKUP and EKEX exceeded the <13 ppb detected in the reference composite.

- Benzo[ghi]perylene concentrations ranged from <13 ppb to 51 ppb in the harbor composites; EKUP (2.7x), EKEX (1.6x) and FLTB (1.2x) exceeded the 19 ppb detected in the reference composite.

Chlorinated Pesticides and PCBs. The Humboldt Harbor sediment composites were analyzed for the eighteen chlorinated pesticides and four polychlorinated biphenyls (PCBs as Aroclors). None of the harbor composites, reference or Tomales Bay control sediments contained detectable amounts of these substances.

Dioxins and Furans. The Humboldt Harbor composites were analyzed for tetra to octa chlorinated dioxins and furans by Alta Analytical Laboratories, (El Dorado Hills, CA). The harbor composites contained from 87.0 pg/g to 503 pg/g total dioxins and from 18.0 pg/g to 84.7 pg/g total furans; FLTB contained the lowest concentrations and EKEX the highest concentrations of each. The reference site sediment contained 621 pg/g total dioxins and 3.65 pg/g total furans. TEQ's ranged from 0.76 at the reference site to 3.5 at EKEX.

Sediment Conventionals. The sediments were tested for total and water soluble sulfides, oil and grease, petroleum hydrocarbons, total volatile solids, percent solids, and total organic carbon. Composite EKEX generally contained the highest concentrations and SAMTB the lowest.

Total sulfides ranged from 79 ppm to 300 ppm in the harbor sediment composites. The reference composite contained 1.3 ppm total sulfides. Except for a trace amount (0.3 ppm) in the EKUP composite, no water soluble sulfides were found in the harbor composites, nor in the reference composite.

Oil and Grease concentrations ranged from <20 ppm to 80 ppm in the harbor sediments; EKUP, EKEX and FLTB each contained higher concentrations than the <20 ppm in the reference composite. Petroleum hydrocarbons were detected only in FLTB (46 ppm). Volatile solids ranged from 2.0% to 4.3% in the harbor composites, and was 3.9% in the reference sediment.

Percent solids in the harbor composites ranged from 59% to 71% compared to 62% in the reference composite; total organic carbon ranged from 0.54% to 0.67% in the harbor composites, compared to 0.72% in the reference composite.

Sediment Chemistry Summary: Except for total sulfides (and possibly phthalate esters) the Humboldt Harbor sediments contained no particularly high concentrations of any of the tested substances or compounds when compared to the reference site sediments. Dioxin and furan concentrations were determined by EPA Region IX to be below levels of concern (USEPA Memorandum, 5/24/95). Although sulfide concentrations in the harbor composites (79 ppm to 300 ppm) were not particularly high for harbor sediments in general, they exceeded the very low reference site concentration of 1.3 ppm. Concentrations of some PAHs in the Eureka Upper Channel and Extension exceeded reference levels by 4.3x to 8.5x (calculating non-detects at 0.5 x D.L.), but again, the absolute concentrations (to 890 ppb total PAH) were not particularly high. Phthalate concentrations of 1700 ppb in Eureka upper Channel, and 1300 ppb in Field's Landing appear somewhat elevated (4.1x to 5.3x reference).

3.3 Bioassay Test Results

Six sediment toxicity evaluations were conducted on the Humboldt Harbor sediments. Suspended particulate phase (SPP) bioassays and solid-phase (SP) bioassays employed a total of five species, and bioaccumulation exposures were conducted with two species (**Table 3**). Bioassay test results and statistical evaluations are summarized in **Table 5** through **Table 11**. Water quality monitoring data summaries, and reference toxicant test results are tabularized, and Logs of test animal shipping, receiving, acclimation and holding are contained in **Appendix E**.

3.3.1 Suspended Particulate Phase (SPP) Bioassays

Suspended Particulate Phase bioassay testing of the Humboldt Harbor Baseline Survey II sediments comprised three species: a bivalve larva (*Mytilus edulis*), a teleost fish (*Citharichthys stigmaeous*) and a mysid shrimp (*Holmesimysis costata*). Results of these bioassays are summarized below, and in **Table 5** through **Table 8**.

3.3.1.1 Bivalve Larvae

Adult *Mytilus edulis* were purchased from Carlsbad Aquafarm Inc., Carlsbad, CA. Collection data were not available. The animals were shipped on 24 April 1995 and arrived at ToxScan's Watsonville laboratory on 25 April via Federal Express overnight; the test was initiated the same day. Results of the bivalve larvae tests are presented in **Table 5**.

Survival. Mean survival of bivalves in the laboratory seawater control was 94.6%, well above the ASTM (1989) protocol requirements of 70 percent. The reference site 100% elutriate produced 80.9% survival, Abbott's-corrected to 85.6%. Abbott's corrected mean survival in the 100% elutriates of the

Humboldt Harbor composites ranged from 0.0% in the EKEX composite to 72.0% in the FLTB composite. Three harbor sediment bivalve tests demonstrated enough toxicity to generate LC_{50}s: EKUP (9.8%), SAMTB (17.3%) and EKEX (5.1%).

Development. Mean normal development values (adjusted with Abbott's correction) for bivalve larvae exposed to 100% elutriates of the test sediment ranged from 0.0% in the EKEX composite to 78.2% in the FLTB composite. Normal development in the disposal site reference elutriate was 91.9%, Abbott's-corrected to 97.1%. Normal development in the laboratory seawater control was 94.6%. Three Harbor sediments tests demonstrated enough bivalve toxicity to generate EC_{50}s: SAMTB (18.6%), EKUP (9.8%) and EKEX (<10%; not calculable).

Reference Toxicant. The Abbott's-corrected bivalve reference toxicant LC_{50} was 7.15 ppb Cu (95% CL: 6.46 - 7.92); the EC_{50} for development was 7.88 ppb Cu (95% CL: 7.29 - 8.52). These values are within ±2 SD of the mean of EC_{50}s calculated from previous *Mytilus*: copper reference toxicant tests. The ammonia reference toxicant test resulted in an LC_{50} of 10.7 µg/L (95% CL: 9.8 - 11.6) and an EC_{50} of 10.8 µg/L (95% CL: 10.0 - 11.7) total NH_3.

3.3.1.2 Mysid Shrimp

Adult *Holmesimysis costata* were collected from kelp beds near Monterey, California by SP Aquatics on 26 April 1995 and transported directly to the bioassay lab. The mysid suspended particulate phase bioassay was initiated that afternoon.

Mean survival of the mysids was 100% in each of the Humboldt Harbor Baseline Survey II sediment elutriates **(Table 6)**. Mean control survival was 100%; reference site survival was 88%. Mysid survival was significantly diminished from reference site survival in three harbor composites (EKUP, EKEX and FLTB) (Steel's Many-One Rank Test: p=0.05, k=4). Except for composite EKEX (LC_{50} = 51.2%) LC_{50}s of all composites were >100% elutriate.

Reference Toxicant. The mysid reference toxicant 96 hour LC_{50} was 8.00 mg/L SDS (95% CL: 5.61 - 11.4). This value is within ±2 SD of the mean of LC_{50}s calculated from previous *Holmesimysis*: SDS reference toxicant tests.

3.3.1.3 Teleost Fish

Speckled sanddabs (*Citharichthys stigmaeus*) were collected from Tomales Bay by John Brezina & Associates; collection data was not available. The animals were delivered to ToxScan's Davenport laboratory on 5 May 1995 by the supplier. The sanddabs were held in 32.5 - 33.0‰ seawater at 10.5 - 14.5 °C until test initiation on 9 May.

Mean survival of the sanddabs in the Humboldt Harbor sediment 100% elutriates ranged from 0.0% in the EKEX composite to 96% in the SAMTB composite (**Table 7**). Mean control survival was 92%,

and the reference site survival was 88%. Survival in the EKEX and FLTB composites was significantly diminished from survival in the reference sediment (Steel's Many-One Rank Test: p=0.05, k=4). Composites EKEX (LC_{50} = 61.6

Reference Toxicant. The sanddab reference toxicant 96 hour LC_{50} was 2.00 mg/L SDS (95% CL: 1.65 - 2.43). This value is within ±2 SD of the mean of LC_{50}s calculated from previous *Citharichthys*: SDS reference toxicant tests. A second reference toxicant test using copper as the reference toxicant produced a 96 hour LC_{50} of 0.37 mg/L (95% CL: 0.31 - 0.44 mg/L).

3.3.1.4 Initial Mixing Calculations

Calculations of initial mixing concentrations for disposal depths of 50m, 20m and 10m are detailed in **Appendix E** (**Table E1**). Three composites (SAMTB, EKUP and EKEX) generated EC_{50} values from the bivalve test, composite FLTB also produced an LC_{50} from the sanddab test, and composite EKEX produced LC_{50}s from all three species **(Table 8)**. Except in one case (EKEX bivalve at 10 m depth) the factored EC_{50}s were each higher than the projected concentrations (C_{sp}) for the three calculated depths. Since the disposal site is greater than 20 m depth, the Limiting Permissible Concentrations (LPCs) were not exceeded for this sediment.

3.3.2 Solid Phase (SP) Static Bioassay (Amphipod)

Test amphipods (*R. abronius*) were collected on 26 April 1995 at Yaquina Bay, OR by Northwestern Aquatics, Inc.. They arrived via overnight delivery at ToxScan's bioassay facility in Watsonville, CA on 28 April. These amphipods did not require salinity acclimation; they were held at 32.9 to 33.2‰ until testing was initiated on 5 May with 31.4‰ - 32.6‰ overlying seawater.

Solid phase static bioassay results for the amphipod *Rhepoxynius abronius* are summarized in **Table 9**. Prior to initiation of the bioassay, analysis of interstitial waters found ammonia concentrations in the EKUP (35.8 mg/L) and EKEX (59.6 mg/L) composites exceeded the threshold limit of 20 mg/L for *Rhepoxynius* **(Table 4)**. Therefore, ammonia-purging procedures were initiated for these sediments, and a parallel (purged) control was set up using home sediments from Yaquina Bay. After two days of aeration and twice-daily renewals of overlying water, total ammonia levels in the pore waters was sufficiently reduced to begin the test. Twice daily renewals continued for these samples for the test duration. Final (end-test) concentration of total ammonia in the pore water was 2.1 mg/L (EKUP) and 5.2 mg/L (EKEX).

Survival. Mean survival of *R. abronius* in the Humboldt Harbor Baseline Survey III sediment composites ranged from 71.0% to 89.0% (versus 98.0% and 99.0% in the home sediment controls and 65.0% in the reference site composite). Amphipod survival in each of the harbor composites exceeded survival in the reference site; therefore statistical analyses were not performed.

Reference Toxicant. The amphipod reference toxicant 96 hour LC_{50} was 1.04 mg/L Cd (95% CL: 0.82 - 1.32). This value is within ±2 SD of the mean of LC_{50}s calculated from previous *Rhepoxynius* : Cd reference toxicant tests. A second reference toxicant test using ammonia as the toxicant resulted in an LC_{50} of 97.0 mg/L (95% CL: 80.3 - 117.1)

3.3.3 Solid Phase (SP) Flow-Through Bioassays: Mysid Shrimp and Polychaete Worm

Mysid Shrimp Survival. Adult *Holmesimysis costata* were collected from kelp beds near Monterey, California by SP Aquatics on 12 May 1995. They were transported directly to the bioassay lab where the mysid SP bioassay was initiated that afternoon.

Mean survival of *H. costata* was 92% to 100% in the Humboldt Harbor composites, 96% in the home sediment control and 93% in the reference composite (**Table 10**). Mysid survival in the harbor composites was either greater than, or not significantly diminished from survival in the reference site composite.

Reference Toxicant. The mysid reference toxicant 96 hour LC_{50} was 12.7 mg/L SDS (95% CL: 10.8 - 15.0). This value falls above ±2 SD of the mean of LC_{50}s calculated from previous *Holmesimysis*: SDS reference toxicant tests. This suggests that these mysids may be less sensitive indicators of sediment toxicity than mysids used in other sediment bioassays in our laboratory.

Polychaete Worm Survival. Adult *N. caecoides* were collected from Tomales Bay by John Brezina and Associates. Collection data were not available. They were delivered to the Davenport bioassay laboratory on 5 May 1995 by the supplier. These animals did not require salinity acclimation; they were held in home sediment with 32.5‰ - 33.0‰ overlying seawater at 10.7 °C - 14.5 °C until testing was initiated on 11 May.

Mean survival of *Nephtys caecoides* in the Humboldt Harbor sediment composites ranged from 90% to 95% (versus 95% in the home sediment control and 84% in the reference composite **(Table 11)**. Worm survival in each of the harbor composites exceeded survival in the reference site composite; therefore statistical evaluation was not necessary.

Reference Toxicant. The polychaete reference toxicant 96 hour LC_{50} was 99.7 µg/L copper (95% CL not calculable). This value is within ±2 SD of the mean of LC_{50}s calculated from previous *Nephtys*: copper reference toxicant tests.

3.3.4 Bioaccumulation Exposure (Clam and Worm)

Based on EPA and SFACOE review of the sediment chemistry results for the three harbor composites and the reference composite, no assessment of the exposed tissues was deemed warranted for either *Macoma nasuta* or *Nephtys caecoides*. The bulk sediment chemistry data revealed no detectable chlorinated pesticides or PCBs, while total detected organotins (<1 ppb) were close to detection limits. Dioxin/furan TEQs ranged from 0.81 to 3.5 in the harbor sediments. PAHs were detected at low concentrations (98 - 160 ppb) in the composites.

Bioassay Results Summary. SPP Bioassay testing of the Humboldt Bay Baseline Survey III sediments demonstrated significantly increased toxicity (compared to the disposal site reference) to mysids and sanddabs in the 100% elutriates from two to three of the four composites tested. Bivalve LC_{50}s and EC_{50}s in three of the composites ranged from 5.1% to 18.6% compared to EC/LC_{50}s >100% in the reference. The bivalve elutriate test LC_{50} in composite EKEX exceeded the LPC value for shallow water (10m depth) disposal. Some of the observed elutriate toxicity is probably attributable to ammonia: NH_3 concentrations in composites EKUP (11.5 mg/L NH_3) and EKEX (15.8 mg/L NH_3) each exceeded the bivalve 48h LC_{50} of 10.7 mg/L in a concurrent ammonia reference toxicant test. Solid phase testing with amphipods, mysids and worms did not find the harbor sediment toxicity significantly elevated compared to the reference sediment. The reference toxicant tests for both mysid bioassays produced LC_{50}s above our control chart limits which suggests the test animal population was less sensitive than usual.

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TABLES

Table 1. Analyses Performed, Humboldt Bay Baseline Survey III (FY 1995). Shaded samples composited; SP = Suspended Phase; SPP = Suspended Particulate Phase.

SAMPLE	Initial Grain Size	Sediment Chemistry	SP + SPP Bioassay	Bioaccumulation Exposure[1]
North Bay Channel:				
NB1	YES	NO	NO	NO
NB2	YES	NO	NO	NO
NB3	YES	NO	NO	NO
NB4	YES	NO	NO	NO
NB5	YES	NO	NO	NO
NB6	YES	NO	NO	NO
NB7	YES	NO	NO	NO
NB8	YES	NO	NO	NO
NB9	YES	NO	NO	NO
Samoa Turning Basin:				
SAM1	YES	YES	NO	NO
SAM2	YES	YES	NO	NO
SAM3	YES	YES	NO	NO
SAM4	YES	YES	NO	NO
SAM5	YES	YES	NO	NO
Comp SAMTB:	YES	YES[2]	YES	YES
SAM6-A	YES	YES	NO	NO
SAM6-B	YES	YES	NO	NO
SAM6-C	YES	YES	NO	NO
SAM7	YES	YES	NO	NO
Eureka Upper Channel:				
EK1	YES	YES	NO	NO
Comp EKUP:	YES	YES[2]	YES	YES
EK2	YES	YES	NO	NO
EK3	YES	YES	NO	NO
EK4	YES	YES	NO	NO
EK4A	YES	YES	NO	NO
Eureka Upper Channel Extension:				
Comp EKEX:	YES	YES[2]	YES	YES
EK5	YES	YES	NO	NO
EK6	YES	YES	NO	NO
EK7	YES	YES	NO	NO
EK8	YES	YES	NO	NO
Field's Landing Lower Channel and Turning Basin:				
Comp FLTB:	YES	YES[2]	YES	YES
FL1	YES	YES	NO	NO
FL2	YES	YES	NO	NO
FL3	YES	YES	NO	NO
FL4	YES	YES	NO	NO
FL5	YES	YES	NO	NO
FL6	YES	YES	NO	NO
FL7	YES	YES	NO	NO
FL8	YES	YES	NO	NO
Entrance Channel, Bar, Reference Site and Control:				
ENT1	YES	NO	NO	NO
ENT2	YES	NO	NO	NO
BAR1	YES	NO	NO	NO
REF	YES	YES[2]	YES	YES
CONTROL	NO	NO	NO[3]	YES

[1] Exposures only; no tissue analyses performed (see text).
[2] Includes tetra to octa dioxins and furans.
[3] Tetra to octa dioxins and furans only.

Table 2. Sediments Collected, Humboldt Bay Baseline Survey III (FY 1995). Samples collected by vibracore or Smith-Macintyre grab; shaded samples composited.

			Core Penetration (Feet)		California Grid Zone Coordinates	
SAMPLE	DATE	TIME	ACHIEVED	SAMPLED	NORTH	EAST
North Bay Channel:						
NB 1	03/30/95	16:50	Grab	Grab	525028	1384350
NB 2	04/04/95	12:55	0.8	Grab	525717	1384680
NB 3	04/02/95	11:26	0.8	Grab	527595	1385835
NB 4	03/30/95	15:24	Grab	Grab	530564	1387808
NB 5	04/02/95	09:55	4.2	4.2	531952	1389996
NB 6	04/02/95	12:00	0.5	Grab	533740	1391373
NB 7	04/02/95	12:11	0.5	Grab	535714	1392302
NB 8	04/02/95	12:24	Grab	Grab	537125	1393099
NB 9	03/30/95	16:23	Grab	Grab	538749	1393646
Samoa Turning Basin (SAMTB):						
SAM 1	04/01/95	09:00	2.5	2.5	541987	1394449
SAM 2	04/01/95	17:51	Grab	Grab	544424	1395575
SAM 3	04/01/95	10:20	5.5	1.8	545539	1396198
SAM 4	04/01/95	17:26	0.5	Grab	546765	1396342
SAM 5	03/31/95	16:35	3.3	3.3	547455	1397822
SAM 6-A	04/01/95	11:25	3.9	3.6	548132	1397179
		12:02	3.0	3.0		
		12:25	4.8	3.6		
SAM 6-B	04/01/95	13:55	6.7	4.5	548384	1397352
		14:38	4.0	4.0		
		15:10	6.4	4.5		
SAM 6-C	04/01/95	16:00	5.1	3.6	548546	1397592
		16:22	4.6	3.6		
		16:50	6.1	3.6		
SAM 7	03/31/95	17:50	2.4	1.2	548109	1398059
Eureka Upper Channel (EKUP):						
EK 1	04/03/95	16:38	3.5	3.5	541497	1394908
EK 2	04/03/95	17:24	0.9	Grab	543132	1397078
		17:32	5.2	3.8		
		17:50	3.6	3.6		
		18:02	2.8	2.8		
		18:22	3.7	3.7		
EK 3	04/04/95	09:42	3.3	3.0	543794	1397913

Continued...

			Core Penetration (Feet)		California Grid Zone Coordinates	
SAMPLE	DATE	TIME	ACHIEVED	SAMPLED	NORTH	EAST
EK 4	04/04/95	08:14	0.5	Grab	543786	1398977
		08:22	3.6	2.5		
		08:38	3.0	2.5		
		08:50	2.4	2.4		
EK 4-A	04/04/95	10:22	3.5	2.3	543749	1398822
		10:42	5.0	2.3		
		10:55	0.8	0.8		
		11:05	3.6	2.3		
Eureka Upper Channel Extension:						
EK-5	04/03/95	14:16	9.8	8.0	543912	1399478
EK-6	04/03/95	12:55	10.0	9.8	544050	1399545
EK-7	04/03/95	11:55	8.3	8.3	543993	1399779
EK-8	04/03/95	10:55	9.0	9.0	544098	1400130
Fields Landing Lower Channel and Turning Basin (FLTB):						
FL-1	04/02/95	15:17	2.8	2.8	513810	1383995
		15:42	2.6	2.6		
		16:00	3.1	2.8		
FL-2	04/02/95	16:22	2.7	2.5	514037	1384139
		16:42	2.5	2.5		
		17:00	2.8	2.5		
FL-3	04/02/95	17:30	2.5	2.5	513846	1384313
		18:00	5.8	3.8		
		18:15	4.0	3.8		
		18:30	4.4	3.8		
FL-4	04/02/95	14:00	0.8	Grab	517329	1385130
		14:12	0.8	Grab		
FL-5	04/02/95	13:43	0.8	Grab	519655	1384129
FL-6	04/02/95	13:30	0.8	Grab	521141	1383493
	04/04/95	12:20	4.0	3.8		
FL-7	04/02/95	13:10	0.5	Grab	523228	1384574
Entrance Channel, Bar and Reference Site:						
ENT-1	03/30/95	17:02	0.8	Grab	525995	1382030
ENT-2	03/30/95	17:14	0.8	Grab	529195	1379874
BAR-1	03/30/95	14:02	0.5	Grab	530955	1377446
RF	03/30/95	11:18-13:00	8 Grabs	8 Grabs	552952	1361615

[1] Field measurements of station locations were made in latitude × longitude (see Field Logs, Appendix A), and converted here to California State Plane Coordinates.

[2] Grab samples (except Entrance and Bar) were taken only where depth from bottom to project depth was less than 1.5 ft; Entrance and Bar stations were grab sampled due to wind and sea conditions.

Table 3. Biological Assessments, Humboldt Bay Baseline Survey III (FY 1995).

Test Species:	SP	SPP	BA
R. abronius	X	-	-
M. edulis	-	X	-
H. costata	X	X	-
C. stigmaeus	-	X	-
N. caecoides	X	-	E
M. nasuta	-	-	E

X = test performed; E = exposure only, no tissue evaluation

SP = Solid Phase; SPP = Suspended Particulate Phase; BA = Bioaccumulation.

Table 4. Sediment Chemistry Summary, Humboldt Bay Baseline Survey III (FY 1995): Composites only; for individual sample results, see Appendix C.

Analyte	Sampling Sections					Detection Limit
	SAMTB	EKUP	EKEX	FLTB	Ref.	
Chlorinated Pesticides (ppb, dry weight)						
Aldrin	ND	ND	ND	ND	ND	2.0
alpha-BHC	ND	ND	ND	ND	ND	2.0
beta-BHC	ND	ND	ND	ND	ND	2.0
delta-BHC	ND	ND	ND	ND	ND	2.0
gamma-BHC (lindane)	ND	ND	ND	ND	ND	2.0
alpha-Chlordane	ND	ND	ND	ND	ND	2.0
gamma-Chlordane	ND	ND	ND	ND	ND	2.0
4,4'-DDD	ND	ND	ND	ND	ND	2.0
4,4'-DDE	ND	ND	ND	ND	ND	2.0
4,4'-DDT	ND	ND	ND	ND	ND	2.0
Dieldrin	ND	ND	ND	ND	ND	2.0
Endosulfan I	ND	ND	ND	ND	ND	2.0
Endosulfan II	ND	ND	ND	ND	ND	2.0
Endosulfan sulfate	ND	ND	ND	ND	ND	10
Endrin	ND	ND	ND	ND	ND	2.0
Heptachlor	ND	ND	ND	ND	ND	2.0
Heptachlor epoxide	ND	ND	ND	ND	ND	10
Toxaphene	ND	ND	ND	ND	ND	30
Dioxins (PCDD) and Furans (PCDF): Tetra- to Octa- Chlorinated[a] (pg/g)						
Total PCDD	274	342.4	502.9	87.03	621.49	0.17-0.36
Total PCDF	33.7	63.1	84.7	18	3.65	0.048-0.45
TEQs	1.4	2.7	3.5	0.81	0.76	---
PCBs (ppb, dry weight)						
PCB 1242	ND	ND	ND	ND	ND	20
PCB 1248	ND	ND	ND	ND	ND	20
PCB 1254	ND	ND	ND	ND	ND	20
PCB 1260	ND	ND	ND	ND	ND	20
total PCBs	ND	ND	ND	ND	ND	
PAHs (ppb, dry wt)						
2-Methylnaphthalene	ND/14	51	39/64	77	71	11-13
Naphthalene	ND/13	44	ND/37	32	27	11-13
2-Chloronaphthalene	ND/ND	ND	ND/ND	ND	ND	11-13
Acenaphthylene	ND/ND	ND	ND/ND	ND	ND	11-13
Acenaphthene	ND/ND	13	ND/ND	ND	ND	11-13
Fluorene	ND/ND	30	32/27	28	24	11-13
Phenanthrene	31/24	110	110/81	100	110	11-13
Anthracene	ND/ND	17	ND/ND	ND	ND	11-13
total detectable LPAHs	31/51	270	180/210	240	230	11-13
Fluoranthene	25/20	160	90/63	47	35	11-13
Pyrene	35/25	150	73/59	46	35	11-13
Chrysene	ND/ND	59	42/31	33	35	11-13
Benzo(a)anthracene	ND/ND	41	22/17	16	16	11-13
Benzo(b)fluoranthene	ND/ND	51	37/24	25	23	11-13
Benzo(k)fluoranthene	ND/ND	29	19/ND	ND	ND	11-13
Benzo(a)pyrene	ND/ND	51	22/16	16	ND	11-13
Indeno[1,2,3-CD]pyrene	ND/ND	32	19/ND	ND	ND	11-18
Dibenzo(a,h)anthracene	ND/ND	ND	ND/ND	ND	ND	11-18
Benzo[ghi]perylene	ND/ND	51	31/22	23	19	11-18
total detectable HPAHs	60/45	620	360/230	210	160	11-18
total detectable PAHs	91/96	890	540/440	450	390	11-18
Phthalates (ppb, dry wt)						
total phthalate esters	220/200	1700	510/300	1300	370	11-13

[a] See Appendix C-1 for PCDD and PCDF congener identifications.

Continued...

Table 4 (continued). Bulk Sediment Chemistry Summary: Humboldt Bay Baseline Survey III (FY1995): Composites only; for individual sample results, see Appendix C.

Analyte		Sampling Sections SAMTB	EKUP	EKEX	FLTB	Ref.	Detection Limit
Grain Size (% dry)							
Coarse Sand/Gravel (Φ < -1)		1.1	0.2	0.0	0.0	0.0	-
Sand (-1 ≤ Φ ≤ 4)		78.24	34.90	15.94	16.90	4.26	-
Silt (5 ≤ Φ ≤ 8)		12.7	43.94	54.64	54.29	74.57	-
Clay (Φ ≥ 9)		7.93	20.93	29.41	28.8	21.16	-
Sediment Conventionals							
Total sulfides (ppm, dry)		79	170	300	160	1.3	0.1
Water soluble sulfides (ppm, dry)		ND	0.3	ND	ND	ND	0.1
Oil & Grease[a] (ppm, dry)		ND	23	80	27	ND	20
Petroleum Hydrocarbons (ppm, dry)		ND	ND	46	ND	ND	20
Total Volatile Solids (%)		2.0	4.0	4.3	3.7	3.9	0.1
% Solids (%)		71	63	59	57	62	1.0
TOC (%)		0.54	0.67	0.66	0.62	0.72	0.1
Metals (ppm, dry wt)							
Arsenic		3.7	4.0	4.7	4.9	5.2	0.1
Cadmium		0.2	0.1	0.2	0.2	0.1	0.1
Chromium		120	130	130	120	120	0.1
Copper		11	27	30	25	28	0.1
Lead		4.9	15	11	8.6	10	0.1
Mercury		0.096	0.10	0.13	0.10	0.12	0.02
Nickel		86	120	130	120	130	0.1
Selenium		0.1	0.2	0.2	0.2	0.2	0.1
Silver		1.4	1.4	1.6	1.3	1.7	0.1
Zinc		44	81	94	56	69	0.1
Organotins (ppb, dry weight)							
Monobutyltin		ND	ND	ND	ND	ND	1.0
Dibutyltin		ND	2	2	ND	ND	1.0
Tributyltin		ND	ND	10	ND	ND	1.0
SP Bioassay Interstitial Water							
Salinity (‰):	Initial	25	23.4	28.6	30.3	32.0	--
	Day 0	33	31	33	32	32	--
	Day 10	32	32	32	32	32	--
pH:	Initial	8.1	7.5	8.0	7.4	7.3	--
	Day 0	7.8	7.1	7.2	7.3	7.5	--
	Day 10	7.6	7.0	7.1	7.2	7.4	--
Total NH_3 (ppm):	Initial	8.9	35.8	59.6	18.7	4.9	--
	Day 0	6.1	14.5	21.5[b]	11.6	3.7	--
	Day 10	3.3	2.1	5.2	7.3	1.7	--
SPP Bioassay Elutriate Water							
Total NH_3 (ppm):		2.1	11.5	15.8	5.9	1.8	--

[a] Freon®-extractable
[b] Remeasured after Day 0 renewal; Total NH_3 = 9.9 mg/L.
ND = None Detected

Table 5. Summary of bivalve larvae (*M. edulis*) suspended particulate phase bioassays for Humboldt Bay Baseline Survey III, FY1995 Maintenance dredging project. See text for explanation of calculations (Mean initial recovery = 5319).

Sample ID	Rep	Number Normal	Number Abnormal	Total Recovered per 1 Ml	Resuspended Volume	Total # Normal Larvae Recovered	% Survival	Mean % Survival ± S.D.	% Normal Develop-ment	Mean % Normal Development ± S.D.	Survival Abbotts Corrected Value	Survival Mean Corrected Value	Normal Development Abbotts Corrected Value	Normal Development Mean Corrected Value
	1	95	7	102	48	4560	85.7		93.1					
	2	109	10	119	47	5123	96.3	94.6	91.6	94.6				
CONTROL	3	104	2	106	48	4992	93.8	±	98.1	±				
	4	92	5	97	47.5	4370	82.2	2.45	94.8	2.45				
	5	100	5	105	47.5	4750	89.3		95.2					
	1	95	5	100	48	4560	85.7		95.0		90.6		100.4	
	2	89	8	97	46	4094	77.0	80.9	91.8	91.9	81.4	85.6	97.0	97.1
REF.	3	89	8	97	46.5	4139	77.8	±	91.8	±	82.3	±	97.0	±
	4	94	7	101	49	4606	86.6	4.79	93.1	2.65	91.5	5.06	98.4	2.81
	5	86	12	98	48	4128	77.6		87.8		82.0		92.8	
	1	21	91	112	47.5	998	18.8		18.8		19.8		19.8	
SAMTB	2	2	95	97	46	92	1.7	6.4	2.1	7.0	1.8	6.8	2.2	7.4
100%	3	13	80	93	48	624	11.7	±	14.0	±	12.4	±	14.8	±
	4	0	94	94	48	0	0.0	8.44	0.0	8.79	0.0	8.92	0.0	9.29
	5	0	108	108	46	0	0.0		0.0		0.0		0.0	
	1	0	81	81	47	0	0.0		0.0		0.0		0.0	
SAMTB	2	0	93	93	48	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50%	3	0	95	95	46	0	0.0	±	0.0	±	0.0	±	0.0	±
	4	0	70	70	47	0	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
	5	0	105	105	46	0	0.0		0.0		0.0		0.0	
	1	85	16	101	46.5	3953	74.3		84.2		78.6		89.0	
SAMTB	2	109	10	119	47	5123	96.3	73.4	91.6	77.7	101.8	77.6	96.8	82.1
10%	3	94	11	105	48	4512	84.8	±	89.5	±	89.7	±	94.6	±
	4	35	74	109	46	1610	30.3	25.39	32.1	25.65	32.0	26.85	33.9	27.12
	5	92	9	101	47	4324	81.3		91.1		85.9		96.3	
	1	0	118	118	47	0	0.0		0.0		0.0		0.0	
EKUP	2	0	94	94	49	0	0.0	0.2	0.0	0.2	0.0	0.2	0.0	0.3
100%	3	0	105	105	46	0	0.0	±	0.0	±	0.0	±	0.0	±
	4	0	117	117	48	0	0.0	0.40	0.0	0.53	0.0	0.43	0.0	0.56
	5	1	83	84	48	48	0.9		1.2		1.0		1.3	

Table 5, continued. Summary of bivalve larvae (*M. edulis*) suspended particulate phase bioassays for Humboldt Bay Baseline Survey III, FY1995 Maintenance dredging project. See text for explanation of calculations (Mean initial recovery = 5319).

Sample ID	Rep	Number Normal	Number Abnormal	Total Recovered per 1 mL	Resuspended Volume	Total # Normal Larvae Recovered	% Survival	Mean % Survival ± S.D.	% Normal Develop-ment	Mean % Normal Development ± S.D.	Survival Abbotts Corrected Value	Survival Mean Corrected Value	Normal Development Abbotts Corrected Value	Normal Development Mean Corrected Value
	1	64	35	99	47	3008	56.6		64.6		59.8		68.3	
EKUP	2	97	41	138	45.5	4414	83.0	47.1	70.3	47.6	87.7	49.8	74.3	50.3
50%	3	79	34	113	47.5	3753	70.5	±	69.9	±	74.6	±	73.9	±
	4	28	57	85	48	1344	25.3	33.99	32.9	30.76	26.7	35.93	34.8	32.52
	5	0	103	103	47	0	0.0		0.0		0.0		0.0	
	1	50	30	80	46.5	2325	43.7		62.5		46.2		66.1	
EKUP	2	79	38	117	46.5	3674	69.1	30.1	67.5	33.6	73.0	31.8	71.4	35.5
10%	3	33	74	107	48	1584	29.8	±	30.8	±	31.5	±	32.6	±
	4	0	109	109	47	0	0.0	27.86	0.0	30.95	0.0	29.45	0.0	32.72
	5	9	120	129	46.5	419	7.9		7.0		8.3		7.4	
	1	0	104	104	47.5	0	0.0		0.0		0.0		0.0	
EKEX	2	0	104	104	47	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100%	3	0	99	99	48.5	0	0.0	±	0.0	±	0.0	±	0.0	±
	4	0	99	99	47	0	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
	5	0	94	94	48	0	0.0		0.0		0.0		0.0	
	1	0	95	95	48.5	0	0.0		0.0		0.0		0.0	
EKEX	2	0	87	87	48	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50%	3	0	96	96	48	0	0.0	±	0.0	±	0.0	±	0.0	±
	4	0	89	89	47.5	0	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
	5	0	105	105	46	0	0.0		0.0		0.0		0.0	
	1	7	82	89	47	329	6.2		7.9		6.5		8.3	
EKEX	2	26	86	112	48	1248	23.5	11.5	23.2	13.0	24.8	12.2	24.5	13.8
10%	3	24	69	93	48	1152	21.7	±	25.8	±	22.9	±	27.3	±
	4	6	75	81	49	294	5.5	10.28	7.4	10.87	5.8	10.87	7.8	11.49
	5	1	110	111	47	47	0.9		0.9		0.9		1.0	
	1	70	29	99	48	3360	63.2		70.7		66.8		74.8	
FLTB	2	58	22	80	50	2900	54.5	68.1	72.5	73.9	57.6	72.0	76.6	78.2
100%	3	78	21	99	49.5	3861	72.6	±	78.8	±	76.7	±	83.3	±
	4	81	36	117	46	3726	70.0	9.80	69.2	4.43	74.1	10.36	73.2	4.68
	5	91	25	116	47	4277	80.4		78.4		85.0		82.9	

For sample SAMTB: LC_{50} = 17.26% (10.89%, 24.90%); EC_{50} = 18.55% (12.10%, 26.50%)
For sample EKUP: LC_{50} = 9.81% (4.66%, 19.47%); EC_{50} = 9.85% (4.62%, 19.96%)
For sample EKEX: LC_{50} = Not calculable; EC_{50} = Not Calculable

Table 6. Mysid SPP Bioassays, Humboldt Bay Baseline Survey III (FY 1995).

Holmesimysis costata
Suspended Particulate Phase Bioassay Results
Humboldt Harbor Sediments

NUMBER OF SURVIVORS (Start n = 10)						
Rep #	Control	REF	SAMTB	EKUP	EKEX	FLTB
1	10	10	10	5	0	7
2	10	10	10	5	0	7
3	10	8	10	8	0	5
4	10	8	10	3	0	4
5	10	8	9	5	0	8
Mean	10.0	8.8	9.8	5.2	0.0	6.2
SD	0.0	1.10	0.447	1.79	0.00	1.64
Mean % Survival	100	88.0	98.0	52.0	0.0	62.0

1. Data **PASS** SHAPIRO-WILKS TEST for normality at P=0.01:

   W=0.947 D = 29.20 Critical $W_{(25,\ 0.01)}$ = 0.888

2. Data **FAIL** BARTLETT'S TEST for homogeneity of variance at α=0.01: At least one group has zero variance.

3. Steel's Many-One Rank test shows **EKUP, EKEX, and FLTB** with significantly diminished survival compared to disposal site reference:

	SAMTB	EKUP	EKEX	FLTB
Rank Sum:	34.0	16.5	15.0	16.5

Critical value = 17 (0.05, k=4)

Table 7. Sanddab SPP bioassays, Humboldt Bay Baseline Survey III (FY 1995).

Citharichthys stigmaeus
Suspended Particulate Phase Bioassay Results (100% only)
Humboldt Harbor Sediments

	NUMBER OF SURVIVORS (Start n = 10)					
Rep #	Control	REF	SAMTB	EKUP	EKEX	FLTB
1	9	8	10	9	0	1
2	9	10	9	8	0	1
3	9	7	10	9	0	0
4	9	10	10	9	0	6
5	10	9	9	8	0	0
Mean	9.2	8.8	9.6	8.6	0.0	1.6
SD	0.45	1.30	0.55	0.55	0	2.51
Mean % Survival	92	88	96	86	0	16

1. Data **FAIL** SHAPIRO-WILKS TEST for normality at P=0.01:

   W= 0.813 D = 34.4000 Critical $W_{(30, 0.01)}$ = 0.888

2. Data **FAIL** BARTLETT'S TEST for homogeneity of variance at α=0.01: At least one group has zero variance.

3. Steel's Many-One Rank test shows **EKEX and FLTB** as significantly different from the disposal site reference composite.

	SAMTB	EKUP	EKEX	FLTB
Rank Sum:	32.0	25.5	15.0	15.0

Critical value = 17 (0.05, k=4)

Table 8. EC/LC_{50} values for SPP bioassays, Humboldt Bay Baseline Survey III, FY 1995.

	Bivalve		Mysid	Sanddab
Sample	EC_{50}	LC_{50}	LC_{50}	LC_{50}
Control	>100	>100	>100	>100
Reference	>100	>100	>100	>100
SAMTB	18.6	17.3	>100	>100
EKUP	9.8	9.8	>100	>100
EKEX	<10.0	5.1	51.2	61.6
FLTB	>100	>100	>100	65.6

Table 9. Amphipod SP static bioassays, Humboldt Bay Baseline Survey III (FY 1995). Home A and composites EKUP and EKEX (**bold** typeface) were ammonia-purged (daily renewals) as per EPA/ACOE memo of 21 December 1993.

Rhepoxynius abronius
Solid Phase Static Bioassay Results
Humboldt Harbor Sediments

NUMBER OF SURVIVORS
(Start n = 20)

Rep #	**Home A**	Home B	REF	SAMTB	**EKUP**	**EKEX**	FLTB
1	19	19	14	17	19	15	19
2	20	20	12	19	17	14	18
3	20	20	13	16	11	16	18
4	20	20	14	19	14	19	17
5	19	20	12	18	10	11	17
Mean	19.6	19.8	13.0	17.8	14.2	15.0	17.8
SD	0.55	0.45	1.00	1.30	3.83	2.92	0.84
Mean % Survival	98.0	99.0	65.0	89.0	71.0	75.0	89.0
Mean % Reburial	100	100	98.5	96.5	93.5	97.4	92.0

Statistical analyses unnecessary: mean survival in harbor composites exceeded survival in reference.

Table 10. Mysid SP flow-through bioassays, Humboldt Bay Baseline Survey III (FY 1995).

Holmesimysis costata
Solid Phase Flow-Through Bioassay Results
Humboldt Harbor Sediments

NUMBER OF SURVIVORS (Start n = 20)						
Rep #	Home	REF	SAMTB	EKUP	EKEX	FLTB
1	18	18	20	17	20	19
2	20	18	19	18	20	19
3	20	19	19	19	20	19
4	18	19	20	19	20	19
5	20	19	20	19	20	20
Mean	19.2	18.6	19.6	18.4	20	19.2
SD	1.10	0.55	0.55	0.89	0	0.45
Mean % Survival	96	93	98	92	100	96

1. Data **PASS** SHAPIRO-WILKS TEST for normality at P=0.01:

   W = 0.931 D = 6.400 Critical $W_{(25,\ 0.01)}$ = 0.888

2. Data **FAIL** BARTLETT'S TEST for homogeneity of variance at α=0.01:

3. ANOVA test shows **NO significant difference** among sample means and disposal site reference:

4. STEEL'S MANY-ONE RANK TEST (Mean Comparison Test) shows **NO Humboldt Harbor sample composite with lower survival** than the Humboldt reference composite at P = 0.05:

	SAMTB	EKUP	EKEX	FLTB
Rank Sum:	37.0	26.5	40.0	34.0

Critical value = 17 (0.05, k=4)

Table 11. Polychaete worm SP flow-through bioassays, Humboldt Bay Baseline Survey III (FY 1995).

Nephtys caecoides
Solid Phase Flow-Through Bioassay Results
Humboldt Harbor Sediments

	NUMBER OF SURVIVORS (Start n = 20)					
Rep #	Home	REF	SAMTB	EKUP	EKEX	FLTB
1	18	18	19	18	20	18
2	18	16	18	17	18	19
3	19	17	18	18	19	20
4	20	17	18	20	19	18
5	20	16	17	19	19	19
Mean	19.0	16.8	18.0	18.4	19.0	18.8
SD	1.00	0.84	0.71	1.14	0.71	0.84
Mean % Survival	95	84	90	92	95	94

Statistical analyses unnecessary: mean survival in harbor composites exceeded survival in reference.

FIGURES

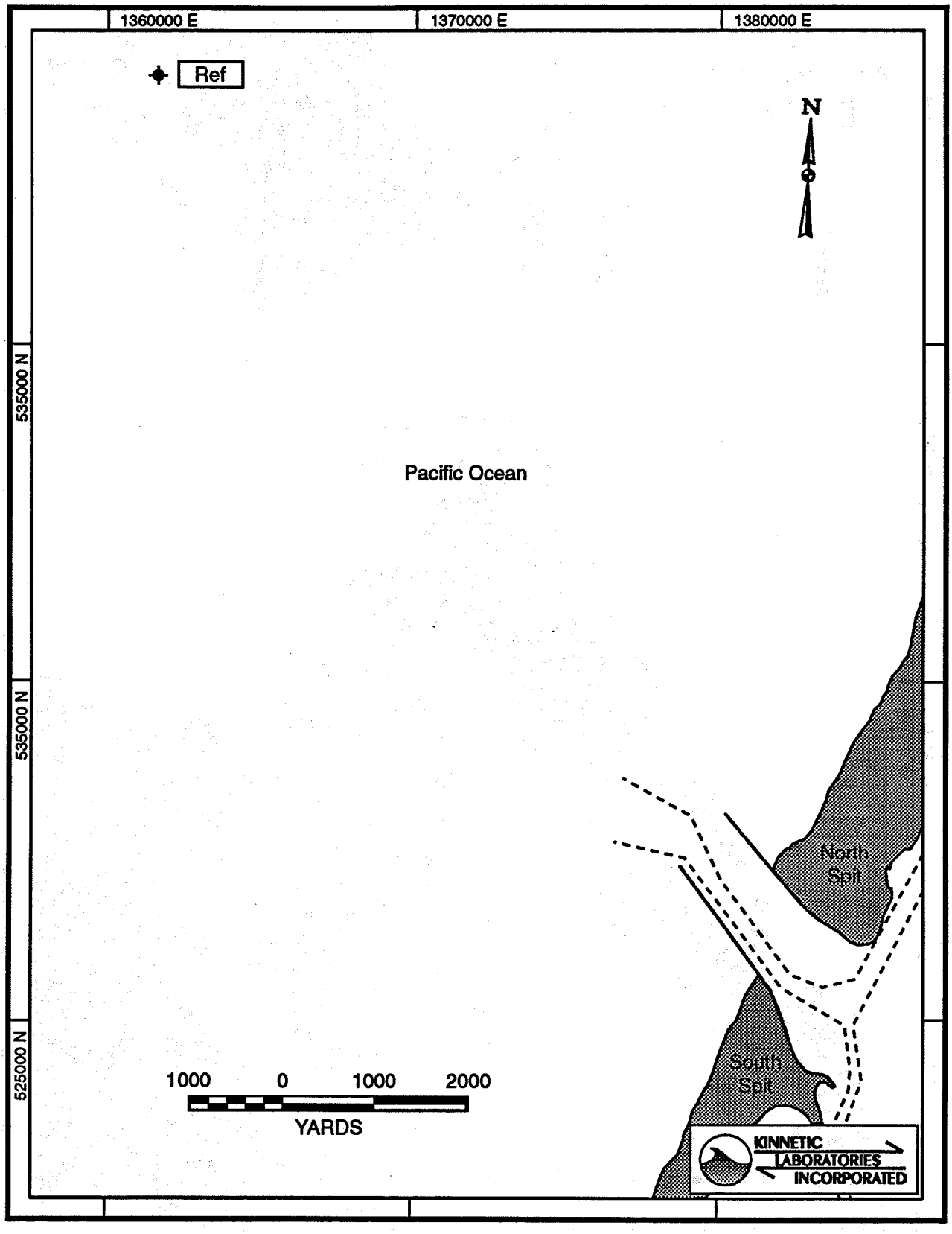

Figure 1. Humboldt Bay FY 1995 sampling locations. Reference station (solid) composite of eight grab samples.

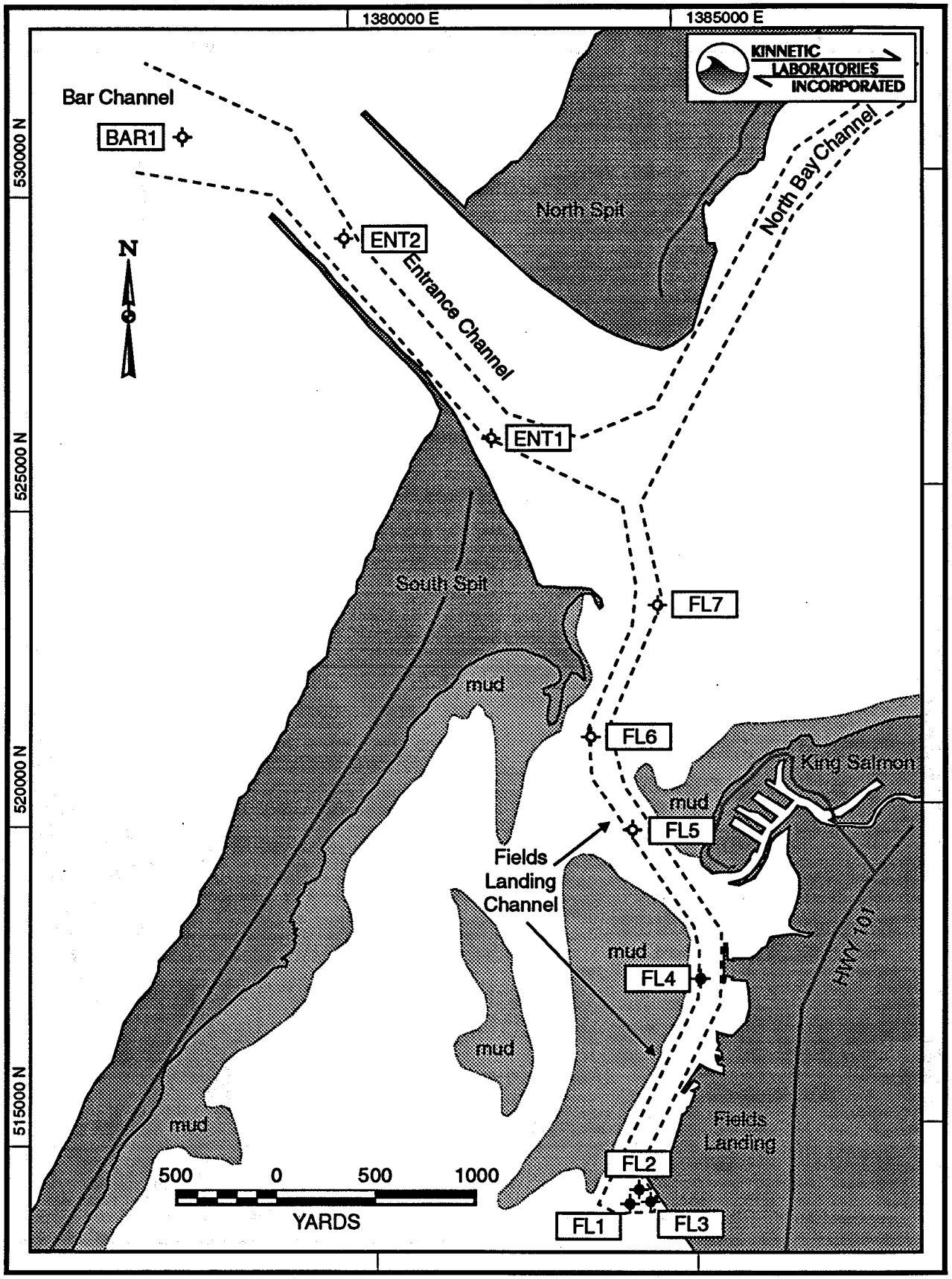

Figure 2. Humboldt Bay FY1995 sampling locations. Stations FL1 through FL8, ENT1, ENT2, and BAR1. Solid stations indicate those used in Fields Landing Lower Channel and Turning Basin (FLTB) composite.

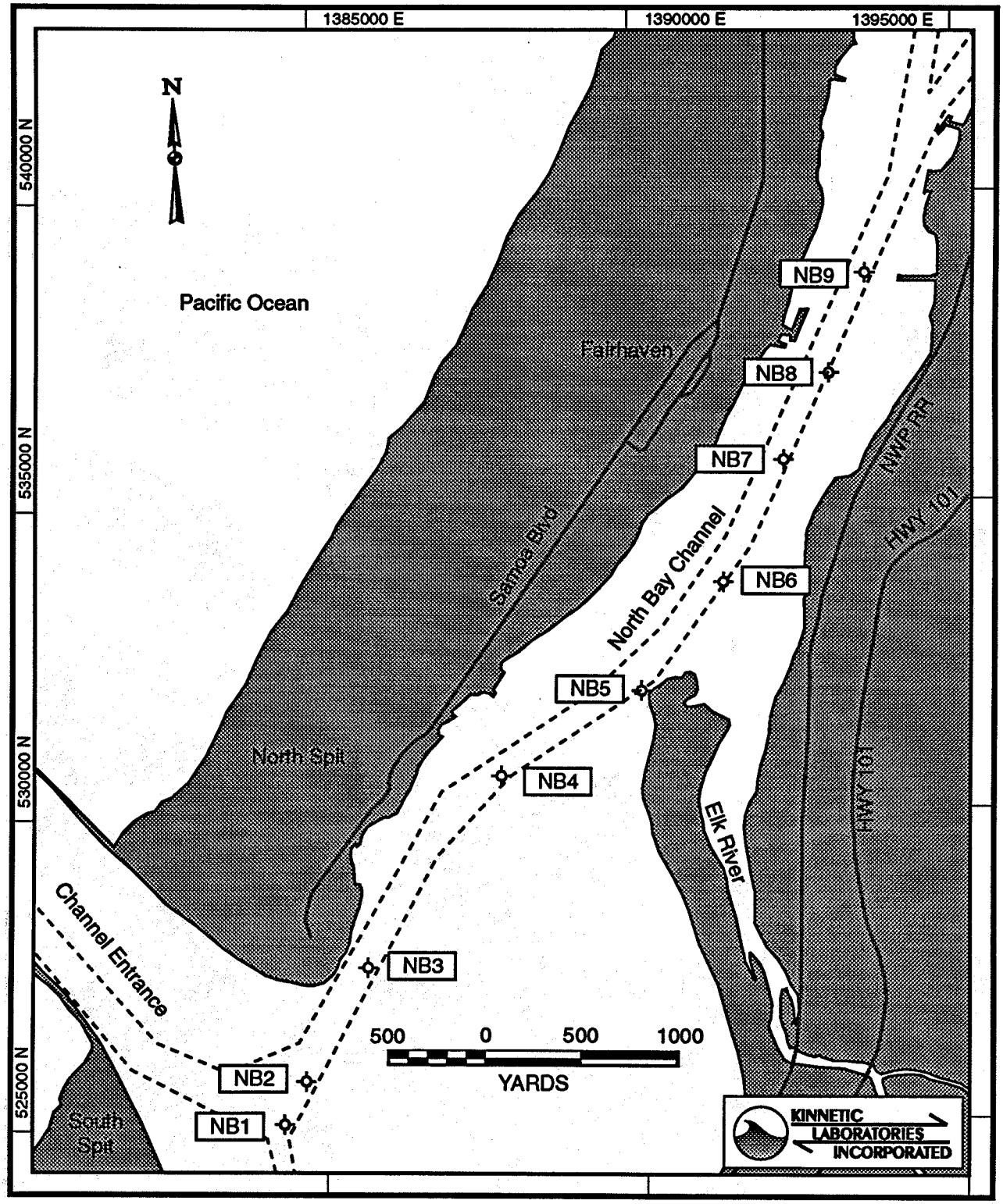

Figure 3. Humboldt Bay FY1995 sampling locations. Stations NB1 through NB9.

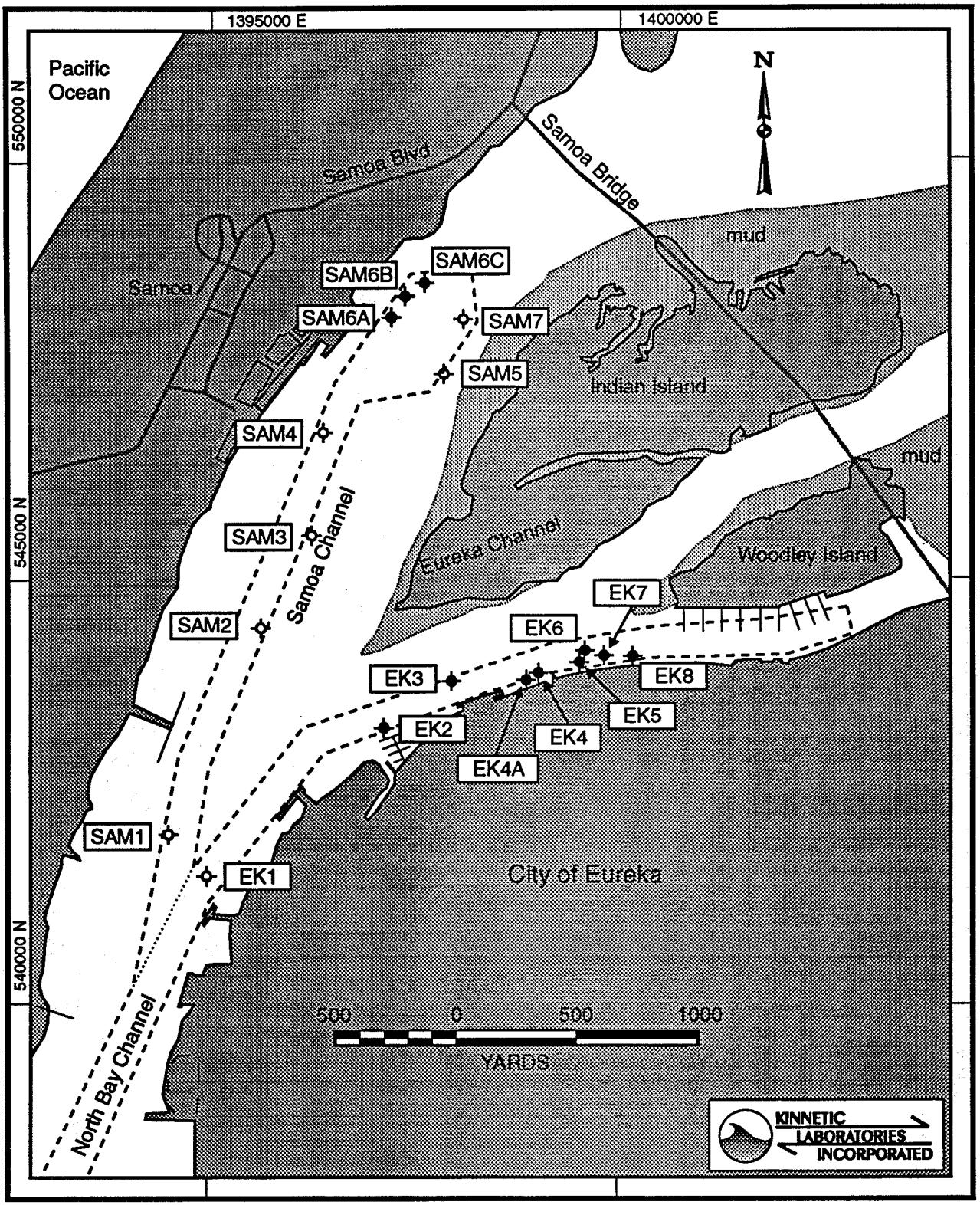

Figure 4. Humboldt Bay FY 1995 sampling locations. Stations EK1 through EK8 and SAM1 through SAM7. Solid stations indicate those used in Eureka Upper Channel (EK2 through EK4 = EKUP), Eureka Upper Channel Extension (EK5 through EK8 = EKEX), and Samoa Turning Basin (SAMTB) composites.

APPENDICES

Appendix A

Scope of Services

Scope of Services
Sediment Chemical, Bioassay and Bioaccumulation Testing
Humboldt Harbor FY 95 Maintenance Dredging
March 29, 1995

1. PURPOSE. The purpose of this contract is to perform bulk sediment analyses, suspended particulate bioassays, solid phase bioassays, and bioaccumulation testing of sediments collected from Humboldt Harbor and Bay. This testing episode is the third and final year of a three year baseline survey by the Corps to determine background levels of contaminants of concern in Humboldt Harbor dredged material. The results of the baseline survey will assist the Corps and EPA in determining (1) whether dredged material from Humboldt Harbor and Bay federal channels is suitable for aquatic disposal in compliance with Section 103 of the Marine Protection Research and Sanctuaries Act; and (2) what future testing requirements will be required to monitor dredged material disposal operations.

2. THE CONTRACTOR'S RESPONSIBILITY. The Contractor shall furnish all necessary labor, facilities, equipment, and materials to perform the work described under this contract. The Contractor's representative shall be available to meet with Government personnel as requested by the USACE San Francisco District. The Contractor shall perform the services in accordance with this statement of work and the general provisions. Any modifications in equipment and/or methodology from those outlined in this Scope of Services must be approved by the San Francisco District (SFD). In order to adhere to the project schedule, all requests for modification or variations in equipment or procedures shall be forwarded to the SFD at the earliest date/time to ensure a timely review. The Contractor shall comply with all pertinent provisions of the U.S. Army Corps of Engineers Safety and Health Requirements Manual EM-385-1-1, date October 1984. The Contractor shall provide transportation and access from shore to the sampling vessel to a representative of the U.S. Army Corps of Engineers who may be present during sampling.

SEDIMENT SAMPLING LOCATIONS

a. Samoa, Eureka, Fields Landing, North Bay, Bar and Entrance Channels. Sediment samples shall be taken at those sites listed in Table 1 (shown in Figure 1). A total of three composites shall be made according to the compositing scheme in Table 2.

b. A sufficient amount of sediment shall be collected from each location specified in Table 1, so that a representative amount of sediment is included from each sampling location in each composite, and that there is sufficient composited sediment to run the initial suite of sediment chemistry, bioassays and bioaccumulation and also one additional sediment chemistry, suspended particulate phase, and solid phase toxicity bioassay on each composite should a re-test be necessary. Sufficient individual sediment from each sediment location within a composite area shall be taken to conduct individual sediment chemistry analyses.

c. All of the samples shall have their containers physically marked as to area, sample location, and purpose of sampling. The Contractor shall furnish SFD an inventory of all samples taken and delivered, and their respective labels.

d. Sediment samples shall be placed in appropriate containers and stored following methodologies described in the manual. Care shall be taken to ensure that the containers are completely filled by the samples and that air bubbles are not trapped in the containers. All samples shall be stored immediately at 4°C and not frozen or dried. The Contractor shall provide the ice and ice chests or chest freezers to be used in the field to maintain samples at 4 C. These samples shall be stored at 4 C until testing initiated.

e. That portion of each individual sediment sample remaining after analyses shall be archived at 4°C. for possible additional chemical analyses until completion of the work and acceptance of the final report. Disposal of all sediments remaining at the end of testing shall be the Contractor's responsibility.

f. The Contractor shall provide the mudline elevations at each sample gathering location in reference to mean lower low water.

g. The Contractor shall maintain a daily field activity log listing the beginning and ending time for every and all phases of operation.

h. Formal chain-of-custody procedures shall be followed and documented.

4. SEDIMENT SAMPLING EQUIPMENT

a. Sediments in the Samoa, Eureka, Fields Landing, and North Bay channels shall be sampled with vibracore equipment. Each of the sampling locations within Humboldt Bay and Harbor sampled by vibracore shall be sampled from mudline to project depths (MLLW) listed on Table 1. Material below the required depths listed on Table 1 shall not be used for testing. Where there is less than a foot of sediment at the sampling location or attempts to sample with the Vibracore equipment has failed, sediment samples at that location shall be obtained with either a Van Veen Grab sampler or a pipe dredge sampler. Samples from the Bar and Entrance channels, reference site, and control site shall be sampled using either a Van Veen Grab Sampler or equivalent, or a pipe dredge.

b. A fathometer shall be used to ensure vertical control of sampling. Horizontal positioning equipment with an accuracy of ten (10) feet is required to locate sampling points within the harbor. An accuracy of fifty (50) feet is required to locate the sampling site of the reference area.

c. Each individual sediment core sample taken in the Humboldt channels shall be taken within an area bounded by a 50-foot radius having its center located at the coordinates provided above or as approved by the government representative. In the event that there is insufficient sediment to sample between mudline elevation and the sampling depth listed above, with either the vibracore or grab sampler, the contractor shall locate as close as possible to the original sampling site, a new sampling location (inside the channel lines) which will provide sufficient sediment for sampling.

d. Care shall be taken during sampling to avoid contamination of sediment. All coring devices, if possible, shall be composed of or lined with a noncontaminating material such as cellulose buterate or lexan. If this is not possible, the Contractor must document what steps will be taken to prevent contamination of sediments during sampling as well as during storage prior to initiation of testing. Any samples indicating external contamination due to handling shall require resampling at no additional cost to the SFD.

5. SEDIMENT CHEMICAL, PHYSICAL AND GEOLOGICAL CHARACTERIZATION.

a. Grain size analyses shall be completed for all individual sediment samples taken in each of the Humboldt Harbor and Bay channels. Individual sediment samples taken in the Bar, Entrance, and North Bay channels, which are found to not be predominantly sand (if <80% retained on #200 sieve), and are not included in a compositing area, shall be analyzed for the parameters specified in Table 3. All composited sediments from Humboldt Harbor channels, the reference site, and the control, and all individual sediments sampled within the Fields landing, Samoa, and Eureka channels, shall be analyzed for the parameters specified in Table 3. In addition, for each composited sediment, Dioxin/Furan analyses shall be conducted. The required detection limits are also given in Table 3. The results shall be reported in dry weight.

b. All analyses must be conducted using EPA approved methodologies that are suitable for marine sediments and which yield the required detection limits with good precision and accuracy. Appropriate clean-up procedures shall be employed that remove as much of the interfering material as possible from the sample without compromising the integrity of the sample or increasing the detection limits.

c. The presence of major "unknown" analytes on gas chromatograms or reconstructed ion chromatography (GC/MS) should be noted.

d. Grain size analysis and hydrometer readings shall be performed in accordance with the grain size procedure found in "Procedures for Handling and Chemical Analysis of Sediment and Water Samples, U.S. Army Corps of Engineers Technical Committee on Criteria for Dredged and Fill Material (Plumb 1981)".

TABLE 1. Humboldt Sampling Locations

CHANNEL	SAMPLE	EASTING	NORTHING	Estimated depth to mudline (MLLW)	Sample Depth of (MLLW)	Sample to maximum Depth of (MLLW)
North Bay						
	NB1	1,384,200	525,070	35.0	37	2.0
	NB2	1,384,640	525,740	33.5	37	3.5
	NB3	1,385,810	527,580	32.0	37	5.0
	NB4	1,387,800	530,600	38.0	37	Grab
	NB5	1,390,000	531,950	29.5	37	7.5
	NB6	1,391,365	533,710	37.5	37	Grab
	NB7	1,392,300	535,690	37.0	37	Grab
	NB8	1,393,100	537,165	36.0	37	Grab
	NB9	1,393,630	538,680	35.5	37	Grab
SAMOA						
	SAM1	1,394,550	542,000	34.0	37	3.0
	SAM2	1,35,600	544,510	34.5	37	2.5
	SAM3	1,396,210	545,550	34.0	37	3.0
	SAM4	1,396,390	546,800	36.0	37	Grab
	SAM5	1,397,700	547,340	32.0	37	5.0
	SAM6-A	1,397,210	548,120	34.2	37	2.8
	SAM6-B	1,397,400	548,370	32.9	37	4.1
	SAM6-c	1,397,400	548,370	32.8	37	4.2
	SAM7	1,398,120	548,000	33.5	37	3.5
EUREKA						
	EK1	1,394,910	541,500	33.9	37	3.1
	EK2	1,397,080	543,120	24.6	28	3.4
	EK3	1,397,900	543,800	22.6	28	3.4
	EK4	1,398,985	543,790	21.0	28	7.0
	EK5	1,399,500	543,920	18.0	28	10.0
	EK6	1,399,500	544,030	20.0	28	8.0
	EK7	1,399,770	544,000	15.0	28	10.0
	EK8	1,400,100	544,100	13.5	28	10.0

CHANNEL	SAMPLE	EASTING	NORTHING	Estimated depth to mudline (MLLW)	Sample Depth of (MLLW)	Sample to maximum Depth of (MLLW)
FIELDS LANDING						
	FL1	1,384,000	513,800	23.0	28	5.0
	FL2	1,384,130	514,070	26.0	28	2.0
	FL3	1,384,240	513,810	24.5	28	3.5
	FL4	1,385,100	517,305	27.0	28	Grab
	FL5	1,384,130	519,650	23.5	28	4.5
	FL6	1,383,510	521,140	22.0	28	6.0
	FL7	1,384,500	523,300	30.0	28	Grab
ENTRANCE	ENT1	1,382,040	526,110	Grab		45
	ENT2	1,379,860	529,240	Grab		45
BAR	BAR1	1,377,490	531,010	GRAB		45
Reference site	RF	124°18'34"	40°49'41"	GRAB OR PIPE DREDGE		165-165' or 26.5-27.0 fathoms
Control Site	Tomales Bay	172o57'40"	38°13'50"			

Table 2. Silt/Clay Material Compositing Plan for Toxicity and Bioaccumulation Evaluations

Composite	SAMPLE
EKUP	EK2
EKUP	EK3
EKUP	EK4
EKEX	EK5
EKEX	EK6
EKEX	EK7
EKEX	EK8
SAM	SAM6-A
SAM	SAM6-B
SAM	SAM6-C
FLTB	FL1
FLTB	FL2
FLTB	FL3
Ref	Reference

* Only placed in composte if >80% passes through #200 sieve

Table 3 Designation of Parameters for Analysis and Detection Limits

Parameters

	Sediment (mg/kg dry wt)[a]	Tissue (mg/kg wet wt)[g]
Conventionals		
TOC	0.1%	NA
Oil and Grease	20	NA
TPH	20	NA
Grain Size	NA	NA
Total Solids	0.1%	NA
Total Volatile Solids	0.1%	NA
Total and Water Soluble Sulfides	0.1	NA
Metals		
Ag	0.1	0.1
As	0.1	0.1
Cd	0.1	0.1
Cr	0.1	1.0
Cu	0.1	4.0
Hg	0.02	0.02
Ni	0.1	1.0
Pb	0.1	1.0
Se	0.1	1.0
Zn	1.0	35.0
Organic Compounds		
Phthalate esters	0.01	0.02
Butyltins[b]	0.001	0.001
PCBs[c]	0.02	0.02
Pesticides-[e]		
Aldrin	0.002	0.002
Alpha-BHC	0.002	0.002
Beta-BHC	0.002	0.002
Delta-BHC	0.002	0.002
Gamma-BHC	0.002	0.002
Alpha-Chlordane	0.002	0.002
Gamma-Chlordane	0.002	0.002
4.4'-DDD	0.002	0.002
4.4'-DDE	0.002	0.002
4.4'-DDT	0.002	0.002
Dieldrin	0.002	0.002
Endosulfan I	0.002	0.002
Endosulfan II	0.002	0.002
Endosulfan Sulfate	0.01	0.002
Endrine	0.002	0.002
Heptochlor	0.002	0.002
Heptochlor Epoxide	0.01	0.01
Toxaphene	0.03	0.03
TCDD/TCDF-Full Screen[f]	0.5-1 (part per trillion)	0.2-0.1 (ppt)

Table 3 Designation of Parameters for Analysis and Detection Limits

Parameters

	Sediment (mg/kg dry wt)[a]	Tissue (mg/kg wet wt)[g]
PAHs[d]		
NAPHTHALENE	0.02	0.02
ACENAPHTHYLENE	0.02	0.02
ACENAPHTHENE	0.02	0.02
FLUORENE	0.02	0.02
PHENANTHRENE	0.02	0.02
ANTHRACENE	0.02	0.02
FLUORANTHENE	0.02	0.02
PYRENE	0.02	0.02
CHRYSENE	0.02	0.02
BENZO(A)ANTHRACENE	0.02	0.02
BENZO(B)FLUORANTHENE	0.02	0.02
BENZO(K)FLUORANTHENE	0.02	0.02
BENZO(A)PYRENE	0.02	0.02
INDENO(1,2,3-CD)PYRENE	0.02	0.02
DIBENZ(A,H)ANTHRACENE	0.02	0.02
BENZO(GHI)PERYLENE	0.02	0.02

(a) Report as mg/kg dry wt., unless otherwise noted.
(b) Mono-, Di-, and Tributyltin.
(c) Reported as Aroclor equivalents 1242, 1248, 1254, and 1260 and total PCB.
(d) All compounds on EPA Method 610 list.
(e) All compounds on EPA Method 608 list.
(f) Full screen- 17 isomers, use EPA method 8290 and report TEQ for each sample.
(g) Although detection limit is in wet wt., report as dry wt.

Note: Throughout the following discussions on bioassays the term Manual refers to the Evaluation of Dredged Material for Ocean Disposal, Testing Manual (EPA-503/8-91/001, February 1991) developed by the EPA Office of Marine and Estuarine Protection and U. S. Army Corps of Engineers, available through the Corps of Engineers' Waterways Experiment Station, Telephone (601)634-2571.

6. SUSPENDED PARTICULATE PHASE BIOASSAYS.

a. Sediment and Water Collection. The Contractor shall collect and preserve all sediment samples as described in sections 3 and 4 above and in the Manual. Water shall be clean, uncontaminated seawater of appropriate salinity, pH and temperature. Sufficient water shall be collected to perform the required tests. Seawater from any suitable location may be used provided it does not exceed applicable EPA quality criteria for marine waters and is of constant quality. Contractors shall be able to provide evidence that water meets these criteria, if necessary. Testing shall be conducted on the composited samples as specified in sections 3 and 4 above.

b. Preparation of the Bioassay Phase.

(1) Suspended Particulate Phase Bioassay. Phase preparation shall follow the procedure in the Manual for the suspended phase.

(2) Water Samples. Preparation of water samples shall follow the Manual.

(3) Sediment Sample. Composited sediment samples from Humboldt Bay and Harbor shall be prepared according to the manual. In addition to the treatment composites, there shall be the control water, reference water, and reference sediments. The control and reference water may be the same if the animals are being held before testing in the same water to be used for the bioassays.

c. Collection and Maintenance of Test Species.

(1) Species Selection. Three species shall be used: (1) Larvae of (pacific oyster) *Crassostraea gigas* or (bay mussel) Mytilus edulis (% normal development to D stage) (2) (mysid shrimp) *Holmesimysis sculpta*, and (3) (juvenile sanddab) *Citharicthys stigmaeus*.

(2) Organism Handling and Holding. Organisms shall be held no longer than two weeks. The SFD must approve additional holding time. Experiments shall be designed and performed so that organisms are handled as minimally as possible. Procedures for handling are found in the Manual. The physiological and biological needs of the test organisms must be met at all times.

d. Bioassay Testing of the Suspended Phase. Five replications of each treatment (including control) shall be performed. If greater than 10% of the control dies during any test, that test must be repeated at no additional expense to the SFD. However, control mortalities of 30% are acceptable in zooplankton bioassays. Conditions and procedures shall follow those found in the Manual, unless otherwise noted.

e. Deviations From the Manual. If there is an odor of hydrogen sulfide, the water shall be aerated until the odor of hydrogen sulfide is no longer detected. The Contractor shall measure NH_3 in the test containers. If the NH_3 concentration is elevated, the water shall be aerated until the concentration is adequately reduced before introducing the test organisms.

f. Experimental Design. The design is a completely randomized design with three dilutions per dredging area per species, three reference sediments, and a control.

Suspended Particulate Treatments	As a Reference	As a Control
For each dredge area:	(1) 100% marine water	(1) 100% culture water
(1) 100% Suspended Particulate Phase	(The following use reference sediment)	Note: May be the same as reference water
(2) 50% suspended particulate phase	(2) 100% suspended particulate phase	
(3) 10% suspended particulate phase	(3) 50% suspended particulate phase	
	(4) 10% suspended particulate phase	

The test organisms and treatment shall be randomly assigned to test containers. The variable measured shall be percent survival except for the bivalve larvae test for which both survival and percent normal development are measured. The EC50 and LC50 shall both be calculated according to ASTM E724-89. Each species shall be considered a separate test. The 100% suspended particulate phase may be run first. If mortalities (or abnormal development) of 50% or less occur by 48-96 hours, the 50% and 10% dilutions need not be run. If greater than 50% mortality (or abnormal development) occurs by 48-96 hours, the test must be rerun at the Contractor's expense using the full series of dilutions (100%, 50%, 10% and control).

g. Data Analysis for Suspended Particulate Bioassays.

(1) If total survival or percent normal development in the test medium is equal to or higher than survival in the reference or control, visual inspection of the data is adequate and no statistical analyses are needed.

(2) A table or tables shall be provided for each species tested, giving the number of organisms tested, the total number of surviving organisms for each time period and each treatment, the mean, and the standard deviation.

(3) If mean percent survival or normal development in the control is greater than any of the other treatments, for the bioassays, than additional statistical analyses shall be performed.

The statistical analyses shall be as described in the Manual. Any deviations from the Manual must be approved by the Government. The results of all statistical analyses shall be presented in tabular form.

(4) If 50 percent or greater mortality or abnormal development occurs in the highest concentration of test medium, than a LC50 or EC50 must be calculated as described in the Manual.

7. SOLID PHASE BIOASSAY

a. Sediment and Water Collection. The Contractor shall collect and preserve all sediment and water samples as described in sections 3 and 4 above and in the Manual. Composited sediment samples shall be prepared and handled according to the Manual. For control sediment, the Contractor shall procure unpolluted sediment that is compatible with the test organisms and preferably from where they were collected. The control sediment must meet the needs of the organisms. The bioassays shall be conducted with a flow-through seawater system except for the test using the amphipod. Seawater of approximately 15°C, 30-32 ppt salinity should be passed through a sand filter and flow into each aquarium at a rate that will replace the aquarium volume at least once every 12 hours. The flow should be directed to achieve good mixing without disturbing the layer of sediment on the aquarium bottom. Water for all bioassays will be clean, uncontaminated seawater of appropriate salinity, pH and temperature. Seawater from any suitable location may be used provided it does not exceed applicable EPA quality criteria for marine waters and is of constant quality.

b. Collection and Maintenance of Test Species.

(1) Species Collection. It is recommended that collection of species should include at least 20% more than the minimum requirement.

(2) Species Selection. Three species shall be used: (1)(Amphipod) *Rhepoxynius abronius;* (2) (burrowing polychaete) *Nepthys caecoides*, and (3) (mysid shrimp) *Holmesimysis costata*.

(3) Organism Handling and Holding. Organisms shall be held no longer than two weeks. The SFD must approve additional holding time. Experiments shall be designed and performed so that organisms are handled as minimally as possible. Procedures for handling are found in the Manual. The physiological and biological needs of the organisms must be met at all times.

c. Solid Phase Preparation and Experimental Design. The test treatments shall consist of the dredged material samples, a reference, and a control. Five replications of each treatment shall be performed. Each replicate shall consist of at least 20 organisms of each of these species. The dredged material treatments, references, and control shall be prepared as described in the Manual. However, only whole sediments shall be used in the solid phase tests. Layering of test sediments or control sediments over reference sediments is no longer acceptable. The purpose of the control is to verify the health of test organisms and the acceptability of test conditions. It also provides for quality assurance. If the mean survival in the control is less than 90 percent, the test must be repeated at no additional

cost to the SFD. The variable measured shall be percent survival. Each species shall be considered a separate test.

d. Solid Phase Testing. Conditions and procedures for the 10-day solid phase bioassay shall follow ASTM (E 1367-90), 1991 and the Manual. In the event of a discrepancy between the ASTM and the Manual the Contractor shall contact the Corp's Contracting Officer for clarification.

(1) The following table[1] contains test condition acceptability ranges for organisms used to evaluate dredged material.

MARINE AND ESTUARINE AMPHIPOD TOXICITY TEST APPLICATION CONDITIONS*

Parameter	Rhepoxynius	Ampelisca	Eohaustorius	Leptocheirus
Temperature (°C)	15	20	15	25
Overlying Salinity (ppt)	>25	>20	2-34	2-32
Grain Size (% silt/clay)	<90	>10	full range	full range
Ammonia (total mg/L, ph 7.7)*	<30	<30	<60	<60
Ammonia (UI** mg/L, ph 7.7)*	<0.4	<0.4	<0.8	<0.8
Sulfides	***	**	**	***

A framework for deciding whether observed sediment (or elutriate) toxicity may be due to ammonia is presented in EPA/USACE (1993: Appendix F). This document should be consulted if ammonia is suspected to be a contaminant of concern.

** Unionized

*** Hydrogen Sulfide is not likely to be a problem in these tests if adequate oxygen levels are maintained in the overlying water.

(2) The contractor shall conduct measurements of interstitial ammonia, ph, and salinity on the sediments prior to the beginning and end of each bioassay test. Whenever chemical evidence of ammonia is present at toxicologically important levels prior to initiation of the test, ammonia in the interstitial water shall be reduced to below 15 mg/l before adding the benthic test organism. Ammonia levels in the interstitial water can be reduced by sufficiently aerating the sample at saturation and replacing two volumes of water per day. During the test, the contractor shall ensured that ammonia concentrations remain within the acceptable range by conducting the toxicity test with continuous flow or volume replacement not to exceed two volumes per day.

e. Data Analysis For Solid Phase Bioassay.

(1) If total survival in the test medium is equal to or higher than in the reference, visual inspection of the data is adequate and no statistical analyses are needed for that test.

(2) A table or tables shall be provided for each species tested, giving the number of organisms tested, the total number of surviving organisms for each treatment, the means, and the standard deviation.

(3) If mean percent survival in the reference is greater than any of the other treatments, for the bioassays, then additional statistical analyses shall be performed. The statistical analyses shall be as described in the Manual except that multiple t-test shall not be used. Alternative statistical methods must be approved by the SFD. The results of all statistical analyses shall be presented in tabular form.

8. BIOACCUMULATION.

a. Sediment and Water Collection. The Contractor shall collect and preserve all sediment and water samples as described in sections 3 and 4 above and in the Manual. Composited sediment samples shall be prepared and handled according to the Manual. For control sediment, the Contractor shall procure unpolluted sediment that is compatible with the test organisms and preferably from where they were collected. The control sediment must meet the needs of the organisms. The bioassays shall be conducted with a flow-through seawater system except for the test using the amphipod. Seawater of approximately 15°C, 30-32 ppt salinity should be passed through a sand filter and flow into each aquarium at a rate that will replace the aquarium volume at least once every 12 hours. The flow should be directed to achieve good mixing without disturbing the layer of sediment on the aquarium bottom. Water for all bioassays will be clean, uncontaminated seawater of appropriate salinity, pH and temperature. Seawater from any suitable location may be used provided it does not exceed applicable EPA quality criteria for marine waters and is of constant quality.

b. Collection and Maintenance of Test Species.

(1) Species Collection. It is recommended that collection of species should include at least 20% more than the minimum requirement.

(2) Species Selection. Two species shall be used: (1) Macuma nasuta and (2) Nephtys caecoides

(3) Organism Handling and Holding. Organisms shall be held no longer than two weeks. The SFD must approve additional holding time. Experiments shall be designed and performed so that organisms are handled as minimally as possible. Procedures for handling are found in the Manual. The physiological and biological needs of the organisms must be met at all times.

c. Solid Phase Preparation and Experimental Design. The test treatments shall consist of the dredged material samples, a reference, and a control. Five replications of each treatment shall be performed. Each replicate shall consist of at least 20 organisms of each of these species. The dredged material treatments, references, and control shall be prepared as described in the Manual. However, only whole sediments shall be used in the solid phase tests. Layering of test sediments or control sediments over reference sediments is no longer acceptable. The purpose of the control is to verify the health

of test organisms and the acceptability of test conditions. It also provides for quality assurance. If the mean survival in the control is less than 90 percent, the test must be repeated at no additional cost to the SFD. This data must be reported to the SFD The variable measured shall be percent survival. Each species shall be considered a separate test.

(1) Tissue Analyses.

At the end of the bioassay, surviving individuals of the bivalve are placed in separate aquaria in clean, flowing sediment-free water for sufficient time to void the digestive tracts. If the test animal requires that material be ingested to void its digestive tract, they should be purged in aquaria with clean sand. The Contractor shall provide rationale for the voiding times selected.

It is possible that tissue samples shall require analyses for some or all of the analytes specified in Table 3. It is the responsibility of the contractor to ensure that sufficient tissue is available at the end of the bioaccumulation tests to conduct the full suite of analytes in Table 3. EPA, NRWQCB, and the Corps shall review the sediment chemistry and provide the required tissue analyses to the contractor. It will be the responsibility of the contractor to provide the sediment data to the Corps at the earliest time possible for this purpose.

Based on the 1993 and 1994 baseline surveys, it is anticipated that minimal organic contaminants will be present in the sediment and that chemical analyses for organics will not be required. It is also anticipated that levels of metals shall be similar to the reference site and not require tissue analyses to be completed. However, it may be possible that elevated levels of an organic contaminant or metal listed on Table 3 is present in a sediment composite. **If this occurs and results in a determination by the agencies that chemical analyses is required on the tissues for this sediment, then this shall be outside of this scope and shall be considered additional work.** A pre-exposure sample of tissue shall be archived for possible analyses. All tissue samples shall be archived for future organic analyses for a period of one year. Required tissue detection limits are specified in Table 3.

(2) Number of Samples. Five replicates from each of the treatments shall be tested for the parameters listed in Table 3. Survivors within each replicate shall be pooled as necessary to provide sufficient tissue for testing. The treatments shall consist of the dredged material samples, the references, and the control.

a. The results shall be reported in dry weight. Percent moisture shall also be reported.

b. Procedure. Suggested procedures for specific constituents are given in the Manual. The method selected must yield the required detection limits with good precision and accuracy.

c. Solid Phase Testing. Conditions and procedures shall follow those found in the Manual for the 28-day solid phase bioassay. Observations and water quality measurements (temperature, pH salinity, dissolve oxygen shall be made daily.

(1) If the test sediment has an odor of hydrogen sulfide or has elevated ammonia levels, prior to introducing the organisms let the sediment settle in tank and then aerate until the ammonia concentration is sufficiently reduced and there is sufficient oxygen (approximately 4ppm) at the sediment-water interface being careful not to oxidize the sediment. One hour after the addition of the organism, the water in the tank shall be analyzed for hydrogen sulfide, ammonia, and dissolved oxygen. This information shall be included in the final report.

d. Data Analysis and Presentation.

(1) If the mean tissue concentration of a parameter in one or more of the dredged material samples is less than or equal to that in the reference, visual inspection of the data is adequate and no statistical analyses are required, for that parameter.

(2) A table or tables shall be provided for each species and each contaminant giving the tissue concentration for each treatment and each replicate, the mean, and the standard deviation.

(3) If mean tissue concentration of any parameter in any of the dredged material samples is higher than that in the reference, then additional statistical analyses comparing the test tissue concentration to the reference tissue concentration shall be performed. The statistical analyses shall be as described in the Manual except that multiple t-tests shall not be used. Alternative statistical procedures shall be approved by the SFD. The results of all statistical analyses shall be presented in tabular form.

9. QUALITY ASSURANCE AND QUALITY CONTROL.

a. The Contractor and subcontractors shall have an established quality control plan which is based on Environmental Protection Agency's quality control program as outlined in Handbook for Analytical Quality Control in Water and Wastewater Laboratories, USEPA 600/4-79-019, March 1979, EPA Office of Research and Development, Cincinatti, Ohio (Handbook). This plan shall also comply with the manual.

b. Quality control charts will be used for precision and accuracy (see section 6.1-6.3 of the Handbook). Percent recovery will be the control chart statistic for controlling accuracy. The industrial statistic "I" will be the control chart statistic for controlling precision. When it is discovered that any analysis is out of control from the standpoint of either precision or accuracy, all analyses since the last in control point will be repeated.

c. Upon completion of the analyses, the laboratory shall prepare a quality control report which includes the precision and accuracy of data generated on the analyzed samples.

d. As an absolute minimum, the following quality control measures shall be taken with each group of samples analyzed:

(1) A reagent blank per batch of samples shall be analyzed.

(2) One duplicate analyses per 10-20 samples shall be made, and precision data shall be reported in the quality control report.

(3) At least one audit or reference sample (EPA, NBS or other EPA- acceptable sources) for each constituent (if available) shall be analyzed (per batch or one per 10-20 samples whichever is less) and reported in the quality control report. This audit sample (marine or estuarine sediment and tissue) shall be within the same concentration range as the samples that are being analyzed.

(4) Spiked samples shall be analyzed in order to address analytical accuracy. At least one per 10-20 samples must be spiked with an appropriate standard in order to address accuracy. The concentration of the spike shall be within 200% of the detection limit.

(5) Printouts from all AA and GC analyses shall be kept on file in the event that any concerns arise with the data.

e. All laboratory analyses shall be completed within the recommended holding time for each analytical method.

f. In addition to following quality control procedures described in the Handbook, quality control procedures described for specific analytical methods shall also be followed.

g. All GC analyses require confirmation using a second column which is different from the one used in the initial GC analysis.

h. Standard reference toxicant tests shall be conducted on all species. The results shall be reported in the report.

10. RELEASE OF DATA.

All data, reports, and materials obtained as a result of this contract shall become the property of the U.S. Government and shall be turned over to the SFD upon completion of this work. No data shall be released by the Contractor to any other party other than the SFD without expressed written permission from the SFD.

11. RESPONSIBILITY FOR FIELD WORK.

The Contractor shall be responsible for all damages to persons and property that occur as a result of actions by the Contractor's employees in connection with execution of the work.

12. REPORT PREPARATION.

a. The contractor shall prepare a project report according to the following format.

(1) Introduction. This section shall include a discussion of the purpose and a description of the project.

(2) Materials and Methods. This section shall include:

a. Narrative description of the material, methods and equipment used to perform the project tasks.

b. Daily field activity log which includes tidal stage and weather conditions.

c. Inventory of all samples taken and explanation of how used in the tests.

d. Diagrams and figures as appropriate including location map of the sampling areas and sample locations within each area.

(3) Results. The Contractor shall include a narrative of the chemical characterization test results as well as the tables and graphs as described earlier. Any unusual laboratory or field observations shall also be described.

(4) References.

(5) Include appendixes

Appendix A -Scope of Work
Appendix B- Field Sampling Log Sheets/Field Notes
Appendix C- Grain Size data/graphs
Appendix D- QA/QC Data Plan and Report

(6) Text material shall be typed on good quality 8 1/2 by 11 inch bond paper with a 1 1/2-inch margin on the right, and 1-inch at the top and bottom.

(7) Drawings or plates shall be no larger than 20 inches by 11 inches with sufficient margin for binding on the left side and shall include a geographical scale.

(8) Each draft report shall be reviewed by the Corps of Engineers and comments returned to the Contractor. The Contractor shall address comments, correct typographical errors, and otherwise revise the document in accordance to the Contracting Officer's or his Authorized Representative's comments and questions.

Period of Service

Check Point One:
Pre-sampling Conference
Within 2 days of receiving the notice to proceed the contractor shall contact the Corps contract representative and provide the proposed dates for sampling.

Check Point Two:
Within 15 workdays of receiving the notice to proceed the contractor shall complete the sampling.

Check Point Three:
Within 60 workdays following the sampling the contractor shall submit 3 copies of the draft report.

Check Point Four:
Within 10 workdays of receiving the Corps comments on the draft report, the contractor shall submit 10 copies of the final report.

Appendix B

Field Sampling Log Sheets

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: NB 1

VESSEL: F/V SALLY KAY

CAPTAIN: MC

DATE: 3-30-95

CREW: SEA WF SJ

WEATHER: CLEAR

SAMPLING EQUIPMENT: SMITH MAC GRAB

SEAS: CALM

NAVIGATION TYPE: DIFF GPS

TIME: 1650

COORDINATES: 40° 45' 10.78"

COORDINATES: 124° 13' 25.17"

WATER DEPTH: - 36.3

TIDAL STAGE: 1.0

DEPTH (MLLW): - 35.3

TARGET SAMPLING DEPTH: -37.0

SAMPLE LENGTH NEEDED: 1.7

PENETRATION/RECOVERY:

CORE LENGTH SAMPLED: GRAB

DESCRIPTION OF MATERIAL

FINE TO MED GRAY SAND

DEPTH

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM 95 PSD 0003	DISCRETE	1	250 ml	HDPE	PSD	∅

COMMENTS: DISCRETE PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: NB 2

VESSEL: SALLY KAY

CAPTAIN: M C

DATE: 4-4-95

CREW: SEA WF SJ

WEATHER: FAIR WIND W @ 5

SAMPLING EQUIPMENT: SMITH MAC GRABS

SEAS: CALM

NAVIGATION TYPE: DIFF GPS

TIME:	1255
COORDINATES:	40 ° 45 ′ 17.67 ″
COORDINATES:	124 ° 13 ′ 21.11 ″
WATER DEPTH:	- 38.5 ′
TIDAL STAGE:	+ 2.7
DEPTH (MLLW):	- 35.8 ′
TARGET SAMPLING DEPTH:	- 37.0
SAMPLE LENGTH NEEDED:	1.2 ′
PENETRATION/RECOVERY:	0.8 ′
CORE LENGTH SAMPLED:	GRAB

DESCRIPTION OF MATERIAL	DEPTH
FINE - MED GRAIN SAND WITH SHELL HASH GREY COLOR NO ODOR	

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 PSD 0024	DISCRETE	1	250 ML	HDPE	PSD	Ø

COMMENTS: DREDGE PROBABLY ALREADY PASSED OVER THIS SITE

PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: NB3

VESSEL: SALLY KAY

CAPTAIN: MC

DATE: 4-2-95

CREW: SEA WF SJ.

WEATHER: CLEAR WIND N @ 3

SAMPLING EQUIPMENT: SMITH MAC GRAB

SEAS: 0 CHOP / SOME SWELL FROM ENTERANCE.

NAVIGATION TYPE: DIFF GPS

TIME: 1126

COORDINATES: 40° 45' 36.51"

COORDINATES: 124° 13' 06.73"

WATER DEPTH: 38.1'

TIDAL STAGE: + 2.8

DEPTH (MLLW): - 35.3

TARGET SAMPLING DEPTH: -37.0

SAMPLE LENGTH NEEDED: 1.7

PENETRATION/RECOVERY: 0.8'

CORE LENGTH SAMPLED: GRAB

DESCRIPTION OF MATERIAL	DEPTH
MED GRAIN SAND GREY COLOR NO ODOR	

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 PSD 0013	DISCRETE	1	250 ML	HDPE	GRAIN SIZE	Ø

COMMENTS:

PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: NB 6

VESSEL: SALLY KAY

CAPTAIN: MC

DATE: 4-2-95

CREW: SEA WF SJ

WEATHER: CLEAR

SAMPLING EQUIPMENT: SMITH MAC GRAB

SEAS: CALM

NAVIGATION TYPE: DIFF GPS

TIME: 1200

COORDINATES: 40 46 38.60

COORDINATES: 124 11 56.77

WATER DEPTH: 41.2

TIDAL STAGE: 3.5

DEPTH (MLLW): 37.7

TARGET SAMPLING DEPTH: -37.0

SAMPLE LENGTH NEEDED: Ø

PENETRATION/RECOVERY: 0.5'

CORE LENGTH SAMPLED: GRAB

DESCRIPTION OF MATERIAL

FINE SILT LAYER ON TOP OF MED GRAY SAND WITH

- SHELLS
- STICKS
- WORM
- GRASS

NO ODOR

TAN SILT

GREY MUD

DEPTH

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 PSD 0015	DISCRETE	1	250 ML	HDPE	GRAIN SIZE	Ø

COMMENTS:

PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: NB 7

VESSEL: F/V SALLY KAY

CAPTAIN: MIKE CUNNINGHAM

DATE: 4-2-95

CREW: SEA WF SJ

WEATHER: CLEAR WIND N 05

SAMPLING EQUIPMENT: SMITH MAC GRAB

SEAS: CALM

NAVIGATION TYPE: DIFF GPS

TIME: 1211

COORDINATES: 40° 46' 58.33"

COORDINATES: 124° 11' 45.35"

WATER DEPTH: -42.0'

TIDAL STAGE: + 3.7'

DEPTH (MLLW): -38.3'

TARGET SAMPLING DEPTH: -37.0

SAMPLE LENGTH NEEDED: Ø

PENETRATION/RECOVERY: 0.5

CORE LENGTH SAMPLED: GRAB

DESCRIPTION OF MATERIAL	DEPTH
SAND W/ SHELL FRAGMENTS	

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM-95 PSD 0016	DISCRETE	1	250 mL	HDPE	PSD	Ø

COMMENTS: EARLIER TEST GRAB ON 3-30-95 CONTAINED A QUANTITY OF FINE GRAINED SILTY MUD HOWEVER TODAYS GRAB DOES NOT CONTAIN ANY SIGNIFICANT QUANTITY OF MUD AND NO SHOALING OVER TARGET DEPTH

SO, PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: NB 8

VESSEL: SALLY KAY

CAPTAIN: M. CUNNINGHAM

DATE: 4-2-95

CREW: SE ADAMS WFILIOS S. JOHNSON

WEATHER: CLEAR WIND N@5

SAMPLING EQUIPMENT: SMITH MAC GRAB

SEAS: CALM

NAVIGATION TYPE: DIFF GPS

TIME:	1224
COORDINATES:	40° 47' 12.47"
COORDINATES:	124° 11' 35.45"
WATER DEPTH:	41.7
TIDAL STAGE:	3.9
DEPTH (MLLW):	37.8
TARGET SAMPLING DEPTH:	-37.0
SAMPLE LENGTH NEEDED:	ø
PENETRATION/RECOVERY:	GRAB
CORE LENGTH SAMPLED:	GRAB

DESCRIPTION OF MATERIAL	DEPTH
MED SAND WITH SHELL HASH	

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 PSD0017	DISCRETE	1	250 ml	HDPE	GRAIN SIZE	ø

COMMENTS:

PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: NB - 9

VESSEL: F/V SALLY KAY

CAPTAIN: M C

DATE: 3 - 30 - 95

CREW: SEA, W.F., S.T.

WEATHER: CLEAR

SAMPLING EQUIPMENT: SMITH MAC

SEAS: CALM

NAVIGATION TYPE: DIFF GPS

TIME: 1623

COORDINATES: 40 47 28.64

COORDINATES: 124 11 28.87

WATER DEPTH: ~ 37.2

TIDAL STAGE: 1.3

DEPTH (MLLW): -35.9

TARGET SAMPLING DEPTH: -37.0

SAMPLE LENGTH NEEDED: 1.1

PENETRATION/RECOVERY: GRAB

CORE LENGTH SAMPLED: GRAB

DESCRIPTION OF MATERIAL	DEPTH
SHELLS SHELL FRAGMENTS SHELL HASH MED SAND SOME FINES	

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 PSD 0002	DISCRETE	1	250	HDPE	PSD	Ø

COMMENTS: SHELL MATERIAL KEPT GRAB FROM CLOSING COMPLETELY
FINE MATERIAL WAS VISIBLY WASHING OUT OF GRAB AT SURFACING

SAMPLED PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: SAM 1

VESSEL: F/V SALLY KAY

CAPTAIN: MIKE CUNNINGHAM

DATE: 4-1-95

CREW: S.E. ADAMS, W. FILIOS, S. JOHNSON

WEATHER: PARTIALLY CLOUDY, WIND NE@5

SAMPLING EQUIPMENT: VIBRACORE

SEAS: 6" CHOP FLOOD CURRENT

NAVIGATION TYPE: DIFF. GPS

TIME:	0900
COORDINATES:	40° 48' 0083"
COORDINATES:	124° 11' 19.48"
WATER DEPTH:	34.9
TIDAL STAGE:	1.6
DEPTH (MLLW):	33.3
TARGET SAMPLING DEPTH:	-37.0
SAMPLE LENGTH NEEDED:	3.7
PENETRATION/RECOVERY:	2.5
CORE LENGTH SAMPLED:	2.5

DESCRIPTION OF MATERIAL	DEPTH
FINE GREY SAND → SHELL FRAGMENTS VERY LITTLE FINE GRAIN NO ODOR	

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 PSD 0008	DISCRETE	1	250 ml	HDPE	PSD	ø

COMMENTS: CORE IS A LITTLE SHORT, BUT OK

NEARLY ALL SAND

PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: SAM 2

VESSEL: SALLY KAY

CAPTAIN: MC

DATE: 4-1-95

CREW: SEA WF SJ

WEATHER: PARTLY WIND NE @ 5

SAMPLING EQUIPMENT: SMITH MAC GRAB

SEAS: < 6"

NAVIGATION TYPE: DIFF GPS

TIME: 1751

COORDINATES: 40° 48' 25.18"

COORDINATES: 124° 11' 05.63"

WATER DEPTH: - 39.1

TIDAL STAGE: 1.9

DEPTH (MLLW): - 37.2

TARGET SAMPLING DEPTH: -37.0

SAMPLE LENGTH NEEDED: Ø

PENETRATION/RECOVERY:

CORE LENGTH SAMPLED: GRAB

DESCRIPTION OF MATERIAL

SOFT SILTY MUD IN TOP 1" (PARTIAL SURFACE COVER) OVER FINE-MED SAND W/ FINE SHELL HASH

DEPTH

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM 95 PSD 0011	DISCRETE	1	250 ml	HDPE	PSD	Ø

COMMENTS: COULD NOT FIND SHOAL INDICATED ON CONDITION SURVEY 0930 4-1-95 — WILL TAKE GRAB SAMPLE AT THIS SITE

1740 — MISFIRE

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: SAM 3

VESSEL: SALLY KAY

CAPTAIN: M C

DATE: 4-1-95

CREW: SEA, WF, SJ

WEATHER: PARTIALLY CLOUDY, WIND NE @ 10

SAMPLING EQUIPMENT: VIBRACORE

SEAS: >6" CHOP, FLOOD CURRENT

NAVIGATION TYPE:

TIME:	1020
COORDINATES:	40° 48' 36 35''
COORDINATES:	124° 10' 57.89''
WATER DEPTH:	- 39.0
TIDAL STAGE:	3.8
DEPTH (MLLW):	- 35.2
TARGET SAMPLING DEPTH:	-37.0
SAMPLE LENGTH NEEDED:	1.8
PENETRATION/RECOVERY:	5.5
CORE LENGTH SAMPLED:	1.8

DESCRIPTION OF MATERIAL -35.2

SOME SILTY MUD IN TOP 1''

FINE WET SAND & SHELL HASH

FINE SILTY MUD BALL NEAR SAMPLING LIMIT

-37.0

NO SAMPLE

FINE GREY SAND AND SOME FINE SHELL HASH

DEPTH

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM 95 PSD 0009	DISCRETE	1	250 mL	HDPE	PSD	Ø

COMMENTS: SOME FINES IN CORE HOWEVER APPEARS LESS THAN 20%

PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: SAM 41

VESSEL: SALLY KAY

CAPTAIN: MC

DATE: 4-1-95

CREW: SA WF SJ

WEATHER: PARTLY WIND NE@7

SAMPLING EQUIPMENT: SMITH MAC

SEAS: < 6"

NAVIGATION TYPE: DIFF GPS

TIME: 1726

COORDINATES: 40° 48' 48.50"

COORDINATES: 124° 10' 56.42"

WATER DEPTH: 38.3

TIDAL STAGE: 2.2

DEPTH (MLLW): 36.1

TARGET SAMPLING DEPTH: -37.0

SAMPLE LENGTH NEEDED: 0.9

PENETRATION/RECOVERY: 0.5

CORE LENGTH SAMPLED: GRAB

DESCRIPTION OF MATERIAL: SOME FINE SILT IN TOP 1" MIXED WITH SHELL FRAGMENTS OVER FINE TO MED SAND

DEPTH

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 PSD 0010	DISCRETE	1	250 mL	HDPE	PSD	Ø

COMMENTS:

PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: SAM - 5

VESSEL: SALLY KAY

CAPTAIN: MIKE CUNNINGHAM

DATE: 3-31-95

CREW: SE. ADAMS, W. ELLIS, S JOHNSON

WEATHER: RAIN, WIND SOUTH @ 15

SAMPLING EQUIPMENT: VIBRACORE

SEAS: 1' CHOP, EBB CURRENT

NAVIGATION TYPE: DIFF GPS

TIME:	1635
COORDINATES:	40° 48' 55.68"
COORDINATES:	124° 10' 37.10"
WATER DEPTH:	- 34.5
TIDAL STAGE:	1.9
DEPTH (MLLW):	- 37.6
TARGET SAMPLING DEPTH:	-37.0
SAMPLE LENGTH NEEDED:	4.4
PENETRATION/RECOVERY:	3.3
CORE LENGTH SAMPLED:	3.3

DESCRIPTION OF MATERIAL	DEPTH
SOME SILTY MUD ON SURFACE MIXING OVER FINE WET SAND DARK GREY COLOR NO ODOR	

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM 95 PSD 0006	DISCRETE	1	250 ML	HDPE	GRAIN SIZE	Ø

COMMENTS: MATERIAL APPEARS TO BE < 80% SAND W/ SOME SURFACE SILT

PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
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408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: SAM 6 - A

VESSEL: SALLY KAY

CAPTAIN: M.C.

DATE: 4-1-95

CREW: SEA W.F. S.T.

WEATHER: MOSTLY SUNNY, WIND NE @ 8

SAMPLING EQUIPMENT: VIBRACORE

SEAS: ~ 6" CHOP, FLOOD CURRENT

NAVIGATION TYPE: DIFF GPS

TIME: 1125, 1202, 1225

COORDINATES: 40° 49' 02.21"

COORDINATES: 124° 10' 45.97"

WATER DEPTH: 38.1

TIDAL STAGE: 4.7

DEPTH (MLLW): 33.4

TARGET SAMPLING DEPTH: -37.0

SAMPLE LENGTH NEEDED: 3.6

PENETRATION/RECOVERY: 3.9, 3.0, 4.8

CORE LENGTH SAMPLED: 3.6, 3.0, 3.6

DESCRIPTION OF MATERIAL	DEPTH
SILTY FINE - MED GRAIN SAND	
DARK GREY COLOR	
NO ODOR	
MOIST TO DRY: FINE SAND	
NO SAMPLE TAKE	-37.0
DRY PACKED FINE SAND	

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 SED 0002	DISCRETE	1	LITER	WMG	SED CHEM	Ø
HUM95 ARL 0002	DISCRETE	1	500 ml	WMG	ARCHIVE	Ø

COMMENTS: OBTAINED 3 CORE SAMPLES

SUBSAMPLED EACH CORE FOR DISCRETE (SITE) AND COMPOSITE (AREA SAMP) INTO TEFLON LINED TRAYS FOR CHEMISTRY SAMPLING

SAVED REMAINING MATERIAL FOR BIO ACCUM/ASSAY COMPOSITE #1

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: SAM 6 - B

VESSEL: F/V Sally Kay

CAPTAIN: Mike Cunningham

DATE: 4-1-95

CREW: S.E. ADAMS, W. FILIOS, S. JOHNSON

WEATHER: Mostly Sunny Wind NE @ 5

SAMPLING EQUIPMENT: VIBRACORE

SEAS: 6' CHOP

NAVIGATION TYPE: DIFF GPS

TIME:	1255, 1430, 1510
COORDINATES:	40° 49' 34.74"
COORDINATES:	124° 10' 43.81"
WATER DEPTH:	- 38.8'
TIDAL STAGE:	+ 6.3'
DEPTH (MLLW):	- 32.5'
TARGET SAMPLING DEPTH:	-37.0
SAMPLE LENGTH NEEDED:	4.5
PENETRATION/RECOVERY:	6.7 4.0 6.4
CORE LENGTH SAMPLED:	4.5 4.0 4.5

DESCRIPTION OF MATERIAL	DEPTH
FINE BLACK SAND WITH SILTY MUD DEPOSITS — 32.5	
MOIST TO DRY; H_2S ODOR	
— 37	
DRY FINE BLACK SAND	

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM 95 SED 0003	DISCRETE	1	2 LITER	WM 6	SED. CHEM	✓
HUM95 ARC 0003	DISCRETE	1	500 ml	WM 6	ARCHIVE	✓

COMMENTS:

3 CORES FOR VOLUME

SUBSAMPLED EACH FOR DISCRETES

ADDED MATERIAL TO COMPOSITE # 1

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: SAM 6-C

VESSEL: SALLY KAY

CAPTAIN: MC

DATE: 4-1-95

CREW: SEA WF SJ

WEATHER: MOSTLY SUNNY, WIND NE @ 7

SAMPLING EQUIPMENT: V. BRACORE

SEAS: < 6" CHOP, TIDE SLACK

NAVIGATION TYPE: DIFF GPS

TIME:	1600, 1622, 1650
COORDINATES:	40° 49' 06.40"
COORDINATES:	122° 10' 40.74"
WATER DEPTH:	- 37.6
TIDAL STAGE:	4.2
DEPTH (MLLW):	- 35.4
TARGET SAMPLING DEPTH:	-37.0
SAMPLE LENGTH NEEDED:	3.6
PENETRATION/RECOVERY:	5.1 4.6 6.1
CORE LENGTH SAMPLED:	3.6 3.6 3.6

DESCRIPTION OF MATERIAL	DEPTH
FINE TO MED SAND W/ DARK GREY SILTY DEPOSITS FINE SHELL HASH MOIST TO SOME DETRITUS H_2S ODOR DRY SAND	
-37.0	
BELOW SAMPLING LINE DRY SAND	

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 SED 0004 HUM95 ARC 0004	DISCRETE	1 1	LITER 500 ml	WMG	SED CHEM ARCHIVE	Ø
HUM95 SED 0005	COMPOSITE	1	L	WMG	SED CHEM	Ø
HUM95 BIO 0001	COMPOSITE	2	10 GAL	WMG	BIO ACC/ASS	Ø
DIOXIN 0002	COMPOSITE	1	500 ml	WMG	DIOXIN	Ø

COMMENTS: SUB SAMPLE 3 CORES FOR DISCRETE CHEM + ARCHIVE

SUB SAMPLE SAME CORES FOR COMPOSITE CHEM

ADD REMAINING MATERIAL TO BIO ACCUMULATION/ASSAY COMPOSITE #1

HOMOGENIZE MATERIAL FROM ALL 9 CORES FROM SITES SAM6-A, SAM6-B, AND SAM 6-C AND SAMPLE FOR CHEM + DIOXIN COMPOSITE #1

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: SAM 7

VESSEL: SALLY KAY

CAPTAIN: M.C.

DATE: 3-31-95

CREW: SEA WF ST

WEATHER: RAIN WIND SOUTH @ 10

SAMPLING EQUIPMENT: VIBRACORE

SEAS: 1' CHOP FOG CURRENT

NAVIGATION TYPE: DIFF GPS

TIME:	1735	1750
COORDINATES:	40° 49' 02.01"	02.20"
COORDINATES:	124° 10' 34.63"	34.52"
WATER DEPTH:	- 36.8	37.1
TIDAL STAGE:	1.4	1.3
DEPTH (MLLW):	- 35.4	35.8
TARGET SAMPLING DEPTH:	-37.0	-37.0
SAMPLE LENGTH NEEDED:	1.6	1.2
PENETRATION/RECOVERY:		2.4
CORE LENGTH SAMPLED:	Ø	1.2

DESCRIPTION OF MATERIAL	DEPTH
FINE SILTY TAN MUD ~1" OVER FINE WET SAND W/ SHELL HASH AND WOOD FRAGMENTS	

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 PSD 0007	DISCRETE	1	250 ML	HDPE	PSD	Ø

COMMENTS: 1ST CORE - LOST CORE TIP - REASON UNKNOWN

PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: EK 1

VESSEL: SALLY KAY

CAPTAIN: M C

DATE: 4-3-95

CREW: SEA WF SJ

WEATHER: PARTLY WIND N@3

SAMPLING EQUIPMENT: VIBRACORE

SEAS: CALM

NAVIGATION TYPE: DIFF GPS

TIME: 1638

COORDINATES: 40° 47' 56.10"

COORDINATES: 124° 11' 13.35"

WATER DEPTH: - 39.0 '

TIDAL STAGE: + 5.6

DEPTH (MLLW): - 33.4 '

TARGET SAMPLING DEPTH: -37.0 '

SAMPLE LENGTH NEEDED: 3.5 '

PENETRATION/RECOVERY: 3.5 '

CORE LENGTH SAMPLED: 3.5 '

DESCRIPTION OF MATERIAL: MED GRAIN GREY SAND W/ TR SHELL HASH

DEPTH

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 PSD 0021	DISCRETE	1	250 ml	HDPE	PSD	C

COMMENTS:

PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: EK2

VESSEL: SAW KAY

CAPTAIN: MC

DATE: 4-3-95

CREW: SEA WF SJ

WEATHER: OVERCAST WIND NW 3

SAMPLING EQUIPMENT: VIBRACORE

SEAS: CALM STRONG EB 3

NAVIGATION TYPE: DIFF GPS

TIME:	1724	1732, 1750, 1802, 1824
COORDINATES:	40° 48' 12.84"	12.79"
COORDINATES:	124° 10' 45.66"	45.67"
WATER DEPTH:	30.5	29.0
TIDAL STAGE:	5.0	4.8
DEPTH (MLLW):	25.5	24.2
TARGET SAMPLING DEPTH:	-28.0	
SAMPLE LENGTH NEEDED:	2.5	3.8
PENETRATION/RECOVERY:	0.9	5.2, 3.6, 2.8, 3.7
CORE LENGTH SAMPLED:	0	3.8, 3.6, 2.8, 3.7

DESCRIPTION OF MATERIAL	DEPTH
	-24
LIGHT BROWN SILTY TOP	-25
DARK GREY SOFT MUD	26
	27
DARK GREY DRY MUD WITH FINE SAND	28
NO SAMPLING	
GREY SAND	

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 SED 0016						
HUM95 ARC 0013						

COMMENTS: FIRST CORE - GRAVITY ONLY - TOO LITTLE SAMPLE

2ND CORE - VIBRATE - GOOD. - SUBSAMPLE FOR DISCRETES

BEGIN COMPOSITES FOR COMP #2

4 CORES AT THIS SITE

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

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SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: EK 3

DATE: 4-4-95

WEATHER: FAIR wind S @ 3

SEAS: CALM

VESSEL: SALLY KAY

CAPTAIN: MC

CREW: SEA WF SJ

SAMPLING EQUIPMENT: VIBRACORE

NAVIGATION TYPE: DIFF GPS

TIME: 0942

COORDINATES: 40° 48' 19.54"

COORDINATES: 124° 10' 35.03"

WATER DEPTH: 25.4'

TIDAL STAGE: 0.4'

DEPTH (MLLW): 25.0

TARGET SAMPLING DEPTH: -28.0

SAMPLE LENGTH NEEDED: 3.0

PENETRATION/RECOVERY: 3.3

CORE LENGTH SAMPLED: 3.0

DESCRIPTION OF MATERIAL	DEPTH
MUDLINE — 25.0	
2" BLACK SILTY MUD OVER	
MED GRAIN SAND WITH SHELL HASH	26
DARK GREY COLOR	27
SAMPLING LIMIT	28

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 PSD 0022	DISCRETE	1	250 mL	HDPE	PSD	✓

COMMENTS:

PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
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SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: EK 4

VESSEL: F/V SALLY KAY

CAPTAIN: MIKE CUNNINGHAM

DATE: 4-4-95

CREW: SCOTT E. ADAMS, WALT FLICK, SPENCER JOHNSON

WEATHER: FAIR CALM

SAMPLING EQUIPMENT: V. RITA CORE

SEAS: CALM SLIGHT SWELL

NAVIGATION TYPE: DIFF GPS

TIME: 0814, 0822, 0830, 0850

COORDINATES: 40° 48' 19.72"

COORDINATES: 124° 10' 21.19"

WATER DEPTH: - 26.6'

TIDAL STAGE: + 1.1

DEPTH (MLLW): - 25.5'

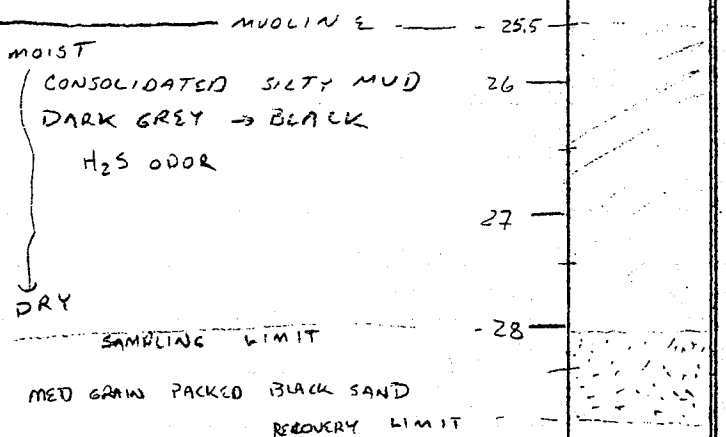
TARGET SAMPLING DEPTH: -28.0

SAMPLE LENGTH NEEDED: 2.5'

PENETRATION/RECOVERY: 0.5', 3.6, 3.0, 2.4

CORE LENGTH SAMPLED: 0', 2.5, 2.5, 2.4

DESCRIPTION OF MATERIAL / DEPTH



SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 SED 0017	DISCRETE	1	RITER	WMG	CHEM	Ø
HUM95 ARC 0014	DISCRETE	1	500 ml	WMG	ARCHIVE	Ø

COMMENTS: FIRST CORE TOO SHORT -
2ND CORE - GOOD - LACK OF BROWN SILTY TOP INDICATED RECENT DISTURBANCE/DREDGE
3RD + 4TH CORES GOOD

SUBSAMPLED CORES FOR DISCRETES

ADDED MATERIAL TO COMPOSITES #2

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

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SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: EK 4A

VESSEL: SALLY KAT

CAPTAIN: MC

DATE: 4-4-95

CREW: SEA WF SJ

WEATHER: FAIR, WIND S @ 3

SAMPLING EQUIPMENT: VIBRACORE

SEAS: CALM SLACK

NAVIGATION TYPE: DIFF GPS

TIME: 1022, 1042, 1055, 1105

COORDINATES: 40° 48' 19.31"

COORDINATES: 124° 10' 23.20"

WATER DEPTH: -26.2

TIDAL STAGE: 0.5

DEPTH (MLLW): -25.7

TARGET SAMPLING DEPTH: -28.0

SAMPLE LENGTH NEEDED: 2.3'

~~PENETRATION~~/RECOVERY: 3.5, 5.0, 0.8, 3.6

CORE LENGTH SAMPLED: 2.3, 2.3, 0.8, 2.3

DESCRIPTION OF MATERIAL	DEPTH
MUDLINE — 25.7	
SOFT TO FIRM SILTY BLACK MUD	26
	27
DRY BOTTOM 3" SAND	
SAMPLING LIMIT	28
MED GRAIN SAND + HASH	
RECOVERY LIMIT	29

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
~~HUM95 ARC 0015~~ HUM95 SED 0018	DISCRETE	1	500 LITER	WMG	ARCHIVE CHEM	Ø
HUM95 BIO 0002	COMPOSITE	2	10 GAL	LINED COOLERS	BIO ACC/ASSAY	Ø
HUM95 SED 0019	COMPOSITE	1	2 LITER	WMG	CHEM	Ø
DIOXIN 005	COMPOSITE	1	500 ML	WMG	DIOXIN	Ø

COMMENTS: ADDITONAL CORE FOR COMP #2 COMPOSITE SITE IS BETWEEN EK 4 AND EK 2

SUB SAMPLE 4 CORES FOR DISCRETES

HOMOGENIZE MATERIAL FROM EK-2, EK 4, EK 4A FOR COMPOSITE (COMP # 2)

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

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SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: EK-5

VESSEL: SALT KAY

CAPTAIN: M. CUNNINGHAM

DATE: 4-3-95

CREW: SEA WF SJ

WEATHER: OVERCAST WIND NW @ 3

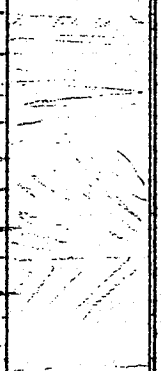
SAMPLING EQUIPMENT: V. BRACORE

SEAS: CALM

NAVIGATION TYPE: DIFF GPS

TIME:	1416
COORDINATES:	40° 48' 21.09"
COORDINATES:	124° 10' 14.72"
WATER DEPTH:	- 25.4
TIDAL STAGE:	+ 5.4
DEPTH (MLLW):	- 20.0
TARGET SAMPLING DEPTH:	-28.0
SAMPLE LENGTH NEEDED:	8.0
PENETRATION/RECOVERY:	10.5 / 9.8
CORE LENGTH SAMPLED:	8.0

DESCRIPTION OF MATERIAL	DEPTH
BROWN SILTY TOP (~2")	20
DARK GREY SOFT MUD	22
	24
LIGHT GREY MUD	26
DARK GREY-DRY MUD	28
NO SAMPLING	



SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 ARC 0012	DISCRETE	1	500 ML	WMG	ARCHIVE	Ø
HUM95 SED 0011		1	0.5 L		CHEM	
HUM95 SED 0015	COMPOSITE	1	1 LITER	WMG	CHEM	Ø
HUM95 BIO 0003	COMPOSITE	2	10 GAL	LINED COOLER	BIO ACC/ASS	Ø
DIOXIN 004	COMPOSITE	1	500 ML	WMG	DIOXIN	Ø

COMMENTS: SUBSAMPLE CORE FOR DISCRETES

HOMOGENIZE MATERIAL FROM EK 5, EK6, EK7, EK8 FOR COMPOSITES

SAMPLE COMP #3

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

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SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: EK-6

VESSEL: SALLY KAY

CAPTAIN: MC

DATE: 4-3-95

CREW: SEA WF SJ

WEATHER: PARTLY WIND W@3

SAMPLING EQUIPMENT: VIBRACORE

SEAS: CALM

NAVIGATION TYPE: DIFF GPS

TIME: 1255

COORDINATES: 40° 48' 22.46"

COORDINATES: 124° 10' 13.89"

WATER DEPTH: -22.0'

TIDAL STAGE: 3.8

DEPTH (MLLW): -18.2

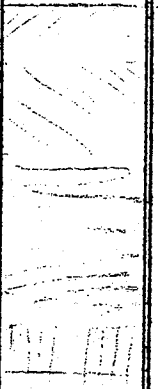
TARGET SAMPLING DEPTH: -28.0

SAMPLE LENGTH NEEDED: 9.8

PENETRATION/RECOVERY: 11.0 / 10.0

CORE LENGTH SAMPLED: 9.8

DESCRIPTION OF MATERIAL	DEPTH
MUDLINE	-18.2
BROWN SOFT SILTY TOP	-20
GREY SOFT MUD	-22
GREY FIRM MUD	-24
	-26
LT. GREY MUD/CLAY	-28



SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 SED 00 13	DISCRETE	1	LITER	WMG	CHEM	✓
HUM95 ARC 0011	DISCRETE	1	500 ML	WMG	ARCHIVE	✓

COMMENTS: SUBSAMPLE CORE FOR DISCRETES

ADD TO CHEM + BIO COMPOSITES (COMP # 3)

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: EK-7

VESSEL: SALTY KAY

CAPTAIN: MC

DATE: 4-3-95

CREW: SEA WF SJ

WEATHER: PARTALL CLOUDY, WIND N @ 3

SAMPLING EQUIPMENT: VIBRACORE

SEAS: CALM

NAVIGATION TYPE: DIFF GPS

TIME: 1155

COORDINATES: 40° 48' 21.96"

COORDINATES: 124° 10' 10.83"

WATER DEPTH: - 18.1'

TIDAL STAGE: + 2.7'

DEPTH (MLLW): - 15.4'

TARGET SAMPLING DEPTH: -28'

SAMPLE LENGTH NEEDED: 12.6 / 10' MAX

PENETRATION/RECOVERY: 11.0 / 8.3

CORE LENGTH SAMPLED: 8.3

DESCRIPTION OF MATERIAL	DEPTH
DARK GREY SILTY SOFT MUD	15.4
OVER	18
DARK GREY FIRM MUD	20
H_2S ODOR	22
MED GREY DRY MUD	

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 SED 0012	DISCRETE	1	2.5 L	WM 6	CHEM	6
HUM95 ARC 0010	DISCRETE	1	500 ML	WM 6	ARCHIVE	Ø

COMMENTS: SUB SAMPLE FOR DISCRETES

ADD TO CHEM + BIO COMPOSITES (COMP #3)

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

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SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: EK-8

VESSEL: SALLY KAY

CAPTAIN: ML

DATE: 4-3-95

CREW: SEA WF SJ

WEATHER: OVERCAST CALM

SAMPLING EQUIPMENT: VIBRACORE

SEAS: CALM

NAVIGATION TYPE:

TIME: 1055

COORDINATES: 40° 49' 23.08"

COORDINATES: 124° 10' 06.31"

WATER DEPTH: - 14.5'

TIDAL STAGE: + 1.5'

DEPTH (MLLW): - 13.0'

TARGET SAMPLING DEPTH: - 20

SAMPLE LENGTH NEEDED: 15.0 / 10' MAX PER CORE

PENETRATION/RECOVERY: 11.0 / 9.0

CORE LENGTH SAMPLED: 9.0

DESCRIPTION OF MATERIAL	DEPTH
	13.0
LIGHT BROWN SILT	
	14
DARK GREY SILTY MUD (SOFT)	
	16
DARK GREY FIRM MUD	
	18
	20
	22

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95SED0011	DISCRETE	1	LITER	WMG	CHEM	∅
HUM95 ARC 0009	DISCRETE	1	500 ML	WMG	ARCHIVE	∅

COMMENTS:

SUB SAMPLE FOR DISCRETES

BEGIN COMPOSITES FOR CHEM AND BIO (COMP #3)

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: FL-1

VESSEL: SALLY RAY

CAPTAIN: M.C.

DATE: 4-2-95

CREW: SEA WF SJ

WEATHER: CLEAR WIND NW 7

SAMPLING EQUIPMENT: V. BRACORE

SEAS: < 6" CHOP

NAVIGATION TYPE: DIFF GPS

TIME:	1517, 1542, 1600
COORDINATES:	40°43' 19.87"
COORDINATES:	124° 13' 26.07"
WATER DEPTH:	- 30.7'
TIDAL STAGE:	+ 5.5
DEPTH (MLLW):	- 25.2'
TARGET SAMPLING DEPTH:	-28.0
SAMPLE LENGTH NEEDED:	2.8
PENETRATION/RECOVERY:	2.8, 2.6, 3.1'
CORE LENGTH SAMPLED:	2.8, 2.6, 2.8'

DESCRIPTION OF MATERIAL	DEPTH
SOFT SILTY BROWN TOP	- 25.2
OVER	- 26.0
MED SOFT BACK SILTY MUD W/ DETRITUS	2.7
H_2S ODOR	- 28.0

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM 95 SED 0007	DISCRETE	1	2	WMG	CHEM	Ø
HUM 95 ARC 0006	DISCRETE	1	500ML	WMG	ARCHIVE	Ø

COMMENTS:

3 CORES FOR VOLUME

SUB SAMPLE EACH CORE FOR DISCRETES

BEGAN COMPOSITE # 4

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
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SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: FL - 2

VESSEL: SALLY KAY

CAPTAIN: M.C.

DATE: 4-2-95

CREW: S.E.A. W.E. S.T.

WEATHER: CLEAR WIND NW 7

SAMPLING EQUIPMENT: VIBRACORE

SEAS: < 6' CHOP

NAVIGATION TYPE: DIFF GPS

TIME: 1622, 1647, 1700

COORDINATES: 40° 43' 22.15"

COORDINATES: 124° 13' 24.28"

WATER DEPTH: 30.3

TIDAL STAGE: + 4.8

DEPTH (MLLW): - 25.5'

TARGET SAMPLING DEPTH: -28.0

SAMPLE LENGTH NEEDED: 2.5'

PENETRATION/RECOVERY: 2.7' 2.5' 2.8

CORE LENGTH SAMPLED: 2.5' 2.5' 2.5

DESCRIPTION OF MATERIAL	DEPTH
MUDLINE — 25.5	
BROWN SOFT SILTY TOP OVER	
BLACK SOFT SILTY MUD	
-28.0	
NO SAMPLE	

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 SED. 0008	DISCRETE	1	LITER	WMG	CHEM	Ø
HUM95 ARC 0007	DISCRETE	1	500ml	WMG	ARCHIVE	Ø

COMMENTS: SUB SAMPLE FROM FULL LENGTH OF ALL 3 CORE FOR DISCRETES

ADD REMAINING MATERIAL TO COMPOSITE #4

HUMBOLDT SEDIMENT SAMPLING
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MAINTENANCE DREDGING FY '95

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SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: FL-3

VESSEL: SALLY KAY

CAPTAIN: MC

DATE: 4-2-95

CREW: SEA, WF SJ

WEATHER: CLEAR WIND N @ 5

SAMPLING EQUIPMENT: VIBRACORE

SEAS: 6"

NAVIGATION TYPE: DIFF GPS

TIME: 1730, 1800, 1815, 1830

COORDINATES: 40° 43' 20.30"

COORDINATES: 124° 13' 21.96"

WATER DEPTH: - 27.9'

TIDAL STAGE: 3.7'

DEPTH (MLLW): - 24.2'

TARGET SAMPLING DEPTH: -28.0'

SAMPLE LENGTH NEEDED: 3.8'

PENETRATION/RECOVERY: 2.5, 5.8, 4.0, 4.4

CORE LENGTH SAMPLED: 2.5, 3.8, 3.8, 3.8

DESCRIPTION OF MATERIAL

-24.2
BROWN SOFT SILTY TOP
OVER
DARK GREY TO BLACK
SOFT SILTY MUD
H_2S ODOR

-28.0
NO SAMPLING
BLACK MUD W/DETRITUS

DEPTH

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM 95 ARC 0008 HUM 95 SED 0009	DISCRETE	1 1	500 mL 1 L	WMG	ARCHIVE CHEM	Ø
HUM 95 SED 0010	COMPOSITE	1	1 L	WMG	CHEM	Ø
HUM 95 BIO 0004	COMPOSITE	2	10 GAL	LINED COOLERS	BIO ACC/ASS	Ø
DIOXIN 003	COMPOSITE	1	500 mL	WMG	DIOXIN	Ø

COMMENTS: - USED SLOW VIBRATE + MED SPEED LOWERING ON FIRST CORE
- USED MED VIBRATE (40%) + SLOW LOWERING ON 2ND

4 CORES AT THIS SITE

SUBSAMPLED PERTINENT LENGTH OF EACH FOR DISCRETE SAMPLES

ADDED REMAINDER TO COMPOSITE #4 FOR CHEM + BIO

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
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SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: FL 4

VESSEL: SALLY KAY

CAPTAIN: M.C.

DATE: 4-2-95

CREW: SEA INF SJ

WEATHER: CLEAR

SAMPLING EQUIPMENT: SMITH MAC

SEAS: CALM

NAVIGATION TYPE: DIFF GPS

TIME: 1400 1412

COORDINATES: 40 43 54 92

COORDINATES: 124 13 12.50

WATER DEPTH: — 33.3

TIDAL STAGE: 5.0

DEPTH (MLLW): - 28.3

TARGET SAMPLING DEPTH: -28.0

SAMPLE LENGTH NEEDED: Ø

PENETRATION/RECOVERY: 0.8'

CORE LENGTH SAMPLED: GRAB

DESCRIPTION OF MATERIAL	DEPTH
SOFT SILTY MUD TAN COLOR NO ODOR	

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95SED0006	DISCRETE	1	ℓ	WM G	CHEM	Ø
HUM95ARC0005	DISCRETE	1	500	WM G	ARCHIVE	Ø

COMMENTS: SITE BELOW OVERDREDGE DEPTH

2 GRABS — SUBSAMPLE FOR DISCRETES + CHEM COMPOSITE

BEGIN FIELDS LANDING BIO COMPOSITE #4 WITH REMAINDER

HUMBOLDT SEDIMENT SAMPLING
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MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
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SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: FL-5

VESSEL: SALLY KAY

CAPTAIN: M.C.

DATE: 4-2-95

CREW: SEA WF SJ

WEATHER: SUNNY WIND NO 5

SAMPLING EQUIPMENT: SMITH MAC GRAB

SEAS: CALM

NAVIGATION TYPE: DIFF GPS

TIME: 1343

COORDINATES: 40° 44' 17.64"

COORDINATES: 124° 13' 26.26"

WATER DEPTH: 32.0'

TIDAL STAGE: 4.9'

DEPTH (MLLW): -27.1'

TARGET SAMPLING DEPTH: -28.0

SAMPLE LENGTH NEEDED: 0.9

PENETRATION/RECOVERY: 0.8'

CORE LENGTH SAMPLED: GRAB

DESCRIPTION OF MATERIAL	DEPTH
POCKETS OF SILTY MUD NEAR TOP	
SAND	
	-27.9
	-28.0

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 PSD 0020	DISCRETE	1	250 ml	HDPE	GRAIN SIZE	Ø

COMMENTS: COULD NOT FIND SHOAL INDICATED ON CONDITION SURVEY

SMITH MAC GRAB

SMALL SILTY MUD LAYER NEAR SURFACE

PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
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408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: FL - 6

VESSEL: SALLY KAY

CAPTAIN: MC

CREW: SEA WF SJ

SAMPLING EQUIPMENT: SMITH MAC 1

NAVIGATION TYPE:

DATE:	4-2-95	4-4-95
WEATHER:	CLEAR	PARTLY CALM
SEAS:	CALM	CALM
TIME:	1330	1220
COORDINATES:	40 44' 32.16"	32.16"
COORDINATES:	124 13' 34.96"	35.01
WATER DEPTH:	28.2	26.2
TIDAL STAGE:	4.7	2.0
DEPTH (MLLW):	23.5	24.2
TARGET SAMPLING DEPTH:	-28.0	-28.0
SAMPLE LENGTH NEEDED:	4.5	3.8
PENETRATION/RECOVERY:	0.8'	4.0
CORE LENGTH SAMPLED:	GRAB	3.8

DESCRIPTION OF MATERIAL		DEPTH
GRAB	CORE	
MED SAND W SHELL HASH	MED SAND WITH SHELL HASH	

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 PSD 0019	DISCRETE	1	250 ml	HDPE	PSD	✓
HUM95 PSD 0023	"	"	"	"	"	"

COMMENTS: PSD OF GRAB FOR NOW (HUM95 PSD 0019)

WILL RETURN TO VIBRACORE

4-4-95

VIBRACORE ALL SAND

PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: FL 7

VESSEL: SALLY KAY

CAPTAIN: MC

DATE: 4-2-95

CREW: SEA WF SJ

WEATHER: SUNNY

SAMPLING EQUIPMENT: SMITH MAC GRAB

SEAS: ~1' ENTSPANKS SWELL

NAVIGATION TYPE: DIFF GPS

TIME: 1310

COORDINATES: 40° 44' 53.05"

COORDINATES: 124° 13' 21.66"

WATER DEPTH: 36.3

TIDAL STAGE: + 4.5

DEPTH (MLLW): - 31.8'

TARGET SAMPLING DEPTH: -30

SAMPLE LENGTH NEEDED: Ø

PENETRATION/RECOVERY: 0.5'

CORE LENGTH SAMPLED: GRAB

DESCRIPTION OF MATERIAL

SOME SMALL CLUMPS OF MUD ON TOP OVER MEDIUM GRAIN SAND

DEPTH

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM 95 PSD 0018	DISCRETE	1	250 ml	HDPE	GRAIN SIZE	Ø

COMMENTS:

PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: ENT 1

VESSEL: F/V SALLY KAY

CAPTAIN: MC

DATE: 3-30-95

CREW: SEA WF SJ

WEATHER: CLEAR

SAMPLING EQUIPMENT: SMITH MAC GRAB

SEAS: CALM

NAVIGATION TYPE: DIFF GPS

TIME: 1702

COORDINATES: 40 45 19.75

COORDINATES: 124 13 55.63

WATER DEPTH: 47.1

TIDAL STAGE: 1.0

DEPTH (MLLW): 46.1

TARGET SAMPLING DEPTH: 47.0

SAMPLE LENGTH NEEDED: 0.9

PENETRATION/RECOVERY: 0.8

CORE LENGTH SAMPLED: GRAB

DESCRIPTION OF MATERIAL: FINE - MED SAND → SHELL HASH

DEPTH

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 PSD 0004	DISCRETE	1	250	HDPE	PSD	Ø

COMMENTS: PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: ENT 2

VESSEL: SALLY KAY

CAPTAIN: M. CUNNINGHAM

DATE: 3-30-95

CREW: SE ADAMS, FLIDS, JOHNSON

WEATHER: CLEAR WIND

SAMPLING EQUIPMENT: SMTH MAC GRAB

SEAS: LOW SWELL, SWIFT CURRENT

NAVIGATION TYPE: DIFF GPS

TIME:	1434	17 14
COORDINATES:	40 45	50.82"
COORDINATES:	124 14	24.70"
WATER DEPTH:		31.5
TIDAL STAGE:	3.4	0.9
DEPTH (MLLW):		30.6
TARGET SAMPLING DEPTH:	GRAB	GRAB
SAMPLE LENGTH NEEDED:		
PENETRATION/RECOVERY:	Ø	0.8
CORE LENGTH SAMPLED:	NONE	GRAB

DESCRIPTION OF MATERIAL	DEPTH
FINE - MED SAND + SHELL HASH	

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95 PSD 0005	DISCRETE	1	250 ML	HDPE	PSD	Ø

COMMENTS: SWIFT EBB CURRENT — NO SAMPLE - DIFFICULTY RETRIEVING GRAB — WILL RETURN DURING SLACK CURRENT

RETURNED - PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: BAR 1

DATE: 3-30-95

WEATHER: CLEAR, WIND LIGHT

SEAS: < 1' WAVE ON 3' SWELL

VESSEL: F/V SALLY KAY

CAPTAIN: MIKE CUNNINGHAM

CREW: SE. ADAMS, W. FIGLOS, S JOHNSON

SAMPLING EQUIPMENT: SMITH MAC GRAB

NAVIGATION TYPE: DIFF GPS

TIME: 1402

COORDINATES: 40° 46' 07.59"

COORDINATES: 124° 14' 56.83"

WATER DEPTH: 50 ± 1

TIDAL STAGE: + 3.9

DEPTH (MLLW):

TARGET SAMPLING DEPTH: GRAB

SAMPLE LENGTH NEEDED:

PENETRATION/RECOVERY: 0.5'

CORE LENGTH SAMPLED: GRAB

DESCRIPTION OF MATERIAL

MED FINE SAND
GREY COLOR
NO ODOR

DEPTH

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM95PSD 0001	DISCRETE	1	250ml	HDPE	PSD	Ø

COMMENTS:

PSD ONLY

HUMBOLDT SEDIMENT SAMPLING
SAN FRANCISCO CORPS OF ENGINEERS
MAINTENANCE DREDGING FY '95

KINNETIC LABORATORIES INC.
OCEANOGRAPHIC RESEARCH
SANTA CRUZ, CA
408-457-3950

SEDIMENT SAMPLING LOG SHEET

STATION IDENTIFICATION: RF

VESSEL: F/V SALLY KAY

CAPTAIN: MIKE CUNNINGHAM

DATE: 3-30-95

CREW: SE. ADAMS, W. FILIOS, S. JOHNSON

WEATHER: CLEAR, WIND LIGHT

SAMPLING EQUIPMENT: SMITH MAC GRAB

SEAS: < 1' WAVES ON 2' SWELL

NAVIGATION TYPE: DIFF. GPS

TIME: 1118 - 1300

COORDINATES: 40° 49' 40.83"

COORDINATES: 124° 18' 30.06"

WATER DEPTH: 35 FATHOMS

TIDAL STAGE: 5.6' FEET

DEPTH (MLLW):

TARGET SAMPLING DEPTH:

SAMPLE LENGTH NEEDED:

PENETRATION/RECOVERY:

CORE LENGTH SAMPLED: TOP 10" SURFACE GRABS

DESCRIPTION OF MATERIAL

SOFT SILTY MUD W/ A LITTLE VERY FINE SAND

TAN TO OLIVE GREY COLOR

NO ODOR

DEPTH

SAMPLE ID. #	TYPE	QUANTITY	VOLUME	CONTAINER	ANALYSIS	PRES.
HUM 95 SED 0001	COMPOSITE	1	1 L	WMG	CHEMISTRY	✓
HUM 95 ARC 0001	↓	1	1 L	WMG	ARCHIVE	✓
HUM 95 BIO 0009		2	10 GAL	PLASTIC BAGS IN COOLER	BIO ALL/ASS	✓
DIOXIN 0001		1	1L	WMG	DIOXIN	✓

COMMENTS: 8 TOTAL GRABS

SPOONED A SUB-SAMPLE OF EACH GRAB FOR CHEMISTRY COMPOSITE

ADDED REMAINDER OF EACH GRAB (~ 2.5 GALLONS) TO BIO COMPOSITE RF

Appendix C

Sediment Chemistry and Physical Parameters

ToxScan, Inc. 42 Hangar Way • Watsonville, CA 95076-2404 • (408) 724-4522 • FAX (408) 724-3188

May 11, 1995 ToxScan Number: T-12046

ToxScan Bioassay Division
42 Hangar Way
Watsonville, CA 95076

Attn: Ray Markel

PROJECT NAME:	San Francisco Army Corps of Engineers; Humboldt COE
DATE SAMPLED:	March 30 - April 3, 1995
DATE RECEIVED:	April 6, 1995
MATRIX:	Sediment

Please find the enclosed test results for the parameters requested for analysis. Samples were analyzed within holding time using the following methods:

Percent Solids by EPA 160.3
Total Volatile Solids by EPA 160.4
Arsenic by EPA/SW-846 7060
Chromium by EPA/SW-846 7190
Mercury by EPA/SW-846 7471
Nickel by EPA/SW-846 7520
Selenium by EPA/SW-846 7741
Silver by EPA/SW-846 7761
All other metals by EPA/SW-846 6020
Total and Dissolved Sulfides by EPA 9030
Total Oil and Grease by SM5520C
Total Petroleum Hydrocarbons by SM5520F
Speciated Butyltins by Gas Chromatograph with Flame Photometric Detector
Total Organic Carbon by Gaudette, et al.[1]
Particle Size by Plumb[2]
Pesticides/PCBs by EPA 8080
Semivolatiles by modified EPA 8270

Samples were received intact and were handled with the proper chain-of-custody procedures. Appropriate QA/QC guidelines were employed during the analyses on a minimum of a 5% basis. QC results were within limits and are reported with or following the data for each analysis.

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[1] Henri E. Gaudette, Wilson R. Flight, Lois Toner and David W. Folger; *Determination of Organic Carbon in Recent Sediments* in *Journal of Sedimentary Petrology*, Vol. 44, No. 1, p. 249-253; 1974.

[2] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

ToxScan Number: T-12046

Semivolatile Analysis:

Several samples in this set were overdried during extraction. As a consequence the surrogate recoveries for nitrobenzene-d5 were below QC limits. The affected samples were reextracted and reanalyzed. However, the second extraction took place between 9 to 11 days beyond the 14 day holding time.

Both sets of data are reported here. The data from the second extraction are labelled as such. The analytes lost during the first extraction were primarily naphthalene and 2-methylnaphthalene. The results for the other analytes were comparable in the two analyses, except for sample SAM 6-B which had a much higher PAH content in the second extract. This inconsistency may be attributed to a lack of homogeneity in the sample. The reextracted samples are listed below:

- HUM95SED0002-0006
- HUM95SED0008-0009
- HUM95SED0011-0012
- HUM95SED0014-0015

If you have any questions or require any additional information, please feel free to call.

Sincerely,

Philip D. Carpenter

Philip D. Carpenter, Ph.D.
President

Enclosures

This cover letter is an integral part of the report.

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 160.3	IN-1
Date Analyzed:	April 14, 1995	
Matrix:	Sediment	
Units:	percent (%)	

Sample ID	Percent Solids
T-12046-16 HUM95SED0001, RF	62
T-12046-17 HUM95SED0002, SAM 6-A	73
T-12046-18 HUM95SED0003, SAM 6-B	70
T-12046-19 HUM95SED0004, SAM 6-C	73
T-12046-20 HUM95SED0005, COMP # 1	71
T-12046-21 HUM95SED0006, FL4	64
T-12046-22 HUM95SED0007, FL-1	57
T-12046-23 HUM95SED0008, FL-2	56
T-12046-24 HUM95SED0009, FL-3	52
T-12046-25 HUM95SED0010, Comp # 4	57
Reporting Limit	1

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 160.3	IN-2
Date Analyzed:	April 14, 1995	
Matrix:	Sediment	
Units:	percent (%)	

Sample ID	Percent Solids
T-12046-26 HUM95SED0011, EK8	62
T-12046-27 HUM95SED0012, EK7	63
T-12046-28 HUM95SED0013, EK6	61
T-12046-29 HUM95SED0014, EK5	57
T-12046-30 HUM95SED0015, COMP #3	59
T-12046-31 HUM95SED0016, EK2	63
T-12046-32 HUM95SED0017, EK4	63
T-12046-33 HUM95SED0018, EK4-A	62
T-12046-34 HUM95SED0019, COMP #2	63
T-12046-40 HUM95PSD0006, SAM 5	69
Reporting Limit	1

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 160.3	IN-3
Date Analyzed:	April 14, 1995	
Matrix:	Sediment	
Units:	percent (%)	

Sample ID	Percent Solids
T-12046-41 HUM95PSD0007, SAM 7	80
T-12046-42 HUM95PSD0008, SAM 1	80
T-12046-43 HUM95PSD0009, SAM 3	80
T-12046-44 HUM95PSD0010, SAM 4	75
T-12046-45 HUM95PSD0011, SAM 2	79
T-12046-52 HUM95PSD0018, FL7	77
T-12046-53 HUM95PSD0019, FL6	81
T-12046-54 HUM95PSD0020, FL5	73
T-12046-55 HUM95PSD0021, EK1	81
T-12046-56 HUM95PSD0022, EK3	75
T-12046-57 HUM95PSD0023, FL6	80
Reporting Limit	1

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 160.4	IN-4
Date Analyzed:	April 26 - May 8, 1995	
Matrix:	Sediment	
Units:	percent (%)	

Sample ID	Total Volatile Solids wet weight	Total Volatile Solids dry weight
T-12046-16 HUM95SED0001, RF	2.4	3.9
T-12046-17 HUM95SED0002, SAM 6-A	1.4	1.9
T-12046-18 HUM95SED0003, SAM 6-B	2.0	2.8
T-12046-19 HUM95SED0004, SAM 6-C	1.3	1.7
T-12046-20 HUM95SED0005, COMP # 1	1.4	2.0
T-12046-21 HUM95SED0006, FL4	1.9	3.0
T-12046-22 HUM95SED0007, FL-1	2.3	4.0
T-12046-23 HUM95SED0008, FL-2	2.3	4.0
T-12046-24 HUM95SED0009, FL-3	2.2	4.2
T-12046-25 HUM95SED0010, Comp # 4	2.2	3.7
Reporting Limit		0.1

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 160.4	IN-5
Date Analyzed:	April 26 - May 8, 1995	
Matrix:	Sediment	
Units:	percent (%)	

Sample ID	Total Volatile Solids wet weight	Total Volatile Solids dry weight
T-12046-26 HUM95SED0011, EK8	2.8	4.5
T-12046-27 HUM95SED0012, EK7	2.7	4.3
T-12046-28 HUM95SED0013, EK6	2.3	3.8
T-12046-29 HUM95SED0014, EK5	3.3	5.8
T-12046-30 HUM95SED0015, COMP #3	2.5	4.3
T-12046-31 HUM95SED0016, EK2	3.0	4.7
T-12046-32 HUM95SED0017, EK4	3.1	4.9
T-12046-33 HUM95SED0018, EK4-A	2.5	3.9
T-12046-34 HUM95SED0019, COMP #2	2.5	4.0
T-12046-40 HUM95PSD0006, SAM 5	1.8	2.4
Reporting Limit		0.1

Client: San Francisco Army Corps of Engineers
Method: EPA 160.4
Date Analyzed: April 26 - May 8, 1995
Matrix: Sediment
Units: percent (%)

ToxScan Number: T-12046
IN-6

Sample ID	Total Volatile Solids wet weight	Total Volatile Solids dry weight
T-12046-41 HUM95PSD0007, SAM 7	1.0	1.2
T-12046-42 HUM95PSD0008, SAM 1	0.9	1.1
T-12046-43 HUM95PSD0009, SAM 3	1.2	1.4
T-12046-44 HUM95PSD0010, SAM 4	1.5	1.9
T-12046-45 HUM95PSD0011, SAM 2	0.9	1.1
T-12046-52 HUM95PSD0018, FL7	0.8	1.0
T-12046-53 HUM95PSD0019, FL6	0.6	0.7
T-12046-54 HUM95PSD0020, FL5	1.3	1.7
T-12046-55 HUM95PSD0021, EK1	0.6	0.7
T-12046-56 HUM95PSD0022, EK3	1.2	1.5
T-12046-57 HUM95PSD0023, FL6	0.8	0.9
Reporting Limit		0.1

Client: San Francisco Army Corps of Engineers ToxScan Number: T-12046
Method: EPA 9030 IN-7
Date Analyzed: May 3-8, 1995
Matrix: Sediment
Units: mg/Kg (ppm)

Sample ID	Total Sulfides wet weight	Total Sulfides dry weight	Water Soluble Sulfides wet weight	Water Soluble Sulfides dry weight
T-12046-16 HUM95SED0001, RF	0.8	1.3	ND	ND
T-12046-17 HUM95SED0002, SAM 6-A	84	120	ND	ND
T-12046-18 HUM95SED0003, SAM 6-B	51	140	ND	ND
T-12046-19 HUM95SED0004, SAM 6-C	16	22	0.1	0.2
T-12046-20 HUM95SED0005, COMP # 1	56	79	ND	ND
T-12046-21 HUM95SED0006, FL4	0.8	1.3	ND	ND
T-12046-22 HUM95SED0007, FL-1	110	200	0.1	0.2
T-12046-23 HUM95SED0008, FL-2	120	210	0.3	0.5
T-12046-24 HUM95SED0009, FL-3	270	510	ND	ND
T-12046-25 HUM95SED0010, Comp # 4	89	160	ND	ND
Reporting Limit		0.1		0.1

ND = None Detected

Client: San Francisco Army Corps of Engineers
Method: EPA 9030
Date Analyzed: May 3-8, 1995
Matrix: Sediment
Units: mg/Kg (ppm)

ToxScan Number: T-12046
IN-8

Sample ID	Total Sulfides wet weight	Total Sulfides dry weight	Water Soluble Sulfides wet weight	Water Soluble Sulfides dry weight
T-12046-26 HUM95SED0011, EK8	45	73	0.1	0.2
T-12046-27 HUM95SED0012, EK7	150	230	ND	ND
T-12046-28 HUM95SED0013, EK6	100	170	ND	ND
T-12046-29 HUM95SED0014, EK5	190	320	ND	ND
T-12046-30 HUM95SED0015, COMP #3	180	300	ND	ND
T-12046-31 HUM95SED0016, EK2	310	490	ND	ND
T-12046-32 HUM95SED0017, EK4	68	110	0.2	0.3
T-12046-33 HUM95SED0018, EK4-A	140	220	0.2	0.3
T-12046-34 HUM95SED0019, COMP #2	110	170	0.2	0.3
T-12046-40 HUM95PSD0006, SAM 5	110	160	ND	ND
Reporting Limit		0.1		0.1

ND = None Detected

Client: San Francisco Army Corps of Engineers ToxScan Number: T-12046
Method: EPA 9030 IN-9
Date Analyzed: May 3-8, 1995
Matrix: Sediment
Units: mg/Kg (ppm)

Sample ID	Total Sulfides wet weight	Total Sulfides dry weight	Water Soluble Sulfides wet weight	Water Soluble Sulfides dry weight
T-12046-41 HUM95PSD0007, SAM 7	81	100	ND	ND
T-12046-42 HUM95PSD0008, SAM 1	1.6	2.0	ND	ND
T-12046-43 HUM95PSD0009, SAM 3	6.6	8.3	ND	ND
T-12046-44 HUM95PSD0010, SAM 4	4.5	6.0	ND	ND
T-12046-45 HUM95PSD0011, SAM 2	3.1	3.9	ND	ND
T-12046-52 HUM95PSD0018, FL7	0.7	0.9	ND	ND
T-12046-53 HUM95PSD0019, FL6	0.2	0.2	ND	ND
T-12046-54 HUM95PSD0020, FL5	0.3	0.4	ND	ND
T-12046-55 HUM95PSD0021, EK1	0.2	0.2	ND	ND
T-12046-56 HUM95PSD0022, EK3	10	13	ND	ND
T-12046-57 HUM95PSD0023, FL6	ND	ND	ND	ND
Reporting Limit		0.1		0.1

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	Gaudette, et al.[1]	IN-10
Date Analyzed:	April 13, 1995	
Matrix:	Sediment	
Units:	percent (%)	

Sample ID	Total Organic Carbon wet weight	Total Organic Carbon dry weight
T-12046-16 HUM95SED0001, RF	0.45	0.72
T-12046-17 HUM95SED0002, SAM 6-A	0.36	0.49
T-12046-18 HUM95SED0003, SAM 6-B	0.46	0.66
T-12046-19 HUM95SED0004, SAM 6-C	0.27	0.37
T-12046-20 HUM95SED0005, COMP # 1	0.38	0.54
T-12046-21 HUM95SED0006, FL4	0.45	0.70
T-12046-22 HUM95SED0007, FL-1	0.38	0.66
T-12046-23 HUM95SED0008, FL-2	0.36	0.65
T-12046-24 HUM95SED0009, FL-3	0.39	0.74
T-12046-25 HUM95SED0010, Comp # 4	0.35	0.62
Reporting Limit		0.1

[1] Henri E. Gaudette, Wilson R. Flight, Lois Toner and David W. Folger; *Determination of Organic Carbon in Recent Sediments* in *Journal of Sedimentary Petrology*, Vol. 44, No. 1, p. 249-253; 1974.

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	Gaudette, et al.[1]	IN-11
Date Analyzed:	April 13, 1995	
Matrix:	Sediment	
Units:	percent (%)	

Sample ID	Total Organic Carbon wet weight	Total Organic Carbon dry weight
T-12046-26 HUM95SED0011, EK8	0.35	0.56
T-12046-27 HUM95SED0012, EK7	0.36	0.57
T-12046-28 HUM95SED0013, EK6	0.32	0.52
T-12046-29 HUM95SED0014, EK5	0.43	0.75
T-12046-30 HUM95SED0015, COMP #3	0.39	0.66
T-12046-31 HUM95SED0016, EK2	0.38	0.60
T-12046-32 HUM95SED0017, EK4	0.43	0.69
T-12046-33 HUM95SED0018, EK4-A	0.40	0.64
T-12046-34 HUM95SED0019, COMP #2	0.42	0.67
T-12046-40 HUM95PSD0006, SAM 5	0.21	0.30
Reporting Limit		0.1

[1] Henri E. Gaudette, Wilson R. Flight, Lois Toner and David W. Folger; *Determination of Organic Carbon in Recent Sediments* in *Journal of Sedimentary Petrology*, Vol. 44, No. 1, p. 249-253; 1974.

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	Gaudette, et al.[1]	IN-12
Date Analyzed:	April 13, 1995	
Matrix:	Sediment	
Units:	percent (%)	

Sample ID	Total Organic Carbon wet weight	Total Organic Carbon dry weight
T-12046-41 HUM95PSD0007, SAM 7	0.14	0.17
T-12046-42 HUM95PSD0008, SAM 1	0.18	0.23
T-12046-43 HUM95PSD0009, SAM 3	0.18	0.23
T-12046-44 HUM95PSD0010, SAM 4	0.26	0.34
T-12046-45 HUM95PSD0011, SAM 2	0.12	0.15
T-12046-52 HUM95PSD0018, FL7	0.17	0.23
T-12046-53 HUM95PSD0019, FL6	0.09	0.11
T-12046-54 HUM95PSD0020, FL5	0.29	0.39
T-12046-55 HUM95PSD0021, EK1	0.11	0.13
T-12046-56 HUM95PSD0022, EK3	0.36	0.48
T-12046-57 HUM95PSD0023, FL6	0.13	0.16
Reporting Limit		0.1

[1] Henri E. Gaudette, Wilson R. Flight, Lois Toner and David W. Folger; *Determination of Organic Carbon in Recent Sediments* in *Journal of Sedimentary Petrology*, Vol. 44, No. 1, p. 249-253; 1974.

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	SM5520C	IN-13
Date Analyzed:	April 19, 1995	
Matrix:	Sediment	
Units:	mg/Kg (ppm)	

Sample ID	Total Oil & Grease wet weight	Total Oil & Grease dry weight
T-12046-16 HUM95SED0001, RF	ND	ND
T-12046-17 HUM95SED0002, SAM 6-A	ND	ND
T-12046-18 HUM95SED0003, SAM 6-B	ND	ND
T-12046-19 HUM95SED0004, SAM 6-C	ND	ND
T-12046-20 HUM95SED0005, COMP # 1	ND	ND
T-12046-21 HUM95SED0006, FL4	ND	ND
T-12046-22 HUM95SED0007, FL-1	16	28
T-12046-23 HUM95SED0008, FL-2	15	27
T-12046-24 HUM95SED0009, FL-3	23	44
T-12046-25 HUM95SED0010, Comp # 4	15	27
Reporting Limit		20

ND = None Detected

Client: San Francisco Army Corps of Engineers
Method: SM5520C
Date Analyzed: April 19, 1995
Matrix: Sediment
Units: mg/Kg (ppm)

ToxScan Number: T-12046
IN-14

Sample ID	Total Oil & Grease wet weight	Total Oil & Grease dry weight
T-12046-26 HUM95SED0011, EK8	36	59
T-12046-27 HUM95SED0012, EK7	39	62
T-12046-28 HUM95SED0013, EK6	27	44
T-12046-29 HUM95SED0014, EK5	28	49
T-12046-30 HUM95SED0015, COMP #3	47	80
T-12046-31 HUM95SED0016, EK2	30	48
T-12046-32 HUM95SED0017, EK4	17	27
T-12046-33 HUM95SED0018, EK4-A	ND	ND
T-12046-34 HUM95SED0019, COMP #2	14	23
T-12046-40 HUM95PSD0006, SAM 5	ND	ND
Reporting Limit		20

ND = None Detected

Client: San Francisco Army Corps of Engineers
Method: SM5520C
Date Analyzed: April 19, 1995
Matrix: Sediment
Units: mg/Kg (ppm)

ToxScan Number: T-12046
IN-15

Sample ID	Total Oil & Grease wet weight	Total Oil & Grease dry weight
T-12046-41 HUM95PSD0007, SAM 7	ND	ND
T-12046-42 HUM95PSD0008, SAM 1	ND	ND
T-12046-43 HUM95PSD0009, SAM 3	ND	ND
T-12046-44 HUM95PSD0010, SAM 4	ND	ND
T-12046-45 HUM95PSD0011, SAM 2	ND	ND
T-12046-52 HUM95PSD0018, FL7	ND	ND
T-12046-53 HUM95PSD0019, FL6	ND	ND
T-12046-54 HUM95PSD0020, FL5	ND	ND
T-12046-55 HUM95PSD0021, EK1	ND	ND
T-12046-56 HUM95PSD0022, EK3	ND	ND
T-12046-57 HUM95PSD0023, FL6	ND	ND
Reporting Limit		20

ND = None Detected

Client: San Francisco Army Corps of Engineers
Method: SM5520F
Date Analyzed: April 19, 1995
Matrix: Sediment
Units: mg/Kg (ppm)

ToxScan Number: T-12046
IN-16

Sample ID	Total Petroleum Hydrocarbons wet weight	Total Petroleum Hydrocarbons dry weight
T-12046-16 HUM95SED0001, RF	ND	ND
T-12046-17 HUM95SED0002, SAM 6-A	ND	ND
T-12046-18 HUM95SED0003, SAM 6-B	ND	ND
T-12046-19 HUM95SED0004, SAM 6-C	ND	ND
T-12046-20 HUM95SED0005, COMP # 1	ND	ND
T-12046-21 HUM95SED0006, FL4	ND	ND
T-12046-22 HUM95SED0007, FL-1	ND	ND
T-12046-23 HUM95SED0008, FL-2	ND	ND
T-12046-24 HUM95SED0009, FL-3	ND	ND
T-12046-25 HUM95SED0010, Comp # 4	ND	ND
Reporting Limit		20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	SM5520F	IN-17
Date Analyzed:	April 19, 1995	
Matrix:	Sediment	
Units:	mg/Kg (ppm)	

Sample ID	Total Petroleum Hydrocarbons wet weight	Total Petroleum Hydrocarbons dry weight
T-12046-26 HUM95SED0011, EK8	23	38
T-12046-27 HUM95SED0012, EK7	27	43
T-12046-28 HUM95SED0013, EK6	25	42
T-12046-29 HUM95SED0014, EK5	16	27
T-12046-30 HUM95SED0015, COMP #3	27	46
T-12046-31 HUM95SED0016, EK2	17	27
T-12046-32 HUM95SED0017, EK4	ND	ND
T-12046-33 HUM95SED0018, EK4-A	ND	ND
T-12046-34 HUM95SED0019, COMP #2	ND	ND
T-12046-40 HUM95PSD0006, SAM 5	ND	ND
Reporting Limit		20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	SM5520F	IN-18
Date Analyzed:	April 19, 1995	
Matrix:	Sediment	
Units:	mg/Kg (ppm)	

Sample ID	Total Petroleum Hydrocarbons wet weight	Total Petroleum Hydrocarbons dry weight
T-12046-41 HUM95PSD0007, SAM 7	ND	ND
T-12046-42 HUM95PSD0008, SAM 1	ND	ND
T-12046-43 HUM95PSD0009, SAM 3	ND	ND
T-12046-44 HUM95PSD0010, SAM 4	ND	ND
T-12046-45 HUM95PSD0011, SAM 2	ND	ND
T-12046-52 HUM95PSD0018, FL7	ND	ND
T-12046-53 HUM95PSD0019, FL6	ND	ND
T-12046-54 HUM95PSD0020, FL5	ND	ND
T-12046-55 HUM95PSD0021, EK1	ND	ND
T-12046-56 HUM95PSD0022, EK3	ND	ND
T-12046-57 HUM95PSD0023, FL6	ND	ND
Reporting Limit		20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	GC/FPD[1]	IN-19
Date Extracted:	April 19, 1995	
Date Analyzed:	April 21, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb), as received	

Sample ID	Monobutyltin	Dibutyltin	Tributyltin	% TPT SUR
T-12046-16 HUM95SED0001, RF	ND	ND	ND	47
T-12046-17 HUM95SED0002, SAM 6-A	ND	ND	ND	54
T-12046-18 HUM95SED0003, SAM 6-B	ND	ND	ND	52
T-12046-19 HUM95SED0004, SAM 6-C	ND	ND	ND	56
T-12046-20 HUM95SED0005, COMP # 1	ND	ND	ND	59
T-12046-21 HUM95SED0006, FL4	ND	ND	ND	52
T-12046-22 HUM95SED0007, FL-1	ND	ND	ND	55
T-12046-23 HUM95SED0008, FL-2	ND	1	2	54
T-12046-24 HUM95SED0009, FL-3	ND	ND	1	57

1 Quantitative chemical analysis for tributyltin by pentyl derivatization using a Gas Chromatograph with a Flame Photometric Detector.

TPT SUR = Tripropyltin surrogate recovery as percent

ND = None Detected

NA = Not Applicable

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	GC/FPD[1]	IN-20
Date Extracted:	April 19, 1995	
Date Analyzed:	April 21, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb), as received	

Sample ID	Monobutyltin	Dibutyltin	Tributyltin	% TPT SUR
T-12046-25 HUM95SED0010, Comp # 4	ND	ND	ND	68
T-12046-26 HUM95SED0011, EK8	ND	ND	ND	63
T-12046-27 HUM95SED0012, EK7	ND	ND	ND	60
T-12046-28 HUM95SED0013, EK6	ND	ND	ND	55
T-12046-29 HUM95SED0014, EK5	ND	ND	ND	61
T-12046-30 HUM95SED0015, COMP #3	ND	1	6	62
T-12046-31 HUM95SED0016, EK2	ND	ND	ND	52
T-12046-32 HUM95SED0017, EK4	ND	ND	ND	53
T-12046-33 HUM95SED0018, EK4-A	ND	ND	ND	56
Reporting Limit	1	1	1	NA

1 Quantitative chemical analysis for tributyltin by pentyl derivatization using a Gas Chromatograph with a Flame Photometric Detector.

TPT SUR = Tripropyltin surrogate recovery as percent

ND = None Detected

NA = Not Applicable

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	GC/FPD[1]	IN-21
Date Extracted:	May 1, 1995	
Date Analyzed:	May 2, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb), as received	

Sample ID	Monobutyltin	Dibutyltin	Tributyltin	% TPT SUR
T-12046-34 HUM95SED0019, COMP #2	ND	1	ND	64
T-12046-40 HUM95PSD0006, SAM 5	ND	ND	ND	54
T-12046-41 HUM95PSD0007, SAM 7	ND	ND	ND	50
T-12046-42 HUM95PSD0008, SAM 1	ND	ND	ND	58
T-12046-43 HUM95PSD0009, SAM 3	ND	ND	ND	50
T-12046-44 HUM95PSD0010, SAM 4	ND	ND	ND	49
Reporting Limit	1	1	1	NA

1 Quantitative chemical analysis for tributyltin by pentyl derivatization using a Gas Chromatograph with a Flame Photometric Detector.

TPT SUR = Tripropyltin surrogate recovery as percent

ND = None Detected

NA = Not Applicable

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	GC/FPD[1]	IN-22
Date Extracted:	May 1, 1995	
Date Analyzed:	May 2, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb), as received	

Sample ID	Monobutyltin	Dibutyltin	Tributyltin	% TPT SUR
T-12046-45 HUM95PSD0011, SAM 2	ND	ND	ND	58
T-12046-52 HUM95PSD0018, FL7	ND	ND	ND	43
T-12046-53 HUM95PSD0019, FL6	ND	ND	ND	54
T-12046-54 HUM95PSD0020, FL5	ND	ND	ND	58
T-12046-55 HUM95PSD0021, EK1	ND	ND	ND	56
T-12046-56 HUM95PSD0022, EK3	ND	ND	ND	49
T-12046-57 HUM95PSD0023, FL6	ND	ND	ND	53
Reporting Limit	1	1	1	NA

1 Quantitative chemical analysis for tributyltin by pentyl derivatization using a Gas Chromatograph with a Flame Photometric Detector.
TPT SUR = Tripropyltin surrogate recovery as percent
ND = None Detected
NA = Not Applicable

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	GC/FPD[1]	IN-23
Date Extracted:	April 19, 1995	
Date Analyzed:	April 21, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb), dry weight basis	

Sample ID	Monobutyltin	Dibutyltin	Tributyltin	% TPT SUR
T-12046-16 HUM95SED0001, RF	ND	ND	ND	47
T-12046-17 HUM95SED0002, SAM 6-A	ND	ND	ND	54
T-12046-18 HUM95SED0003, SAM 6-B	ND	ND	ND	52
T-12046-19 HUM95SED0004, SAM 6-C	ND	ND	ND	56
T-12046-20 HUM95SED0005, COMP # 1	ND	ND	ND	59
T-12046-21 HUM95SED0006, FL4	ND	ND	ND	52
T-12046-22 HUM95SED0007, FL-1	ND	ND	ND	55
T-12046-23 HUM95SED0008, FL-2	ND	2	4	54
T-12046-24 HUM95SED0009, FL-3	ND	ND	2	57
Reporting Limit	1	1	1	NA

1 Quantitative chemical analysis for tributyltin by pentyl derivatization using a Gas Chromatograph with a Flame Photometric Detector.

TPT SUR = Tripropyltin surrogate recovery as percent

ND = None Detected

NA = Not Applicable

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	GC/FPD[1]	IN-24
Date Extracted:	April 19, 1995	
Date Analyzed:	April 21, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb), dry weight basis	

Sample ID	Monobutyltin	Dibutyltin	Tributyltin	% TPT SUR
T-12046-25 HUM95SED0010, Comp # 4	ND	ND	ND	68
T-12046-26 HUM95SED0011, EK8	ND	ND	ND	63
T-12046-27 HUM95SED0012, EK7	ND	ND	ND	60
T-12046-28 HUM95SED0013, EK6	ND	ND	ND	55
T-12046-29 HUM95SED0014, EK5	ND	ND	ND	61
T-12046-30 HUM95SED0015, COMP #3	ND	2	10	62
T-12046-31 HUM95SED0016, EK2	ND	ND	ND	52
T-12046-32 HUM95SED0017, EK4	ND	ND	ND	53
T-12046-33 HUM95SED0018, EK4-A	ND	ND	ND	56
Reporting Limit	1	1	1	NA

1 Quantitative chemical analysis for tributyltin by pentyl derivatization using a Gas Chromatograph with a Flame Photometric Detector.

TPT SUR = Tripropyltin surrogate recovery as percent

ND = None Detected

NA = Not Applicable

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	GC/FPD[1]	IN-25
Date Extracted:	May 1, 1995	
Date Analyzed:	May 2, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb), dry weight basis	

Sample ID	Monobutyltin	Dibutyltin	Tributyltin	% TPT SUR
T-12046-34 HUM95SED0019, COMP #2	ND	2	ND	64
T-12046-40 HUM95PSD0006, SAM 5	ND	ND	ND	54
T-12046-41 HUM95PSD0007, SAM 7	ND	ND	ND	50
T-12046-42 HUM95PSD0008, SAM 1	ND	ND	ND	58
T-12046-43 HUM95PSD0009, SAM 3	ND	ND	ND	50
T-12046-44 HUM95PSD0010, SAM 4	ND	ND	ND	49
Reporting Limit	1	1	1	NA

1 Quantitative chemical analysis for tributyltin by pentyl derivatization using a Gas Chromatograph with a Flame Photometric Detector.

TPT SUR = Tripropyltin surrogate recovery as percent

ND = None Detected

NA = Not Applicable

Client: San Francisco Army Corps of Engineers
Method: GC/FPD[1]
Date Extracted: May 1, 1995
Date Analyzed: May 2, 1995
Matrix: Sediment
Units: µg/Kg (ppb), dry weight basis

ToxScan Number: T-12046
IN-26

Sample ID	Monobutyltin	Dibutyltin	Tributyltin	% TPT SUR
T-12046-45 HUM95PSD0011, SAM 2	ND	ND	ND	58
T-12046-52 HUM95PSD0018, FL7	ND	ND	ND	43
T-12046-53 HUM95PSD0019, FL6	ND	ND	ND	54
T-12046-54 HUM95PSD0020, FL5	ND	ND	ND	58
T-12046-55 HUM95PSD0021, EK1	ND	ND	ND	56
T-12046-56 HUM95PSD0022, EK3	ND	ND	ND	49
T-12046-57 HUM95PSD0023, FL6	ND	ND	ND	53
Reporting Limit	1	1	1	NA

1 Quantitative chemical analysis for tributyltin by pentyl derivatization using a Gas Chromatograph with a Flame Photometric Detector.
TPT SUR = Tripropyltin surrogate recovery as percent
ND = None Detected
NA = Not Applicable

Client: San Francisco Army Corps of Engineers
Method: GC/FPD[1]
Matrix: Sediment
Units: µg/Kg (ppb), dry weight basis

ToxScan Number: T-12046
IN-27

QA/QC REPORT: Spike recoveries/laboratory blank

Date Extracted: April 19, 1995
Date Analyzed: April 21, 1995

Identification	Monobutyltin	Dibutyltin	Tributyltin	% TPT SUR
Blank	ND	ND	ND	60
Blank Spike (% recovery)	65	82	93	63
Spike (% recovery)[2]	7	75	90	55
Spike Duplicate (% recovery)[2]	5	72	84	60

Date Extracted: May 1, 1995
Date Analyzed: May 2, 1995

Identification	Monobutyltin	Dibutyltin	Tributyltin	% TPT SUR
Blank	ND	ND	ND	51
Blank Spike (% recovery)	71	97	110	51
Spike (% recovery)[3]	5	84	100	55
Spike Duplicate (% recovery)[3]	4	88	107	51

1 Quantitative chemical analysis for tributyltin by pentyl derivatization using a Gas Chromatograph with a Flame Photometric Detector.
2 Spike of sample number T-12066-01.
3 Spike of sample number T-12046-57 (FL6).
TPT SUR = Tripropyltin surrogate recovery as percent
ND = None Detected
NA = Not Applicable

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA/SW-846 6020/7000 series	IN-28
Date Completed:	May 11, 1995	
Matrix:	Sediment	
Units:	mg/Kg (ppm), as received	

Client Sample ID:	HUM95SED0001	HUM95SED0002	HUM95SED0003
Client Site ID:	RF	SAM 6-A	SAM 6-B
ToxScan Lab ID:	T-12046-16	T-12046-17	T-12046-18
Element			
Arsenic	3.2	2.7	2.7
Cadmium	0.1	0.1	0.1
Chromium	76	77	81
Copper	17	10	9.2
Lead	6.2	3.8	4.0
Mercury	0.08	0.09	0.06
Nickel	81	65	60
Selenium	0.1	0.1	0.1
Silver	1.1	0.9	0.8
Zinc	43	31	38

Client Sample ID:	HUM95SED0004	HUM95SED0005	HUM95SED0006
Client Site ID:	SAM 6-C	COMP # 1	FL4
ToxScan Lab ID:	T-12046-19	T-12046-20	T-12046-21
Element			
Arsenic	2.3	2.6	3.0
Cadmium	0.1	0.1	0.1
Chromium	81	84	74
Copper	6.2	8.0	16
Lead	3.6	3.5	5.5
Mercury	0.05	0.06	0.07
Nickel	52	61	83
Selenium	0.1	0.1	0.1
Silver	0.9	1.0	1.0
Zinc	22	31	31

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA/SW-846 6020/7000 series	IN-29
Date Completed:	May 11, 1995	
Matrix:	Sediment	
Units:	mg/Kg (ppm), as received	

Client Sample ID:	HUM95SED0007	HUM95SED0008	HUM95SED009
Client Site ID:	FL-1	FL-2	FL-3
ToxScan Lab ID:	T-12046-22	T-12046-23	T-12046-24
Element			
Arsenic	2.8	2.5	2.6
Cadmium	0.1	0.1	0.1
Chromium	74	72	69
Copper	16	16	12
Lead	5.5	5.2	4.7
Mercury	0.07	0.06	0.06
Nickel	83	72	71
Selenium	0.1	0.1	0.1
Silver	1.0	0.8	0.8
Zinc	31	39	34

Client Sample ID:	HUM95SED0010	HUM95SED0011	HUM95SED012
Client Site ID:	Comp # 4	EK8	EK7
ToxScan Lab ID:	T-12046-25	T-12046-26	T-12046-27
Element			
Arsenic	2.8	1.3	2.1
Cadmium	0.1	ND	0.1
Chromium	69	61	80
Copper	14	13	19
Lead	4.9	4.9	7.5
Mercury	0.06	0.07	0.08
Nickel	71	64	83
Selenium	0.1	0.1	0.1
Silver	0.7	0.8	0.9
Zinc	32	40	49

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA/SW-846 6020/7000 series	IN-30
Date Completed:	May 11, 1995	
Matrix:	Sediment	
Units:	mg/Kg (ppm), as received	

Client Sample ID:	HUM95SED0013	HUM95SED0014	HUM95SED0015
Client Site ID:	EK-6	EK-5	Comp # 3
ToxScan Lab ID:	T-12046-28	T-12046-29	T-12046-30
Element			
Arsenic	3.0	2.9	2.8
Cadmium	0.2	0.1	0.1
Chromium	80	76	77
Copper	17	15	18
Lead	6.8	6.4	6.5
Mercury	0.10	0.07	0.08
Nickel	81	72	74
Selenium	0.1	0.1	0.1
Silver	1.0	0.9	0.9
Zinc	51	41	56

Client Sample ID:	HUM95SED0016	HUM95SED0017	HUM95SED018
Client Site ID:	EK2	EK4	EK4-A
ToxScan Lab ID:	T-12046-31	T-12046-32	T-12046-33
Element			
Arsenic	2.5	2.8	2.9
Cadmium	ND	0.1	0.2
Chromium	76	86	78
Copper	12	17	14
Lead	5.4	7.3	7.4
Mercury	0.07	0.07	0.07
Nickel	73	83	73
Selenium	0.1	0.1	0.1
Silver	0.9	0.8	0.8
Zinc	42	47	33

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA/SW-846 6020/7000 series	IN-31
Date Completed:	May 11, 1995	
Matrix:	Sediment	
Units:	mg/Kg (ppm), as received	

Client Sample ID:	HUM95SED0019	HUM95PSD0006	HUM95PSD0007
Client Site ID:	COMP #2	SAM 5	SAM 7
ToxScan Lab ID:	T-12046-34	T-12046-40	T-12046-41
Element			
Arsenic	2.5	2.3	2.5
Cadmium	0.1	ND	ND
Chromium	80	73	57
Copper	17	8.2	6.1
Lead	9.5	3.8	3.7
Mercury	0.06	0.06	0.04
Nickel	77	60	42
Selenium	0.1	ND	ND
Silver	0.9	0.7	0.8
Zinc	51	39	37

Client Sample ID:	HUM95PSD0008	HUM95PSD0009	HUM95PSD0010
Client Site ID:	SAM 1	SAM 3	SAM 4
ToxScan Lab ID:	T-12046-42	T-12046-43	T-12046-44
Element			
Arsenic	4.1	2.2	2.6
Cadmium	ND	ND	ND
Chromium	73	52	73
Copper	4.4	5.6	6.0
Lead	2.5	3.5	2.9
Mercury	0.04	0.04	0.05
Nickel	47	43	48
Selenium	ND	ND	ND
Silver	0.6	0.8	0.7
Zinc	28	23	27

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA/SW-846 6020/7000 series	IN-32
Date Completed:	May 11, 1995	
Matrix:	Sediment	
Units:	mg/Kg (ppm), as received	

Client Sample ID:	HUM95PSD0011	HUM95PSD0018	HUM95PSD0019
Client Site ID:	SAM 2	FL7	FL6
ToxScan Lab ID:	T-12046-45	T-12046-52	T-12046-53
Element			
Arsenic	3.0	2.6	2.4
Cadmium	0.1	0.1	ND
Chromium	67	72	67
Copper	5.4	5.8	2.2
Lead	3.6	3.4	1.7
Mercury	0.04	0.04	0.03
Nickel	44	56	47
Selenium	ND	ND	ND
Silver	0.6	0.6	0.5
Zinc	33	34	13

Client Sample ID:	HUM95PSD0020	HUM95PSD0021	HUM95PSD0022
Client Site ID:	FL5	EK1	EK3
ToxScan Lab ID:	T-12046-54	T-12046-55	T-12046-56
Element			
Arsenic	2.4	1.3	2.3
Cadmium	ND	ND	0.1
Chromium	78	66	60
Copper	11	3.3	6.1
Lead	4.0	3.0	5.1
Mercury	0.06	0.05	0.07
Nickel	65	42	45
Selenium	ND	ND	ND
Silver	0.7	0.6	0.6
Zinc	37	21	31

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA/SW-846 6020/7000 series	IN-33
Date Completed:	May 11, 1995	
Matrix:	Sediment	
Units:	mg/Kg (ppm), as received	

Client Sample ID:	HUM95PSD0023
Client Site ID:	FL6
ToxScan Lab ID:	T-12046-57

Element	
Arsenic	2.6
Cadmium	ND
Chromium	68
Copper	3.7
Lead	3.0
Mercury	0.05
Nickel	48
Selenium	ND
Silver	0.6
Zinc	23

ND = None Detected

Client: San Francisco Army Corps of Engineers
Method: EPA/SW-846 6020/7000 series
Date Completed: May 11, 1995
Matrix: Sediment
Units: mg/Kg (ppm), dry weight basis

ToxScan Number: T-12046
IN-34

Client Sample ID:	HUM95SED0001	HUM95SED0002	HUM95SED0003	
Client Site ID:	RF	SAM 6-A	SAM 6-B	Reporting
ToxScan Lab ID:	T-12046-16	T-12046-17	T-12046-18	Limits
Element				
Arsenic	5.2	3.7	3.9	0.1
Cadmium	0.1	0.1	0.1	0.1
Chromium	120	110	120	0.1
Copper	28	13	13	0.1
Lead	10	5.3	5.8	0.1
Mercury	0.12	0.13	0.09	0.02
Nickel	130	88	86	0.1
Selenium	0.2	0.1	0.1	0.1
Silver	1.7	1.2	1.2	0.1
Zinc	69	4.2	55	1.0

Client Sample ID:	HUM95SED0004	HUM95SED0005	HUM95SED0006	
Client Site ID:	SAM 6-C	COMP # 1	FL4	Reporting
ToxScan Lab ID:	T-12046-19	T-12046-20	T-12046-21	Limits
Element				
Arsenic	3.2	3.7	4.8	0.1
Cadmium	0.1	0.2	0.1	0.1
Chromium	110	120	120	0.1
Copper	8.5	11	24	0.1
Lead	4.9	4.9	8.6	0.1
Mercury	0.07	0.09	0.11	0.02
Nickel	72	86	130	0.1
Selenium	0.1	0.1	0.2	0.1
Silver	1.2	1.4	1.6	0.1
Zinc	30	44	49	1.0

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA/SW-846 6020/7000 series	IN-35
Date Completed:	May 11, 1995	
Matrix:	Sediment	
Units:	mg/Kg (ppm), dry weight basis	

Client Sample ID:	HUM95SED0007	HUM95SED0008	HUM95SED009	
Client Site ID:	FL-1	FL-2	FL-3	Reporting
ToxScan Lab ID:	T-12046-22	T-12046-23	T-12046-24	Limits
Element				
Arsenic	4.9	4.5	4.9	0.1
Cadmium	0.2	0.2	0.4	0.1
Chromium	130	120	140	0.1
Copper	27	22	33	0.1
Lead	9.2	8.3	10	0.1
Mercury	0.11	0.10	0.12	0.02
Nickel	130	130	140	0.1
Selenium	0.3	0.24	0.3	0.1
Silver	1.4	1.5	1.6	0.1
Zinc	68	60	96	1.0

Client Sample ID:	HUM95SED0010	HUM95SED0011	HUM95SED012	
Client Site ID:	Comp # 4	EK8	EK7	Reporting
ToxScan Lab ID:	T-12046-25	T-12046-26	T-12046-27	Limits
Element				
Arsenic	4.9	2.1	3.3	0.1
Cadmium	0.2	ND	0.1	0.1
Chromium	120	99	130	0.1
Copper	25	21	30	0.1
Lead	8.6	8.0	12	0.1
Mercury	0.10	0.11	0.13	0.02
Nickel	120	100	130	0.1
Selenium	0.2	0.2	0.2	0.1
Silver	1.3	1.3	1.5	0.1
Zinc	56	64	78	1.0

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA/SW-846 6020/7000 series	IN-36
Date Completed:	May 11, 1995	
Matrix:	Sediment	
Units:	mg/Kg (ppm), dry weight basis	

Client Sample ID:	HUM95SED0013	HUM95SED0014	HUM95SED0015	
Client Site ID:	EK-6	EK-5	Comp # 3	Reporting
ToxScan Lab ID:	T-12046-28	T-12046-29	T-12046-30	Limits
Element				
Arsenic	5.0	5.1	4.7	0.1
Cadmium	0.3	0.2	0.2	0.1
Chromium	130	130	130	0.1
Copper	28	26	30	0.1
Lead	11	11	11	0.1
Mercury	0.16	0.13	0.13	0.02
Nickel	130	130	130	0.1
Selenium	0.2	0.2	0.2	0.1
Silver	1.6	1.6	1.6	0.1
Zinc	84	72	94	1.0

Client Sample ID:	HUM95SED0016	HUM95SED0017	HUM95SED018	
Client Site ID:	EK2	EK4	EK4-A	Reporting
ToxScan Lab ID:	T-12046-31	T-12046-32	T-12046-33	Limits
Element				
Arsenic	3.9	4.4	4.6	0.1
Cadmium	ND	0.1	0.3	0.1
Chromium	120	140	130	0.1
Copper	19	26	22	0.1
Lead	8.6	12	12	0.1
Mercury	0.12	0.12	0.11	0.02
Nickel	120	130	120	0.1
Selenium	0.2	0.2	0.2	0.1
Silver	1.4	1.3	1.3	0.1
Zinc	66	75	53	1.0

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA/SW-846 6020/7000 series	IN-37
Date Completed:	May 11, 1995	
Matrix:	Sediment	
Units:	mg/Kg (ppm), dry weight basis	

Client Sample ID:	HUM95SED0019	HUM95PSD0006	HUM95PSD0007	
Client Site ID:	COMP #2	SAM 5	SAM 7	Reporting
ToxScan Lab ID:	T-12046-34	T-12046-40	T-12046-41	Limits
Element				
Arsenic	4.0	3.4	3.1	0.1
Cadmium	0.1	ND	ND	0.1
Chromium	130	110	71	0.1
Copper	27	12	7.6	0.1
Lead	15	5.6	4.6	0.1
Mercury	0.10	0.09	0.06	0.02
Nickel	120	87	52	0.1
Selenium	0.2	ND	ND	0.1
Silver	1.4	1.0	1.0	0.1
Zinc	81	56	46	1.0

Client Sample ID:	HUM95PSD0008	HUM95PSD0009	HUM95PSD0010	
Client Site ID:	SAM 1	SAM 3	SAM 4	Reporting
ToxScan Lab ID:	T-12046-42	T-12046-43	T-12046-44	Limits
Element				
Arsenic	5.1	2.8	3.5	0.1
Cadmium	ND	ND	ND	0.1
Chromium	91	64	97	0.1
Copper	5.6	7.0	8.1	0.1
Lead	3.2	4.3	3.9	0.1
Mercury	0.05	0.06	0.07	0.02
Nickel	59	53	64	0.1
Selenium	ND	ND	ND	0.1
Silver	0.7	1.0	1.0	0.1
Zinc	35	29	36	1.0

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA/SW-846 6020/7000 series	IN-38
Date Completed:	May 11, 1995	
Matrix:	Sediment	
Units:	mg/Kg (ppm), dry weight basis	

Client Sample ID:	HUM95PSD0011	HUM95PSD0018	HUM95PSD0019	
Client Site ID:	SAM 2	FL7	FL6	Reporting
ToxScan Lab ID:	T-12046-45	T-12046-52	T-12046-53	Limits
Element				
Arsenic	3.7	3.3	3.0	0.1
Cadmium	0.1	0.1	ND	0.1
Chromium	85	94	82	0.1
Copper	6.9	7.6	2.7	0.1
Lead	4.6	4.4	2.2	0.1
Mercury	0.05	0.06	0.04	0.02
Nickel	56	72	58	0.1
Selenium	ND	ND	ND	0.1
Silver	0.8	0.8	0.6	0.1
Zinc	42	44	17	1.0

Client Sample ID:	HUM95PSD0020	HUM95PSD0021	HUM95PSD0022	
Client Site ID:	FL5	EK1	EK3	Reporting
ToxScan Lab ID:	T-12046-54	T-12046-55	T-12046-56	Limits
Element				
Arsenic	3.2	1.6	3.0	0.1
Cadmium	ND	ND	0.1	0.1
Chromium	110	81	80	0.1
Copper	15	4.1	8.1	0.1
Lead	5.5	3.6	6.8	0.1
Mercury	0.09	0.06	0.10	0.02
Nickel	89	52	60	0.1
Selenium	ND	ND	ND	0.1
Silver	1.0	0.7	0.8	0.1
Zinc	51	26	41	1.0

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA/SW-846 6020/7000 series	IN-39
Date Completed:	May 11, 1995	
Matrix:	Sediment	
Units:	mg/Kg (ppm), dry weight basis	

Client Sample ID:	HUM95PSD0023
Client Site ID:	FL6
ToxScan Lab ID:	T-12046-57

Element	
Arsenic	3.3
Cadmium	ND
Chromium	85
Copper	4.6
Lead	3.7
Mercury	0.06
Nickel	60
Selenium	ND
Silver	0.7
Zinc	29

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA/SW-846 6020/7000 series	IN-40
Date Completed:	May 11, 1995	
Matrix:	Sediment	
Units:	mg/Kg (ppm), dry weight basis	

QA/QC REPORT: Laboratory Blank Summary

Element	Method Blank	Reporting Limits
Arsenic	ND	0.1
Cadmium	ND	0.1
Chromium	ND	0.1
Copper	ND	0.1
Lead	ND	0.1
Mercury	ND	0.02
Nickel	ND	0.1
Selenium	ND	0.1
Silver	ND	0.1
Zinc	ND	1.0

ND = None Detected

Client: San Francisco Army Corps of Engineers
Method: EPA/SW-846 6020/7000 series
Date Completed: May 11, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-41

QA/QC REPORT: Matrix Spike/Matrix Spike Duplicate Summary

QA/QC on sample T-12046-53 (HUM95PSD0019, FL6)

Element	Spike Amount*	% Recovery Spike 1	% Recovery Spike 2	RPD
Arsenic	0.28	97	94	3
Cadmium	0.028	102	89	14
Chromium	2.86	92	92	0
Copper	2.86	79	77	3
Lead	1.43	100	99	1
Mercury	0.028	96	85	12
Nickel	1.43	120	120	20
Selenium	0.14	85	86	1
Silver	0.28	79	87	10
Zinc	2.86	112	115	3

QA/QC on sample T-12074-05

Element	Spike Amount*	% Recovery Spike 1	% Recovery Spike 2	RPD
Arsenic	0.28	96	88	9
Cadmium	0.028	96	95	1
Chromium	2.86	92	109	17
Copper	2.86	103	89	15
Lead	1.43	92	91	1
Mercury	0.028	290	91	1
Nickel	1.43	108	102	6
Selenium**	0.14	93	97	4
Silver	0.28	79	83	5
Zinc	2.86	125	92	30

RPD = Relative Percent Difference
* Spike amount given in μg/mL.
** QA/QC on sample T-12046-26 (HUM95SED0011, EK8) for Selenium only.

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA/SW-846 6020/7000 series	IN-42
Date Completed:	May 11, 1995	
Matrix:	Sediment	
Units:	mg/Kg (ppm), dry weight basis	

QA/QC REPORT: SRM Summary

Element	SRM Value Found	Certified SRM Value	+/-	% Recovery
Arsenic	21.0	23.4	0.2	90
Cadmium	3.40	3.45	0.22	99
Chromium	81.0	135	5	60
Copper	91.0	98.6	5	92
Lead	144	161	17	89
Mercury	1.58	1.47	0.07	107
Nickel	42	44	3	95
Selenium	1.33	1.12	0.05	119
Zinc	414	438	12	95

SRM = National Institute of Standards and Technology, Buffalo River Sediment, 2704

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: April 25, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-43

Client Sample ID: HUM95SED0001
Client Site ID: RF
ToxScan Lab ID: T-12046-16

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.00	0.0	0.0
0	2- 1	0.04	0.2	0.2
1	1-0.5	0.06	0.3	0.6
2	0.5-0.25	0.08	0.5	1.0
3	0.25-0.125	0.14	0.8	1.8
4	0.125-0.062	0.43	2.4	4.3
5	0.062-0.031	2.97	16.9	21.1
6	0.031-0.016	5.28	30.0	51.1
7	0.016-0.008	3.55	20.2	71.3
8	0.008-0.004	1.33	7.5	78.8
9	0.004-0.002	1.17	6.6	85.5
>9	< 0.002	2.56	14.5	100.0

total wt	coarse wt	fine wt
17.6	0.8	16.9
% sand	% silt	% clay
4.26	74.57	21.16

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: April 25, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-44

Client Sample ID: HUM95SED0002
Client Site ID: SAM 6-A
ToxScan Lab ID: T-12046-17

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.00	0.0	0.0
0	2- 1	0.05	0.2	0.2
1	1-0.5	0.11	0.5	0.8
2	0.5-0.25	0.68	3.2	4.0
3	0.25-0.125	11.81	56.4	60.4
4	0.125-0.062	2.00	9.6	70.0
5	0.062-0.031	1.82	8.7	78.7
6	0.031-0.016	1.08	5.1	83.8
7	0.016-0.008	0.89	4.3	88.1
8	0.008-0.004	0.50	2.4	90.4
9	0.004-0.002	0.45	2.1	92.6
>9	< 0.002	1.55	7.4	100.0

total wt	coarse wt	fine wt
20.9	14.7	6.3
% sand	% silt	% clay
69.98	20.47	9.55

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: April 25, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-45

Client Sample ID: HUM95SED0003
Client Site ID: SAM 6-B
ToxScan Lab ID: T-12046-18

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	1.11	5.6	5.6
-1	4- 2	0.00	0.0	5.6
0	2- 1	0.07	0.4	6.0
1	1-0.5	0.12	0.6	6.6
2	0.5-0.25	0.48	2.4	9.0
3	0.25-0.125	11.24	56.9	65.9
4	0.125-0.062	2.07	10.5	76.3
5	0.062-0.031	1.16	5.9	82.2
6	0.031-0.016	0.56	2.8	85.0
7	0.016-0.008	0.78	3.9	89.0
8	0.008-0.004	0.51	2.6	91.6
9	0.004-0.002	0.42	2.1	93.7
>9	< 0.002	1.25	6.3	100.0

total wt	coarse wt	fine wt
19.8	15.1	4.7
% sand	% silt	% clay
70.71	15.23	8.45

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: April 25, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-46

Client Sample ID: HUM95SED0004
Client Site ID: SAM 6-C
ToxScan Lab ID: T-12046-19

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.20	0.9	0.9
-1	4- 2	0.00	0.0	0.9
0	2- 1	0.37	1.7	2.6
1	1-0.5	0.58	2.7	5.3
2	0.5-0.25	1.33	6.2	11.5
3	0.25-0.125	14.88	69.1	80.7
4	0.125-0.062	1.14	5.3	86.0
5	0.062-0.031	0.74	3.4	89.4
6	0.031-0.016	0.25	1.2	90.5
7	0.016-0.008	0.63	2.9	93.4
8	0.008-0.004	0.27	1.3	94.7
9	0.004-0.002	0.30	1.4	96.1
>9	< 0.002	0.84	3.9	100.0

total wt	coarse wt	fine wt
21.5	18.5	3.0
% sand	% silt	% clay
85.04	8.74	5.30

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: April 25, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-47

Client Sample ID: HUM95SED0005
Client Site ID: COMP # 1
ToxScan Lab ID: T-12046-20

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.25	1.1	1.1
-1	4- 2	0.00	0.0	1.1
0	2- 1	0.17	0.8	1.9
1	1-0.5	0.32	1.5	3.4
2	0.5-0.25	0.94	4.3	7.6
3	0.25-0.125	14.04	63.8	71.4
4	0.125-0.062	1.75	8.0	79.4
5	0.062-0.031	1.04	4.7	84.1
6	0.031-0.016	0.65	3.0	87.0
7	0.016-0.008	0.70	3.2	90.2
8	0.008-0.004	0.41	1.9	92.1
9	0.004-0.002	0.36	1.6	93.7
>9	< 0.002	1.39	6.3	100.0

total wt	coarse wt	fine wt
22.0	17.5	4.5
% sand	% silt	% clay
78.24	12.70	7.93

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: April 25, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-48

Client Sample ID: HUM95SED0006
Client Site ID: FL4
ToxScan Lab ID: T-12046-21

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.00	0.0	0.0
0	2- 1	0.00	0.0	0.0
1	1-0.5	0.04	0.2	0.2
2	0.5-0.25	0.45	2.6	2.8
3	0.25-0.125	1.77	10.1	12.9
4	0.125-0.062	1.11	6.3	19.3
5	0.062-0.031	3.06	17.5	36.7
6	0.031-0.016	2.90	16.5	53.2
7	0.016-0.008	2.18	12.5	65.7
8	0.008-0.004	1.55	8.8	74.5
9	0.004-0.002	1.22	6.9	81.5
>9	< 0.002	3.25	18.5	100.0

total wt	coarse wt	fine wt
17.5	3.4	14.1
% sand	% silt	% clay
19.25	55.27	25.48

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: April 25, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-49

Client Sample ID: HUM95SED0007
Client Site ID: FL-1
ToxScan Lab ID: T-12046-22

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.00	0.0	0.0
0	2- 1	0.03	0.2	0.2
1	1-0.5	0.06	0.4	0.5
2	0.5-0.25	0.12	0.7	1.3
3	0.25-0.125	0.29	1.7	3.0
4	0.125-0.062	1.96	11.7	14.6
5	0.062-0.031	3.77	22.4	37.1
6	0.031-0.016	2.54	15.1	52.2
7	0.016-0.008	2.44	14.5	66.7
8	0.008-0.004	1.39	8.2	74.9
9	0.004-0.002	1.19	7.1	82.0
>9	< 0.002	3.02	18.0	100.0

total wt	coarse wt	fine wt
16.8	2.5	14.3
% sand	% silt	% clay
14.64	60.30	25.06

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: April 25, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-50

Client Sample ID: HUM95SED0008
Client Site ID: FL-2
ToxScan Lab ID: T-12046-23

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.00	0.0	0.0
0	2- 1	0.03	0.2	0.2
1	1-0.5	0.04	0.2	0.4
2	0.5-0.25	0.09	0.6	1.0
3	0.25-0.125	0.28	1.7	2.7
4	0.125-0.062	1.60	9.9	12.6
5	0.062-0.031	2.63	16.3	29.0
6	0.031-0.016	3.23	20.0	48.9
7	0.016-0.008	2.35	14.6	63.5
8	0.008-0.004	1.52	9.4	72.9
9	0.004-0.002	1.14	7.0	79.9
>9	< 0.002	3.24	20.1	100.0

total wt	coarse wt	fine wt
16.1	2.0	14.1
% sand	% silt	% clay
12.65	60.26	27.09

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: April 25, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-51

Client Sample ID: HUM95SED0009
Client Site ID: FL-3
ToxScan Lab ID: T-12046-24

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.00	0.0	0.0
0	2- 1	0.00	0.0	0.0
1	1-0.5	0.02	0.1	0.1
2	0.5-0.25	0.10	0.6	0.8
3	0.25-0.125	0.14	0.9	1.7
4	0.125-0.062	1.26	8.1	9.8
5	0.062-0.031	2.82	18.2	28.0
6	0.031-0.016	2.72	17.5	45.5
7	0.016-0.008	2.41	15.5	61.0
8	0.008-0.004	1.50	9.7	70.7
9	0.004-0.002	1.27	8.2	78.9
>9	< 0.002	3.28	21.1	100.0

total wt	coarse wt	fine wt
15.5	1.5	14.0
% sand	% silt	% clay
9.80	60.90	29.30

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: April 25, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-52

Client Sample ID: HUM95SED0010
Client Site ID: Comp # 4
ToxScan Lab ID: T-12046-25

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.00	0.0	0.0
0	2- 1	0.02	0.1	0.1
1	1-0.5	0.05	0.3	0.5
2	0.5-0.25	0.21	1.4	1.9
3	0.25-0.125	0.55	3.8	5.7
4	0.125-0.062	1.62	11.2	16.9
5	0.062-0.031	2.26	15.6	32.5
6	0.031-0.016	2.23	15.4	47.8
7	0.016-0.008	2.04	14.0	61.8
8	0.008-0.004	1.36	9.3	71.2
9	0.004-0.002	1.05	7.2	78.4
>9	< 0.002	3.13	21.6	100.0

total wt	coarse wt	fine wt
14.5	2.5	12.0
% sand	% silt	% clay
16.90	54.29	28.80

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: April 25, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-53

Client Sample ID: HUM95SED0011
Client Site ID: EK8
ToxScan Lab ID: T-12046-26

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.00	0.0	0.0
0	2- 1	0.04	0.2	0.2
1	1-0.5	0.05	0.3	0.5
2	0.5-0.25	0.06	0.3	0.8
3	0.25-0.125	0.14	0.8	1.6
4	0.125-0.062	1.22	6.8	8.5
5	0.062-0.031	3.07	17.2	25.7
6	0.031-0.016	2.89	16.2	41.9
7	0.016-0.008	2.42	13.6	55.5
8	0.008-0.004	1.70	9.5	65.0
9	0.004-0.002	1.62	9.1	74.1
>9	< 0.002	4.63	25.9	100.0

total wt	coarse wt	fine wt
17.8	1.5	16.3
% sand	% silt	% clay
8.47	56.52	35.01

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 1, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-54

Client Sample ID: HUM95SED0012
Client Site ID: EK7
ToxScan Lab ID: T-12046-27

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.23	0.8	0.8
0	2- 1	0.25	0.9	1.8
1	1-0.5	0.14	0.5	2.3
2	0.5-0.25	0.24	0.9	3.2
3	0.25-0.125	0.72	2.6	5.8
4	0.125-0.062	2.28	8.4	14.2
5	0.062-0.031	3.86	14.2	28.4
6	0.031-0.016	3.70	13.6	41.9
7	0.016-0.008	3.95	14.5	56.4
8	0.008-0.004	2.85	10.5	66.9
9	0.004-0.002	2.31	8.5	75.4
>9	< 0.002	6.70	24.6	100.0

total wt	coarse wt	fine wt
27.2	3.9	23.4
% sand	% silt	% clay
14.19	52.70	33.11

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 1, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-55

Client Sample ID: HUM95SED0013
Client Site ID: EK6
ToxScan Lab ID: T-12046-28

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.05	0.2	0.2
-1	4- 2	0.16	0.7	0.9
0	2- 1	0.20	0.9	1.8
1	1-0.5	0.15	0.6	2.4
2	0.5-0.25	0.19	0.8	3.2
3	0.25-0.125	0.86	3.7	6.9
4	0.125-0.062	3.38	14.4	21.3
5	0.062-0.031	4.48	19.1	40.4
6	0.031-0.016	3.37	14.4	54.8
7	0.016-0.008	2.89	12.3	67.1
8	0.008-0.004	1.81	7.7	74.8
9	0.004-0.002	1.48	6.3	81.1
>9	< 0.002	4.43	18.9	100.0

total wt	coarse wt	fine wt
23.4	5.0	18.4
% sand	% silt	% clay
21.09	53.50	25.19

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 1, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-56

Client Sample ID: HUM95SED0014
Client Site ID: EK5
ToxScan Lab ID: T-12046-29

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.02	0.1	0.1
0	2- 1	0.28	1.1	1.2
1	1-0.5	0.23	0.9	2.1
2	0.5-0.25	0.29	1.2	3.3
3	0.25-0.125	0.58	2.3	5.6
4	0.125-0.062	3.20	12.8	18.3
5	0.062-0.031	3.88	15.5	33.8
6	0.031-0.016	3.95	15.7	49.5
7	0.016-0.008	3.47	13.8	63.3
8	0.008-0.004	2.21	8.8	72.1
9	0.004-0.002	1.87	7.4	79.6
>9	< 0.002	5.13	20.4	100.0

total wt	coarse wt	fine wt
25.1	4.6	20.5
% sand	% silt	% clay
18.33	53.81	27.86

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 1, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-57

Client Sample ID: HUM95SED0015
Client Site ID: COMP #3
ToxScan Lab ID: T-12046-30

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.00	0.0	0.0
0	2- 1	0.16	0.7	0.7
1	1-0.5	0.13	0.6	1.2
2	0.5-0.25	0.19	0.8	2.1
3	0.25-0.125	0.57	2.5	4.5
4	0.125-0.062	2.65	11.4	15.9
5	0.062-0.031	4.11	17.7	33.6
6	0.031-0.016	3.68	15.9	49.5
7	0.016-0.008	2.93	12.6	62.1
8	0.008-0.004	1.97	8.5	70.6
9	0.004-0.002	1.77	7.6	78.2
>9	< 0.002	5.06	21.8	100.0

total wt	coarse wt	fine wt
23.2	3.7	19.5
% sand	% silt	% clay
15.94	54.64	29.41

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 1, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-58

Client Sample ID: HUM95SED0016
Client Site ID: EK2
ToxScan Lab ID: T-12046-31

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.06	0.3	0.3
0	2- 1	0.18	0.8	1.0
1	1-0.5	0.21	0.9	1.9
2	0.5-0.25	0.81	3.4	5.3
3	0.25-0.125	3.38	14.3	19.6
4	0.125-0.062	4.69	19.8	39.5
5	0.062-0.031	3.68	15.6	55.0
6	0.031-0.016	2.30	9.7	64.7
7	0.016-0.008	2.38	10.1	74.8
8	0.008-0.004	1.41	5.9	80.7
9	0.004-0.002	1.14	4.8	85.5
>9	< 0.002	3.42	14.5	100.0

total wt	coarse wt	fine wt
23.6	9.3	14.3
% sand	% silt	% clay
39.46	41.28	19.26

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 1, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-59

Client Sample ID: HUM95SED0017
Client Site ID: EK4
ToxScan Lab ID: T-12046-32

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.22	0.8	0.8
-1	4- 2	0.23	0.8	1.6
0	2- 1	0.32	1.1	2.8
1	1-0.5	0.17	0.6	3.4
2	0.5-0.25	0.37	1.3	4.7
3	0.25-0.125	1.22	4.4	9.1
4	0.125-0.062	3.16	11.3	20.4
5	0.062-0.031	6.74	24.1	44.5
6	0.031-0.016	2.20	7.9	52.3
7	0.016-0.008	3.41	12.2	64.5
8	0.008-0.004	2.40	8.6	73.1
9	0.004-0.002	1.93	6.9	80.0
>9	< 0.002	5.58	20.0	100.0

total wt	coarse wt	fine wt
27.9	5.7	22.3
% sand	% silt	% clay
19.58	52.77	26.86

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 1, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-60

Client Sample ID: HUM95SED0018
Client Site ID: EK 4-A
ToxScan Lab ID: T-12046-33

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.13	0.5	0.5
0	2- 1	0.22	0.9	1.4
1	1-0.5	0.30	1.2	2.6
2	0.5-0.25	0.99	4.0	6.6
3	0.25-0.125	2.26	9.1	15.7
4	0.125-0.062	3.54	14.2	29.9
5	0.062-0.031	4.70	18.8	48.7
6	0.031-0.016	3.39	13.6	62.3
7	0.016-0.008	2.65	10.6	72.9
8	0.008-0.004	1.62	6.5	79.4
9	0.004-0.002	1.22	4.9	84.3
>9	< 0.002	3.91	15.7	100.0

total wt	coarse wt	fine wt
24.9	7.4	17.5
% sand	% silt	% clay
29.87	49.56	20.57

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 1, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-61

Client Sample ID: HUM95SED0019
Client Site ID: COMP #2
ToxScan Lab ID: T-12046-34

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.06	0.2	0.2
-1	4- 2	0.09	0.3	0.6
0	2- 1	0.25	1.0	1.5
1	1-0.5	0.23	0.9	2.4
2	0.5-0.25	0.86	3.3	5.8
3	0.25-0.125	3.13	12.1	17.9
4	0.125-0.062	4.47	17.3	35.1
5	0.062-0.031	4.05	15.7	50.8
6	0.031-0.016	3.26	12.6	63.4
7	0.016-0.008	2.25	8.7	72.1
8	0.008-0.004	1.82	7.0	79.1
9	0.004-0.002	1.31	5.0	84.1
>9	< 0.002	4.11	15.9	100.0

total wt	coarse wt	fine wt
25.9	9.1	16.8
% sand	% silt	% clay
34.90	43.94	20.93

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 1, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-62

Client Sample ID: HUM95PSD0001
Client Site ID: BAR 1
ToxScan Lab ID: T-12046-35

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.00	0.0	0.0
0	2- 1	0.03	0.1	0.1
1	1-0.5	0.01	0.0	0.1
2	0.5-0.25	1.21	3.1	3.2
3	0.25-0.125	36.99	94.4	97.6
4	0.125-0.062	0.95	2.4	100.0
5	0.062-0.031	0.00	0.0	100.0
6	0.031-0.016	0.00	0.0	100.0
7	0.016-0.008	0.00	0.0	100.0
8	0.008-0.004	0.00	0.0	100.0
9	0.004-0.002	0.00	0.0	100.0
>9	< 0.002	0.00	0.0	100.0

total wt	coarse wt	fine wt
39.2	39.2	0.0
% sand	% silt	% clay
100.00	0.00	0.00

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	Plumb[1]	IN-63
Date Analyzed:	May 1, 1995	
Matrix:	Sediment	

Client Sample ID:	HUM95PSD0002
Client Site ID:	NB9
ToxScan Lab ID:	T-12046-36

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	14.67	38.1	38.1
-1	4- 2	7.28	18.9	57.1
0	2- 1	2.55	6.6	63.7
1	1-0.5	2.82	7.3	71.0
2	0.5-0.25	4.20	10.9	82.0
3	0.25-0.125	1.74	4.5	86.5
4	0.125-0.062	0.70	1.8	88.3
5	0.062-0.031	1.44	3.7	92.0
6	0.031-0.016	1.15	3.0	95.0
7	0.016-0.008	0.59	1.5	96.6
8	0.008-0.004	0.35	0.9	97.5
9	0.004-0.002	0.28	0.7	98.2
>9	< 0.002	0.70	1.8	100.0

total wt	coarse wt	fine wt
38.5	34.0	4.5
% sand	% silt	% clay
50.16	9.17	2.54

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 1, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-64

Client Sample ID: HUM95PSD0003
Client Site ID: NB1
ToxScan Lab ID: T-12046-37

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.00	0.0	0.0
0	2- 1	0.03	0.1	0.1
1	1-0.5	0.08	0.2	0.3
2	0.5-0.25	12.92	37.4	37.7
3	0.25-0.125	20.43	59.1	96.9
4	0.125-0.062	1.08	3.1	100.0
5	0.062-0.031	0.00	0.0	100.0
6	0.031-0.016	0.00	0.0	100.0
7	0.016-0.008	0.00	0.0	100.0
8	0.008-0.004	0.00	0.0	100.0
9	0.004-0.002	0.00	0.0	100.0
>9	< 0.002	0.00	0.0	100.0

total wt	coarse wt	fine wt
34.5	34.5	0.0
% sand	% silt	% clay
100.00	0.00	0.00

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	Plumb[1]	IN-65
Date Analyzed:	May 1, 1995	
Matrix:	Sediment	

Client Sample ID:	HUM95PSD0004
Client Site ID:	ENT 1
ToxScan Lab ID:	T-12046-38

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.00	0.0	0.0
0	2- 1	0.01	0.0	0.0
1	1-0.5	0.28	0.8	0.8
2	0.5-0.25	19.61	56.0	56.8
3	0.25-0.125	15.03	42.9	99.7
4	0.125-0.062	0.09	0.3	100.0
5	0.062-0.031	0.00	0.0	100.0
6	0.031-0.016	0.00	0.0	100.0
7	0.016-0.008	0.00	0.0	100.0
8	0.008-0.004	0.00	0.0	100.0
9	0.004-0.002	0.00	0.0	100.0
>9	< 0.002	0.00	0.0	100.0

total wt	coarse wt	fine wt
35.0	35.0	0.0
% sand	% silt	% clay
100.00	0.00	0.00

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 1, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-66

Client Sample ID: HUM95PSD0005
Client Site ID: ENT 2
ToxScan Lab ID: T-12046-39

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.00	0.0	0.0
0	2- 1	0.01	0.0	0.0
1	1-0.5	0.06	0.2	0.2
2	0.5-0.25	15.58	44.9	45.1
3	0.25-0.125	18.98	54.7	99.9
4	0.125-0.062	0.05	0.1	100.0
5	0.062-0.031	0.00	0.0	100.0
6	0.031-0.016	0.00	0.0	100.0
7	0.016-0.008	0.00	0.0	100.0
8	0.008-0.004	0.00	0.0	100.0
9	0.004-0.002	0.00	0.0	100.0
>9	< 0.002	0.00	0.0	100.0

total wt	coarse wt	fine wt
34.7	34.7	0.0
% sand	% silt	% clay
100.00	0.00	0.00

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 1, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-67

Client Sample ID: HUM95PSD0006
Client Site ID: SAM 5
ToxScan Lab ID: T-12046-40

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.09	0.3	0.3
-1	4- 2	0.11	0.4	0.7
0	2- 1	0.08	0.3	1.0
1	1-0.5	0.09	0.3	1.3
2	0.5-0.25	0.82	2.9	4.2
3	0.25-0.125	18.90	66.3	70.4
4	0.125-0.062	1.68	5.9	76.3
5	0.062-0.031	0.75	2.6	79.0
6	0.031-0.016	1.15	4.0	83.0
7	0.016-0.008	1.29	4.5	87.5
8	0.008-0.004	0.88	3.1	90.6
9	0.004-0.002	0.39	1.3	91.9
>9	< 0.002	2.30	8.1	100.0
		total wt	coarse wt	fine wt
		28.5	21.8	6.8
		% sand	% silt	% clay
		76.02	14.25	9.41

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 4, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-68

Client Sample ID: HUM95PSD0007
Client Site ID: SAM 7
ToxScan Lab ID: T-12046-41

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.34	0.9	0.9
-1	4- 2	2.00	5.4	6.3
0	2- 1	2.57	6.9	13.2
1	1-0.5	6.85	18.4	31.7
2	0.5-0.25	17.48	47.1	78.7
3	0.25-0.125	5.17	13.9	92.6
4	0.125-0.062	0.35	0.9	93.6
5	0.062-0.031	0.28	0.7	94.3
6	0.031-0.016	0.44	1.2	95.5
7	0.016-0.008	0.39	1.1	96.6
8	0.008-0.004	0.34	0.9	97.5
9	0.004-0.002	0.29	0.8	98.3
>9	< 0.002	0.65	1.7	100.0
		total wt	coarse wt	fine wt
		37.1	34.8	2.4
		% sand	% silt	% clay
		92.68	3.89	2.52

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 5, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-69

Client Sample ID: HUM95PSD0008
Client Site ID: SAM 1
ToxScan Lab ID: T-12046-42

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	2.25	6.3	6.3
-1	4- 2	1.40	3.9	10.3
0	2- 1	1.12	3.2	13.4
1	1-0.5	1.55	4.4	17.8
2	0.5-0.25	13.65	38.5	56.3
3	0.25-0.125	13.15	37.1	93.4
4	0.125-0.062	0.46	1.3	94.7
5	0.062-0.031	0.43	1.2	95.9
6	0.031-0.016	0.32	0.9	96.8
7	0.016-0.008	0.30	0.8	97.6
8	0.008-0.004	0.16	0.4	98.0
9	0.004-0.002	0.21	0.6	98.6
>9	< 0.002	0.49	1.4	100.0

total wt	coarse wt	fine wt
35.5	33.6	1.9
% sand	% silt	% clay
88.33	3.37	1.96

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 5, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-70

Client Sample ID: HUM95PSD0009
Client Site ID: SAM 3
ToxScan Lab ID: T-12046-43

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.40	1.0	1.0
0	2- 1	2.86	7.3	8.3
1	1-0.5	7.91	20.2	28.6
2	0.5-0.25	16.70	42.7	71.3
3	0.25-0.125	7.11	18.2	89.5
4	0.125-0.062	0.28	0.7	90.2
5	0.062-0.031	0.44	1.1	91.4
6	0.031-0.016	0.57	1.4	92.8
7	0.016-0.008	0.55	1.4	94.2
8	0.008-0.004	0.38	1.0	95.2
9	0.004-0.002	0.67	1.7	96.9
>9	< 0.002	1.22	3.1	100.0

total wt	coarse wt	fine wt
39.1	35.3	3.8
% sand	% silt	% clay
90.24	4.94	4.82

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 5, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-71

Client Sample ID: HUM95PSD0010
Client Site ID: SAM 4
ToxScan Lab ID: T-12046-44

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.00	0.0	0.0
0	2- 1	0.35	1.3	1.3
1	1-0.5	0.93	3.4	4.7
2	0.5-0.25	4.07	15.0	19.7
3	0.25-0.125	17.48	64.3	84.0
4	0.125-0.062	1.20	4.4	88.5
5	0.062-0.031	0.70	2.6	91.0
6	0.031-0.016	0.51	1.9	92.9
7	0.016-0.008	0.50	1.8	94.7
8	0.008-0.004	0.36	1.3	96.0
9	0.004-0.002	0.30	1.1	97.1
>9	< 0.002	0.79	2.9	100.0

total wt	coarse wt	fine wt
27.2	24.0	3.1
% sand	% silt	% clay
88.46	7.56	3.98

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 5, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-72

Client Sample ID: HUM95PSD0011
Client Site ID: SAM 2
ToxScan Lab ID: T-12046-45

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.33	0.9	0.9
-1	4- 2	0.23	0.6	1.5
0	2- 1	0.38	1.0	2.5
1	1-0.5	1.94	5.1	7.6
2	0.5-0.25	18.24	47.8	55.4
3	0.25-0.125	15.50	40.7	96.1
4	0.125-0.062	0.30	0.8	96.9
5	0.062-0.031	0.30	0.8	97.6
6	0.031-0.016	0.14	0.4	98.0
7	0.016-0.008	0.22	0.6	98.6
8	0.008-0.004	0.10	0.3	98.8
9	0.004-0.002	0.12	0.3	99.1
>9	< 0.002	0.33	0.9	100.0
		total wt	coarse wt	fine wt
		38.1	36.9	1.2
		% sand	% silt	% clay
		95.99	1.97	1.18

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 5, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-73

Client Sample ID: HUM95PSD0012
Client Site ID: NB5
ToxScan Lab ID: T-12046-46

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.06	0.2	0.2
0	2- 1	0.09	0.3	0.4
1	1-0.5	0.89	2.5	2.9
2	0.5-0.25	19.65	54.7	57.6
3	0.25-0.125	14.76	41.1	98.8
4	0.125-0.062	0.14	0.4	99.2
5	0.062-0.031	0.04	0.1	99.3
6	0.031-0.016	0.00	0.0	99.3
7	0.016-0.008	0.07	0.2	99.5
8	0.008-0.004	0.01	0.0	99.5
9	0.004-0.002	0.02	0.1	99.5
>9	< 0.002	0.17	0.5	100.0

total wt	coarse wt	fine wt
35.9	35.6	0.3
% sand	% silt	% clay
99.15	0.33	0.55

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 5, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-74

Client Sample ID: HUM95PSD0013
Client Site ID: NB3
ToxScan Lab ID: T-12046-47

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.02	0.1	0.1
0	2- 1	0.01	0.0	0.1
1	1-0.5	0.21	0.6	0.7
2	0.5-0.25	19.43	53.0	53.6
3	0.25-0.125	16.79	45.8	99.4
4	0.125-0.062	0.21	0.6	100.0
5	0.062-0.031	0.00	0.0	100.0
6	0.031-0.016	0.00	0.0	100.0
7	0.016-0.008	0.00	0.0	100.0
8	0.008-0.004	0.00	0.0	100.0
9	0.004-0.002	0.00	0.0	100.0
>9	< 0.002	0.00	0.0	100.0

total wt	coarse wt	fine wt
36.7	36.7	0.0
% sand	% silt	% clay
100.00	0.00	0.00

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 5, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-75

Client Sample ID: HUM95PSD0014
Client Site ID: NB4
ToxScan Lab ID: T-12046-48

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.56	1.6	1.6
0	2- 1	0.65	1.9	3.5
1	1-0.5	1.09	3.1	6.6
2	0.5-0.25	22.08	63.6	70.3
3	0.25-0.125	7.38	21.3	91.5
4	0.125-0.062	0.28	0.8	92.3
5	0.062-0.031	0.25	0.7	93.1
6	0.031-0.016	0.59	1.7	94.8
7	0.016-0.008	0.49	1.4	96.2
8	0.008-0.004	0.29	0.8	97.0
9	0.004-0.002	0.32	0.9	97.9
>9	< 0.002	0.73	2.1	100.0

total wt	coarse wt	fine wt
34.7	32.0	2.7
% sand	% silt	% clay
92.35	4.65	3.00

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 5, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-76

Client Sample ID: HUM95PSD0015
Client Site ID: NB6
ToxScan Lab ID: T-12046-49

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	4.07	12.5	12.5
-1	4- 2	5.59	17.2	29.7
0	2- 1	2.84	8.7	38.4
1	1-0.5	2.41	7.4	45.8
2	0.5-0.25	9.71	29.8	75.6
3	0.25-0.125	6.06	18.6	94.2
4	0.125-0.062	0.46	1.4	95.6
5	0.062-0.031	0.31	1.0	96.6
6	0.031-0.016	0.25	0.8	97.3
7	0.016-0.008	0.24	0.7	98.1
8	0.008-0.004	0.16	0.5	98.5
9	0.004-0.002	0.10	0.3	98.8
>9	< 0.002	0.38	1.2	100.0

total wt	coarse wt	fine wt
32.6	31.1	1.4
% sand	% silt	% clay
83.13	2.90	1.47

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 5, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-77

Client Sample ID: HUM95PSD0016
Client Site ID: NB7
ToxScan Lab ID: T-12046-50

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	1.43	4.2	4.2
-1	4- 2	3.61	10.5	14.7
0	2- 1	3.03	8.8	23.5
1	1-0.5	6.25	18.2	41.8
2	0.5-0.25	15.17	44.3	86.0
3	0.25-0.125	2.85	8.3	94.3
4	0.125-0.062	0.31	0.9	95.2
5	0.062-0.031	0.59	1.7	97.0
6	0.031-0.016	0.11	0.3	97.3
7	0.016-0.008	0.24	0.7	98.0
8	0.008-0.004	0.15	0.4	98.4
9	0.004-0.002	0.16	0.5	98.8
>9	< 0.002	0.40	1.2	100.0

total wt	coarse wt	fine wt
34.3	32.7	1.6
% sand	% silt	% clay
91.07	3.15	1.60

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 5, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-78

Client Sample ID: HUM95PSD0017
Client Site ID: NB8
ToxScan Lab ID: T-12046-51

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.23	0.6	0.6
-1	4- 2	2.97	8.0	8.6
0	2- 1	4.41	11.9	20.5
1	1-0.5	10.75	28.9	49.4
2	0.5-0.25	16.53	44.4	93.8
3	0.25-0.125	1.73	4.7	98.5
4	0.125-0.062	0.10	0.3	98.7
5	0.062-0.031	0.06	0.2	98.9
6	0.031-0.016	0.00	0.0	98.9
7	0.016-0.008	0.20	0.6	99.5
8	0.008-0.004	0.03	0.1	99.6
9	0.004-0.002	0.00	0.0	99.6
>9	< 0.002	0.18	0.4	100.0

total wt	coarse wt	fine wt
37.2	36.7	0.5
% sand	% silt	% clay
98.12	0.90	0.40

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 5, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-79

Client Sample ID: HUM95PSD0018
Client Site ID: FL7
ToxScan Lab ID: T-12046-52

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.12	0.3	0.3
0	2- 1	0.17	0.4	0.8
1	1-0.5	0.44	1.2	1.9
2	0.5-0.25	16.91	44.6	46.5
3	0.25-0.125	17.66	46.6	93.1
4	0.125-0.062	0.99	2.6	95.7
5	0.062-0.031	0.29	0.8	96.5
6	0.031-0.016	0.25	0.6	97.1
7	0.016-0.008	0.32	0.8	98.0
8	0.008-0.004	0.19	0.5	98.5
9	0.004-0.002	0.15	0.4	98.9
>9	< 0.002	0.44	1.1	100.0

total wt	coarse wt	fine wt
37.9	36.3	1.6
% sand	% silt	% clay
95.73	2.73	1.54

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 5, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-80

Client Sample ID: HUM95PSD0019
Client Site ID: FL6
ToxScan Lab ID: T-12046-53

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.06	0.1	0.1
0	2- 1	0.45	1.1	1.2
1	1-0.5	2.24	5.3	6.5
2	0.5-0.25	23.92	56.7	63.3
3	0.25-0.125	11.74	27.8	91.1
4	0.125-0.062	3.11	7.4	98.5
5	0.062-0.031	0.20	0.5	98.9
6	0.031-0.016	0.12	0.3	99.2
7	0.016-0.008	0.05	0.1	99.3
8	0.008-0.004	0.01	0.0	99.3
9	0.004-0.002	0.04	0.1	99.4
>9	< 0.002	0.24	0.6	100.0

total wt	coarse wt	fine wt
42.2	41.5	0.6
% sand	% silt	% clay
98.48	0.87	0.65

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 5, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-81

Client Sample ID: HUM95PSD0020
Client Site ID: FL5
ToxScan Lab ID: T-12046-54

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.01	0.0	0.0
0	2- 1	0.09	0.3	0.3
1	1-0.5	0.09	0.3	0.6
2	0.5-0.25	2.98	8.9	9.5
3	0.25-0.125	19.88	59.5	69.0
4	0.125-0.062	1.75	5.2	74.3
5	0.062-0.031	1.72	5.1	79.4
6	0.031-0.016	1.72	5.2	84.5
7	0.016-0.008	1.40	4.2	88.7
8	0.008-0.004	0.93	2.8	91.5
9	0.004-0.002	0.77	2.3	93.8
>9	< 0.002	2.07	6.2	100.0

total wt	coarse wt	fine wt
33.4	24.8	8.6
% sand	% silt	% clay
74.26	17.26	8.47

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 8, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-82

Client Sample ID: HUM95PSD0021
Client Site ID: EK1
ToxScan Lab ID: T-12046-55

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	2.45	5.9	5.9
-1	4- 2	0.52	1.3	7.2
0	2- 1	0.56	1.4	8.5
1	1-0.5	4.57	11.0	19.5
2	0.5-0.25	18.69	45.1	64.7
3	0.25-0.125	14.22	34.3	99.0
4	0.125-0.062	0.18	0.4	99.4
5	0.062-0.031	0.04	0.1	99.5
6	0.031-0.016	0.02	0.0	99.5
7	0.016-0.008	0.00	0.0	99.5
8	0.008-0.004	0.03	0.1	99.6
9	0.004-0.002	0.00	0.0	99.6
>9	< 0.002	0.17	0.4	100.0

total wt	coarse wt	fine wt
41.4	41.2	0.2
% sand	% silt	% clay
93.50	0.21	0.40

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	Plumb[1]	IN-83
Date Analyzed:	May 8, 1995	
Matrix:	Sediment	

Client Sample ID:	HUM95PSD0022
Client Site ID:	EK3
ToxScan Lab ID:	T-12046-56

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.19	0.5	0.5
-1	4- 2	0.55	1.5	2.0
0	2- 1	0.97	2.6	4.7
1	1-0.5	1.85	5.0	9.7
2	0.5-0.25	11.14	30.3	40.0
3	0.25-0.125	16.00	43.6	83.6
4	0.125-0.062	1.67	4.5	88.2
5	0.062-0.031	0.83	2.3	90.4
6	0.031-0.016	1.20	3.3	93.7
7	0.016-0.008	0.42	1.1	94.8
8	0.008-0.004	0.49	1.3	96.1
9	0.004-0.002	0.32	0.9	97.0
>9	< 0.002	1.10	3.0	100.0

total wt	coarse wt	fine wt
36.7	32.4	4.3
% sand	% silt	% clay
87.65	7.98	3.85

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 8, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-84

Client Sample ID: HUM95PSD0023
Client Site ID: FL6
ToxScan Lab ID: T-12046-57

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.00	0.0	0.0
0	2- 1	0.26	0.6	0.6
1	1-0.5	1.00	2.4	3.0
2	0.5-0.25	20.87	50.1	53.1
3	0.25-0.125	17.19	41.2	94.3
4	0.125-0.062	0.82	2.0	96.3
5	0.062-0.031	0.49	1.2	97.5
6	0.031-0.016	0.28	0.7	98.1
7	0.016-0.008	0.19	0.4	98.6
8	0.008-0.004	0.10	0.2	98.8
9	0.004-0.002	0.13	0.3	99.1
>9	< 0.002	0.37	0.9	100.0

total wt	coarse wt	fine wt
41.7	40.1	1.5
% sand	% silt	% clay
96.32	2.51	1.18

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client: San Francisco Army Corps of Engineers
Method: Plumb[1]
Date Analyzed: May 8, 1995
Matrix: Sediment

ToxScan Number: T-12046
IN-85

Client Sample ID: HUM95PSD0024
Client Site ID: NB2
ToxScan Lab ID: T-12046-58

SIZE INTERVAL Phi	mm	INTERVAL WT	INTERVAL %	CUMULATIVE %
<-5	>32	0.00	0.0	0.0
-4	32-16	0.00	0.0	0.0
-3	16- 8	0.00	0.0	0.0
-2	8- 4	0.00	0.0	0.0
-1	4- 2	0.00	0.0	0.0
0	2- 1	0.02	0.1	0.1
1	1-0.5	0.02	0.1	0.1
2	0.5-0.25	8.19	20.9	21.0
3	0.25-0.125	29.42	75.2	96.2
4	0.125-0.062	1.03	2.6	98.9
5	0.062-0.031	0.08	0.3	99.2
6	0.031-0.016	0.00	0.0	99.2
7	0.016-0.008	0.00	0.0	99.2
8	0.008-0.004	0.14	0.4	99.6
9	0.004-0.002	0.10	0.2	99.8
>9	< 0.002	0.12	0.2	100.0

total wt	coarse wt	fine wt
39.1	38.7	0.4
% sand	% silt	% clay
98.88	0.68	0.40

[1] Russell H. Plumb, Jr.; *Procedures for Handling and Chemical Analysis of Sediment and Water Samples*, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station; 1981.

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-1
Date Extracted:	April 11, 1995	
Date Analyzed:	April 22-23, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95SED0001

Client Site ID: RF

ToxScan Lab ID: 12046-16

Analyte	Wet Wt. Sample Value	Wet Wt. Detection Limit	Dry Wt. Sample Value	Dry Wt. Detection Limit
Aldrin	ND	1.2	ND	2.0
alpha-BHC	ND	1.2	ND	2.0
beta-BHC	ND	1.2	ND	2.0
delta-BHC	ND	1.2	ND	2.0
gamma-BHC (lindane)	ND	1.2	ND	2.0
alpha-Chlordane	ND	1.2	ND	2.0
gamma-Chlordane	ND	1.2	ND	2.0
4,4'-DDD	ND	1.2	ND	2.0
4,4'-DDE	ND	1.2	ND	2.0
4,4'-DDT	ND	1.2	ND	2.0
Dieldrin	ND	1.2	ND	2.0
Endosulfan I	ND	1.2	ND	2.0
Endosulfan II	ND	1.2	ND	2.0
Endosulfan sulfate	ND	6.2	ND	10
Endrin	ND	1.2	ND	2.0
Heptachlor	ND	1.2	ND	2.0
Heptachlor epoxide	ND	6.2	ND	10
Toxaphene	ND	19	ND	30
PCBs:				
PCB 1242	ND	12	ND	20
PCB 1248	ND	12	ND	20
PCB 1254	ND	12	ND	20
PCB 1260	ND	12	ND	20
TOTAL PCBs	ND	12	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-2
Date Extracted:	April 11, 1995	
Date Analyzed:	April 22-23, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95SED0002

Client Site ID: SAM 6-A

ToxScan Lab ID: 12046-17

Analyte	Wet Wt. Sample Value	Wet Wt. Detection Limit	Dry Wt. Sample Value	Dry Wt. Detection Limit
Aldrin	ND	1.5	ND	2.0
alpha-BHC	ND	1.5	ND	2.0
beta-BHC	ND	1.5	ND	2.0
delta-BHC	ND	1.5	ND	2.0
gamma-BHC (lindane)	ND	1.5	ND	2.0
alpha-Chlordane	ND	1.5	ND	2.0
gamma-Chlordane	ND	1.5	ND	2.0
4,4'-DDD	ND	1.5	ND	2.0
4,4'-DDE	ND	1.5	ND	2.0
4,4'-DDT	ND	1.5	ND	2.0
Dieldrin	ND	1.5	ND	2.0
Endosulfan I	ND	1.5	ND	2.0
Endosulfan II	ND	1.5	ND	2.0
Endosulfan sulfate	ND	7.3	ND	10
Endrin	ND	1.5	ND	2.0
Heptachlor	ND	1.5	ND	2.0
Heptachlor epoxide	ND	7.3	ND	10
Toxaphene	ND	22	ND	30
PCBs:				
PCB 1242	ND	15	ND	20
PCB 1248	ND	15	ND	20
PCB 1254	ND	15	ND	20
PCB 1260	ND	15	ND	20
TOTAL PCBs	ND	15	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-3
Date Extracted:	April 11, 1995	
Date Analyzed:	April 22-24, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95SED0003

Client Site ID: SAM 6-B	Wet Wt.		Dry Wt.	
ToxScan Lab ID: 12046-18	Sample	Detection	Sample	Detection
Analyte	Value	Limit	Value	Limit
Aldrin	ND	1.4	ND	2.0
alpha-BHC	ND	1.4	ND	2.0
beta-BHC	ND	1.4	ND	2.0
delta-BHC	ND	1.4	ND	2.0
gamma-BHC (lindane)	ND	1.4	ND	2.0
alpha-Chlordane	ND	1.4	ND	2.0
gamma-Chlordane	ND	1.4	ND	2.0
4,4'-DDD	ND	1.4	ND	2.0
4,4'-DDE	ND	1.4	ND	2.0
4,4'-DDT	ND	1.4	ND	2.0
Dieldrin	3.9	1.4	5.6	2.0
Endosulfan I	ND	1.4	ND	2.0
Endosulfan II	ND	1.4	ND	2.0
Endosulfan sulfate	ND	7.0	ND	10
Endrin	ND	1.4	ND	2.0
Heptachlor	ND	1.4	ND	2.0
Heptachlor epoxide	ND	7.0	ND	10
Toxaphene	ND	21	ND	30
PCBs:				
PCB 1242	ND	14	ND	20
PCB 1248	ND	14	ND	20
PCB 1254	ND	14	ND	20
PCB 1260	ND	14	ND	20
TOTAL PCBs	ND	14	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-4
Date Extracted:	April 11, 1995	
Date Analyzed:	April 22-23, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95SED0004

Client Site ID: SAM 6-C	Wet Wt.		Dry Wt.	
ToxScan Lab ID: 12046-19	Sample	Detection	Sample	Detection
Analyte	Value	Limit	Value	Limit
Aldrin	ND	1.5	ND	2.0
alpha-BHC	ND	1.5	ND	2.0
beta-BHC	ND	1.5	ND	2.0
delta-BHC	ND	1.5	ND	2.0
gamma-BHC (lindane)	ND	1.5	ND	2.0
alpha-Chlordane	ND	1.5	ND	2.0
gamma-Chlordane	ND	1.5	ND	2.0
4,4'-DDD	ND	1.5	ND	2.0
4,4'-DDE	ND	1.5	ND	2.0
4,4'-DDT	ND	1.5	ND	2.0
Dieldrin	ND	1.5	ND	2.0
Endosulfan I	ND	1.5	ND	2.0
Endosulfan II	ND	1.5	ND	2.0
Endosulfan sulfate	ND	7.3	ND	10
Endrin	ND	1.5	ND	2.0
Heptachlor	ND	1.5	ND	2.0
Heptachlor epoxide	ND	7.3	ND	10
Toxaphene	ND	22	ND	30
PCBs:				
PCB 1242	ND	15	ND	20
PCB 1248	ND	15	ND	20
PCB 1254	ND	15	ND	20
PCB 1260	ND	15	ND	20
TOTAL PCBs	ND	15	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046	
Method:	EPA 8080		P-7
Date Extracted:	April 11, 1995		
Date Analyzed:	April 22-23, 1995		
Matrix:	Sediment		
Units:	µg/Kg (ppb)		

Client Sample ID: HUM95SED0007

Client Site ID: FL-1

ToxScan Lab ID: 12046-22

Analyte	Wet Wt. Sample Value	Wet Wt. Detection Limit	Dry Wt. Sample Value	Dry Wt. Detection Limit
Aldrin	ND	1.1	ND	2.0
alpha-BHC	ND	1.1	ND	2.0
beta-BHC	ND	1.1	ND	2.0
delta-BHC	ND	1.1	ND	2.0
gamma-BHC (lindane)	ND	1.1	ND	2.0
alpha-Chlordane	ND	1.1	ND	2.0
gamma-Chlordane	ND	1.1	ND	2.0
4,4'-DDD	ND	1.1	ND	2.0
4,4'-DDE	ND	1.1	ND	2.0
4,4'-DDT	ND	1.1	ND	2.0
Dieldrin	ND	1.1	ND	2.0
Endosulfan I	ND	1.1	ND	2.0
Endosulfan II	ND	1.1	ND	2.0
Endosulfan sulfate	ND	5.7	ND	10
Endrin	ND	1.1	ND	2.0
Heptachlor	ND	1.1	ND	2.0
Heptachlor epoxide	ND	5.7	ND	10
Toxaphene	ND	17	ND	30
PCBs:				
PCB 1242	ND	11	ND	20
PCB 1248	ND	11	ND	20
PCB 1254	ND	11	ND	20
PCB 1260	ND	11	ND	20
TOTAL PCBs	ND	11	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-8
Date Extracted:	April 11, 1995	
Date Analyzed:	April 22-23, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95SED0008

Client Site ID: FL-2	Wet Wt.		Dry Wt.	
ToxScan Lab ID: 12046-23	Sample	Detection	Sample	Detection
Analyte	Value	Limit	Value	Limit
Aldrin	ND	1.1	ND	2.0
alpha-BHC	ND	1.1	ND	2.0
beta-BHC	ND	1.1	ND	2.0
delta-BHC	ND	1.1	ND	2.0
gamma-BHC (lindane)	ND	1.1	ND	2.0
alpha-Chlordane	ND	1.1	ND	2.0
gamma-Chlordane	ND	1.1	ND	2.0
4,4'-DDD	ND	1.1	ND	2.0
4,4'-DDE	ND	1.1	ND	2.0
4,4'-DDT	ND	1.1	ND	2.0
Dieldrin	ND	1.1	ND	2.0
Endosulfan I	ND	1.1	ND	2.0
Endosulfan II	ND	1.1	ND	2.0
Endosulfan sulfate	ND	5.6	ND	10
Endrin	ND	1.1	ND	2.0
Heptachlor	ND	1.1	ND	2.0
Heptachlor epoxide	ND	5.6	ND	10
Toxaphene	ND	17	ND	30
PCBs:				
PCB 1242	ND	11	ND	20
PCB 1248	ND	11	ND	20
PCB 1254	ND	11	ND	20
PCB 1260	ND	11	ND	20
TOTAL PCBs	ND	11	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-9
Date Extracted:	April 11, 1995	
Date Analyzed:	April 22-25, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95SED0009

Client Site ID: FL-3

ToxScan Lab ID: 12046-24

Analyte	Wet Wt. Sample Value	Wet Wt. Detection Limit	Dry Wt. Sample Value	Dry Wt. Detection Limit
Aldrin	ND	1.0	ND	2.0
alpha-BHC	ND	1.0	ND	2.0
beta-BHC	ND	1.0	ND	2.0
delta-BHC	ND	1.0	ND	2.0
gamma-BHC (lindane)	ND	1.0	ND	2.0
alpha-Chlordane	ND	1.0	ND	2.0
gamma-Chlordane	ND	1.0	ND	2.0
4,4'-DDD	ND	1.0	ND	2.0
4,4'-DDE	ND	1.0	ND	2.0
4,4'-DDT	ND	1.0	ND	2.0
Dieldrin	ND	1.0	ND	2.0
Endosulfan I	ND	1.0	ND	2.0
Endosulfan II	ND	1.0	ND	2.0
Endosulfan sulfate	ND	5.2	ND	10
Endrin	ND	1.0	ND	2.0
Heptachlor	ND	1.0	ND	2.0
Heptachlor epoxide	ND	5.2	ND	10
Toxaphene	ND	16	ND	30
PCBs:				
PCB 1242	ND	10	ND	20
PCB 1248	ND	10	ND	20
PCB 1254	ND	10	ND	20
PCB 1260	ND	10	ND	20
TOTAL PCBs	ND	10	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-10
Date Extracted:	April 11, 1995	
Date Analyzed:	April 22-23, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95SED0010

Client Site ID: COMP # 4	Wet Wt.		Dry Wt.	
ToxScan Lab ID: 12046-25	Sample	Detection	Sample	Detection
Analyte	Value	Limit	Value	Limit
Aldrin	ND	1.0	ND	2.0
alpha-BHC	ND	1.0	ND	2.0
beta-BHC	ND	1.0	ND	2.0
delta-BHC	ND	1.0	ND	2.0
gamma-BHC (lindane)	ND	1.0	ND	2.0
alpha-Chlordane	ND	1.0	ND	2.0
gamma-Chlordane	ND	1.0	ND	2.0
4,4'-DDD	ND	1.0	ND	2.0
4,4'-DDE	ND	1.0	ND	2.0
4,4'-DDT	ND	1.0	ND	2.0
Dieldrin	ND	1.0	ND	2.0
Endosulfan I	ND	1.0	ND	2.0
Endosulfan II	ND	1.0	ND	2.0
Endosulfan sulfate	ND	5.7	ND	10
Endrin	ND	1.0	ND	2.0
Heptachlor	ND	1.0	ND	2.0
Heptachlor epoxide	ND	5.7	ND	10
Toxaphene	ND	17	ND	30
PCBs:				
PCB 1242	ND	11	ND	20
PCB 1248	ND	11	ND	20
PCB 1254	ND	11	ND	20
PCB 1260	ND	11	ND	20
TOTAL PCBs	ND	11	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-11
Date Extracted:	April 11, 1995	
Date Analyzed:	April 22-25, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95PSD0006

Client Site ID: SAM 5

ToxScan Lab ID: 12046-40

Analyte	Wet Wt. Sample Value	Wet Wt. Detection Limit	Dry Wt. Sample Value	Dry Wt. Detection Limit
Aldrin	ND	1.4	ND	2.0
alpha-BHC	ND	1.4	ND	2.0
beta-BHC	ND	1.4	ND	2.0
delta-BHC	ND	1.4	ND	2.0
gamma-BHC (lindane)	ND	1.4	ND	2.0
alpha-Chlordane	ND	1.4	ND	2.0
gamma-Chlordane	ND	1.4	ND	2.0
4,4'-DDD	ND	1.4	ND	2.0
4,4'-DDE	ND	1.4	ND	2.0
4,4'-DDT	ND	1.4	ND	2.0
Dieldrin	ND	1.4	ND	2.0
Endosulfan I	ND	1.4	ND	2.0
Endosulfan II	ND	1.4	ND	2.0
Endosulfan sulfate	ND	6.9	ND	10
Endrin	ND	1.4	ND	2.0
Heptachlor	ND	1.4	ND	2.0
Heptachlor epoxide	ND	6.9	ND	10
Toxaphene	ND	21	ND	30
PCBs:				
PCB 1242	ND	14	ND	20
PCB 1248	ND	14	ND	20
PCB 1254	ND	14	ND	20
PCB 1260	ND	14	ND	20
TOTAL PCBs	ND	14	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-12
Date Extracted:	April 11, 1995	
Date Analyzed:	April 22-23, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95PSD0007

Client Site ID: SAM 7	Wet Wt.		Dry Wt.	
ToxScan Lab ID: 12046-41	Sample	Detection	Sample	Detection
Analyte	Value	Limit	Value	Limit
Aldrin	ND	1.6	ND	2.0
alpha-BHC	ND	1.6	ND	2.0
beta-BHC	ND	1.6	ND	2.0
delta-BHC	ND	1.6	ND	2.0
gamma-BHC (lindane)	ND	1.6	ND	2.0
alpha-Chlordane	ND	1.6	ND	2.0
gamma-Chlordane	ND	1.6	ND	2.0
4,4'-DDD	ND	1.6	ND	2.0
4,4'-DDE	ND	1.6	ND	2.0
4,4'-DDT	ND	1.6	ND	2.0
Dieldrin	ND	1.6	ND	2.0
Endosulfan I	ND	1.6	ND	2.0
Endosulfan II	ND	1.6	ND	2.0
Endosulfan sulfate	ND	8.0	ND	10
Endrin	ND	1.6	ND	2.0
Heptachlor	ND	1.6	ND	2.0
Heptachlor epoxide	ND	8.0	ND	10
Toxaphene	ND	24	ND	30
PCBs:				
PCB 1242	ND	16	ND	20
PCB 1248	ND	16	ND	20
PCB 1254	ND	16	ND	20
PCB 1260	ND	16	ND	20
TOTAL PCBs	ND	16	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046	
Method:	EPA 8080		P-13
Date Extracted:	April 11, 1995		
Date Analyzed:	April 22-23, 1995		
Matrix:	Sediment		
Units:	µg/Kg (ppb)		

Client Sample ID: HUM95PSD0008

Client Site ID: SAM 1

ToxScan Lab ID: 12046-42

Analyte	Wet Wt. Sample Value	Wet Wt. Detection Limit	Dry Wt. Sample Value	Dry Wt. Detection Limit
Aldrin	ND	1.6	ND	2.0
alpha-BHC	ND	1.6	ND	2.0
beta-BHC	ND	1.6	ND	2.0
delta-BHC	ND	1.6	ND	2.0
gamma-BHC (lindane)	ND	1.6	ND	2.0
alpha-Chlordane	ND	1.6	ND	2.0
gamma-Chlordane	ND	1.6	ND	2.0
4,4'-DDD	ND	1.6	ND	2.0
4,4'-DDE	ND	1.6	ND	2.0
4,4'-DDT	ND	1.6	ND	2.0
Dieldrin	ND	1.6	ND	2.0
Endosulfan I	ND	1.6	ND	2.0
Endosulfan II	ND	1.6	ND	2.0
Endosulfan sulfate	ND	8.0	ND	10
Endrin	ND	1.6	ND	2.0
Heptachlor	ND	1.6	ND	2.0
Heptachlor epoxide	ND	8.0	ND	10
Toxaphene	ND	24	ND	30
PCBs:				
PCB 1242	ND	16	ND	20
PCB 1248	ND	16	ND	20
PCB 1254	ND	16	ND	20
PCB 1260	ND	16	ND	20
TOTAL PCBs	ND	16	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-14
Date Extracted:	April 11, 1995	
Date Analyzed:	April 22-23, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95PSD0009

Client Site ID: SAM 3	Wet Wt.		Dry Wt.	
ToxScan Lab ID: 12046-43	Sample	Detection	Sample	Detection
Analyte	Value	Limit	Value	Limit
Aldrin	ND	1.6	ND	2.0
alpha-BHC	ND	1.6	ND	2.0
beta-BHC	ND	1.6	ND	2.0
delta-BHC	ND	1.6	ND	2.0
gamma-BHC (lindane)	ND	1.6	ND	2.0
alpha-Chlordane	ND	1.6	ND	2.0
gamma-Chlordane	ND	1.6	ND	2.0
4,4'-DDD	ND	1.6	ND	2.0
4,4'-DDE	ND	1.6	ND	2.0
4,4'-DDT	ND	1.6	ND	2.0
Dieldrin	ND	1.6	ND	2.0
Endosulfan I	ND	1.6	ND	2.0
Endosulfan II	ND	1.6	ND	2.0
Endosulfan sulfate	ND	8.0	ND	10
Endrin	ND	1.6	ND	2.0
Heptachlor	ND	1.6	ND	2.0
Heptachlor epoxide	ND	8.0	ND	10
Toxaphene	ND	24	ND	30
PCBs:				
PCB 1242	ND	16	ND	20
PCB 1248	ND	16	ND	20
PCB 1254	ND	16	ND	20
PCB 1260	ND	16	ND	20
TOTAL PCBs	ND	16	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-15
Date Extracted:	April 11, 1995	
Date Analyzed:	April 22-23, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95PSD0009 Rep.

Client Site ID: SAM 3	Wet Wt.		Dry Wt.	
ToxScan Lab ID: 12046-43 Rep.	Sample	Detection	Sample	Detection
Analyte	Value	Limit	Value	Limit
Aldrin	ND	1.6	ND	2.0
alpha-BHC	ND	1.6	ND	2.0
beta-BHC	ND	1.6	ND	2.0
delta-BHC	ND	1.6	ND	2.0
gamma-BHC (lindane)	ND	1.6	ND	2.0
alpha-Chlordane	ND	1.6	ND	2.0
gamma-Chlordane	ND	1.6	ND	2.0
4,4'-DDD	ND	1.6	ND	2.0
4,4'-DDE	ND	1.6	ND	2.0
4,4'-DDT	ND	1.6	ND	2.0
Dieldrin	ND	1.6	ND	2.0
Endosulfan I	ND	1.6	ND	2.0
Endosulfan II	ND	1.6	ND	2.0
Endosulfan sulfate	ND	8.0	ND	10
Endrin	ND	1.6	ND	2.0
Heptachlor	ND	1.6	ND	2.0
Heptachlor epoxide	ND	8.0	ND	10
Toxaphene	ND	24	ND	30
PCBs:				
PCB 1242	ND	16	ND	20
PCB 1248	ND	16	ND	20
PCB 1254	ND	16	ND	20
PCB 1260	ND	16	ND	20
TOTAL PCBs	ND	16	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-16
Date Extracted:	April 11, 1995	
Date Analyzed:	April 22-23, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95PSD0010

Client Site ID: SAM 4	Wet Wt.		Dry Wt.	
ToxScan Lab ID: 12046-44	Sample	Detection	Sample	Detection
Analyte	Value	Limit	Value	Limit
Aldrin	ND	1.5	ND	2.0
alpha-BHC	ND	1.5	ND	2.0
beta-BHC	ND	1.5	ND	2.0
delta-BHC	ND	1.5	ND	2.0
gamma-BHC (lindane)	ND	1.5	ND	2.0
alpha-Chlordane	ND	1.5	ND	2.0
gamma-Chlordane	ND	1.5	ND	2.0
4,4'-DDD	ND	1.5	ND	2.0
4,4'-DDE	ND	1.5	ND	2.0
4,4'-DDT	ND	1.5	ND	2.0
Dieldrin	ND	1.5	ND	2.0
Endosulfan I	ND	1.5	ND	2.0
Endosulfan II	ND	1.5	ND	2.0
Endosulfan sulfate	ND	7.5	ND	10
Endrin	ND	1.5	ND	2.0
Heptachlor	ND	1.5	ND	2.0
Heptachlor epoxide	ND	7.5	ND	10
Toxaphene	ND	23	ND	30
PCBs:				
PCB 1242	ND	15	ND	20
PCB 1248	ND	15	ND	20
PCB 1254	ND	15	ND	20
PCB 1260	ND	15	ND	20
TOTAL PCBs	ND	15	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-19
Date Extracted:	April 12, 1995	
Date Analyzed:	April 25, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Method Blank — Dry Wt.

ToxScan Lab ID: MB041295

Analyte	Sample Value	Detection Limit
Aldrin	ND	2.0
alpha-BHC	ND	2.0
beta-BHC	ND	2.0
delta-BHC	ND	2.0
gamma-BHC (lindane)	ND	2.0
alpha-Chlordane	ND	2.0
gamma-Chlordane	ND	2.0
4,4'-DDD	ND	2.0
4,4'-DDE	ND	2.0
4,4'-DDT	ND	2.0
Dieldrin	ND	2.0
Endosulfan I	ND	2.0
Endosulfan II	ND	2.0
Endosulfan sulfate	ND	10
Endrin	ND	2.0
Heptachlor	ND	2.0
Heptachlor epoxide	ND	10
Toxaphene	ND	30
PCBs:		
PCB 1242	ND	20
PCB 1248	ND	20
PCB 1254	ND	20
PCB 1260	ND	20
TOTAL PCBs	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-20
Date Extracted:	April 12, 1995	
Date Analyzed:	April 24, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95SED0011

Client Site ID: EK 8	Wet Wt.		Dry Wt.	
ToxScan Lab ID: 12046-26	Sample	Detection	Sample	Detection
Analyte	Value	Limit	Value	Limit
Aldrin	ND	1.2	ND	2.0
alpha-BHC	ND	1.2	ND	2.0
beta-BHC	ND	1.2	ND	2.0
delta-BHC	ND	1.2	ND	2.0
gamma-BHC (lindane)	ND	1.2	ND	2.0
alpha-Chlordane	ND	1.2	ND	2.0
gamma-Chlordane	ND	1.2	ND	2.0
4,4'-DDD	ND	1.2	ND	2.0
4,4'-DDE	ND	1.2	ND	2.0
4,4'-DDT	ND	1.2	ND	2.0
Dieldrin	ND	1.2	ND	2.0
Endosulfan I	ND	1.2	ND	2.0
Endosulfan II	ND	1.2	ND	2.0
Endosulfan sulfate	ND	6.2	ND	10
Endrin	ND	1.2	ND	2.0
Heptachlor	ND	1.2	ND	2.0
Heptachlor epoxide	ND	6.2	ND	10
Toxaphene	ND	19	ND	30
PCBs:				
PCB 1242	ND	12	ND	20
PCB 1248	ND	12	ND	20
PCB 1254	ND	12	ND	20
PCB 1260	ND	12	ND	20
TOTAL PCBs	ND	12	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-21
Date Extracted:	April 12, 1995	
Date Analyzed:	April 24, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95SED0012

Client Site ID: EK 7

ToxScan Lab ID: 12046-27

Analyte	Wet Wt. Sample Value	Wet Wt. Detection Limit	Dry Wt. Sample Value	Dry Wt. Detection Limit
Aldrin	ND	1.3	ND	2.0
alpha-BHC	ND	1.3	ND	2.0
beta-BHC	ND	1.3	ND	2.0
delta-BHC	ND	1.3	ND	2.0
gamma-BHC (lindane)	ND	1.3	ND	2.0
alpha-Chlordane	ND	1.3	ND	2.0
gamma-Chlordane	ND	1.3	ND	2.0
4,4'-DDD	ND	1.3	ND	2.0
4,4'-DDE	ND	1.3	ND	2.0
4,4'-DDT	ND	1.3	ND	2.0
Dieldrin	ND	1.3	ND	2.0
Endosulfan I	ND	1.3	ND	2.0
Endosulfan II	ND	1.3	ND	2.0
Endosulfan sulfate	ND	6.3	ND	10
Endrin	ND	1.3	ND	2.0
Heptachlor	ND	1.3	ND	2.0
Heptachlor epoxide	ND	6.3	ND	10
Toxaphene	ND	19	ND	30
PCBs:				
PCB 1242	ND	13	ND	20
PCB 1248	ND	13	ND	20
PCB 1254	ND	13	ND	20
PCB 1260	ND	13	ND	20
TOTAL PCBs	ND	13	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-22
Date Extracted:	April 12, 1995	
Date Analyzed:	April 25, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95SED0013

Client Site ID: EK 6

ToxScan Lab ID: 12046-28

Analyte	Wet Wt. Sample Value	Wet Wt. Detection Limit	Dry Wt. Sample Value	Dry Wt. Detection Limit
Aldrin	ND	1.2	ND	2.0
alpha-BHC	ND	1.2	ND	2.0
beta-BHC	ND	1.2	ND	2.0
delta-BHC	ND	1.2	ND	2.0
gamma-BHC (lindane)	ND	1.2	ND	2.0
alpha-Chlordane	ND	1.2	ND	2.0
gamma-Chlordane	ND	1.2	ND	2.0
4,4'-DDD	ND	1.2	ND	2.0
4,4'-DDE	ND	1.2	ND	2.0
4,4'-DDT	ND	1.2	ND	2.0
Dieldrin	ND	1.2	ND	2.0
Endosulfan I	ND	1.2	ND	2.0
Endosulfan II	ND	1.2	ND	2.0
Endosulfan sulfate	ND	6.1	ND	10
Endrin	ND	1.2	ND	2.0
Heptachlor	ND	1.2	ND	2.0
Heptachlor epoxide	ND	6.1	ND	10
Toxaphene	ND	18	ND	30
PCBs:				
PCB 1242	ND	12	ND	20
PCB 1248	ND	12	ND	20
PCB 1254	ND	12	ND	20
PCB 1260	ND	12	ND	20
TOTAL PCBs	ND	12	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-25
Date Extracted:	April 12, 1995	
Date Analyzed:	April 25, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95SED0016

Client Site ID: EK 2	Wet Wt.		Dry Wt.	
ToxScan Lab ID: 12046-31	Sample	Detection	Sample	Detection
Analyte	Value	Limit	Value	Limit
Aldrin	ND	1.3	ND	2.0
alpha-BHC	ND	1.3	ND	2.0
beta-BHC	ND	1.3	ND	2.0
delta-BHC	ND	1.3	ND	2.0
gamma-BHC (lindane)	ND	1.3	ND	2.0
alpha-Chlordane	ND	1.3	ND	2.0
gamma-Chlordane	ND	1.3	ND	2.0
4,4'-DDD	ND	1.3	ND	2.0
4,4'-DDE	ND	1.3	ND	2.0
4,4'-DDT	ND	1.3	ND	2.0
Dieldrin	ND	1.3	ND	2.0
Endosulfan I	ND	1.3	ND	2.0
Endosulfan II	ND	1.3	ND	2.0
Endosulfan sulfate	ND	6.3	ND	10
Endrin	ND	1.3	ND	2.0
Heptachlor	ND	1.3	ND	2.0
Heptachlor epoxide	ND	6.3	ND	10
Toxaphene	ND	19	ND	30
PCBs:				
PCB 1242	ND	13	ND	20
PCB 1248	ND	13	ND	20
PCB 1254	ND	13	ND	20
PCB 1260	ND	13	ND	20
TOTAL PCBs	ND	13	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-26
Date Extracted:	April 12, 1995	
Date Analyzed:	April 25, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95SED0017

Client Site ID: EK 4

ToxScan Lab ID: 12046-32

Analyte	Wet Wt. Sample Value	Wet Wt. Detection Limit	Dry Wt. Sample Value	Dry Wt. Detection Limit
Aldrin	ND	1.3	ND	2.0
alpha-BHC	ND	1.3	ND	2.0
beta-BHC	ND	1.3	ND	2.0
delta-BHC	ND	1.3	ND	2.0
gamma-BHC (lindane)	ND	1.3	ND	2.0
alpha-Chlordane	ND	1.3	ND	2.0
gamma-Chlordane	ND	1.3	ND	2.0
4,4'-DDD	ND	1.3	ND	2.0
4,4'-DDE	ND	1.3	ND	2.0
4,4'-DDT	ND	1.3	ND	2.0
Dieldrin	ND	1.3	ND	2.0
Endosulfan I	ND	1.3	ND	2.0
Endosulfan II	ND	1.3	ND	2.0
Endosulfan sulfate	ND	6.3	ND	10
Endrin	ND	1.3	ND	2.0
Heptachlor	ND	1.3	ND	2.0
Heptachlor epoxide	ND	6.3	ND	10
Toxaphene	ND	19	ND	30
PCBs:				
PCB 1242	ND	13	ND	20
PCB 1248	ND	13	ND	20
PCB 1254	ND	13	ND	20
PCB 1260	ND	13	ND	20
TOTAL PCBs	ND	13	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-27
Date Extracted:	April 12, 1995	
Date Analyzed:	April 25, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95SED0018

Client Site ID: EK 4-A	Wet Wt.		Dry Wt.	
ToxScan Lab ID: 12046-33	Sample	Detection	Sample	Detection
Analyte	Value	Limit	Value	Limit
Aldrin	ND	1.2	ND	2.0
alpha-BHC	ND	1.2	ND	2.0
beta-BHC	ND	1.2	ND	2.0
delta-BHC	ND	1.2	ND	2.0
gamma-BHC (lindane)	ND	1.2	ND	2.0
alpha-Chlordane	ND	1.2	ND	2.0
gamma-Chlordane	ND	1.2	ND	2.0
4,4'-DDD	ND	1.2	ND	2.0
4,4'-DDE	ND	1.2	ND	2.0
4,4'-DDT	ND	1.2	ND	2.0
Dieldrin	ND	1.2	ND	2.0
Endosulfan I	ND	1.2	ND	2.0
Endosulfan II	ND	1.2	ND	2.0
Endosulfan sulfate	ND	6.2	ND	10
Endrin	ND	1.2	ND	2.0
Heptachlor	ND	1.2	ND	2.0
Heptachlor epoxide	ND	6.2	ND	10
Toxaphene	ND	19	ND	30
PCBs:				
PCB 1242	ND	12	ND	20
PCB 1248	ND	12	ND	20
PCB 1254	ND	12	ND	20
PCB 1260	ND	12	ND	20
TOTAL PCBs	ND	12	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-28
Date Extracted:	April 12, 1995	
Date Analyzed:	April 25, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95SED0019

Client Site ID: COMP #2

ToxScan Lab ID: 12046-34

Analyte	Wet Wt. Sample Value	Wet Wt. Detection Limit	Dry Wt. Sample Value	Dry Wt. Detection Limit
Aldrin	ND	1.3	ND	2.0
alpha-BHC	ND	1.3	ND	2.0
beta-BHC	ND	1.3	ND	2.0
delta-BHC	ND	1.3	ND	2.0
gamma-BHC (lindane)	ND	1.3	ND	2.0
alpha-Chlordane	ND	1.3	ND	2.0
gamma-Chlordane	ND	1.3	ND	2.0
4,4'-DDD	ND	1.3	ND	2.0
4,4'-DDE	ND	1.3	ND	2.0
4,4'-DDT	ND	1.3	ND	2.0
Dieldrin	ND	1.3	ND	2.0
Endosulfan I	ND	1.3	ND	2.0
Endosulfan II	ND	1.3	ND	2.0
Endosulfan sulfate	ND	6.3	ND	10
Endrin	ND	1.3	ND	2.0
Heptachlor	ND	1.3	ND	2.0
Heptachlor epoxide	ND	6.3	ND	10
Toxaphene	ND	19	ND	30
PCBs:				
PCB 1242	ND	13	ND	20
PCB 1248	ND	13	ND	20
PCB 1254	ND	13	ND	20
PCB 1260	ND	13	ND	20
TOTAL PCBs	ND	13	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-29
Date Extracted:	April 12, 1995	
Date Analyzed:	April 25, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95PSD0018

Client Site ID: FL7

ToxScan Lab ID: 12046-52

Analyte	Wet Wt. Sample Value	Wet Wt. Detection Limit	Dry Wt. Sample Value	Dry Wt. Detection Limit
Aldrin	ND	1.5	ND	2.0
alpha-BHC	ND	1.5	ND	2.0
beta-BHC	ND	1.5	ND	2.0
delta-BHC	ND	1.5	ND	2.0
gamma-BHC (lindane)	ND	1.5	ND	2.0
alpha-Chlordane	ND	1.5	ND	2.0
gamma-Chlordane	ND	1.5	ND	2.0
4,4'-DDD	ND	1.5	ND	2.0
4,4'-DDE	ND	1.5	ND	2.0
4,4'-DDT	ND	1.5	ND	2.0
Dieldrin	ND	1.5	ND	2.0
Endosulfan I	ND	1.5	ND	2.0
Endosulfan II	ND	1.5	ND	2.0
Endosulfan sulfate	ND	7.7	ND	10
Endrin	ND	1.5	ND	2.0
Heptachlor	ND	1.5	ND	2.0
Heptachlor epoxide	ND	7.7	ND	10
Toxaphene	ND	23	ND	30
PCBs:				
PCB 1242	ND	15	ND	20
PCB 1248	ND	15	ND	20
PCB 1254	ND	15	ND	20
PCB 1260	ND	15	ND	20
TOTAL PCBs	ND	15	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-30
Date Extracted:	April 12, 1995	
Date Analyzed:	April 25, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95PSD0020

Client Site ID: FL5	Wet Wt.		Dry Wt.	
ToxScan Lab ID: 12046-54	Sample	Detection	Sample	Detection
Analyte	Value	Limit	Value	Limit
Aldrin	ND	1.5	ND	2.0
alpha-BHC	ND	1.5	ND	2.0
beta-BHC	ND	1.5	ND	2.0
delta-BHC	ND	1.5	ND	2.0
gamma-BHC (lindane)	ND	1.5	ND	2.0
alpha-Chlordane	ND	1.5	ND	2.0
gamma-Chlordane	ND	1.5	ND	2.0
4,4'-DDD	ND	1.5	ND	2.0
4,4'-DDE	ND	1.5	ND	2.0
4,4'-DDT	ND	1.5	ND	2.0
Dieldrin	ND	1.5	ND	2.0
Endosulfan I	ND	1.5	ND	2.0
Endosulfan II	ND	1.5	ND	2.0
Endosulfan sulfate	ND	7.3	ND	10
Endrin	ND	1.5	ND	2.0
Heptachlor	ND	1.5	ND	2.0
Heptachlor epoxide	ND	7.3	ND	10
Toxaphene	ND	22	ND	30
PCBs:				
PCB 1242	ND	15	ND	20
PCB 1248	ND	15	ND	20
PCB 1254	ND	15	ND	20
PCB 1260	ND	15	ND	20
TOTAL PCBs	ND	15	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-31
Date Extracted:	April 12, 1995	
Date Analyzed:	April 25, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95PSD0021

Client Site ID: EK1

ToxScan Lab ID: 12046-55

Analyte	Wet Wt. Sample Value	Wet Wt. Detection Limit	Dry Wt. Sample Value	Dry Wt. Detection Limit
Aldrin	ND	1.6	ND	2.0
alpha-BHC	ND	1.6	ND	2.0
beta-BHC	ND	1.6	ND	2.0
delta-BHC	ND	1.6	ND	2.0
gamma-BHC (lindane)	ND	1.6	ND	2.0
alpha-Chlordane	ND	1.6	ND	2.0
gamma-Chlordane	ND	1.6	ND	2.0
4,4'-DDD	ND	1.6	ND	2.0
4,4'-DDE	ND	1.6	ND	2.0
4,4'-DDT	ND	1.6	ND	2.0
Dieldrin	ND	1.6	ND	2.0
Endosulfan I	ND	1.6	ND	2.0
Endosulfan II	ND	1.6	ND	2.0
Endosulfan sulfate	ND	8.1	ND	10
Endrin	ND	1.6	ND	2.0
Heptachlor	ND	1.6	ND	2.0
Heptachlor epoxide	ND	8.1	ND	10
Toxaphene	ND	24	ND	30
PCBs:				
PCB 1242	ND	16	ND	20
PCB 1248	ND	16	ND	20
PCB 1254	ND	16	ND	20
PCB 1260	ND	16	ND	20
TOTAL PCBs	ND	16	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-32
Date Extracted:	April 12, 1995	
Date Analyzed:	April 25, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95PSD0022

Client Site ID: EK3

ToxScan Lab ID: 12046-56

Analyte	Wet Wt. Sample Value	Wet Wt. Detection Limit	Dry Wt. Sample Value	Dry Wt. Detection Limit
Aldrin	ND	1.5	ND	2.0
alpha-BHC	ND	1.5	ND	2.0
beta-BHC	ND	1.5	ND	2.0
delta-BHC	ND	1.5	ND	2.0
gamma-BHC (lindane)	ND	1.5	ND	2.0
alpha-Chlordane	ND	1.5	ND	2.0
gamma-Chlordane	ND	1.5	ND	2.0
4,4'-DDD	ND	1.5	ND	2.0
4,4'-DDE	ND	1.5	ND	2.0
4,4'-DDT	ND	1.5	ND	2.0
Dieldrin	ND	1.5	ND	2.0
Endosulfan I	ND	1.5	ND	2.0
Endosulfan II	ND	1.5	ND	2.0
Endosulfan sulfate	ND	7.5	ND	10
Endrin	ND	1.5	ND	2.0
Heptachlor	ND	1.5	ND	2.0
Heptachlor epoxide	ND	7.5	ND	10
Toxaphene	ND	23	ND	30
PCBs:				
PCB 1242	ND	15	ND	20
PCB 1248	ND	15	ND	20
PCB 1254	ND	15	ND	20
PCB 1260	ND	15	ND	20
TOTAL PCBs	ND	15	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-33
Date Extracted:	April 12, 1995	
Date Analyzed:	April 25, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95PSD0023

Client Site ID: FL6

ToxScan Lab ID: 12046-57

Analyte	Wet Wt. Sample Value	Wet Wt. Detection Limit	Dry Wt. Sample Value	Dry Wt. Detection Limit
Aldrin	ND	1.6	ND	2.0
alpha-BHC	ND	1.6	ND	2.0
beta-BHC	ND	1.6	ND	2.0
delta-BHC	ND	1.6	ND	2.0
gamma-BHC (lindane)	ND	1.6	ND	2.0
alpha-Chlordane	ND	1.6	ND	2.0
gamma-Chlordane	ND	1.6	ND	2.0
4,4'-DDD	ND	1.6	ND	2.0
4,4'-DDE	ND	1.6	ND	2.0
4,4'-DDT	ND	1.6	ND	2.0
Dieldrin	ND	1.6	ND	2.0
Endosulfan I	ND	1.6	ND	2.0
Endosulfan II	ND	1.6	ND	2.0
Endosulfan sulfate	ND	8.0	ND	10
Endrin	ND	1.6	ND	2.0
Heptachlor	ND	1.6	ND	2.0
Heptachlor epoxide	ND	8.0	ND	10
Toxaphene	ND	24	ND	30
PCBs:				
PCB 1242	ND	16	ND	20
PCB 1248	ND	16	ND	20
PCB 1254	ND	16	ND	20
PCB 1260	ND	16	ND	20
TOTAL PCBs	ND	16	ND	20

ND = None Detected

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-34
Date Extracted:	April 12, 1995	
Date Analyzed:	April 25, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

Client Sample ID: HUM95PSD0023 REP.

Client Site ID: FL6	Wet Wt.		Dry Wt.	
ToxScan Lab ID: 12046-57	Sample	Detection	Sample	Detection
Analyte	Value	Limit	Value	Limit
Aldrin	ND	1.6	ND	2.0
alpha-BHC	ND	1.6	ND	2.0
beta-BHC	ND	1.6	ND	2.0
delta-BHC	ND	1.6	ND	2.0
gamma-BHC (lindane)	ND	1.6	ND	2.0
alpha-Chlordane	ND	1.6	ND	2.0
gamma-Chlordane	ND	1.6	ND	2.0
4,4'-DDD	ND	1.6	ND	2.0
4,4'-DDE	ND	1.6	ND	2.0
4,4'-DDT	ND	1.6	ND	2.0
Dieldrin	ND	1.6	ND	2.0
Endosulfan I	ND	1.6	ND	2.0
Endosulfan II	ND	1.6	ND	2.0
Endosulfan sulfate	ND	8.0	ND	10
Endrin	ND	1.6	ND	2.0
Heptachlor	ND	1.6	ND	2.0
Heptachlor epoxide	ND	8.0	ND	10
Toxaphene	ND	24	ND	30
PCBs:				
PCB 1242	ND	16	ND	20
PCB 1248	ND	16	ND	20
PCB 1254	ND	16	ND	20
PCB 1260	ND	16	ND	20
TOTAL PCBs	ND	16	ND	20

ND = None Detected

Client: San Francisco Army Corps of Engineers
Method: EPA 8080
Date Extracted: April 12, 1995
Date Analyzed: April 25, 1995
Matrix: Sediment

ToxScan Number: T-12046
P-35

QA/QC REPORT: Matrix Spike Summary
QA/QC on sample 12046-57

Compound	% REC MS	% REC MSD	% RPD	QC LIMITS % REC	QC LIMITS % RPD
Lindane	80	78	3	46-127	50
Heptachlor	68	71	4	35-130	31
Aldrin	81	79	3	34-132	43
Dieldrin	96	84	13	31-134	38
Endrin	115	101	13	42-139	43
DDT	102	96	6	23-134	50

MS = Matrix Spike

MSD = Matrix Spike Duplicate

RPD = Relative Percent Difference

Client: San Francisco Army Corps of Engineers
Method: EPA 8080
Date Extracted: April 12, 1995
Date Analyzed: April 23, 1995
Matrix: Sediment

ToxScan Number: T-12046
P-36

QA/QC REPORT: Matrix Spike Summary
QA/QC on sample 12046-43

Compound	% REC MS	% REC MSD	% RPD	QC LIMITS % REC	QC LIMITS % RPD
Lindane	85	81		46-127	50
Heptachlor	66	112		35-130	31
Aldrin	85	85		34-132	43
Dieldrin	97	98		31-134	38
Endrin	114	125		42-139	43
DDT	104	104		23-134	50

MS = Matrix Spike

MSD = Matrix Spike Duplicate

RPD = Relative Percent Difference

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-37
Date Extracted:	April 11, 1995	
Date Analyzed:	April 24, 1995	
Matrix:	Sediment	

QA/QC REPORT: Laboratory Control Sample Summary

Compound	% REC LCS	QC LIMITS % REC
Lindane	76	46-127
Heptachlor	64	35-130
Aldrin	78	34-132
Dieldrin	80	31-134
Endrin	87	42-139
DDT	91	23-134

LCS = Laboratory Control Sample

Client: San Francisco Army Corps of Engineers
Method: EPA 8080
Date Extracted: April 11, 1995
Date Analyzed: April 24, 1995
Matrix: Sediment

ToxScan Number: T-12046
P-38

QA/QC REPORT: Laboratory Control Sample Summary

Compound	% REC LCS	QC LIMITS % REC
Lindane	103	46-127
Heptachlor	63	35-130
Aldrin	90	34-132
Dieldrin	92	31-134
Endrin	92	42-139
DDT	105	23-134

LCS = Laboratory Control Sample

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-39
Date Extracted:	April 11-12, 1995	
Date Analyzed:	April 23-25, 1995	
Matrix:	Sediment	

QA/QC REPORT: Surrogate Recoveries (%)

Sample ID	Tetrachloro-m-xylene	Decachlorobiphenyl
HUM95SED0001	100	87
HUM95SED0002	123	88
HUM95SED0003	93	103
HUM95SED0004	140	90
HUM95SED0005	132	85
HUM95SED0006	113	91
HUM95SED0007	66	90
HUM95SED0008	87	89
HUM95SED0009	120	102
HUM95SED0010	111	91
HUM95PSD0006	98	96
HUM95PSD0007	121	94
HUM95PSD0008	98	100
HUM95PSD0009	78	85
HUM95PSD0009 Rep.	91	100
HUM95PSD0010	89	93
HUM95PSD0011	88	97
HUM95SED0011	133	94
HUM95SED0012	85	91
HUM95SED0013	84	93
HUM95SED0014	96	87
HUM95SED0015	137	95
HUM95SED0016	129	89
HUM95SED0017	81	92
HUM95SED0018	105	93
HUM95SED0019	87	94
HUM95PSD0018	111	98
HUM95PSD0020	141	101
HUM95PSD0021	80	89
HUM95PSD0022	106	95
HUM95PSD0023	117	102
HUM95PSD0023 Rep.	95	98
Method Blank(04/11/95)	77	89
Method Blank(04/12/95)	81	91

QC Limits = 50-150

Client:	San Francisco Army Corps of Engineers	ToxScan Number: T-12046
Method:	EPA 8080	P-40
Date Extracted:	April 11, 1995	
Date Analyzed:	April 22, 1995	
Matrix:	Sediment	
Units:	µg/Kg (ppb)	

QA/QC REPORT: SRM Recoveries

Element	Value Found	Certified Value	Advisory Range
Pesticides			
Aldrin	124	196	105-221
beta-BHC	324	361	172-415
gamma-BHC (Lindane)	121	142	65.5-153
4,4'-DDD	196	151	72.5-181
4,4'-DDE	239	275	157-327
Dieldrin	60	87.6	41.9-104
Endrin	136	211	108-262
Heptachlor	234	324	179-363
delta-BHC	274	306	207-373
Heptachlor epoxide	207	245	85.8-306
alpha - Chlordane	138	173	69.4-199

SRM = Environmental Resource Associates Lot #330

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-1
Date Extracted:	04/12/95	
Date Analyzed:	04/24/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0001
Station ID: RF
ToxScan Lab ID: 12046-16

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	17	7.5	27	12
2-Methylnaphthalene	44	7.5	71	12
2-Chloronaphthalene	ND	7.5	ND	12
Acenaphthylene	ND	7.5	ND	12
Acenaphthene	ND	7.5	ND	12
Fluorene	15	7.5	24	12
Phenanthrene	70	7.5	110	12
Anthracene	ND	7.5	ND	12
Total LPAHs	150	7.5	230	12
Fluoranthene	22	7.5	35	12
Pyrene	22	7.5	35	12
Benzo(a)anthracene	9.8	7.5	16	12
Chrysene	22	7.5	35	12
Benzo(b)fluoranthene	14	7.5	23	12
Benzo(k)fluoranthene	ND	7.5	ND	12
Benzo(a)pyrene	ND	7.5	ND	12
Indeno(1,2,3-cd)pyrene	ND	10	ND	16
Dibenzo(a,h)anthracene	ND	10	ND	16
Benzo(g,h,i)perylene	12	10	19	16
Total HPAHs	100	7.5-10	160	12-16
Total PAHs	250	7.5-10	390	12-16
Total phthalate esters	230	7.5	370	12

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-2
Date Extracted:	04/12/95	
Date Analyzed:	04/24/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0002
Station ID: DISCRETE SAM 6-A
ToxScan Lab ID: 12046-17

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	ND	7.5	ND	10
2-Methylnaphthalene	ND	7.5	ND	10
2-Chloronaphthalene	ND	7.5	ND	10
Acenaphthylene	ND	7.5	ND	10
Acenaphthene	ND	7.5	ND	10
Fluorene	ND	7.5	ND	10
Phenanthrene	18	7.5	25	10
Anthracene	ND	7.5	ND	10
Total LPAHs	18	7.5	25	10
Fluoranthene	7.7	7.5	11	10
Pyrene	8.9	7.5	12	10
Benzo(a)anthracene	ND	7.5	ND	10
Chrysene	ND	7.5	ND	10
Benzo(b)fluoranthene	7.8	7.5	11	10
Benzo(k)fluoranthene	ND	7.5	ND	10
Benzo(a)pyrene	ND	7.5	ND	10
Indeno(1,2,3-cd)pyrene	ND	10	ND	14
Dibenzo(a,h)anthracene	ND	10	ND	14
Benzo(g,h,i)perylene	ND	10	ND	14
Total HPAHs	24	7.5-10	34	10-14
Total PAHs	42	7.5-10	59	10-14
Total phthalate esters	120	7.5	160	10

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	
Date Extracted:	04/26/95	
Date Analyzed:	04/28/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0002 (2nd Extraction)
Station ID: DISCRETE SAM 6-A
ToxScan Lab ID: 12046-17 (2nd Extraction)

	Wet Weight			Dry Weight		
Analyte	Sample Value	Reporting Limit		Sample Value	Reporting Limit	
Naphthalene	8.9	7.5		12	10	
2-Methylnaphthalene	9.8	7.5		13	10	
2-Chloronaphthalene	ND	7.5		ND	10	
Acenaphthylene	ND	7.5		ND	10	
Acenaphthene	ND	7.5		ND	10	
Fluorene	ND	7.5		ND	10	
Phenanthrene	20	7.5		27	10	
Anthracene	ND	7.5		ND	10	
Total LPAHs	39	7.5		52	10	
Fluoranthene	16	7.5		22	10	
Pyrene	16	7.5		22	10	
Benzo(a)anthracene	ND	7.5		ND	10	
Chrysene	ND	8.0	*	ND	11	*
Benzo(b)fluoranthene	ND	7.5		ND	10	
Benzo(k)fluoranthene	ND	7.5		ND	10	
Benzo(a)pyrene	ND	7.5		ND	10	
Indeno(1,2,3-cd)pyrene	ND	10		ND	14	
Dibenzo(a,h)anthracene	ND	10		ND	14	
Benzo(g,h,i)perylene	ND	10		ND	14	
Total HPAHs	32	7.5-10	*	44	10-14	*
Total PAHs	71	7.5-10	*	96	10-14	*
Total phthalate esters	160	7.5		210	10	

ND = Not Detected
* Reporting limit raised due to matrix interference
LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-4
Date Extracted:	04/12/95	
Date Analyzed:	04/24/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0003
Station ID: DISCRETE SAM 6-B
ToxScan Lab ID: 12046-18

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	ND	7.5	ND	11
2-Methylnaphthalene	ND	7.5	ND	11
2-Chloronaphthalene	ND	7.5	ND	11
Acenaphthylene	ND	7.5	ND	11
Acenaphthene	ND	7.5	ND	11
Fluorene	ND	7.5	ND	11
Phenanthrene	25	7.5	36	11
Anthracene	ND	7.5	ND	11
Total LPAHs	25	7.5	36	11
Fluoranthene	26	7.5	37	11
Pyrene	32	7.5	46	11
Benzo(a)anthracene	ND	7.5	ND	11
Chrysene	9.2	7.5	13	11
Benzo(b)fluoranthene	8.3	7.5	12	11
Benzo(k)fluoranthene	ND	7.5	ND	11
Benzo(a)pyrene	ND	7.5	ND	11
Indeno(1,2,3-cd)pyrene	ND	10	ND	14
Dibenzo(a,h)anthracene	ND	10	ND	14
Benzo(g,h,i)perylene	ND	10	ND	14
Total HPAHs	76	7.5-10	110	11-14
Total PAHs	100	7.5-10	150	11-14
Total phthalate esters	140	7.5	200	11

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-5
Date Extracted:	04/26/95	
Date Analyzed:	04/28/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0003 (2nd Extraction)
Station ID: DISCRETE SAM 6-B
ToxScan Lab ID: 12046-18 (2nd Extraction)

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	14	7.5	20	11
2-Methylnaphthalene	12	7.5	17	11
2-Chloronaphthalene	ND	7.5	ND	11
Acenaphthylene	ND	7.5	ND	11
Acenaphthene	16	7.5	23	11
Fluorene	20	7.5	29	11
Phenanthrene	160	7.5	230	11
Anthracene	37	7.5	53	11
Total LPAHs	260	7.5	370	11
Fluoranthene	170	7.5	240	11
Pyrene	240	7.5	340	11
Benzo(a)anthracene	110	7.5	160	11
Chrysene	140	7.5	200	11
Benzo(b)fluoranthene	65	7.5	93	11
Benzo(k)fluoranthene	70	7.5	100	11
Benzo(a)pyrene	110	7.5	160	11
Indeno(1,2,3-cd)pyrene	41	10	59	14
Dibenzo(a,h)anthracene	21	10	30	14
Benzo(g,h,i)perylene	50	10	71	14
Total HPAHs	1000	7.5-10	1500	11-14
Total PAHs	1300	7.5-10	1900	11-14
Total phthalate esters	170	7.5	240	11

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-6
Date Extracted:	04/12/95	
Date Analyzed:	04/24/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0004
Station ID: DISCRETE SAM 6-C
ToxScan Lab ID: 12046-19

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	ND	7.5	ND	10
2-Methylnaphthalene	ND	7.5	ND	10
2-Chloronaphthalene	ND	7.5	ND	10
Acenaphthylene	ND	7.5	ND	10
Acenaphthene	ND	7.5	ND	10
Fluorene	ND	7.5	ND	10
Phenanthrene	15	7.5	21	10
Anthracene	ND	7.5	ND	10
Total LPAHs	15	7.5	21	10
Fluoranthene	15	7.5	21	10
Pyrene	16	7.5	22	10
Benzo(a)anthracene	ND	7.5	ND	10
Chrysene	ND	7.5	ND	10
Benzo(b)fluoranthene	ND	7.5	ND	10
Benzo(k)fluoranthene	ND	7.5	ND	10
Benzo(a)pyrene	ND	7.5	ND	10
Indeno(1,2,3-cd)pyrene	ND	10	ND	14
Dibenzo(a,h)anthracene	ND	10	ND	14
Benzo(g,h,i)perylene	ND	10	ND	14
Total HPAHs	31	7.5-10	43	10-14
Total PAHs	46	7.5-10	64	10-14
Total phthalate esters	95	7.5	130	10

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-7
Date Extracted:	04/26/95	
Date Analyzed:	04/28/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0004 (2nd Extraction)
Station ID: DISCRETE SAM 6-C
ToxScan Lab ID: 12046-19 (2nd Extraction)

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	ND	7.5	ND	10
2-Methylnaphthalene	7.8	7.5	11	10
2-Chloronaphthalene	ND	7.5	ND	10
Acenaphthylene	ND	7.5	ND	10
Acenaphthene	ND	7.5	ND	10
Fluorene	ND	7.5	ND	10
Phenanthrene	11	7.5	15	10
Anthracene	ND	7.5	ND	10
Total LPAHs	19	7.5	26	10
Fluoranthene	8.9	7.5	12	10
Pyrene	11	7.5	15	10
Benzo(a)anthracene	ND	7.5	ND	10
Chrysene	ND	7.5	ND	10
Benzo(b)fluoranthene	ND	7.5	ND	10
Benzo(k)fluoranthene	ND	7.5	ND	10
Benzo(a)pyrene	ND	7.5	ND	10
Indeno(1,2,3-cd)pyrene	ND	10	ND	14
Dibenzo(a,h)anthracene	ND	10	ND	14
Benzo(g,h,i)perylene	ND	10	ND	14
Total HPAHs	20	7.5-10	27	10-14
Total PAHs	39	7.5-10	53	10-14
Total phthalate esters	170	7.5	230	10

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-8
Date Extracted:	04/12/95	
Date Analyzed:	04/25/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID:	HUM95SED0005
Station ID:	**COMP #1**
ToxScan Lab ID:	12046-20

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	ND	7.5	ND	11
2-Methylnaphthalene	ND	7.5	ND	11
2-Chloronaphthalene	ND	7.5	ND	11
Acenaphthylene	ND	7.5	ND	11
Acenaphthene	ND	7.5	ND	11
Fluorene	ND	7.5	ND	11
Phenanthrene	22	7.5	31	11
Anthracene	ND	7.5	ND	11
Total LPAHs	22	7.5	31	11
Fluoranthene	18	7.5	25	11
Pyrene	25	7.5	35	11
Benzo(a)anthracene	ND	7.5	ND	11
Chrysene	ND	7.5	ND	11
Benzo(b)fluoranthene	ND	7.5	ND	11
Benzo(k)fluoranthene	ND	7.5	ND	11
Benzo(a)pyrene	ND	7.5	ND	11
Indeno(1,2,3-cd)pyrene	ND	10	ND	14
Dibenzo(a,h)anthracene	ND	10	ND	14
Benzo(g,h,i)perylene	ND	10	ND	14
Total HPAHs	43	7.5-10	60	11-14
Total PAHs	65	7.5-10	91	11-14
Total phthalate esters	160	7.5	220	11

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-9
Date Extracted:	04/26/95	
Date Analyzed:	04/28/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0005 (2nd Extraction)
Station ID: COMP #1
ToxScan Lab ID: 12046-20 (2nd Extraction)

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	9.1	7.5	13	11
2-Methylnaphthalene	9.9	7.5	14	11
2-Chloronaphthalene	ND	7.5	ND	11
Acenaphthylene	ND	7.5	ND	11
Acenaphthene	ND	7.5	ND	11
Fluorene	ND	7.5	ND	11
Phenanthrene	17	7.5	24	11
Anthracene	ND	7.5	ND	11
Total LPAHs	36	7.5	51	11
Fluoranthene	14	7.5	20	11
Pyrene	18	7.5	25	11
Benzo(a)anthracene	ND	7.5	ND	11
Chrysene	ND	7.5	ND	11
Benzo(b)fluoranthene	ND	7.5	ND	11
Benzo(k)fluoranthene	ND	7.5	ND	11
Benzo(a)pyrene	ND	7.5	ND	11
Indeno(1,2,3-cd)pyrene	ND	10	ND	14
Dibenzo(a,h)anthracene	ND	10	ND	14
Benzo(g,h,i)perylene	ND	10	ND	14
Total HPAHs	32	7.5-10	45	11-14
Total PAHs	68	7.5-10	96	11-14
Total phthalate esters	140	7.5	200	11

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-10
Date Extracted:	04/12/95	
Date Analyzed:	04/25/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0006
Station ID: FL 4
ToxScan Lab ID: 12046-21

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	9.1	7.5	14	12
2-Methylnaphthalene	36	7.5	56	12
2-Chloronaphthalene	ND	7.5	ND	12
Acenaphthylene	ND	7.5	ND	12
Acenaphthene	ND	7.5	ND	12
Fluorene	16	7.5	25	12
Phenanthrene	63	7.5	98	12
Anthracene	ND	7.5	ND	12
Total LPAHs	120	7.5	190	12
Fluoranthene	7.8	7.5	12	12
Pyrene	10	7.5	16	12
Benzo(a)anthracene	ND	7.5	ND	12
Chrysene	15	7.5	23	12
Benzo(b)fluoranthene	9.5	7.5	15	12
Benzo(k)fluoranthene	ND	7.5	ND	12
Benzo(a)pyrene	ND	7.5	ND	12
Indeno(1,2,3-cd)pyrene	ND	10	ND	16
Dibenzo(a,h)anthracene	ND	10	ND	16
Benzo(g,h,i)perylene	ND	10	ND	16
Total HPAHs	42	7.5-10	66	12-16
Total PAHs	160	7.5-10	260	12-16
Total phthalate esters	240	7.5	370	12

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-11
Date Extracted:	04/26/95	
Date Analyzed:	04/28/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0006 (2nd Extraction)
Station ID: FL 4
ToxScan Lab ID: 12046-21 (2nd Extraction)

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	24	7.5	38	12
2-Methylnaphthalene	58	7.5	91	12
2-Chloronaphthalene	ND	7.5	ND	12
Acenaphthylene	ND	7.5	ND	12
Acenaphthene	ND	7.5	ND	12
Fluorene	14	7.5	22	12
Phenanthrene	51	7.5	80	12
Anthracene	ND	7.5	ND	12
Total LPAHs	150	7.5	230	12
Fluoranthene	ND	7.5	ND	12
Pyrene	8.8	7.5	14	12
Benzo(a)anthracene	ND	7.5	ND	12
Chrysene	12	7.5	19	12
Benzo(b)fluoranthene	8.3	7.5	13	12
Benzo(k)fluoranthene	ND	7.5	ND	12
Benzo(a)pyrene	ND	7.5	ND	12
Indeno(1,2,3-cd)pyrene	ND	10	ND	16
Dibenzo(a,h)anthracene	ND	10	ND	16
Benzo(g,h,i)perylene	ND	10	ND	16
Total HPAHs	29	7.5-10	46	12-16
Total PAHs	180	7.5-10	280	12-16
Total phthalate esters	510	7.5	800	12

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-12
Date Extracted:	04/12/95	
Date Analyzed:	04/25/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID:	HUM95SED0007
Station ID:	**FL-1**
ToxScan Lab ID:	12046-22

	Wet Weight			Dry Weight		
Analyte	Sample Value	Reporting Limit		Sample Value	Reporting Limit	
Naphthalene	15	7.5		26	13	
2-Methylnaphthalene	39	7.5		68	13	
2-Chloronaphthalene	ND	7.5		ND	13	
Acenaphthylene	ND	7.5		ND	13	
Acenaphthene	ND	7.5		ND	13	
Fluorene	14	7.5		25	13	
Phenanthrene	52	7.5		91	13	
Anthracene	ND	7.5		ND	13	
Total LPAHs	120	7.5		210	13	
Fluoranthene	23	7.5		40	13	
Pyrene	23	7.5		40	13	
Benzo(a)anthracene	ND	7.5		ND	13	
Chrysene	17	7.5		30	13	
Benzo(b)fluoranthene	12	7.5		21	13	
Benzo(k)fluoranthene	ND	7.5		ND	13	
Benzo(a)pyrene	ND	7.5		ND	13	
Indeno(1,2,3-cd)pyrene	ND	10		ND	18	
Dibenzo(a,h)anthracene	ND	10		ND	18	
Benzo(g,h,i)perylene	ND	12	*	ND	21	*
Total HPAHs	75	7.5-12	*	130	13-21	*
Total PAHs	200	7.5-12	*	340	13-21	*
Total phthalate esters	160	7.5		280	13	

ND = Not Detected
* Reporting limit raised due to matrix interference
LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/12/95
Date Analyzed: 04/25/95
Matrix: Sediment
Units: ug/Kg (ppb)

Client Sample ID: HUM95SED0008
Station ID: FL-2
ToxScan Lab ID: 12046-23

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	10	7.5	18	13
2-Methylnaphthalene	30	7.5	54	13
2-Chloronaphthalene	ND	7.5	ND	13
Acenaphthylene	ND	7.5	ND	13
Acenaphthene	ND	7.5	ND	13
Fluorene	14	7.5	25	13
Phenanthrene	48	7.5	86	13
Anthracene	ND	7.5	ND	13
Total LPAHs	100	7.5	180	13
Fluoranthene	23	7.5	41	13
Pyrene	24	7.5	43	13
Benzo(a)anthracene	8.5	7.5	15	13
Chrysene	18	7.5	32	13
Benzo(b)fluoranthene	11	7.5	20	13
Benzo(k)fluoranthene	ND	7.5	ND	13
Benzo(a)pyrene	ND	7.5	ND	13
Indeno(1,2,3-cd)pyrene	ND	10	ND	18
Dibenzo(a,h)anthracene	ND	10	ND	18
Benzo(g,h,i)perylene	ND	10	ND	18
Total HPAHs	85	7.5-10	150	13-18
Total PAHs	190	7.5-10	330	13-18
Total phthalate esters	99	7.5	180	13

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-14
Date Extracted:	04/26/95	
Date Analyzed:	04/28/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0008 (2nd Extraction)
Station ID: FL 2
ToxScan Lab ID: 12046-23 (2nd Extraction)

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	17	7.5	30	13
2-Methylnaphthalene	36	7.5	64	13
2-Chloronaphthalene	ND	7.5	ND	13
Acenaphthylene	ND	7.5	ND	13
Acenaphthene	ND	7.5	ND	13
Fluorene	13	7.5	23	13
Phenanthrene	47	7.5	84	13
Anthracene	ND	7.5	ND	13
Total LPAHs	110	7.5	200	13
Fluoranthene	24	7.5	43	13
Pyrene	24	7.5	43	13
Benzo(a)anthracene	8.1	7.5	14	13
Chrysene	18	7.5	32	13
Benzo(b)fluoranthene	12	7.5	21	13
Benzo(k)fluoranthene	ND	7.5	ND	13
Benzo(a)pyrene	ND	7.5	ND	13
Indeno(1,2,3-cd)pyrene	ND	10	ND	18
Dibenzo(a,h)anthracene	ND	10	ND	18
Benzo(g,h,i)perylene	ND	10	ND	18
Total HPAHs	86	7.5-10	150	13-18
Total PAHs	200	7.5-10	350	13-18
Total phthalate esters	230	7.5	420	13

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/12/95
Date Analyzed: 04/25/95
Matrix: Sediment
Units: ug/Kg (ppb)

ToxScan Number: T-12046

Client Sample ID: HUM95SED0009
Station ID: FL-3
ToxScan Lab ID: 12046-24

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit		Dry Weight Sample Value	Dry Weight Reporting Limit	
Naphthalene	ND	7.5		ND	14	
2-Methylnaphthalene	16	7.5		31	14	
2-Chloronaphthalene	ND	7.5		ND	14	
Acenaphthylene	ND	7.5		ND	14	
Acenaphthene	ND	7.5		ND	14	
Fluorene	14	7.5		27	14	
Phenanthrene	52	7.5		100	14	
Anthracene	ND	7.5		ND	14	
Total LPAHs	82	7.5		160	14	
Fluoranthene	26	7.5		50	14	
Pyrene	22	7.5		42	14	
Benzo(a)anthracene	9.9	7.5		19	14	
Chrysene	18	7.5		35	14	
Benzo(b)fluoranthene	13	7.5		25	14	
Benzo(k)fluoranthene	ND	7.5		ND	14	
Benzo(a)pyrene	ND	7.5		ND	14	
Indeno(1,2,3-cd)pyrene	ND	10		ND	19	
Dibenzo(a,h)anthracene	ND	10		ND	19	
Benzo(g,h,i)perylene	ND	12	*	ND	23	*
Total HPAHs	89	7.5-12	*	170	14-23	*
Total PAHs	170	7.5-12	*	330	14-23	*
Total phthalate esters	150	7.5		300	14	

ND = Not Detected
* Reporting limit raised due to matrix interference
LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-16
Date Extracted:	04/26/95	
Date Analyzed:	04/29/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0009 (2nd Extraction)
Station ID: FL 3
ToxScan Lab ID: 12046-24 (2nd Extraction)

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	15	7.5	29	14
2-Methylnaphthalene	35	7.5	67	14
2-Chloronaphthalene	ND	7.5	ND	14
Acenaphthylene	ND	7.5	ND	14
Acenaphthene	ND	7.5	ND	14
Fluorene	12	7.5	23	14
Phenanthrene	40	7.5	77	14
Anthracene	ND	7.5	ND	14
Total LPAHs	100	7.5	200	14
Fluoranthene	15	7.5	29	14
Pyrene	16	7.5	31	14
Benzo(a)anthracene	ND	7.5	ND	14
Chrysene	11	7.5	21	14
Benzo(b)fluoranthene	9.6	7.5	18	14
Benzo(k)fluoranthene	ND	7.5	ND	14
Benzo(a)pyrene	ND	7.5	ND	14
Indeno(1,2,3-cd)pyrene	ND	10	ND	19
Dibenzo(a,h)anthracene	ND	10	ND	19
Benzo(g,h,i)perylene	ND	10	ND	19
Total HPAHs	52	7.5-10	99	14-19
Total PAHs	150	7.5-10	300	14-19
Total phthalate esters	270	7.5	520	14

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-17
Date Extracted:	04/12/95	
Date Analyzed:	04/25/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID:	HUM95SED0010
Station ID:	**COMP #4**
ToxScan Lab ID:	12046-25

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	18	7.5	32	13
2-Methylnaphthalene	44	7.5	77	13
2-Chloronaphthalene	ND	7.5	ND	13
Acenaphthylene	ND	7.5	ND	13
Acenaphthene	ND	7.5	ND	13
Fluorene	16	7.5	28	13
Phenanthrene	58	7.5	100	13
Anthracene	ND	7.5	ND	13
Total LPAHs	140	7.5	240	13
Fluoranthene	27	7.5	47	13
Pyrene	26	7.5	46	13
Benzo(a)anthracene	9.0	7.5	16	13
Chrysene	19	7.5	33	13
Benzo(b)fluoranthene	14	7.5	25	13
Benzo(k)fluoranthene	ND	7.5	ND	13
Benzo(a)pyrene	8.9	7.5	16	13
Indeno(1,2,3-cd)pyrene	ND	10	ND	18
Dibenzo(a,h)anthracene	ND	10	ND	18
Benzo(g,h,i)perylene	13	10	23	18
Total HPAHs	120	7.5-10	210	13-18
Total PAHs	260	7.5-10	450	13-18
Total phthalate esters	730	7.5	1300	13

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-18
Date Extracted:	04/12/95	
Date Analyzed:	04/25/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID:	HUM95SED0011
Station ID:	**EK 8**
ToxScan Lab ID:	12046-26

	Wet Weight			Dry Weight		
Analyte	Sample Value	Reporting Limit		Sample Value	Reporting Limit	
Naphthalene	ND	7.5		ND	12	
2-Methylnaphthalene	18	7.5		29	12	
2-Chloronaphthalene	ND	7.5		ND	12	
Acenaphthylene	ND	7.5		ND	12	
Acenaphthene	ND	7.5		ND	12	
Fluorene	15	7.5		24	12	
Phenanthrene	62	7.5		100	12	
Anthracene	ND	7.5		ND	12	
Total LPAHs	95	7.5		150	12	
Fluoranthene	38	7.5		61	12	
Pyrene	36	7.5		58	12	
Benzo(a)anthracene	9.6	7.5		15	12	
Chrysene	23	7.5		37	12	
Benzo(b)fluoranthene	18	7.5		29	12	
Benzo(k)fluoranthene	ND	7.5		ND	12	
Benzo(a)pyrene	ND	10	*	ND	16	*
Indeno(1,2,3-cd)pyrene	ND	10		ND	16	
Dibenzo(a,h)anthracene	ND	10		ND	16	
Benzo(g,h,i)perylene	17	10		27	16	
Total HPAHs	140	7.5-10	*	230	12-16	*
Total PAHs	240	7.5-10	*	380	12-16	*
Total phthalate esters	220	7.5		360	12	

ND = Not Detected
* Reporting limit raised due to matrix interference
LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-19
Date Extracted:	04/26/95	
Date Analyzed:	04/30/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0011 (2nd Extraction)
Station ID: EK 8
ToxScan Lab ID: 12046-26 (2nd Extraction)

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	19	7.5	31	12
2-Methylnaphthalene	36	7.5	58	12
2-Chloronaphthalene	ND	7.5	ND	12
Acenaphthylene	ND	7.5	ND	12
Acenaphthene	ND	7.5	ND	12
Fluorene	13	7.5	21	12
Phenanthrene	43	7.5	69	12
Anthracene	ND	7.5	ND	12
Total LPAHs	110	7.5	180	12
Fluoranthene	27	7.5	44	12
Pyrene	27	7.5	44	12
Benzo(a)anthracene	ND	7.5	ND	12
Chrysene	16	7.5	26	12
Benzo(b)fluoranthene	12	7.5	19	12
Benzo(k)fluoranthene	ND	7.5	ND	12
Benzo(a)pyrene	ND	7.5	ND	12
Indeno(1,2,3-cd)pyrene	ND	10	ND	16
Dibenzo(a,h)anthracene	ND	10	ND	16
Benzo(g,h,i)perylene	10	10	16	16
Total HPAHs	92	7.5-10	150	12-16
Total PAHs	200	7.5-10	330	12-16
Total phthalate esters	280	7.5	440	12

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-20
Date Extracted:	04/12/95	
Date Analyzed:	04/26/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID:	HUM95SED0012
Station ID:	**EK 7**
ToxScan Lab ID:	12046-27

	Wet Weight		Dry Weight	
Analyte	Sample Value	Reporting Limit	Sample Value	Reporting Limit
Naphthalene	21	7.5	33	12
2-Methylnaphthalene	36	7.5	57	12
2-Chloronaphthalene	ND	7.5	ND	12
Acenaphthylene	ND	7.5	ND	12
Acenaphthene	ND	7.5	ND	12
Fluorene	18	7.5	29	12
Phenanthrene	66	7.5	100	12
Anthracene	ND	7.5	ND	12
Total LPAHs	140	7.5	220	12
Fluoranthene	49	7.5	78	12
Pyrene	45	7.5	71	12
Benzo(a)anthracene	13	7.5	21	12
Chrysene	23	7.5	37	12
Benzo(b)fluoranthene	18	7.5	29	12
Benzo(k)fluoranthene	8.8	7.5	14	12
Benzo(a)pyrene	12	7.5	19	12
Indeno(1,2,3-cd)pyrene	ND	10	ND	16
Dibenzo(a,h)anthracene	ND	10	ND	16
Benzo(g,h,i)perylene	17	10	27	16
Total HPAHs	190	7.5-10	300	12-16
Total PAHs	330	7.5-10	520	12-16
Total phthalate esters	230	7.5	370	12

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-21
Date Extracted:	04/26/95	
Date Analyzed:	04/30/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0012 (2nd Extraction)
Station ID: EK 7
ToxScan Lab ID: 12046-27 (2nd Extraction)

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	20	7.5	32	12
2-Methylnaphthalene	40	7.5	63	12
2-Chloronaphthalene	ND	7.5	ND	12
Acenaphthylene	ND	7.5	ND	12
Acenaphthene	ND	7.5	ND	12
Fluorene	15	7.5	24	12
Phenanthrene	50	7.5	79	12
Anthracene	ND	7.5	ND	12
Total LPAHs	130	7.5	200	12
Fluoranthene	36	7.5	57	12
Pyrene	33	7.5	52	12
Benzo(a)anthracene	11	7.5	17	12
Chrysene	19	7.5	30	12
Benzo(b)fluoranthene	16	7.5	25	12
Benzo(k)fluoranthene	ND	7.5	ND	12
Benzo(a)pyrene	9.0	7.5	14	12
Indeno(1,2,3-cd)pyrene	ND	10	ND	16
Dibenzo(a,h)anthracene	ND	10	ND	16
Benzo(g,h,i)perylene	13	10	21	16
Total HPAHs	140	7.5-10	220	12-16
Total PAHs	270	7.5-10	420	12-16
Total phthalate esters	300	7.5	480	12

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/12/95
Date Analyzed: 04/25/95
Matrix: Sediment
Units: ug/Kg (ppb)

Client Sample ID: HUM95SED0013
Station ID: EK 6
ToxScan Lab ID: 12046-28

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	24	7.5	39	12
2-Methylnaphthalene	41	7.5	67	12
2-Chloronaphthalene	ND	7.5	ND	12
Acenaphthylene	ND	7.5	ND	12
Acenaphthene	ND	7.5	ND	12
Fluorene	18	7.5	30	12
Phenanthrene	61	7.5	100	12
Anthracene	ND	7.5	ND	12
Total LPAHs	140	7.5	240	12
Fluoranthene	42	7.5	69	12
Pyrene	42	7.5	69	12
Benzo(a)anthracene	11	7.5	18	12
Chrysene	23	7.5	38	12
Benzo(b)fluoranthene	19	7.5	31	12
Benzo(k)fluoranthene	9.0	7.5	15	12
Benzo(a)pyrene	11	7.5	18	12
Indeno(1,2,3-cd)pyrene	ND	10	ND	16
Dibenzo(a,h)anthracene	ND	10	ND	16
Benzo(g,h,i)perylene	17	10	28	16
Total HPAHs	170	7.5-10	290	12-16
Total PAHs	310	7.5-10	530	12-16
Total phthalate esters	160	7.5	260	12

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-23
Date Extracted:	04/12/95	
Date Analyzed:	04/25/95 - 04/26/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID:	HUM95SED0014
Station ID:	**EK 5**
ToxScan Lab ID:	12046-29

	Wet Weight		Dry Weight	
Analyte	Sample Value	Reporting Limit	Sample Value	Reporting Limit
Naphthalene	ND	7.5	ND	13
2-Methylnaphthalene	15	7.5	26	13
2-Chloronaphthalene	ND	7.5	ND	13
Acenaphthylene	ND	7.5	ND	13
Acenaphthene	8.1	7.5	14	13
Fluorene	21	7.5	37	13
Phenanthrene	92	7.5	160	13
Anthracene	15	7.5	26	13
Total LPAHs	150	7.5	260	13
Fluoranthene	83	7.5	150	13
Pyrene	62	7.5	110	13
Benzo(a)anthracene	34	7.5	60	13
Chrysene	56	7.5	98	13
Benzo(b)fluoranthene	33	7.5	58	13
Benzo(k)fluoranthene	21	7.5	37	13
Benzo(a)pyrene	25	7.5	44	13
Indeno(1,2,3-cd)pyrene	15	10	26	18
Dibenzo(a,h)anthracene	ND	10	ND	18
Benzo(g,h,i)perylene	20	10	35	18
Total HPAHs	350	7.5-10	620	13-18
Total PAHs	500	7.5-10	880	13-18
Total phthalate esters	840	7.5	1400	13

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/26/95
Date Analyzed: 04/30/95
Matrix: Sediment
Units: ug/Kg (ppb)

Client Sample ID: HUM95SED0014 (2nd Extraction)
Station ID: EK 5
ToxScan Lab ID: 12046-29 (2nd Extraction)

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit		Dry Weight Sample Value	Dry Weight Reporting Limit	
Naphthalene	18	7.5		32	13	
2-Methylnaphthalene	35	7.5		61	13	
2-Chloronaphthalene	ND	7.5		ND	13	
Acenaphthylene	ND	7.5		ND	13	
Acenaphthene	8.3	7.5		15	13	
Fluorene	17	7.5		30	13	
Phenanthrene	67	7.5		120	13	
Anthracene	ND	7.5		ND	13	
Total LPAHs	150	7.5		260	13	
Fluoranthene	81	7.5		140	13	
Pyrene	64	7.5		110	13	
Benzo(a)anthracene	16	7.5		28	13	
Chrysene	25	7.5		44	13	
Benzo(b)fluoranthene	20	7.5		35	13	
Benzo(k)fluoranthene	13	7.5		23	13	
Benzo(a)pyrene	13	7.5		23	13	
Indeno(1,2,3-cd)pyrene	ND	12	*	ND	21	*
Dibenzo(a,h)anthracene	ND	10		ND	18	
Benzo(g,h,i)perylene	16	10		28	18	
Total HPAHs	250	7.5-12	*	430	13-21	*
Total PAHs	400	7.5-12	*	690	13-21	*
Total phthalate esters	160	7.5		280	13	

ND = Not Detected
* Reporting limit raised due to matrix interference
LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-25
Date Extracted:	04/12/95	
Date Analyzed:	04/25/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0015
Station ID: COMP #3
ToxScan Lab ID: 12046-30

	Wet Weight		Dry Weight	
Analyte	Sample Value	Reporting Limit	Sample Value	Reporting Limit
Naphthalene	ND	7.5	ND	13
2-Methylnaphthalene	23	7.5	39	13
2-Chloronaphthalene	ND	7.5	ND	13
Acenaphthylene	ND	7.5	ND	13
Acenaphthene	ND	7.5	ND	13
Fluorene	19	7.5	32	13
Phenanthrene	64	7.5	110	13
Anthracene	ND	7.5	ND	13
Total LPAHs	110	7.5	180	13
Fluoranthene	53	7.5	90	13
Pyrene	43	7.5	73	13
Benzo(a)anthracene	13	7.5	22	13
Chrysene	25	7.5	42	13
Benzo(b)fluoranthene	22	7.5	37	13
Benzo(k)fluoranthene	11	7.5	19	13
Benzo(a)pyrene	13	7.5	22	13
Indeno(1,2,3-cd)pyrene	11	10	19	17
Dibenzo(a,h)anthracene	ND	10	ND	17
Benzo(g,h,i)perylene	18	10	31	17
Total HPAHs	210	7.5-10	360	13-17
Total PAHs	320	7.5-10	540	13-17
Total phthalate esters	300	7.5	510	13

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/26/95
Date Analyzed: 04/30/95
Matrix: Sediment
Units: ug/Kg (ppb)

Client Sample ID: HUM95SED0015 (2nd Extraction)
Station ID: COMP #3
ToxScan Lab ID: 12046-30 (2nd Extraction)

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	22	7.5	37	13
2-Methylnaphthalene	38	7.5	64	13
2-Chloronaphthalene	ND	7.5	ND	13
Acenaphthylene	ND	7.5	ND	13
Acenaphthene	ND	7.5	ND	13
Fluorene	16	7.5	27	13
Phenanthrene	48	7.5	81	13
Anthracene	ND	7.5	ND	13
Total LPAHs	120	7.5	210	13
Fluoranthene	37	7.5	63	13
Pyrene	35	7.5	59	13
Benzo(a)anthracene	9.8	7.5	17	13
Chrysene	18	7.5	31	13
Benzo(b)fluoranthene	14	7.5	24	13
Benzo(k)fluoranthene	ND	7.5	ND	13
Benzo(a)pyrene	9.2	7.5	16	13
Indeno(1,2,3-cd)pyrene	ND	10	ND	17
Dibenzo(a,h)anthracene	ND	10	ND	17
Benzo(g,h,i)perylene	13	10	22	17
Total HPAHs	140	7.5-10	230	13-17
Total PAHs	260	7.5-10	440	13-17
Total phthalate esters	180	7.5	300	13

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-27
Date Extracted:	04/13/95	
Date Analyzed:	04/21/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0016
Station ID: EK 2
ToxScan Lab ID: 12046-31

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	21	7.5	33	12
2-Methylnaphthalene	27	7.5	43	12
2-Chloronaphthalene	ND	7.5	ND	12
Acenaphthylene	ND	7.5	ND	12
Acenaphthene	ND	7.5	ND	12
Fluorene	15	7.5	24	12
Phenanthrene	53	7.5	84	12
Anthracene	ND	7.5	ND	12
Total LPAHs	120	7.5	180	12
Fluoranthene	52	7.5	83	12
Pyrene	49	7.5	78	12
Benzo(a)anthracene	12	7.5	19	12
Chrysene	20	7.5	32	12
Benzo(b)fluoranthene	19	7.5	30	12
Benzo(k)fluoranthene	8.1	7.5	13	12
Benzo(a)pyrene	10	7.5	16	12
Indeno(1,2,3-cd)pyrene	ND	10	ND	16
Dibenzo(a,h)anthracene	ND	10	ND	16
Benzo(g,h,i)perylene	14	10	22	16
Total HPAHs	180	7.5-10	290	12-16
Total PAHs	300	7.5-10	470	12-16
Total phthalate esters	810	7.5	1300	12

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-28
Date Extracted:	04/13/95	
Date Analyzed:	04/21/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0017
Station ID: EK 4
ToxScan Lab ID: 12046-32

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	30	7.5	48	12
2-Methylnaphthalene	33	7.5	52	12
2-Chloronaphthalene	ND	7.5	ND	12
Acenaphthylene	8.2	7.5	13	12
Acenaphthene	25	7.5	40	12
Fluorene	29	7.5	46	12
Phenanthrene	190	7.5	300	12
Anthracene	21	7.5	33	12
Total LPAHs	340	7.5	530	12
Fluoranthene	260	7.5	410	12
Pyrene	270	7.5	430	12
Benzo(a)anthracene	68	7.5	110	12
Chrysene	96	7.5	150	12
Benzo(b)fluoranthene	98	7.5	160	12
Benzo(k)fluoranthene	71	7.5	110	12
Benzo(a)pyrene	110	7.5	170	12
Indeno(1,2,3-cd)pyrene	69	10	110	16
Dibenzo(a,h)anthracene	17	10	27	16
Benzo(g,h,i)perylene	110	10	170	16
Total HPAHs	1200	7.5-10	1800	12-16
Total PAHs	1500	7.5-10	2300	12-16
Total phthalate esters	1000	7.5	1700	12

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-29
Date Extracted:	04/13/95	
Date Analyzed:	04/21/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0018
Station ID: EK 4-A
ToxScan Lab ID: 12046-33

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	20	7.5	32	12
2-Methylnaphthalene	26	7.5	42	12
2-Chloronaphthalene	ND	7.5	ND	12
Acenaphthylene	ND	7.5	ND	12
Acenaphthene	ND	7.5	ND	12
Fluorene	16	7.5	26	12
Phenanthrene	79	7.5	130	12
Anthracene	15	7.5	24	12
Total LPAHs	160	7.5	250	12
Fluoranthene	120	7.5	190	12
Pyrene	140	7.5	230	12
Benzo(a)anthracene	33	7.5	53	12
Chrysene	44	7.5	71	12
Benzo(b)fluoranthene	42	7.5	68	12
Benzo(k)fluoranthene	24	7.5	39	12
Benzo(a)pyrene	47	7.5	76	12
Indeno(1,2,3-cd)pyrene	30	10	48	16
Dibenzo(a,h)anthracene	ND	10	ND	16
Benzo(g,h,i)perylene	47	10	76	16
Total HPAHs	530	7.5-10	850	12-16
Total PAHs	690	7.5-10	1100	12-16
Total phthalate esters	660	7.5	1100	12

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-30
Date Extracted:	04/13/95	
Date Analyzed:	04/21/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95SED0019
Station ID: COMP #2
ToxScan Lab ID: 12046-34

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	28	7.5	44	12
2-Methylnaphthalene	32	7.5	51	12
2-Chloronaphthalene	ND	7.5	ND	12
Acenaphthylene	ND	7.5	ND	12
Acenaphthene	7.9	7.5	13	12
Fluorene	19	7.5	30	12
Phenanthrene	69	7.5	110	12
Anthracene	11	7.5	17	12
Total LPAHs	170	7.5	270	12
Fluoranthene	100	7.5	160	12
Pyrene	96	7.5	150	12
Benzo(a)anthracene	26	7.5	41	12
Chrysene	37	7.5	59	12
Benzo(b)fluoranthene	32	7.5	51	12
Benzo(k)fluoranthene	18	7.5	29	12
Benzo(a)pyrene	32	7.5	51	12
Indeno(1,2,3-cd)pyrene	20	10	32	16
Dibenzo(a,h)anthracene	ND	10	ND	16
Benzo(g,h,i)perylene	32	10	51	16
Total HPAHs	390	7.5-10	620	12-16
Total PAHs	560	7.5-10	890	12-16
Total phthalate esters	1000	7.5	1700	12

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-31
Date Extracted:	04/12/95	
Date Analyzed:	04/26/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95PSD0006
Station ID: SAM 5
ToxScan Lab ID: 12046-40

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	11	7.5	16	11
2-Methylnaphthalene	16	7.5	23	11
2-Chloronaphthalene	ND	7.5	ND	11
Acenaphthylene	ND	7.5	ND	11
Acenaphthene	ND	7.5	ND	11
Fluorene	7.5	7.5	11	11
Phenanthrene	26	7.5	38	11
Anthracene	ND	7.5	ND	11
Total LPAHs	61	7.5	88	11
Fluoranthene	19	7.5	28	11
Pyrene	16	7.5	23	11
Benzo(a)anthracene	ND	7.5	ND	11
Chrysene	9.3	7.5	13	11
Benzo(b)fluoranthene	8.5	7.5	12	11
Benzo(k)fluoranthene	ND	7.5	ND	11
Benzo(a)pyrene	ND	7.5	ND	11
Indeno(1,2,3-cd)pyrene	ND	10	ND	14
Dibenzo(a,h)anthracene	ND	10	ND	14
Benzo(g,h,i)perylene	ND	10	ND	14
Total HPAHs	53	7.5-10	76	11-14
Total PAHs	110	7.5-10	160	11-14
Total phthalate esters	320	7.5	460	11

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/12/95
Date Analyzed: 04/25/95
Matrix: Sediment
Units: ug/Kg (ppb)

Client Sample ID: HUM95PSD0007
Station ID: SAM 7
ToxScan Lab ID: 12046-41

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	ND	7.5	ND	9.4
2-Methylnaphthalene	ND	7.5	ND	9.4
2-Chloronaphthalene	ND	7.5	ND	9.4
Acenaphthylene	ND	7.5	ND	9.4
Acenaphthene	ND	7.5	ND	9.4
Fluorene	ND	7.5	ND	9.4
Phenanthrene	8.1	7.5	10	9.4
Anthracene	ND	7.5	ND	9.4
Total LPAHs	8.1	7.5	10	9.4
Fluoranthene	ND	7.5	ND	9.4
Pyrene	ND	7.5	ND	9.4
Benzo(a)anthracene	ND	7.5	ND	9.4
Chrysene	ND	7.5	ND	9.4
Benzo(b)fluoranthene	ND	7.5	ND	9.4
Benzo(k)fluoranthene	ND	7.5	ND	9.4
Benzo(a)pyrene	ND	7.5	ND	9.4
Indeno(1,2,3-cd)pyrene	ND	10	ND	13
Dibenzo(a,h)anthracene	ND	10	ND	13
Benzo(g,h,i)perylene	ND	10	ND	13
Total HPAHs	ND	7.5-10	ND	9.4-13
Total PAHs	8.1	7.5-10	10	9.4-13
Total phthalate esters	140	7.5	180	9.4

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-33
Date Extracted:	04/12/95	
Date Analyzed:	04/25/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95PSD0007
Station ID: SAM 7
ToxScan Lab ID: 12046-41REP

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	ND	7.5	ND	9.4
2-Methylnaphthalene	ND	7.5	ND	9.4
2-Chloronaphthalene	ND	7.5	ND	9.4
Acenaphthylene	ND	7.5	ND	9.4
Acenaphthene	ND	7.5	ND	9.4
Fluorene	ND	7.5	ND	9.4
Phenanthrene	8.1	7.5	10	9.4
Anthracene	ND	7.5	ND	9.4
Total LPAHs	8.1	7.5	10	9.4
Fluoranthene	ND	7.5	ND	9.4
Pyrene	ND	7.5	ND	9.4
Benzo(a)anthracene	ND	7.5	ND	9.4
Chrysene	ND	7.5	ND	9.4
Benzo(b)fluoranthene	ND	7.5	ND	9.4
Benzo(k)fluoranthene	ND	7.5	ND	9.4
Benzo(a)pyrene	ND	7.5	ND	9.4
Indeno(1,2,3-cd)pyrene	ND	10	ND	13
Dibenzo(a,h)anthracene	ND	10	ND	13
Benzo(g,h,i)perylene	ND	10	ND	13
Total HPAHs	ND	7.5-10	ND	9.4-13
Total PAHs	8.1	7.5-10	10	9.4-13
Total phthalate esters	260	7.5	330	9.4

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-34
Date Extracted:	04/13/95	
Date Analyzed:	04/21/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95PSD0008
Station ID: SAM 1
ToxScan Lab ID: 12046-42

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	ND	7.5	ND	9.4
2-Methylnaphthalene	ND	7.5	ND	9.4
2-Chloronaphthalene	ND	7.5	ND	9.4
Acenaphthylene	ND	7.5	ND	9.4
Acenaphthene	ND	7.5	ND	9.4
Fluorene	ND	7.5	ND	9.4
Phenanthrene	ND	7.5	ND	9.4
Anthracene	ND	7.5	ND	9.4
Total LPAHs	ND	7.5	ND	9.4
Fluoranthene	ND	7.5	ND	9.4
Pyrene	ND	7.5	ND	9.4
Benzo(a)anthracene	ND	7.5	ND	9.4
Chrysene	ND	7.5	ND	9.4
Benzo(b)fluoranthene	ND	7.5	ND	9.4
Benzo(k)fluoranthene	ND	7.5	ND	9.4
Benzo(a)pyrene	ND	7.5	ND	9.4
Indeno(1,2,3-cd)pyrene	ND	10	ND	13
Dibenzo(a,h)anthracene	ND	10	ND	13
Benzo(g,h,i)perylene	ND	10	ND	13
Total HPAHs	ND	7.5-10	ND	9.4-13
Total PAHs	ND	7.5-10	ND	9.4-13
Total phthalate esters	200	7.5	260	9.4

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/13/95
Date Analyzed: 04/21/95 - 04/24/95
Matrix: Sediment
Units: ug/Kg (ppb)

Client Sample ID: HUM95PSD0009
Station ID: SAM 3
ToxScan Lab ID: 12046-43

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	ND	7.5	ND	9.4
2-Methylnaphthalene	10	7.5	13	9.4
2-Chloronaphthalene	ND	7.5	ND	9.4
Acenaphthylene	ND	7.5	ND	9.4
Acenaphthene	ND	7.5	ND	9.4
Fluorene	ND	7.5	ND	9.4
Phenanthrene	11	7.5	14	9.4
Anthracene	ND	7.5	ND	9.4
Total LPAHs	21	7.5	27	9.4
Fluoranthene	ND	7.5	ND	9.4
Pyrene	ND	7.5	ND	9.4
Benzo(a)anthracene	ND	7.5	ND	9.4
Chrysene	ND	7.5	ND	9.4
Benzo(b)fluoranthene	ND	7.5	ND	9.4
Benzo(k)fluoranthene	ND	7.5	ND	9.4
Benzo(a)pyrene	ND	7.5	ND	9.4
Indeno(1,2,3-cd)pyrene	ND	10	ND	13
Dibenzo(a,h)anthracene	ND	10	ND	13
Benzo(g,h,i)perylene	ND	10	ND	13
Total HPAHs	ND	7.5-10	ND	9.4-13
Total PAHs	21	7.5-10	27	9.4-13
Total phthalate esters	630	7.5	790	9.4

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/13/95
Date Analyzed: 04/21/95 - 04/24/95
Matrix: Sediment
Units: ug/Kg (ppb)

Client Sample ID: HUM95PSD0010
Station ID: SAM 4
ToxScan Lab ID: 12046-44

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	ND	7.5	ND	10
2-Methylnaphthalene	9.5	7.5	13	10
2-Chloronaphthalene	ND	7.5	ND	10
Acenaphthylene	ND	7.5	ND	10
Acenaphthene	ND	7.5	ND	10
Fluorene	ND	7.5	ND	10
Phenanthrene	13	7.5	17	10
Anthracene	ND	7.5	ND	10
Total LPAHs	23	7.5	30	10
Fluoranthene	ND	7.5	ND	10
Pyrene	ND	7.5	ND	10
Benzo(a)anthracene	ND	7.5	ND	10
Chrysene	ND	7.5	ND	10
Benzo(b)fluoranthene	ND	7.5	ND	10
Benzo(k)fluoranthene	ND	7.5	ND	10
Benzo(a)pyrene	ND	7.5	ND	10
Indeno(1,2,3-cd)pyrene	ND	10	ND	13
Dibenzo(a,h)anthracene	ND	10	ND	13
Benzo(g,h,i)perylene	ND	10	ND	13
Total HPAHs	ND	7.5-10	ND	10-13
Total PAHs	23	7.5-10	30	10-13
Total phthalate esters	910	7.5	1200	10

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-39
Date Extracted:	04/13/95	
Date Analyzed:	04/22/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID: HUM95PSD0020
Station ID: FL 5
ToxScan Lab ID: 12046-54

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	9.5	7.5	13	10
2-Methylnaphthalene	22	7.5	30	10
2-Chloronaphthalene	ND	7.5	ND	10
Acenaphthylene	ND	7.5	ND	10
Acenaphthene	ND	7.5	ND	10
Fluorene	ND	7.5	ND	10
Phenanthrene	24	7.5	33	10
Anthracene	ND	7.5	ND	10
Total LPAHs	56	7.5	76	10
Fluoranthene	ND	7.5	ND	10
Pyrene	ND	7.5	ND	10
Benzo(a)anthracene	ND	7.5	ND	10
Chrysene	ND	7.5	ND	10
Benzo(b)fluoranthene	ND	7.5	ND	10
Benzo(k)fluoranthene	ND	7.5	ND	10
Benzo(a)pyrene	ND	7.5	ND	10
Indeno(1,2,3-cd)pyrene	ND	10	ND	14
Dibenzo(a,h)anthracene	ND	10	ND	14
Benzo(g,h,i)perylene	ND	10	ND	14
Total HPAHs	ND	7.5-10	ND	10-14
Total PAHs	56	7.5-10	76	10-14
Total phthalate esters	190	7.5	270	10

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/13/95
Date Analyzed: 04/24/95
Matrix: Sediment
Units: ug/Kg (ppb)

Client Sample ID: HUM95PSD0021
Station ID: EK 1
ToxScan Lab ID: 12046-55

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	ND	7.5	ND	9.3
2-Methylnaphthalene	ND	7.5	ND	9.3
2-Chloronaphthalene	ND	7.5	ND	9.3
Acenaphthylene	ND	7.5	ND	9.3
Acenaphthene	ND	7.5	ND	9.3
Fluorene	ND	7.5	ND	9.3
Phenanthrene	ND	7.5	ND	9.3
Anthracene	ND	7.5	ND	9.3
Total LPAHs	ND	7.5	ND	9.3
Fluoranthene	ND	7.5	ND	9.3
Pyrene	ND	7.5	ND	9.3
Benzo(a)anthracene	ND	7.5	ND	9.3
Chrysene	ND	7.5	ND	9.3
Benzo(b)fluoranthene	ND	7.5	ND	9.3
Benzo(k)fluoranthene	ND	7.5	ND	9.3
Benzo(a)pyrene	ND	7.5	ND	9.3
Indeno(1,2,3-cd)pyrene	ND	10	ND	12
Dibenzo(a,h)anthracene	ND	10	ND	12
Benzo(g,h,i)perylene	ND	10	ND	12
Total HPAHs	ND	7.5-10	ND	9.3-12
Total PAHs	ND	7.5-10	ND	9.3-12
Total phthalate esters	180	7.5	220	9.3

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/13/95
Date Analyzed: 04/24/95 - 04/25/95
Matrix: Sediment
Units: ug/Kg (ppb)

Client Sample ID: HUM95PSD0022
Station ID: EK 3
ToxScan Lab ID: 12046-56

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	ND	7.5	ND	10
2-Methylnaphthalene	ND	7.5	ND	10
2-Chloronaphthalene	ND	7.5	ND	10
Acenaphthylene	ND	7.5	ND	10
Acenaphthene	ND	7.5	ND	10
Fluorene	ND	7.5	ND	10
Phenanthrene	15	7.5	20	10
Anthracene	ND	7.5	ND	10
Total LPAHs	15	7.5	20	10
Fluoranthene	16	7.5	21	10
Pyrene	18	7.5	24	10
Benzo(a)anthracene	ND	7.5	ND	10
Chrysene	7.6	7.5	10	10
Benzo(b)fluoranthene	ND	7.5	ND	10
Benzo(k)fluoranthene	ND	7.5	ND	10
Benzo(a)pyrene	ND	7.5	ND	10
Indeno(1,2,3-cd)pyrene	ND	10	ND	13
Dibenzo(a,h)anthracene	ND	10	ND	13
Benzo(g,h,i)perylene	ND	10	ND	13
Total HPAHs	42	7.5-10	55	10-13
Total PAHs	57	7.5-10	75	10-13
Total phthalate esters	770	7.5	1000	10

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-42
Date Extracted:	04/13/95	
Date Analyzed:	04/20/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

Client Sample ID:	HUM95PSD0023
Station ID:	**FL 6**
ToxScan Lab ID:	12046-57

	Wet Weight		Dry Weight	
Analyte	Sample Value	Reporting Limit	Sample Value	Reporting Limit
Naphthalene	ND	7.5	ND	9.4
2-Methylnaphthalene	ND	7.5	ND	9.4
2-Chloronaphthalene	ND	7.5	ND	9.4
Acenaphthylene	ND	7.5	ND	9.4
Acenaphthene	ND	7.5	ND	9.4
Fluorene	ND	7.5	ND	9.4
Phenanthrene	ND	7.5	ND	9.4
Anthracene	ND	7.5	ND	9.4
Total LPAHs	ND	7.5	ND	9.4
Fluoranthene	ND	7.5	ND	9.4
Pyrene	ND	7.5	ND	9.4
Benzo(a)anthracene	ND	7.5	ND	9.4
Chrysene	ND	7.5	ND	9.4
Benzo(b)fluoranthene	ND	7.5	ND	9.4
Benzo(k)fluoranthene	ND	7.5	ND	9.4
Benzo(a)pyrene	ND	7.5	ND	9.4
Indeno(1,2,3-cd)pyrene	ND	10	ND	13
Dibenzo(a,h)anthracene	ND	10	ND	13
Benzo(g,h,i)perylene	ND	10	ND	13
Total HPAHs	ND	7.5-10	ND	9.4-13
Total PAHs	ND	7.5-10	ND	9.4-13
Total phthalate esters	300	7.5	370	9.4

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/13/95
Date Analyzed: 04/20/95
Matrix: Sediment
Units: ug/Kg (ppb)

Client Sample ID: HUM95PSD0023
Station ID: FL 6
ToxScan Lab ID: 12046-57REP

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit	Dry Weight Sample Value	Dry Weight Reporting Limit
Naphthalene	ND	7.5	ND	9.4
2-Methylnaphthalene	ND	7.5	ND	9.4
2-Chloronaphthalene	ND	7.5	ND	9.4
Acenaphthylene	ND	7.5	ND	9.4
Acenaphthene	ND	7.5	ND	9.4
Fluorene	ND	7.5	ND	9.4
Phenanthrene	ND	7.5	ND	9.4
Anthracene	ND	7.5	ND	9.4
Total LPAHs	ND	7.5	ND	9.4
Fluoranthene	ND	7.5	ND	9.4
Pyrene	ND	7.5	ND	9.4
Benzo(a)anthracene	ND	7.5	ND	9.4
Chrysene	ND	7.5	ND	9.4
Benzo(b)fluoranthene	ND	7.5	ND	9.4
Benzo(k)fluoranthene	ND	7.5	ND	9.4
Benzo(a)pyrene	ND	7.5	ND	9.4
Indeno(1,2,3-cd)pyrene	ND	10	ND	13
Dibenzo(a,h)anthracene	ND	10	ND	13
Benzo(g,h,i)perylene	ND	10	ND	13
Total HPAHs	ND	7.5-10	ND	9.4-13
Total PAHs	ND	7.5-10	ND	9.4-13
Total phthalate esters	320	7.5	400	9.4

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-44
Date Extracted:	04/12/95	
Date Analyzed:	04/24/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

ToxScan Lab ID: Method Blank

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit
Naphthalene	ND	7.5
2-Methylnaphthalene	ND	7.5
2-Chloronaphthalene	ND	7.5
Acenaphthylene	ND	7.5
Acenaphthene	ND	7.5
Fluorene	ND	7.5
Phenanthrene	ND	7.5
Anthracene	ND	7.5
Total LPAHs	ND	7.5
Fluoranthene	ND	7.5
Pyrene	ND	7.5
Benzo(a)anthracene	ND	7.5
Chrysene	ND	7.5
Benzo(b)fluoranthene	ND	7.5
Benzo(k)fluoranthene	ND	7.5
Benzo(a)pyrene	ND	7.5
Indeno(1,2,3-cd)pyrene	ND	10
Dibenzo(a,h)anthracene	ND	10
Benzo(g,h,i)perylene	ND	10
Total HPAHs	ND	7.5-10
Total PAHs	ND	7.5-10
Total phthalate esters	150	7.5

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-45
Date Extracted:	04/13/95	
Date Analyzed:	04/20/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

ToxScan Lab ID: Method Blank

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit
Naphthalene	ND	7.5
2-Methylnaphthalene	ND	7.5
2-Chloronaphthalene	ND	7.5
Acenaphthylene	ND	7.5
Acenaphthene	ND	7.5
Fluorene	ND	7.5
Phenanthrene	ND	7.5
Anthracene	ND	7.5
Total LPAHs	ND	7.5
Fluoranthene	ND	7.5
Pyrene	ND	7.5
Benzo(a)anthracene	ND	7.5
Chrysene	ND	7.5
Benzo(b)fluoranthene	ND	7.5
Benzo(k)fluoranthene	ND	7.5
Benzo(a)pyrene	ND	7.5
Indeno(1,2,3-cd)pyrene	ND	10
Dibenzo(a,h)anthracene	ND	10
Benzo(g,h,i)perylene	ND	10
Total HPAHs	ND	7.5-10
Total PAHs	ND	7.5-10
Total phthalate esters	240	7.5

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client:	SF Army Corps of Engineers	ToxScan Number: T-12046
Method:	Modified EPA Method 8270	Page SV-46
Date Extracted:	04/26/95	
Date Analyzed:	04/28/95	
Matrix:	Sediment	
Units:	ug/Kg (ppb)	

ToxScan Lab ID: Method Blank

Analyte	Wet Weight Sample Value	Wet Weight Reporting Limit
Naphthalene	ND	7.5
2-Methylnaphthalene	ND	7.5
2-Chloronaphthalene	ND	7.5
Acenaphthylene	ND	7.5
Acenaphthene	ND	7.5
Fluorene	ND	7.5
Phenanthrene	ND	7.5
Anthracene	ND	7.5
Total LPAHs	ND	7.5
Fluoranthene	ND	7.5
Pyrene	ND	7.5
Benzo(a)anthracene	ND	7.5
Chrysene	ND	7.5
Benzo(b)fluoranthene	ND	7.5
Benzo(k)fluoranthene	ND	7.5
Benzo(a)pyrene	ND	7.5
Indeno(1,2,3-cd)pyrene	ND	10
Dibenzo(a,h)anthracene	ND	10
Benzo(g,h,i)perylene	ND	10
Total HPAHs	ND	7.5-10
Total PAHs	ND	7.5-10
Total phthalate esters	47	7.5

ND = Not Detected

LPAH = Low Molecular Weight PAH
HPAH = High Molecular Weight PAH

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/12/95
Date Analyzed: 04/25/95
Matrix: Sediment

Quality Control Report: Spike recoveries expressed as percentages

Client ID: HUM95PSD0007

ToxScan ID: 12046-41

Analyte	% Rec MS	% Rec MSD	RPD	QAQC LIMITS %REC	%RPD
Acenaphthene	93	89	4	31-137	19
Pyrene	96	91	5	35-142	36

MS = Matrix Spike
MSD = Matrix Spike Duplicate
RPD = Relative Percent Difference

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/13/95
Date Analyzed: 04/20/95
Matrix: Sediment

Quality Control Report: Spike recoveries expressed as percentages

Client ID: HUM95PSD0023

ToxScan ID: 12046-57

Analyte	% Rec MS	% Rec MSD	RPD	QAQC LIMITS %REC	%RPD
Acenaphthene	77	85	10	31-137	19
Pyrene	81	87	7	35-142	36

MS = Matrix Spike
MSD = Matrix Spike Duplicate
RPD = Relative Percent Difference

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/12/95
Date Analyzed: 04/24/95
Matrix: Sediment

Quality Control Report: Spike recoveries expressed as percentages

Analyte	% Rec LCS	QAQC LIMITS %REC
Acenaphthene	63	31-137
Pyrene	96	35-142

LCS = Laboratory Control Sample

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/13/95
Date Analyzed: 04/20/95
Matrix: Sediment

Quality Control Report: Spike recoveries expressed as percentages

Analyte	% Rec LCS	QAQC LIMITS %REC
Acenaphthene	78	31-137
Pyrene	75	35-142

LCS = Laboratory Control Sample

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/26/95
Date Analyzed: 04/28/95
Matrix: Sediment

Quality Control Report: Spike recoveries expressed as percentages

Analyte	% Rec LCS	QAQC LIMITS %REC
Acenaphthene	92	31-137
Pyrene	90	35-142

LCS = Laboratory Control Sample

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/12/95
Date Analyzed: 04/24/95 - 04/26/95
Matrix: Sediment

Quality Control Report: Surrogate recoveries expressed as percentages

Sample Identification	S1	S2	S3
Method Blank	7 *	49	105
Laboratory Control Sample	4 *	39	103
HUM95SED0001	54	78	94
HUM95SED0002	10 *	46	90
HUM95SED0003	5 *	54	95
HUM95SED0004	4 *	25 *	96
HUM95SED0005	3 *	47	98
HUM95SED0006	21 *	64	96
HUM95SED0007	54	90	100
HUM95SED0008	31	77	97
HUM95SED0009	3 *	53	93
HUM95SED0010	62	89	97
HUM95SED0011	3 *	57	102
HUM95SED0012	54	86	101
HUM95SED0013	65	92	103
HUM95SED0014	4 *	57	92
HUM95SED0015	13 *	63	97
HUM95PSD0006	66	90	98
HUM95PSD0007	66	89	99
HUM95PSD0007REP	52	72	94
HUM95PSD0007MS	67	87	105
HUM95PSD0007MSD	59	83	96

* Outside QC limits; sample was reextracted (new recoveries on page SV-54)
MS = Matrix Spike
MS = Matrix Spike Duplicate

Surrogates:
S1 = Nitrobenzene-d5 (S.S.)
S2 = 2-Fluorobiphenyl (S.S.)
S3 = Terphenyl-d14 (S.S.)

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/13/95
Date Analyzed: 04/20/95 - 04/24/95
Matrix: Sediment

Quality Control Report: Surrogate recoveries expressed as percentages

Sample Identification	S1	S2	S3
Method Blank	60	80	95
Laboratory Control Sample	46	71	86
SRM #332	55	74	86
HUM95SED0016	55	82	94
HUM95SED0017	59	82	92
HUM95SED0018	60	81	92
HUM95SED0019	64	86	97
HUM95PSD0008	61	76	95
HUM95PSD0009	60	80	91
HUM95PSD0010	60	86	97
HUM95PSD0011	67	86	95
HUM95PSD0018	58	81	96
HUM95PSD0020	67	91	98
HUM95PSD0021	58	77	91
HUM95PSD0022	56	85	100
HUM95PSD0023	45	70	88
HUM95PSD0023REP	50	72	96
HUM95PSD0023MS	48	71	88
HUM95PSD0023MSD	53	76	90

MS = Matrix Spike
MS = Matrix Spike Duplicate

Surrogates:
S1 = Nitrobenzene-d5 (S.S.)
S2 = 2-Fluorobiphenyl (S.S.)
S3 = Terphenyl-d14 (S.S.)

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/26/95
Date Analyzed: 04/28/95 - 04/30/95
Matrix: Sediment

Quality Control Report: Surrogate recoveries expressed as percentages

Sample Identification	S1	S2	S3
Method Blank	67	88	96
Laboratory Control Sample	66	86	92
HUM95SED0002 (2nd Extraction)	69	95	98
HUM95SED0003 (2nd Extraction)	66	87	94
HUM95SED0004 (2nd Extraction)	67	89	99
HUM95SED0005 (2nd Extraction)	67	83	91
HUM95SED0006 (2nd Extraction)	68	88	93
HUM95SED0008 (2nd Extraction)	67	91	95
HUM95SED0009 (2nd Extraction)	65	87	94
HUM95SED0011 (2nd Extraction)	83	92	100
HUM95SED0012 (2nd Extraction)	81	95	99
HUM95SED0014 (2nd Extraction)	82	92	100
HUM95SED0015 (2nd Extraction)	82	92	102

Surrogates:
S1 = Nitrobenzene-d5 (S.S.)
S2 = 2-Fluorobiphenyl (S.S.)
S3 = Terphenyl-d14 (S.S.)

Client: SF Army Corps of Engineers
Method: Modified EPA Method 8270
Date Extracted: 04/13/95
Date Analyzed: 04/24/95
Matrix: Sediment
Units: ug/Kg (ppb)

Standard Reference Material Results: ERA Lot # 332

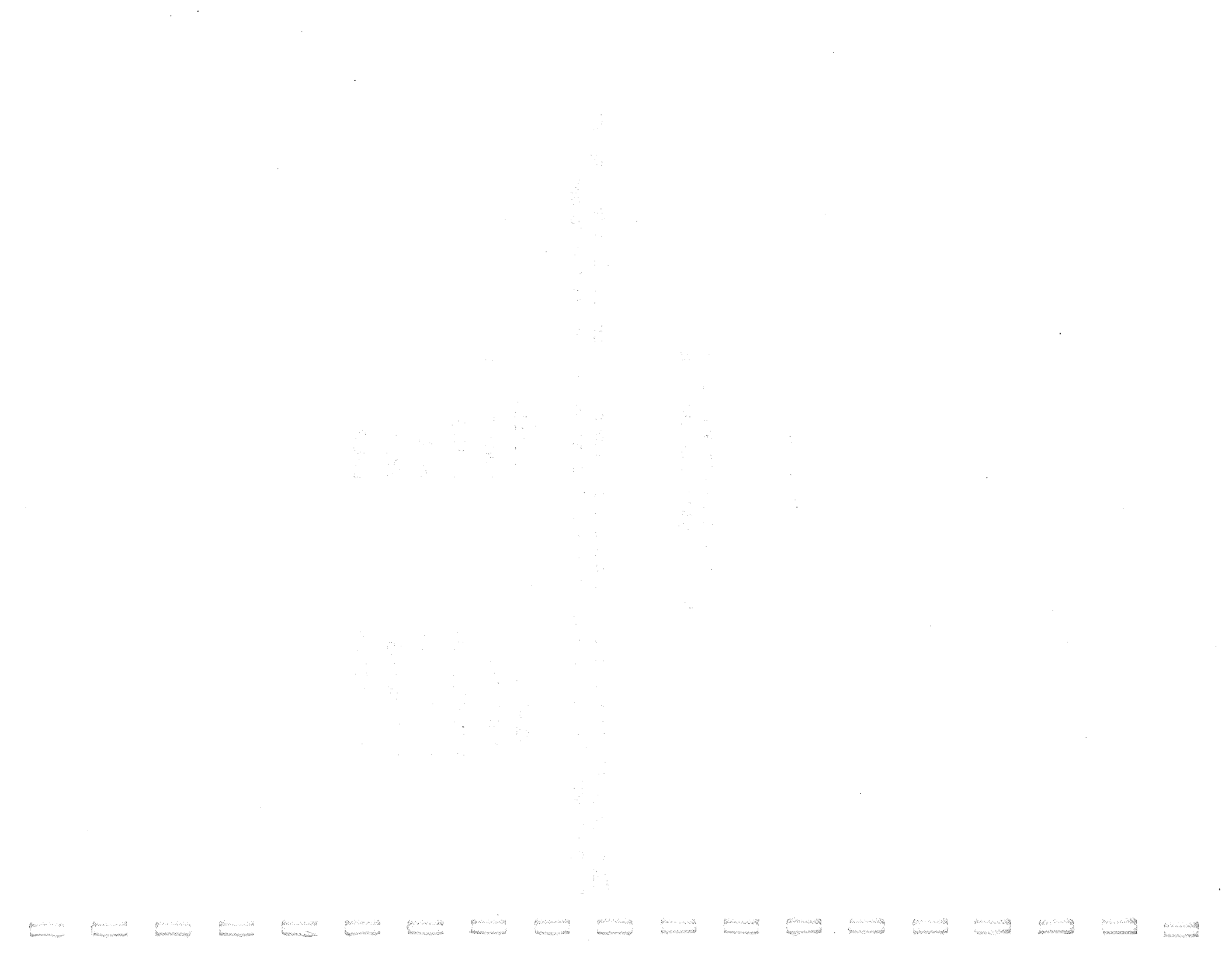
Analyte	Certified Value	Acceptance Limits Low	Acceptance Limits High	Analytical Result
Anthracene	5090	1590	5340	2080
Benzo(k)fluoranthene	3920	1670	4120	2030
Butyl benzyl phthalate	6300	2440	7310	4670
Chrysene	6860	2490	7200	4630
Dibenzo(a,h)anthracene	3300	868	5210	1830
Bis(2-ethylhexyl)phthalate	4060	1910	4750	3080
Fluoranthene	2570	776	2700	1590
Naphthalene	8110	1680	8520	3640
Pyrene	9870	3630	10400	6040

Appendix C-1

Sediment Dioxins and Furans
(Alta Analytical Laboratory, Inc.)

Please note: The composite sample labels in this appendix are equivalent to the composite sample labels referenced in other sections and appendices of this report, as follows:

Alta Lab. ID	Composite
1110-0001-SA	Reference Site
1110-00021-SA	SAMTB
1110-00031-SA	FLTB
1110-00041-SA	EKEX
1110-00051-SA	EKUP



ALTA

April 28, 1995

Alta Batch I.D.: 1110

Ms. Mary Lou Milazzo
Toxscan
42 Hangar Way
Watsonville, CA 95076

Dear Ms. Milazzo,

Enclosed are the results for the five sediment samples received at Alta Analytical Laboratory on April 11, 1995. The work was authorized as your Project #10334. These samples were analyzed using EPA Method 8290 for tetra to octa chlorinated dioxins and furans. Routine turnaround time was provided for this project.

The following report consists of a Sample Inventory (Section I), Analytical Results (Section II) and the Appendix. The Appendix contains a copy of the chain-of-custody, a list of data qualifiers and abbreviations and copies of the raw data (if requested).

If you have any questions regarding this report please feel free to contact me.

Sincerely,

William J. Luksemburg
Director of HRMS Services

Alta Analytical Laboratory Inc.
5070 Robert J. Mathews Parkway
El Dorado Hills, CA 95762
FAX (916) 933-0940
(916) 933-1640

ALTA

Section I: Sample Inventory Report

Date Received: 4/11/95

Alta Lab. ID	Client Sample ID
1110-0001-SA	DIOXIN 001
1110-0002-SA	DIOXIN 002
1110-0003-SA	DIOXIN 003
1110-0004-SA	DIOXIN 004
1110-0005-SA	DIOXIN 005

SECTION II.

ALTA

PCDD & PCDF
EPA METHOD 8290

METHOD BLANK
Lab ID: 1110-0001-MB
Matrix: Sediment
TEQ = 0.002

Date Received: NA
Date Extracted: 4/14/95
Sample Amount: 10.00 g

ICAL ID: I1613A
QC Lot: LC0413S
Units: pg/g

Compound	Conc.	D.L.	Ratio	S/N Ratio	Qualifier
2,3,7,8-TCDD	ND	0.12			
Total TCDD	ND	0.12			
1,2,3,7,8-PeCDD	ND	0.15			
Total PeCDD	ND	0.15			
1,2,3,4,7,8-HxCDD	ND	0.11			
1,2,3,6,7,8-HxCDD	ND	0.11			
1,2,3,7,8,9-HxCDD	ND	0.11			
Total HxCDD	ND	0.11			
1,2,3,4,6,7,8-HpCDD	ND	0.18			
Total HpCDD	ND	0.25			
OCDD	2.0		1.02	>10:1	A
2,3,7,8-TCDF	ND	0.18			
Total TCDF	ND	0.18			
1,2,3,7,8-PeCDF	ND	0.16			
2,3,4,7,8-PeCDF	ND	0.17			
Total PeCDF	ND	0.17			
1,2,3,4,7,8-HxCDF	ND	0.20			
1,2,3,6,7,8-HxCDF	ND	0.20			
2,3,4,6,7,8-HxCDF	ND	0.20			
1,2,3,7,8,9-HxCDF	ND	0.24			
Total HxCDF	ND	0.24			
1,2,3,4,6,7,8-HpCDF	ND	0.20			
1,2,3,4,7,8,9-HpCDF	ND	0.11			
Total HpCDF	ND	0.20			
OCDF	ND	0.30			

Analyst: 64

Reviewer: 4/2

PCDD & PCDF
EPA METHOD 8290

METHOD BLANK
Lab ID: 1110-0001-MB

Isotopic Recovery Results

Internal Standard	% R	Ratio	Qualifier
^{13}C-2,3,7,8-TCDD	96	0.74	
^{13}C-1,2,3,7,8-PeCDD	103	1.57	
^{13}C-1,2,3,4,7,8-HxCDD	89	1.32	
^{13}C-1,2,3,6,7,8-HxCDD	98	1.33	
^{13}C-1,2,3,4,6,7,8-HpCDD	98	1.07	
^{13}C-OCDD	113	0.91	
^{13}C-2,3,7,8-TCDF	95	0.80	
^{13}C-1,2,3,7,8-PeCDF	88	1.64	
^{13}C-2,3,4,7,8-PeCDF	84	1.67	
^{13}C-1,2,3,4,7,8-HxCDF	83	0.52	
^{13}C-1,2,3,6,7,8-HxCDF	85	0.52	
^{13}C-2,3,4,6,7,8-HxCDF	80	0.53	
^{13}C-1,2,3,7,8,9-HxCDF	96	0.52	
^{13}C-1,2,3,4,6,7,8-HpCDF	86	0.43	
^{13}C-1,2,3,4,7,8,9-HpCDF	98	0.45	

Clean-up Recovery Standard:

^{37}Cl-2,3,7,8-TCDD	91	NA

Dates Analyzed:

DB-5: 4/17/95 **DB-225:** NA **SP-2331:** NA

Analyst: _____ **Reviewer:** _____

ALTA

PCDD & PCDF
EPA METHOD 8290

LCS RESULTS
Lab ID: 1110-LCS1/LCS2
Matrix: Sediment

Date Received: NA
Date Extracted: 4/13/95
Sample Amount: 10.00 g

ICAL ID: I1613A
QC Lot: LC0413S
Units: NA

Compound	LCS1 % R	LCS2 % R	RPD %
2,3,7,8-TCDD	89	94	5.5
1,2,3,7,8-PeCDD	89	91	2.2
1,2,3,4,7,8-HxCDD	93	98	5.2
1,2,3,6,7,8-HxCDD	95	97	2.1
1,2,3,7,8,9-HxCDD	94	97	3.1
1,2,3,4,6,7,8-HpCDD	93	98	5.2
OCDD	108	117	8.0
2,3,7,8-TCDF	93	96	3.2
1,2,3,7,8-PeCDF	94	98	4.2
2,3,4,7,8-PeCDF	94	99	5.2
1,2,3,4,7,8-HxCDF	94	98	4.2
1,2,3,6,7,8-HxCDF	96	99	3.1
2,3,4,6,7,8-HxCDF	90	93	3.3
1,2,3,7,8,9-HxCDF	95	97	2.1
1,2,3,4,6,7,8-HpCDF	94	97	3.1
1,2,3,4,7,8,9-HpCDF	95	97	2.1
OCDF	100	120	18

Analyst: [signature]

Reviewer: [signature]

PCDD & PCDF
EPA METHOD 8290

LCS RESULTS
Lab ID: 1110-LCS1/LCS2

Isotopic Recovery Results

Internal Standard:	LCS1 % R	LCS2 % R
^{13}C-2,3,7,8-TCDD	95	98
^{13}C-1,2,3,7,8-PeCDD	106	115
^{13}C-1,2,3,4,7,8-HxCDD	90	94
^{13}C-1,2,3,6,7,8-HxCDD	90	97
^{13}C-1,2,3,4,6,7,8-HpCDD	95	97
^{13}C-OCDD	98	88
^{13}C-2,3,7,8-TCDF	96	98
^{13}C-1,2,3,7,8-PeCDF	100	102
^{13}C-2,3,4,7,8-PeCDF	96	100
^{13}C-1,2,3,4,7,8-HxCDF	84	87
^{13}C-1,2,3,6,7,8-HxCDF	82	87
^{13}C-2,3,4,6,7,8-HxCDF	82	86
^{13}C-1,2,3,7,8,9-HxCDF	84	88
^{13}C-1,2,3,4,6,7,8-HpCDF	79	85
^{13}C-1,2,3,4,7,8,9-HpCDF	87	91
Clean-up Recovery Standard:		
^{37}Cl-2,3,7,8-TCDD	87	89

Date Analyzed: 4/15/95

ALTA

PCDD & PCDF

EPA METHOD 8290

Sample ID: Dioxin 001
Lab ID: 1110-0001-SA
Matrix: Sediment
% Solid: 64

Date Received: 4/11/95
Date Extracted: 4/14/95
Sample Amount: 8.07 g
TEQ = 0.76

ICAL ID: I1613A
QC Lot: LC0413S
Units: pg/g

Compound	Conc.	D.L.	Ratio	S/N Ratio	Qualifier
2,3,7,8-TCDD	ND	0.19			
Total TCDD	0.29		0.79	>10:1	A
1,2,3,7,8-PeCDD	ND	0.27			
Total PeCDD	ND	0.27			
1,2,3,4,7,8-HxCDD	ND	0.20			
1,2,3,6,7,8-HxCDD	0.35		1.30	5:1	A
1,2,3,7,8,9-HxCDD	0.34		1.20	4:1	A
Total HxCDD	3.4		1.12	>10:1	
1,2,3,4,6,7,8-HpCDD	4.2		1.07	>10:1	
Total HpCDD	7.8		1.01	>10:1	
OCDD	610		0.90	>10:1	B
2,3,7,8-TCDF	ND	0.19			
Total TCDF	0.31		0.69	7:1	A
1,2,3,7,8-PeCDF	ND	0.13			
2,3,4,7,8-PeCDF	ND	0.13			
Total PeCDF	0.71		1.34	>10:1	A
1,2,3,4,7,8-HxCDF	ND	0.049			
1,2,3,6,7,8-HxCDF	ND	0.048			
2,3,4,6,7,8-HxCDF	0.39		1.27	>10:1	A
1,2,3,7,8,9-HxCDF	ND	0.051			
Total HxCDF	0.82		1.17	>10:1	A
1,2,3,4,6,7,8-HpCDF	0.47		1.09	>10:1	
1,2,3,4,7,8,9-HpCDF	ND	0.070			
Total HpCDF	1.3		1.09	>10:1	A
OCDF	0.51		0.97	>10:1	A

Analyst: BMH

Reviewer:

ALTA

PCDD & PCDF
EPA METHOD 8290

Sample ID: Dioxin 001
Lab ID: 1110-0001-SA

Isotopic Recovery Results

Internal Standard:	% R	Ratio	Qualifier
^{13}C-2,3,7,8-TCDD	86	0.75	
^{13}C-1,2,3,7,8-PeCDD	88	1.59	
^{13}C-1,2,3,4,7,8-HxCDD	90	1.31	
^{13}C-1,2,3,6,7,8-HxCDD	91	1.32	
^{13}C-1,2,3,4,6,7,8-HpCDD	89	1.07	
^{13}C-OCDD	98	0.92	
^{13}C-2,3,7,8-TCDF	89	0.81	
^{13}C-1,2,3,7,8-PeCDF	82	1.68	
^{13}C-2,3,4,7,8-PeCDF	81	1.64	
^{13}C-1,2,3,4,7,8-HxCDF	83	0.52	
^{13}C-1,2,3,6,7,8-HxCDF	83	0.52	
^{13}C-2,3,4,6,7,8-HxCDF	79	0.52	
^{13}C-1,2,3,7,8,9-HxCDF	90	0.53	
^{13}C-1,2,3,4,6,7,8-HpCDF	80	0.43	
^{13}C-1,2,3,4,7,8,9-HpCDF	89	0.44	
Clean-up Recovery Standard:			
^{37}Cl-2,3,7,8-TCDD	81	NA	

Dates Analyzed:

DB-5: 4/18/95 **DB-225:** 4/28/95 **SP-2331:** NA

Analyst: _____

Reviewer: _____

ALTA

PCDD & PCDF

EPA METHOD 8290

Sample ID: Dioxin 002
Lab ID: 1110-0002-SA
Matrix: Sediment
% Solid: 68

Date Received: 4/11/95
Date Extracted: 4/14/95
Sample Amount: 8.68 g
TEQ = 1.4

ICAL ID: I1613A
QC Lot: LC0413S
Units: pg/g

Compound	Conc.	D.L.	Ratio	S/N Ratio	Qualifier
2,3,7,8-TCDD	ND	0.17			
Total TCDD	22		0.79	>10:1	
1,2,3,7,8-PeCDD	0.32		1.55	8:1	A
Total PeCDD	12		1.73	>10:1	
1,2,3,4,7,8-HxCDD	0.40		1.30	5:1	A
1,2,3,6,7,8-HxCDD	2.6		1.22	>10:1	
1,2,3,7,8,9-HxCDD	1.5		1.23	>10:1	A
Total HxCDD	27		1.27	>10:1	
1,2,3,4,6,7,8-HpCDD	18		1.08	>10:1	
Total HpCDD	43		1.03	>10:1	
OCDD	110		0.90	>10:1	B
2,3,7,8-TCDF	0.93		0.86	>10:1	
Total TCDF	5.3		0.74	>10:1	
1,2,3,7,8-PeCDF	0.18		1.53	6:1	A
2,3,4,7,8-PeCDF	0.36		1.48	>10:1	A
Total PeCDF	4.0		1.36	>10:1	
1,2,3,4,7,8-HxCDF	0.53		1.35	>10:1	A
1,2,3,6,7,8-HxCDF	0.27		1.22	8:1	A
2,3,4,6,7,8-HxCDF	0.70		1.40	>10:1	A
1,2,3,7,8,9-HxCDF	0.14		1.30	4:1	A
Total HxCDF	7.2		1.30	>10:1	
1,2,3,4,6,7,8-HpCDF	3.8		1.09	>10:1	
1,2,3,4,7,8,9-HpCDF	ND	0.45			
Total HpCDF	11		1.09	>10:1	
OCDF	6.2		0.93	>10:1	

Analyst: [signature]

Reviewer: [signature]

ALTA

PCDD & PCDF
EPA METHOD 8290

Sample ID: Dioxin 002
Lab ID: 1110-0002-SA

Isotopic Recovery Results

Internal Standard:	% R	Ratio	Qualifier
^{13}C-2,3,7,8-TCDD	96	0.73	
^{13}C-1,2,3,7,8-PeCDD	105	1.57	
^{13}C-1,2,3,4,7,8-HxCDD	96	1.37	
^{13}C-1,2,3,6,7,8-HxCDD	97	1.26	
^{13}C-1,2,3,4,6,7,8-HpCDD	98	1.06	
^{13}C-OCDD	108	0.93	
^{13}C-2,3,7,8-TCDF	98	0.79	
^{13}C-1,2,3,7,8-PeCDF	92	1.65	
^{13}C-2,3,4,7,8-PeCDF	89	1.66	
^{13}C-1,2,3,4,7,8-HxCDF	88	0.52	
^{13}C-1,2,3,6,7,8-HxCDF	89	0.53	
^{13}C-2,3,4,6,7,8-HxCDF	85	0.52	
^{13}C-1,2,3,7,8,9-HxCDF	100	0.52	
^{13}C-1,2,3,4,6,7,8-HpCDF	86	0.43	
^{13}C-1,2,3,4,7,8,9-HpCDF	99	0.45	
Clean-up Recovery Standard:			
^{37}Cl-2,3,7,8-TCDD	91	NA	

Dates Analyzed:

DB-5: 4/18/95 **DB-225:** 4/28/95 **SP-2331:** NA

Analyst: _____

Reviewer: _____

ALTA

PCDD & PCDF

EPA METHOD 8290

Sample ID: Dioxin 003
Lab ID: 1110-0003-SA
Matrix: Sediment
% Solid: 55

Date Received: 4/11/95
Date Extracted: 4/14/95
Sample Amount: 6.63 g
TEQ = 0.81

ICAL ID: I1613A
QC Lot: LC0413S
Units: pg/g

Compound	Conc.	D.L.	Ratio	S/N Ratio	Qualifier
2,3,7,8-TCDD	ND	0.19			
Total TCDD	0.53		0.82	>10:1	
1,2,3,7,8-PeCDD	0.29		1.61	>10:1	A
Total PeCDD	1.1		1.56	>10:1	A
1,2,3,4,7,8-HxCDD	ND	0.36			
1,2,3,6,7,8-HxCDD	1.2		1.20	>10:1	A
1,2,3,7,8,9-HxCDD	0.72		1.22	5:1	A
Total HxCDD	9.4		1.26	>10:1	
1,2,3,4,6,7,8-HpCDD	8.7		1.09	>10:1	
Total HpCDD	20		1.02	>10:1	
OCDD	56		0.91	>10:1	B
2,3,7,8-TCDF	1.0		0.78	>10:1	
Total TCDF	4.9		0.79	>10:1	
1,2,3,7,8-PeCDF	0.14		1.57	3:1	A
2,3,4,7,8-PeCDF	0.20		1.76	4:1	A
Total PeCDF	1.5		1.76	>10:1	A
1,2,3,4,7,8-HxCDF	0.23		1.37	8:1	A
1,2,3,6,7,8-HxCDF	0.13		1.35	6:1	A
2,3,4,6,7,8-HxCDF	0.59		1.07	>10:1	A
1,2,3,7,8,9-HxCDF	ND	0.054			
Total HxCDF	3.1		1.21	>10:1	
1,2,3,4,6,7,8-HpCDF	1.6		1.01	>10:1	A
1,2,3,4,7,8,9-HpCDF	ND	0.19			
Total HpCDF	4.8		1.01	>10:1	
OCDF	3.7		0.90	>10:1	A

Analyst: _____

Reviewer: _____

ALTA

PCDD & PCDF
EPA METHOD 8290

Sample ID: Dioxin 003
Lab ID: 1110-0003-SA

Isotopic Recovery Results

Internal Standard:	% R	Ratio	Qualifier
^{13}C-2,3,7,8-TCDD	91	0.73	
^{13}C-1,2,3,7,8-PeCDD	95	1.45	
^{13}C-1,2,3,4,7,8-HxCDD	94	1.30	
^{13}C-1,2,3,6,7,8-HxCDD	94	1.33	
^{13}C-1,2,3,4,6,7,8-HpCDD	97	1.07	
^{13}C-OCDD	106	0.90	
^{13}C-2,3,7,8-TCDF	98	0.81	
^{13}C-1,2,3,7,8-PeCDF	90	1.63	
^{13}C-2,3,4,7,8-PeCDF	88	1.65	
^{13}C-1,2,3,4,7,8-HxCDF	87	0.53	
^{13}C-1,2,3,6,7,8-HxCDF	87	0.53	
^{13}C-2,3,4,6,7,8-HxCDF	84	0.53	
^{13}C-1,2,3,7,8,9-HxCDF	95	0.53	
^{13}C-1,2,3,4,6,7,8-HpCDF	87	0.44	
^{13}C-1,2,3,4,7,8,9-HpCDF	95	0.45	
Clean-up Recovery Standard:			
^{37}Cl-2,3,7,8-TCDD	85	NA	

Dates Analyzed:

DB-5: 4/18/95 **DB-225:** 4/28/95 **SP-2331:** NA

Analyst: _____

Reviewer: _____

ALTA

PCDD & PCDF

EPA METHOD 8290

Sample ID: Dioxin 004
Lab ID: 1110-0004-SA
Matrix: Sediment
% Solid: 60

Date Received: 4/11/95
Date Extracted: 4/14/95
Sample Amount: 7.88 g
TEQ = 3.5

ICAL ID: I1613A
QC Lot: LC0413S
Units: pg/g

Compound	Conc.	D.L.	Ratio	S/N Ratio	Qualifier
2,3,7,8-TCDD	0.34		0.66	>10:1	A
Total TCDD	5.3		0.79	>10:1	
1,2,3,7,8-PeCDD	0.75		1.72	>10:1	A
Total PeCDD	6.6		1.65	>10:1	
1,2,3,4,7,8-HxCDD	0.91		1.16	3:1	A
1,2,3,6,7,8-HxCDD	6.3		1.26	>10:1	
1,2,3,7,8,9-HxCDD	3.3		1.24	>10:1	
Total HxCDD	51		1.22	>10:1	
1,2,3,4,6,7,8-HpCDD	52		1.06	>10:1	
Total HpCDD	120		1.00	>10:1	
OCDD	320		0.90	>10:1	B
2,3,7,8-TCDF	1.0		0.72	>10:1	
Total TCDF	8.6		0.83	>10:1	
1,2,3,7,8-PeCDF	0.28		1.38	>10:1	A
2,3,4,7,8-PeCDF	0.67		1.69	>10:1	A
Total PeCDF	8.1		1.33	>10:1	
1,2,3,4,7,8-HxCDF	1.0		1.36	>10:1	A
1,2,3,6,7,8-HxCDF	0.61		1.13	>10:1	A
2,3,4,6,7,8-HxCDF	1.2		1.25	>10:1	A
1,2,3,7,8,9-HxCDF	0.26		1.29	>10:1	A
Total HxCDF	16		1.33	>10:1	
1,2,3,4,6,7,8-HpCDF	11		1.04	>10:1	
1,2,3,4,7,8,9-HpCDF	0.69		1.04	>10:1	A
Total HpCDF	31		1.04	>10:1	
OCDF	21		0.88	>10:1	

Analyst: BM

Reviewer:

ALTA

PCDD & PCDF
EPA METHOD 8290

Sample ID: Dioxin 004
Lab ID: 1110-0004-SA

Isotopic Recovery Results

Internal Standard:	% R	Ratio	Qualifier
^{13}C-2,3,7,8-TCDD	89	0.73	
^{13}C-1,2,3,7,8-PeCDD	98	1.57	
^{13}C-1,2,3,4,7,8-HxCDD	89	1.33	
^{13}C-1,2,3,6,7,8-HxCDD	89	1.32	
^{13}C-1,2,3,4,6,7,8-HpCDD	91	1.04	
^{13}C-OCDD	97	0.90	
^{13}C-2,3,7,8-TCDF	92	0.79	
^{13}C-1,2,3,7,8-PeCDF	86	1.64	
^{13}C-2,3,4,7,8-PeCDF	85	1.63	
^{13}C-1,2,3,4,7,8-HxCDF	84	0.53	
^{13}C-1,2,3,6,7,8-HxCDF	83	0.52	
^{13}C-2,3,4,6,7,8-HxCDF	80	0.52	
^{13}C-1,2,3,7,8,9-HxCDF	90	0.52	
^{13}C-1,2,3,4,6,7,8-HpCDF	76	0.41	
^{13}C-1,2,3,4,7,8,9-HpCDF	88	0.44	
Clean-up Recovery Standard:			
^{37}Cl-2,3,7,8-TCDD	84	NA	

Dates Analyzed:

DB-5: 4/18/95 **DB-225:** 4/28/95 **SP-2331:** NA

Analyst: _____

Reviewer: _____

ALTA

PCDD & PCDF

EPA METHOD 8290

Sample ID: Dioxin 005
Lab ID: 1110-0005-SA
Matrix: Sediment
% Solid: 63

Date Received: 4/11/95
Date Extracted: 4/14/95
Sample Amount: 7.75 g
TEQ = 2.7

ICAL ID: I1613A
QC Lot: LC0413S
Units: pg/g

Compound	Conc.	D.L.	Ratio	S/N Ratio	Qualifier
2,3,7,8-TCDD	0.38		0.68	>10:1	A
Total TCDD	7.8		0.74	>10:1	
1,2,3,7,8-PeCDD	0.49		1.48	>10:1	A
Total PeCDD	8.6		1.66	>10:1	
1,2,3,4,7,8-HxCDD	0.61		1.17	>10:1	A
1,2,3,6,7,8-HxCDD	3.7		1.25	>10:1	
1,2,3,7,8,9-HxCDD	2.0		1.07	>10:1	A
Total HxCDD	36		1.26	>10:1	
1,2,3,4,6,7,8-HpCDD	33		0.97	>10:1	
Total HpCDD	80		0.94	>10:1	
OCDD	210		0.90	>10:1	B
2,3,7,8-TCDF	1.3		0.78	>10:1	
Total TCDF	12		0.73	>10:1	
1,2,3,7,8-PeCDF	0.30		1.55	>10:1	A
2,3,4,7,8-PeCDF	0.77		1.57	>10:1	A
Total PeCDF	5.1		1.60	>10:1	
1,2,3,4,7,8-HxCDF	0.90		1.35	>10:1	A
1,2,3,6,7,8-HxCDF	0.54		1.22	>10:1	A
2,3,4,6,7,8-HxCDF	0.97		1.26	>10:1	A
1,2,3,7,8,9-HxCDF	0.23		1.27	>10:1	A
Total HxCDF	13		1.34	>10:1	
1,2,3,4,6,7,8-HpCDF	7.5		1.11	>10:1	
1,2,3,4,7,8,9-HpCDF	0.46		1.04	>10:1	A
Total HpCDF	20		1.11	>10:1	
OCDF	13		0.91	>10:1	

Analyst: _____

Reviewer: _____

ALTA

PCDD & PCDF
EPA METHOD 8290

Sample ID: Dioxin 005
Lab ID: 1110-0005-SA

Isotopic Recovery Results

Internal Standard:	% R	Ratio	Qualifier
^{13}C-2,3,7,8-TCDD	93	0.73	
^{13}C-1,2,3,7,8-PeCDD	102	1.55	
^{13}C-1,2,3,4,7,8-HxCDD	91	1.30	
^{13}C-1,2,3,6,7,8-HxCDD	92	1.33	
^{13}C-1,2,3,4,6,7,8-HpCDD	79	0.96	
^{13}C-OCDD	104	0.92	
^{13}C-2,3,7,8-TCDF	93	0.79	
^{13}C-1,2,3,7,8-PeCDF	90	1.63	
^{13}C-2,3,4,7,8-PeCDF	87	1.62	
^{13}C-1,2,3,4,7,8-HxCDF	84	0.53	
^{13}C-1,2,3,6,7,8-HxCDF	84	0.52	
^{13}C-2,3,4,6,7,8-HxCDF	82	0.52	
^{13}C-1,2,3,7,8,9-HxCDF	92	0.52	
^{13}C-1,2,3,4,6,7,8-HpCDF	72	0.38	
^{13}C-1,2,3,4,7,8,9-HpCDF	77	0.37	
Clean-up Recovery Standard:			
^{37}Cl-2,3,7,8-TCDD	87	NA	

Dates Analyzed:

DB-5: 4/18/95 **DB-225:** 4/28/95 **SP-2331:** NA

Analyst: BM

Reviewer: MF

APPENDIX

DATA QUALIFIERS & ABBREVIATIONS

ALTA

A	**The amount detected is below the Method Calibration Limit.**
B	**This compound was also detected in the blank.**
C	**The amount detected is less than five times the Method Quantitation Limit.**
D	**The amount reported is the maximum possible concentration.**
E	**The detection limit was raised above the Method Quantitation Limit due to chemical interferences.**
F	**This result has been confirmed on a DB-225 column.**
G	**This result has been confirmed on a SP-2331 column.**
H	**The signal-to-noise ratio is greater than 10:1.**
I	**Chemical Interference**

Conc.	**Concentration**
D.L.	**Detection Limit**
NA	**Not applicable**
S/N	**Signal-to-noise**
*	**See Cover Letter**
ND	**Not Detected**
MPC	**Maximum Possible Concentration**

ALTA Analytical Laboratory

Batch ID: 1110

Sample Log-In Checklist	Yes	No
1. Date Samples Arrived: 4-11-95 Initials: M.F		
2. Samples Arrived By: (circle one) Airborne Express Federal Express (UPS) Emery Freezer Truck Company Courier Other _____		
3. Shipping Documentation Present? (circle one) Shipping Label (Airbill) Tracking Number 0 2515486 798	X	
4. Shipping Container(s) Intact? If no, describe condition below.		
5. Custody Seals Present and Intact? If not intact, describe condition below. No. of Seals _____ or Seal No. _____ Type:(circle) Bottle or Container		
6. Sample Container Intact? If no, indicate sample condition below.		
7. Shipping Preservation: (circle one) Ice (Blue Ice) Dry Ice None Temp(°C) 2		
8. Chain of Custody (COC) or other Sample Documentation Present?		
9. COC/Documentation Acceptable? If no, complete COC Anomaly Form.		
10. Shipping Container: (circle one each) ALTA or Client / Return or Retain		
11. Container and/or Bottles Requested?		
*12. Drinking Water Sample? If yes, Acceptable Preservation? (circle) Y or N		

*Required for HRMS

Name: _____ Date Samples Reconciled: _____
(Signature Required for LCMS Only)

Comments:

TOXSCAN CHAIN-OF-CUSTODY DOCUMENT

SUBCONTRACT CHAIN OF CUSTODY T-12046 PAGE 1 OF 1

COMPANY NAME: Toxscan Inc.	COMMENTS / SPECIAL INSTRUCTIONS: INCLUDE TEQ's; TAT = STD. (21 DAYS); REPORT BOTH SAMPLE I.D. & STATION I.D.
ATTN: MARY LOU MILAZZO	
ADDRESS: 42 Hangar Way, Watsonville, CA 95076	
PHONE: (408) 724-4522	
FAX: (408) 724-3188	
PROJECT NAME: HUMBOLDT COE	SEND INVOICE TO: Above
PROJECT NUMBER: T-12046	P.O. / CONTRACT NO: 10334

ANALYSIS(ES) REQUESTED: EPA 8290 (TETRA THROUGH OCTA)

TOXSCAN INC.
42 Hangar Way
Watsonville, CA 95076
PHONE: 408/724-4522
FAX: 408/724-3188

LAB USE ONLY: STORAGE LOCATION: FREEZER #: REFRIGERATOR #: SHELF #:

Lab Use Only: ID Number	Client Sample Identification	STATION I.D.	Sample Information: Sampling Date	Sampling Time	Sample Type	Bottle or Container Information: Sample Preservative	Bottle Type:	Bottle Size:	No. of Bottles:	CHECK THE APPROPRIATE BOX BELOW:	SAMPLE CONDITION:
T-12046-11	DIOXIN 001	HUMBOLDT RF	30 MAR 95	1118	SEDIMENT		WM GLASS JAR	1L	1	✓	
-12	DIOXIN 002	COMP#1	01 APR 95	1125				500 mL	1	✓	
-13	DIOXIN 003	COMP#4	02 APR 95	1400					1	✓	
-14	DIOXIN 004	COMP#3	03 APR 95	1055					1	✓	
-15	DIOXIN 005	COMP#2	↓	1732	↓		↓	↓	1	✓	

SAMPLER'S SIGNATURE AND PRINTED NAME:

SAMPLES SENT TO: ALTA ANALYTICAL ; EL DORADO HILLS, CA

RELINQUISHED BY (SIGNATURE AND PRINTED NAME):	RECEIVED BY (SIGNATURE AND PRINTED NAME):	DATE:	TIME:
Douglas Clark DOUGLAS CLARK	VIA UPS RED	10 APR 95	1630
UPS Red	Ken Flatt	4-11-95	1100

Appendix D

QA/QC Data Plan

QA/QC PLAN

1.0 Field Survey Procedures

Sediment samples were collected from prescribed locations in Humboldt Harbor by use of a vibra-core and Smith-Macintyre grab. The vibra-core consists of a vibrating aluminum head and a ten foot long aluminum core tube. The core tube is capped with a stainless steel cutting tip and a stainless steel core catcher. The vibra-core is lowered slowly into the sediment; the vibration allows entry into the sediment from the mudline to the sample depth. If a sample was not obtained on the first attempt, core attempts were repeated until a sample was secured. The Smith-Macintyre grab consists of a set of spring-loaded galvanized steel jaws, triggered by impact with the sediment surface.

The water sample used to prepare elutriates for bioassays was collected from the disposal site using a peristaltic pump with silicon and teflon hoses which had been precleaned with soap and nitric acid, and thoroughly rinsed with deionized (DI) water.

Horizontal positioning was accomplished by use of a Trimble Global Positioning System (GPS). Water depth was measured by use of a precision Fathometer, calibrated daily according to manufacture specification. Tidal height was extrapolated from tide tables.

Sediment samples were composited in a precleaned teflon-lined container. Samples for chemical analysis were placed into pre-cleaned glass jars and sealed with teflon-lined lids. Bioassay samples were placed into one-gallon, pre-cleaned polyethylene jars with poly screw closures. Immediately after collection and compositing, samples were stored in insulated coolers with ice. Upon arrival at the ToxScan laboratory in Watsonville, CA, sediments were stored in the 4°C room until analyzed. Holding times for chemical analysis are detailed below. None were exceeded during this study.

All sampling data are documented in the field log sheets included in this report.

2.0 Laboratory

Laboratory QA/QC procedures for this testing program were implemented as described in the ToxScan QA/QC program. Generic QA measures are described below in an excerpt from our written program. Table 5 presents a summary of instruments used in this study for bulk sediment analyses, along with methods and schedules for calibration, maintenance, precision/accuracy monitoring and record keeping.

All sediment samples were preserved by storage at 4°C in the dark. While EPA/COE protocol allows a 6-week holding period for dredged material sampled, certain of the methods require extraction and/or analysis within a shorter time period. These restricted holding times are listed below, and were adhered to in this program.

Analyte	Maximum Holding Time
Mercury	28 days
PAH's	extraction within 14 days
Chlorinated Hydrocarbons	extraction within 14 days
Sulfides	7 days
Petroleum Hydrocarbons	28 days
Organotins	28 days

As required by the Scope of Services for this program, the frequency of duplicate analyses and spiked sample analyses has been increased over our standard practice. For this study, 10% of the analyses have been duplicated and 20% of samples have been spiked.

Following is an excerpt from our QA/QC program which details the routine QA/QC measures followed in this program.

Procedures for Sample Receiving

The samples, accompanied by a chain of custody form are received by the sample control officer who follows the listed procedures for receiving a sample.

All sample containers are inspected to determine if any breakage or mishandling occurred and to determine that the proper container and preservatives have been used. The sample control officer will verify that sample labels match those on the chain of custody and that all samples listed are present. If a chain of custody does not exist and one is to be generated. See section below on Chain of Custody and Documentation.

The "log-in" process is initiated by giving each sample a discrete laboratory number which is entered on the chain of custody, in the log book and on the project sheet.

The proper paperwork (Sample Analysis Request Form or SARF) indicating analyses needed, detection limits, due dates, sample description and location, and necessary QA/QC is prepared and given to the appropriate analyst. The project manager receives the project sheet, which indicates analyses to be performed and due dates, along with a copy of the original SARF.

Sample Identification Procedure

In order to maintain sample identity, the following scheme is used:
T-0001-01, where T = ToxScan
0001 is the group number assigned to the set of samples
01 is the individual container number received.

Chain of Custody and Documentation

A chain of custody is initiated prior to sampling or at the time of sample delivery is submitted by a walk-in client. This chain of custody accompanies all samples and is given to the sample control officer along with the samples. Samples are logged in and the chain of custody is kept with the original SARF. If samples are to be subcontracted to another laboratory, a photocopy of the original chain of custody is made and will accompany those samples.

Source and Preparation of Standards

All primary standards are purchased in concentrated solutions or as pure substances and purchased in the highest purity available from reputable manufacturers or suppliers. Liquid stock solutions of concentrated standards are accompanied by a certification as to purity and concentration. All batch numbers, catalogue numbers, supplier and date of purchase are kept in the standards log book and updated as necessary.

Stock and working standards are prepared taking into account the stability and concentration of the analyte. Thus, some standards are prepared daily, others at less frequent intervals. Those standards that are light sensitive are stored in amber or like containers. If refrigeration will maximize the lifetime of the standards, they are stored at 4°C. Included on the standards container are date of preparation, concentration of solution analyte, and weight or volume used to prepare the standard if applicable. All standards are prepared with a high quality deionized or distilled water or with known purity solvents. A blank of all dilutants is checked to determine if any contamination has been introduced.

Calibration Procedures and Methods of Analysis

All instrument calibration methods are related to known analyte concentrations. This requires a calibration curve be prepared for each analyte. Some instruments can be calibrated directly from known concentrations of a standard; others furnish data for construction of a three-point curve.

The analyst follows the procedures specified in the operational manual for each instrument as well as those guidelines set forth by operational standard methods: Standard Methods for the Evaluation of Waters and Wastewaters, EPA Protocol SW-846, AOAC Manual of Methodologies,

etc. Calibration of instrumental parameters is further checked against standard reference materials provided by the EPA or NBS with listings of certified values. The worksheets given to the analyst have pertinent areas for calibration data to be recorded from which calibration or standard curves can be obtained.

Once the instrument has been standardized, analyte concentrations are checked against the standard curve every 10 analyses to assure continued calibration.

Samples are prepared, analyzed and reported according to those standardized procedures specified by EPA, Standard Methods, AOAC, or other recognized, documented methodologies. Sample weights, preparation, aliquots taken, and calculations are recorded on the analysis sheet furnished for each parameter to be determined and recorded in ink.

Method Blanks and Duplicate and Spiked Samples

A method blank is the analysis of pure organic-free water, high purity solvent or clean sample matrix after being subjected to treatment specified by the method used. Method blanks are used on all analyses to verify, qualitatively, that no false positives will occur and quantitatively, that concentrations are accurate and do not reflect contamination. A method blank is analyzed at a minimum of once for each batch of samples or after every twentieth sample, whichever is more frequent.

Spiking concentrations are dependent upon the background levels in the original sample. When spiking for a scan analysis, nominal spiking levels are used as described by the method. If a small number of specified chemicals are being measured, the sample is ideally spiked at one-half to one-and-one-half times the concentration found in the sample.

The recovery of the spiked samples is calculated and summarized in the quality control record as accuracy and gives the control chart limits.

Establishment of Acceptance Limits of Precision and Accuracy

Each set of samples analyzed per analyte has a blank, duplicate, spike and a standard reference material from which the precision and accuracy data are obtained.

The precision of RPD is obtained by the manipulation of duplicate sample data as follows:

$$RPD = \frac{(D1 - D2)}{(D1 + D2)/2} \times 100$$

where D1 = sample
D2 = sample replicate

The accuracy is a measurement of the percentage of a spike recovery, %R, calculated by the formula:

$$\%R = [(SSR - SR)/SA] \times 100$$

where SSR = spiked sample
SR = sample
SA = spike added

Control charts are maintained to show the limits within which measurements should fall. The upper and lower control limits are calculated as follows and are based on 25 sample sets:

$$Upper\ control\ limits = M + 3\ Sm \quad (UCL)$$
$$Lower\ control\ limits = M - 3\ Sm \quad (LCL)$$

M = the average of the RPD
Sm = standard deviation of the RPD

Procedures for Corrective Action

If values fall outside the ULC or LCL, the following guidelines are taken for corrective action:

1. Define the problem.
2. QA/QC officer and laboratory section leader assign the investigation responsibility to an analyst.
3. Document the action needed to correct the problem.
4. Implement and verify that corrective action is taken and the problem corrected.

In general, when QA techniques or procedures identify errors, deficiencies or an "out of control" situation, and two types of action need to be considered. The first, immediate action is generally to correct instrumentation error or malfunction, poor technique, or sample variability. Long-term action is to correct out-of-control conditions that may stem from contamination, old standards, improper spiking, or improperly calibrated equipment.

The above guidelines would be followed to correct the problem and maintain acceptable levels of confidence. No laboratory results will be reported or released until the "out of control" situation is rectified.

All worksheets given to the analyst for analyte determination are dated and initialed after major analytical procedures are completed, i.e. on date weighed, after extraction, upon completion of digestion, and on the date the sample is given to the laboratory supervisor for review. This is signed by the supervisor after review for reliability in terms of accuracy, precision, detection limits, and quantitative limits, and forwarded to data processing.

Reports submitted to clients routinely include method numbers and detection limits as well as identifying information, date received, data analyzed, etc.

Maintenance and Repair of Instrumentation

Instruments are maintained according to the operation manuals supplied by the manufacturer. Repairs are conducted as needed, either by manufacturer representatives or by in-house personnel (for simple problems). Routine maintenance, such as lamp replacement, is conducted as indicated by the collected QC data.

3.0 Bioassay

All bioassays for this testing program (with the exception of the bivalve larval test) were conducted following methods outlined in the EPA/COE Testing Manual (1991). The bivalve larval bioassays were performed according to protocol described in ASTM (1989). Standard operating procedures (SOPs) have been written and approved for these procedures, and are accessible to all bioassay staff. Dilution water for the bioassays, collected from the ToxScan Davenport laboratory, meets all requirements outlined in ASTM (1989).

Data resulting from the bioassays were recorded in ink on laboratory data sheets, evaluated by the project manager to insure that all test conditions were within protocol limits, and incorporated into the permanent project record file.

SOPs have been developed for instrument calibration, which detail standards to be used, units for reporting data and expected performance standards for accuracy and precision. Water quality monitoring instruments (D.O. meter, pH meter, salinometer, thermometer) are calibrated at least once daily according to these SOPs, and data are recorded in logbooks at the laboratory. Backup instrumentation is available in the event of equipment failure.

Bioassay test protocols generally specify acceptable limits of water quality (pH, D.O., temperature, salinity) in test containers during test performance. They also specify certain minimum levels of organism response (survival, normal development, growth) which must be achieved in test controls in order to validate the bioassay. A reference toxicant bioassay has been requested for this program as an additional quality assurance measure. Reference toxicant tests serve to "calibrate" the sensitivity of organisms to a known toxic compound, and control charts are maintained in the laboratory

for each organism:toxicant combination. Our control charts are continuously updated as each new reference toxicant bioassay data set is incorporated. In order to be within control limits, the reftox EC50 or LC50 must fall within the range of ±2 standard deviations of the mean of all previous reference toxicant bioassays. The following table outlines reference toxicants used by the laboratory with each test species:

TEST ORGANISM	REFERENCE TOXICANT	CONCENTRATION RANGE
Amphipod	Cadmium Chloride ($CdCl_2$)	0.125 - 4.0 mg/L
Mysid	Sodium Dodecyl Sulfate (SDS)	0.5 - 16.0 mg/L
Fish (Sanddab)	Sodium Dodecyl Sulfate (SDS)	0.25 - 4.0 mg/L
Bivalve (Mussel)	Copper Sulfate ($CuSO_4$)	2.0 - 32.0 µg/L
Worm (Polychaete)	Copper Sulfate ($CuSO_4$)	6.25 - 500 µg/L

Statistical analyses of bioassay data are performed using computer programs which provide not only the EC50 or LC50 calculation but also provide estimates of the precision of the data in the form of 95% confidence limits around the EC/LC50 point.

QA/QC data for chemical analyses and reference toxicant data for this test program, as well as environmental monitoring data for these bioassays are presented herein. Chains of Custody are presented in Appendix E.

Table 5. Summary of instruments, calibration methods, precision/accuracy monitoring, maintenance and record-keeping for analytical equipment utilized in this test program.

Analyte	Instruments	Calibration Method	Precision & Accuracy Standards	Maintenance Schedule	Record-keeping Methods
Metals	Varian AA5; Models 400P, 4002, 10	3-4 point standard curve	SRMs* and replicate analyses	as needed	instrument print-out, electronic meter hard copy
Oil & Grease	Perkin-Elmer IR Spectrophotometer Model 710B	4-point standard curve	spikes and replicate analyses	as needed	chromatogram charts, hard copy
Sulfides	Titration	standardized titrant	replicate analyses	clean burettes	notebook hard copy
Organotins	Hewlett-Packard GC; model 5890, series II	3-point standard curve and surro-gate injection	SRMs and replicate analyses	as needed	instrument print-out, hard copy
Chlorinated pesticides and PCBs	Hewlett-Packard GC; model 5890 dual columns; ECD detectors	3-point standard curve	SRMs, matrix spikes, matrix spike duplicates, duplicate samples, surrogates	as needed	instrument printout and work sheet
PAHs, phenols, phthalates	Varian GC/MS Saturn II	5-point standard curve	SRMs, matrix spikes, matrix spike duplicates, duplicate samples, surrogates	as needed	instrument printout and work sheet

* SRM = standard reference materials, obtained from NIST (National Institute of Standards and Technology).

Appendix E

- LPC Calculations
- Bioassay QC: Water Quality Monitoring & Reference Toxicant Test Results
- Test Organism Handling Logs

Table E1. Humboldt Harbor: Calculation of the Limiting Permissible Concentration for disposal depth of **10 meters** (from EPA/COE 1977[10]).

Mixing Zone Estimation (V_m)	SAMTB Bivalve	EKUP Bivalve	EKEX Bivalve	EKEX Sanddab (Mysid)
Depth of disposal site (m) =	10	10	10	10
Pi =	3.1416	3.1416	3.1416	3.1416
Width of vessel (m) =	11*	11*	11*	11*
Length of vessel (m) =	35*	35*	35*	35*
Speed of vessel (m/sec) =	0.5*	0.5*	0.5*	0.5*
Time of discharge (sec) =	15*	15*	15*	15*
Mixing Zone Volume (m^3) =	427815	427815	427815	427815
Volume of Liquid Phase (V_w)				
Bulk density (constant) =	1.5	1.5	1.5	1.5
Particle density (constant) =	2.6	2.6	2.6	2.6
Density of liquid phase (constant) =	1.0	1.0	1.0	1.0
Volume of disposal vessel (m^3) =	1155*	1155*	1155*	1155*
Liquid phase volume (m^3) =	794	794	794	794
Concentration of Suspended Phase (C_{sp})				
Percent Silt =	12.7	43.94	54.64	54.64
Percent Clay =	7.93	20.93	29.41	29.41
Volume (m^3) of suspended phase (V_{sp}) =	74.5	234.1	303.4	303.4
Projected Percent Concentration (C_{sp}) =	0.0174	0.0547	0.0709**	0.0709
EC_{50} from bioassay (% elutriate) =	18.6	9.8	5.11***	61.6 (51.2)
Factor EC_{50} X 0.01 =	0.186	0.098	0.0511	0.616 (0.512)

For Stations SAMTB and EKUP bivalves, and Station EKEX sandabs and mysids, the factored EC50s are higher than the projected concentrations; therefore the Limiting Permissible Concentration is not exceeded.

* These values are estimations; actual values were not available.
** Exceeds LPC at this depth.
*** EC_{50} not calculable; LC_{50} value used.

Table E1, continued. Humboldt Harbor: Calculation of the Limiting Permissible Concentration for disposal depth of **20 meters** (from EPA/COE 1977[10]).

Mixing Zone Estimation (V_m)	SAMTB Bivalve	EKUP Bivalve	EKEX Bivalve	EKEX Sanddab (Mysid)
Depth of disposal site (m) =	20	20	20	20
Pi =	3.1416	3.1416	3.1416	3.1416
Width of vessel (m) =	11*	11*	11*	11*
Length of vessel (m) =	35*	35*	35*	35*
Speed of vessel (m/sec) =	0.5*	0.5*	0.5*	0.5*
Time of discharge (sec) =	15*	15*	15*	15*
Mixing Zone Volume (m^3) =	855630	855630	855630	855630
Volume of Liquid Phase (V_w)				
Bulk density (constant) =	1.5	1.5	1.5	1.5
Particle density (constant) =	2.6	2.6	2.6	2.6
Density of liquid phase (constant) =	1.0	1.0	1.0	1.0
Volume of disposal vessel (m^3) =	1155*	1155*	1155*	1155*
Liquid phase volume (m^3) =	794	794	794	794
Concentration of Suspended Phase (C_{sp})				
Percent Silt =	12.7	43.94	54.64	54.64
Percent Clay =	7.93	20.93	29.41	29.41
Volume (m^3) of suspended phase (V_{sp}) =	74.5	234.1	303.4	303.4
Projected Percent Concentration (C_{sp}) =	0.0087	0.0274	0.0355	0.0355
EC_{50} from bioassay (% elutriate) =	18.6	9.8	5.11***	61.6 (51.2)
Factor EC_{50} X 0.01 =	0.186	0.098	0.0511	0.616 (0.512)

The factored EC50s are higher than the projected concentrations; therefore the Limiting Permissible Concentration is not exceeded for Stations SAMTB, EKUP and EKEX.

* These values are estimations; actual values were not available.
*** EC_{50} not calculable; LC_{50} value used.

Table E1, continued. Humboldt Harbor: Calculation of the Limiting Permissible Concentration for disposal depth of **50 meters** (from EPA/COE 1977[10]).

Mixing Zone Estimation (V_m)	SAMTB Bivalve	EKUP Bivalve	EKEX Bivalve	EKEX Sanddab (Mysid)
Depth of disposal site (m) =	50	50	50	50
Pi =	3.1416	3.1416	3.1416	3.1416
Width of vessel (m) =	11*	11*	11*	11*
Length of vessel (m) =	35*	35*	35*	35*
Speed of vessel (m/sec) =	0.5*	0.5*	0.5*	0.5*
Time of discharge (sec) =	15*	15*	15*	15*
Mixing Zone Volume (m^3) =	2139075	2139075	2139075	2139075
Volume of Liquid Phase (V_w)				
Bulk density (constant) =	1.5	1.5	1.5	1.5
Particle density (constant) =	2.6	2.6	2.6	2.6
Density of liquid phase (constant) =	1.0	1.0	1.0	1.0
Volume of disposal vessel (m^3) =	1155*	1155*	1155*	1155*
Liquid phase volume (m^3) =	794	794	794	794
Concentration of Suspended Phase (C_{sp})				
Percent Silt =	12.7	43.94	54.64	54.64
Percent Clay =	7.93	20.93	29.41	29.41
Volume (m^3) of suspended phase (V_{sp}) =	74.5	234.1	303.4	303.4
Projected Percent Concentration (C_{sp}) =	0.0348	0.0109	0.0142	0.0142
EC_{50} from bioassay (% elutriate) =	18.6	9.8	5.11***	61.6 (51.2)
Factor EC_{50} X 0.01 =	0.186	0.098	0.0511	0.616 (0.512)

The factored EC50s are higher than the projected concentrations; therefore the Limiting Permissible Concentration is not exceeded for Stations SAMTB, EKUP and EKEX.

* These values are estimations; actual values were not available.
*** EC_{50} not calculable; LC_{50} value used.

Summary of Bivalve Larvae Bioassay Environmental Monitoring Data

Sample ID	Parameter	Mean	Std. Dev.	Max	Min
Seawater Control	pH value (units)	7.9	0.06	7.9	7.8
	Temperature (°C)	16.1	0.31	16.4	15.8
	D.O. (mg/L)	7.9	0.1	8.0	7.8
	Salinity (‰)	32.0	0	32.0	32.0
Reference	pH value (units)	7.9	0.11	8.0	7.7
	Temperature (°C)	15.9	0.30	16.1	15.4
	D.O. (mg/L)	7.6	0.3	7.8	7.2
	Salinity (‰)	32.0	0	32.0	32.0
SAMTB	pH value (units)	7.9	0.05	8.0	7.9
	Temperature (°C)	15.9	0.36	16.2	15.3
	D.O. (mg/L)	7.5	0.28	7.9	7.1
	Salinity (‰)	31.6	0.4	32.0	31.2
EKUP	pH value (units)	7.9	0.10	8.1	7.8
	Temperature (°C)	15.9	0.29	16.1	15.4
	D.O. (mg/L)	7.7	0.32	8.2	7.3
	Salinity (‰)	31.5	0.5	32.0	31.0
EKEX	pH value (units)	7.9	0.11	8.1	7.8
	Temperature (°C)	15.8	0.33	16.1	15.4
	D.O. (mg/L)	7.6	0.33	8.0	7.2
	Salinity (‰)	32.0	0	32.0	32.0
FLTB	pH value (units)	7.9	0.11	8.1	7.8
	Temperature (°C)	15.9	0.27	16.1	15.5
	D.O. (mg/L)	7.6	0.34	7.9	7.2
	Salinity (‰)	32.0	0	32.0	32.0

Summary of *Holmesimysis costata* Suspended Particulate Phase Bioassay Environmental Monitoring Data

Sample ID	Parameter	Mean	Std.Dev.	Maximum	Minimum
Control	D.O. (mg/L)	7.6	0.24	7.9	7.2
	Temperature (°C)	15.1	0.20	15.6	14.9
	pH value (units)	7.9	0.06	8.1	7.9
Humboldt Reference Sediment	D.O. (mg/L)	7.5	0.31	7.8	6.9
	Temperature (°C)	15.0	0.13	15.2	14.9
	pH value (units)	8.0	0.11	8.1	7.8
	Salinity (‰)	32.2	0	32.2	32.2
EKUP	D.O. (mg/L)	7.6	0.28	7.9	7.1
	Temperature (°C)	15.0	0.11	15.3	14.9
	pH value (units)	8.1	0.16	8.3	7.8
	Salinity (‰)	31.9	0.59	32.6	31.2
EKEX	D.O. (mg/L)	7.6	0.30	7.9	7.0
	Temperature (°C)	15.0	0.12	15.2	14.9
	pH value (units)	8.2	0.20	8.4	7.8
	Salinity (‰)	32.2	0.20	32.5	32.1
SAMTB	D.O. (mg/L)	7.7	0.24	8.0	7.1
	Temperature (°C)	15.0	0.13	15.3	14.9
	pH value (units)	8.1	0.09	8.2	7.9
	Salinity (‰)	32.3	0.40	32.8	31.9
FLTB	D.O. (mg/L)	7.5	0.31	7.8	6.9
	Temperature (°C)	15.0	0.12	15.2	14.9
	pH value (units)	8.1	0.14	8.3	7.9
	Salinity (‰)	32.1	0.13	32.3	32.0

Summary of *Citharichthys stigmaeus* Suspended Particulate Phase Bioassay Environmental Monitoring Data

Sample ID	Parameter	Mean	Std.Dev.	Maximum	Minimum
Control	D.O. (mg/L)	7.7	0.31	8.0	7.0
	Temperature (°C)	14.6	0.12	14.7	14.4
	pH value (units)	7.9	0.07	8.1	7.8
Humboldt Reference Sediment	D.O. (mg/L)	7.6	0.31	8.1	6.1
	Temperature (°C)	14.3	0.22	14.6	13.8
	pH value (units)	7.9	0.14	8.2	7.6
EKUP	D.O. (mg/L)	7.5	0.29	8.0	6.6
	Temperature (°C)	14.5	0.13	14.8	14.2
	pH value (units)	8.1	0.17	8.3	7.6
EKEX	D.O. (mg/L)	7.7	0.33	8.2	6.2
	Temperature (°C)	14.5	0.07	14.6	14.3
	pH value (units)	8.1	0.18	8.3	7.7
SAMTB	D.O. (mg/L)	7.6	0.22	8.0	7.1
	Temperature (°C)	14.5	0.14	14.7	14.2
	pH value (units)	8.1	0.09	8.2	7.9
FLTB	D.O. (mg/L)	7.7	0.26	8.2	7.2
	Temperature (°C)	14.4	0.15	14.7	14.1
	pH value (units)	8.1	0.24	8.2	7.5

Summary of *Rhepoxynius abronius* Solid Phase Static Bioassay Environmental Monitoring Data

Sample ID	Parameter	Mean	Std. Dev.	Maximum	Minimum
Control	D.O. (mg/L)	7.8	0.23	8.3	7.5
	Temperature (°C)	14.9	0.16	15.2	14.0
	pH value (units)	8.1	0.08	8.2	7.9
	Salinity (‰)	32.2	0.21	32.5	32.0
Humboldt Reference Sediment	D.O. (mg/L)	7.8	0.19	8.1	7.5
	Temperature (°C)	14.9	0.10	15.1	14.7
	pH value (units)	8.1	0.08	8.2	7.9
	Salinity (‰)	32.1	0.14	32.3	32.0
Home Renewal	D.O. (mg/L)	7.8	0.23	8.3	7.4
	Temperature (°C)	14.9	0.12	15.1	14.7
	pH value (units)	8.0	0.08	8.2	7.9
	Salinity (‰)	32.3	0.27	32.8	32.0
EKUP Renewal	D.O. (mg/L)	7.7	0.21	8.2	7.5
	Temperature (°C)	14.9	0.15	15.4	14.7
	pH value (units)	8.0	0.08	8.1	7.8
	Salinity (‰)	32.3	0.20	32.5	32.1
EKEX Renewal	D.O. (mg/L)	7.7	0.25	8.3	7.2
	Temperature (°C)	14.9	0.13	15.3	14.7
	pH value (units)	8.1	0.07	8.2	7.8
	Salinity (‰)	32.3	0.20	32.5	32.1
SAMTB	D.O. (mg/L)	7.8	0.23	8.2	7.3
	Temperature (°C)	14.9	0.11	15.2	14.7
	pH value (units)	8.1	0.09	8.2	7.9
	Salinity (‰)	31.8	0.28	32.1	31.4
FLTB	D.O. (mg/L)	7.7	0.21	8.2	7.5
	Temperature (°C)	14.9	0.10	15.1	14.7
	pH value (units)	8.1	0.10	8.3	7.9
	Salinity (‰)	32.0	0.11	32.2	31.9

Summary of *Holmesimysis costata* Solid Phase Flow Through Bioassay Environmental Monitoring Data

Sample ID	Parameter	Mean	Std.Dev.	Maximum	Minimum
Control	D.O. (mg/L)	8.1	0.26	8.4	7.6
	Temperature (°C)	12.1	0.61	13.6	10.7
	pH value (units)	7.9	0.05	8.0	7.9
	Salinity (‰)	33.3	0.27	34.0	33.0
Humboldt Reference Sediment	D.O. (mg/L)	8.0	0.23	8.4	7.7
	Temperature (°C)	12.2	0.66	13.6	10.7
	pH value (units)	7.9	0.05	8.1	7.9
	Salinity (‰)	33.3	0.27	34.0	33.0
EKUP	D.O. (mg/L)	8.1	0.24	8.5	7.7
	Temperature (°C)	12.3	0.95	16.1	10.7
	pH value (units)	7.9	0.07	8.1	7.8
	Salinity (‰)	33.3	0.27	34.0	33.0
EKEX	D.O. (mg/L)	8.0	0.23	8.4	7.6
	Temperature (°C)	12.2	0.68	13.2	10.7
	pH value (units)	7.9	0.04	8.0	7.9
	Salinity (‰)	33.3	0.27	34.0	33.0
SAMTB	D.O. (mg/L)	8.1	0.26	8.4	7.6
	Temperature (°C)	12.3	0.74	15.5	11.0
	pH value (units)	7.9	0.05	8.0	7.9
	Salinity (‰)	33.3	0.27	34.0	33.0
FLTB	D.O. (mg/L)	8.1	0.26	8.5	7.7
	Temperature (°C)	12.3	0.70	13.9	10.7
	pH value (units)	7.9	0.05	8.1	7.9
	Salinity (‰)	33.3	0.27	34.0	33.0

Summary of *Nephtys caecoides* Solid Phase Flow Through Bioassay Environmental Monitoring Data

Sample ID	Parameter	Mean	Std Dev	Maximum	Minimum
Control	D.O. (mg/L)	7.7	0.26	8.2	7.1
	Temperature (°C)	13.1	1.25	16.4	11.0
	pH value (units)	7.9	0.06	8.1	7.8
	Salinity (‰)	33.3	0.27	34.0	33.0
Humboldt Reference Sediment	D.O. (mg/L)	7.7	0.24	8.2	7.1
	Temperature (°C)	12.6	0.97	16.3	11.0
	pH value (units)	8.0	0.06	8.1	7.7
	Salinity (‰)	33.3	0.27	34.0	33.0
EKUP	D.O. (mg/L)	7.7	0.29	8.2	7.1
	Temperature (°C)	13.2	1.25	16.3	11.0
	pH value (units)	7.9	0.09	8.1	7.7
	Salinity (‰)	33.3	0.27	34.0	33.0
EKEX	D.O. (mg/L)	7.7	0.31	8.2	7.1
	Temperature (°C)	13.9	1.32	16.7	11.1
	pH value (units)	7.9	0.08	8.0	7.7
	Salinity (‰)	33.2	0.27	34.0	33.0
SAMTB	D.O. (mg/L)	7.7	0.29	8.2	7.0
	Temperature (°C)	13.3	1.42	16.5	11.1
	pH value (units)	7.9	0.06	8.1	7.7
	Salinity (‰)	33.3	0.27	34.0	33.0
FLTB	D.O. (mg/L)	7.7	0.37	9.1	6.8
	Temperature (°C)	13.9	1.26	16.4	11.2
	pH value (units)	7.9	0.09	8.0	7.6
	Salinity (‰)	33.3	0.27	34.0	33.0

REFERENCE TOXICANT BIOASSAY
Bivalve Larvae (*M. edulis*) and Copper
Mean Initial Recovery = 5319

Sample ID	Rep	Number Normal	Number Abnormal	Total Recovered per 1 mL	Resuspended Volume	Total # Normal Larvae Recovered	% Survival	Mean % Survival ± S.D.	% Normal Develop-ment	Mean % Normal Development ± S.D.	Survival Abbotts Corrected Value	Survival Mean Corrected Value	Normal Development Abbotts Corrected Value	Normal Development Mean Corrected Value
	1	95	7	102	48	4560	85.7		93.1					
	2	109	10	119	47	5123	96.3	89.5	91.6	94.6				
LAB SW	3	104	2	106	48	4992	93.8	±	98.1	±				
CONTROL	4	92	5	97	47.5	4370	82.2	5.78	94.8	2.45				
	5	100	5	105	47.5	4750	89.3		95.2					
	1	93	2	95	48	4464	83.9	74.0	97.9	94.9	93.8	82.8	103.5	100.37
	2	75	8	83	46.5	3488	65.6	±	90.4	±	73.3	±	95.5	±
2 PPB	3	84	3	87	46	3864	72.6	9.26	96.6	4.02	81.2	10.35	102.1	4.25
	1	88	7	95	47.5	4180	78.6	76.4	92.6	94.9	87.8	85.4	97.9	100.3
	2	93	3	96	46	4278	80.4	±	96.9	±	89.9	±	102.4	±
4 PPB	3	77	4	81	48.5	3735	70.2	5.45	95.1	2.13	78.5	6.09	100.5	2.25
	1	38	67	105	48.5	1843	34.6	39.6	36.2	43.7	38.7	44.3	38.3	46.2
8 PPB	2	32	62	94	48	1536	28.9	±	34.0	±	32.3	±	36.0	±
	3	64	41	105	46	2944	55.3	13.92	61.0	14.95	61.9	15.56	64.4	15.81
	1	0	110	110	46.5	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16 PPB	2	0	107	107	47.5	0	0.0	±	0.0	±	0.0	±	0.0	±
	3	0	96	96	46	0	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
	1	0	9	9	47.5	0	0.0	0.9	0.0	0.9	0.0	1.0	0.0	8.8
32 PPB	2	2	14	16	46	92	1.7	±	12.5	±	1.9	±	13.2	±
	3	1	7	8	47.5	48	0.9	0.86	12.5	0.86	1.0	0.97	13.2	7.63

LC_{50} = 7.15 ppb (6.46, 7.92 ppb); EC_{50} = 7.88 ppb (7.29, 8.52 ppb)

REFERENCE TOXICANT BIOASSAY
Bivalve Larvae (*M. edulis*) and Ammonia
Mean Initial Recovery = 5319

Sample ID	Rep	Number Normal	Number Abnormal	Total Recovered per 1 mL	Resuspended Volume	Total # Normal Larvae Recovered	% Survival	Mean % Survival + S.D.	% Normal Develop-ment	Mean % Normal Development + S.D.	Survival		Normal Development	
											Abbotts Corrected Value	Mean Corrected Value	Abbotts Corrected Value	Mean Corrected Value
	1	95	7	102	48	4560	85.7		93.1					
	2	109	10	119	47	5123	96.3	89.5	91.6	94.6				
LAB SW	3	104	2	106	48	4992	93.8	+	98.1	+				
CONTROL	4	92	5	97	47.5	4370	82.2	5.78	94.8	2.45				
	5	100	5	105	47.5	4750	89.3		95.2					
	1	100	4	104	47	4700	88.4	78.1	96.2	92.5	98.8	87.3	101.7	97.84
	2	100	8	108	47.5	4750	89.3	+	92.6	+	99.8	+	97.9	+
1.5 PPM	3	64	8	72	47	3008	56.6	18.64	88.9	3.63	63.2	20.84	94.0	3.84
	1	87	8	95	46.5	4046	76.1	81.0	91.6	95.2	85.0	90.5	96.8	100.6
	2	95	5	100	46	4370	82.2	+	95.0	+	91.8	+	100.4	+
3.0 PPM	3	98	1	99	46	4508	84.8	4.46	99.0	3.71	94.7	4.99	104.7	3.92
	1	83	16	99	46	3818	71.8	83.7	83.8	87.0	80.2	93.6	88.6	92.0
6.0 PPM	2	108	12	120	47	5076	95.4	+	90.0	+	106.7	+	95.2	+
	3	95	14	109	47	4465	83.9	11.83	87.2	3.08	93.8	13.22	92.1	3.26
	1	45	63	108	45	2025	38.1	35.8	41.7	35.8	42.6	40.0	44.1	43.0
12.0 PPM	2	37	51	88	47.5	1758	33.0	+	42.0	+	36.9	+	44.5	+
	3	42	68	110	46	1932	36.3	2.55	38.2	2.55	40.6	2.85	40.4	2.25
	1	0	17	17	48	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24.0 PPM	2	0	87	87	48	0	0.0	+	0.0	+	0.0	+	0.0	+
	3	0	85	85	46.5	0	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00

LC_{50} = 10.67 ppm (9.80, 11.62 ppm); EC_{50} = 10.83 ppm (10.00, 11.74 ppm)

Reference Toxicant Bioassay

Species: *Holmesimysis costata*
Toxicant: Sodium Dodecyl Sulfate

Date: 26 April 1995
T-12046

Concentration (ppm)	Replicate	Number Surviving		Mean % Survival
		Observation Time (hours)		
		0	96	
Control	1	10	10	100
	2	10	10	
1.0	1	10	10	100
	2	10	10	
2.0	1	10	9	95
	2	10	10	
4.0	1	10	8	90
	2	10	10	
8.0	1	10	4	45
	2	10	5	
16.0	1	10	3	25
	2	10	2	

96-hour LC_{50} (Spearman) = 8.00 ppm

95% confidence limits = 5.61 ppm - 11.40 ppm

Reference Toxicant Bioassay

Species: *Citharichthys stigmaeus*
Toxicant: Copper

Date: 9 May 1995
T-12046

Concentration (ppm)	Replicate	Number Surviving: Observation Time (hours) 0	Number Surviving: Observation Time (hours) 96	Mean % Survival
Control	1	10	10	100
	2	10	10	
0.25	1	10	8	85
	2	10	9	
0.5	1	10	8	70
	2	10	6	
1.0	1	10	0	15
	2	10	3	
1.5	1	10	0	0
	2	10	0	
2.0	1	10	0	0
	2	10	0	

96-hour LC_{50} (Spearman) = 0.37 ppm

95% confidence limits = 0.31 ppm - 0.44 ppm

Reference Toxicant Bioassay

Species: *Citharichthys stigmaeus*
Toxicant: Sodium Dodecyl Sulfate

Date: 9 May 1995
T-12046

Concentration (ppm)	Replicate	Number Surviving: Observation Time (hours) 0	Number Surviving: Observation Time (hours) 96	Mean % Survival
Control	1	10	10	100
	2	10	10	
0.25	1	10	10	100
	2	10	10	
0.5	1	10	9	85
	2	10	8	
1.0	1	10	10	95
	2	10	9	
2.0	1	10	7	70
	2	10	7	
4.0	1	10	0	0
	2	10	0	

96-hour LC_{50} (Spearman) = 2.00 ppm

95% confidence limits = 1.65 ppm - 2.43 ppm

Reference Toxicant Bioassay

Species: *Rhepoxynius abronius*
Toxicant: Cadmium chloride

Date: 5 May 1995
T-12046

Concentration (ppm)	Replicate	Number Surviving: Observation Time (hours) 0	Number Surviving: Observation Time (hours) 96	Mean % Survival
Control	1	10	10	100
	2	10	10	
0.125	1	10	10	100
	2	10	10	
0.25	1	10	10	95
	2	10	9	
0.50	1	10	9	95
	2	10	10	
1.00	1	10	6	50
	2	10	4	
2.00	1	10	2	15
	2	10	1	

96-hour LC_{50} (Spearman) = 1.04 ppm

95% confidence limits = .82 ppm - 1.32 ppm

Reference Toxicant Bioassay

Species: *Rhepoxynius abronius*
Toxicant: Ammonia

Date: 5 May 1995
T-12046

Concentration (ppm)	Replicate	Number Surviving: Observation Time (hours) 0	96	Mean % Survival
Control	1	10	10	100
	2	10	10	
16	1	10	10	100
	2	10	10	
32	1	10	10	100
	2	10	10	
64	1	10	6	80
	2	10	10	
128	1	10	4	30
	2	10	2	
256	1	10	0	0
	2	10	0	

96-hour LC_{50} (Spearman) = 97.01 ppm

95% confidence limits = 80.34 ppm - 117.14 ppm

Reference Toxicant Bioassay

Species: *Holmesimysis costata*
Toxicant: Sodium Dodecyl Sulfate

Date: 12 May 1995
T-12046

Concentration (ppm)	Replicate	Number Surviving: Observation Time (hours) 0	96	Mean % Survival
Control	1	10	10	100
	2	10	10	
1.0	1	10	10	100
	2	10	10	
2.0	1	10	10	100
	2	10	10	
4.0	1	10	10	90
	2	10	8	
8.0	1	10	9	90
	2	10	9	
16.0	1	10	6	30
	2	10	0	

96-hour LC_{50} (Spearman) = 12.70 ppm

95% confidence limits = 10.76 ppm - 14.99 ppm

Reference Toxicant Bioassay

Species: *Nephtys caecoides*
Toxicant: Copper Sulfate

Date: 11 May 1995
T-12046

Concentration (μg/L)	Replicate	Number Surviving: Observation Time (hours) 0	Number Surviving: Observation Time (hours) 96	Mean % Survival
Control	1	10	9	90
	2	10	9	
20	1	10	3	25
	2	10	2	
40	1	10	9	95
	2	10	10	
80	1	10	9	95
	2	10	10	
160	1	10	0	0
	2	10	0	
320	1	10	0	0
	2	10	0	

96-hour LC_{50} (Spearman) = 98.65 μg/L

95% confidence limits = Not calculable

ToxScan, Inc.

Receiving, Evaluation and Acclimation Log Worksheet

REAL

Myt 042595

Species: Mytilus edulis	Supplier: Carlsbad Aquafarms	# Ordered: 11b
Date Shipped: 4/24/95	Date/Time Received: 4/25/95 1030	Shipped via: Fed Ex

INITIAL EVALUATION

Package Intact? ☑ Yes ☐ No	Initials: JC	pH: — units
Temperature: ~5 °C	Dissolved Oxygen: — mg/l	Sal./Cond.: — ‰/µmhos
Estimated # received: ~10lbs		# Dead: ~5

Organism condition/comments: Rec'd large bag of mussels in white styrofoam cooler w/ 3 blue ice & lots of news paper. Opened 5 animals all w/ ripe gonads

HOLDING/ACCLIMATION

Date	Initials	pH (units)	Temp (°C)	D.O. (mg/l)	Sal/Cond (‰/µmhos)	Food	# Dead	Comments

TEST INITIATION

Date	Initials	Test ID#	# Organisms used	Comments
4/25/95	JC	T- 12046 Humboldt	~60	spawned quickly at 17°C. Couldn't hold because kept spawning in 15°C holding tank. Discarded.
		T-		
		T-		
		T-		
		T-		

Receiving, Evaluation and Acclimation Log Worksheet
REAL

Ho1042695 (SP-

pecies: *Holmesimysis costata*	Supplier: *Steve Peters*	# Ordered: *1 lot 1000*
ate hipped: *04/26/95*	Date/Time Received: *04/26/95 / 1430*	Shipped via: *Steve Peters*

NITIAL EVALUATION

ackage Intact? ☒ Yes ☐ No	Initials: *FB*	pH: *7.6* units
emperature: *16* °C	Dissolved Oxygen: *8.0* mg/l	Sal./Cond.: *32.3* ‰/µmhos
stimated # received:		# Dead:

rganism condition/comments: *Seemed quite sparse. Received in 4 coolers.*

OLDING/ACCLIMATION

ate	Initials	pH (units)	Temp (°C)	D.O. (mg/l)	Sal/Cond (‰/µmhos)	Food	# Dead	Comments
1/27/95	FB	remaining mysids terminated						

EST INITIATION

ıte	Initials	Test ID	# Organisms used	Comments
26/95	FB	T-12046	900	
		T-		
		T-		
		T-		
		T-		

Lot #

ToxScan, Inc.

Receiving, Evaluation and Acclimation Log Worksheet

REAL (continued)

C+050595

Species: Citharichthys stigmaeus	Supplier: Brezina & Assoc.	# Ordered: ~~2000~~
Date Shipped: 5/5/95	Date/Time Received: 5/5/95	Shipped via: Brezina

Tanks 1 & 2 outside Tr. #3

HOLDING/ACCLIMATION

Date	Initials	pH (units)	Temp (°C)	D.O. (mg/l)	Sal/Cond (‰/µmhos)	Food	# Dead	Comments
received 5/5/95	JC							
holding 5/5/95	JC	8.2	14.5	8.0	33.0	—	3	
5/6/95	CE	8.0	19.5	8.4	32.5	✓	0	Fed Sandabs
5/7/95	TS	7.8	10.9	8.5	32.5	✓	0	
5/8/95	TS	8.1	12.7	8.4	33.0	✓	2	
5/9/95	ASB	8.0	11.3	8.5	32.8	—	720	Humbolt set up
5/10/95	ASB	8.2	13.3		33.2	✓		Ac meter not working
5/11/95	ASB	8.0	11.4	7.7	33.0			
5/12/95	Crew	— remainder		Terminated				

F:\WPS1\DATALOGS\BA-REAL.EXT:01/25/94

ToxScan, Inc.

Receiving, Evaluation and Acclimation Log Worksheet

REAL

(SP)

Species: Holmesemysis costata	Supplier: Steve Peters	# Ordered:
Date Shipped: —	Date/Time Received: 12MAY95; 0840	Shipped via: Hand delivery

INITIAL EVALUATION

Package Intact? ☒ Yes ☐ No	Initials: CRW	pH: 7.8 units
Temperature: 11.9 °C	Dissolved Oxygen: 18.2 mg/l	Sal./Cond.: 32.9 ‰/µmhos
Estimated # received: ~ 750		# Dead: Few

Organism condition/comments: Fed artemia upon arrival; Active

HOLDING/ACCLIMATION

Date	Initials	pH (units)	Temp (°C)	D.O. (mg/l)	Sal/Cond (‰/µmhos)	Food	# Dead	Comments
—	Used all animals in test: 5/12/95						—	

TEST INITIATION

Date	Initials	Test ID	# Organisms used	Comments
5/12/95	CRW	T-12046	720	
		T-		
		T-		
		T-		
		T-		

ToxScan Inc.

Artemia Feeding Schedule

Project: ACOE Humboldt	ID: T- 12046	Test Species: H. costata

Day	Date	Amount	Time	Initials	Amount	Time	Initials	Amount	Time	Initials
0	04/27/95	—	—	—	750	1100	FB	—	—	—
1	04/28/95	—	—	—	1000	1300	FB	—	—	—
2	4/29/95	—	—	—	1000	1000	JC	—	—	—
3										
4										
5										
6										
7										
8										
9										
10										

F:\WP51\DATALOGS\BIOASSAY\ARTEMIA.FDG:11/01/94

LOI —

ToxScan, Inc.

Receiving, Evaluation and Acclimation Log Worksheet

REAL (continued)

Mac 050595

Species: Macoma nasuta	Supplier: Brezina & Assoc.	# Ordered: ~~3000~~
Date Shipped: 5/5/95	Date/Time Received: 5/5/95	Shipped via: Brezina de

Tank #3 outside Tr. #3

HOLDING/ACCLIMATION

Date	Initials	pH (units)	Temp (°C)	D.O. (mg/l)	Sal/Cond (‰/µmhos)	Food	# Dead	Comments
Received 5/5/95	JC							
Holding 5/5/95	JC	8.2	14.5	8.0	33.0	—	0	
5/6/95	CE	7.9	12.5	7.6	32.5	—	0	
5/7/95	TS	7.9	11.0	8.2	32.5	—	0	
5/8/95	TS	8.0	13.5	7.8	33.0	—	0	
5/9/95	AB	8.0	11.3	8.3	33.0	—	0	
5/10/95	AB	8.1	13.2	—	33.2	—	0	DO meter not working
5/11/95	AB	8.0	11.8	7.7	33.1	—	3	
5/11/95	JC	Used	875	for	T-12046	~	30 small	clams remaining

F:\WP51\DATALOGS\BA-REAL.EXT:01/25/94

ToxScan, Inc.

Receiving, Evaluation and Acclimation Log Worksheet

REAL

R042895

cies: *Rhepoxynius abronius*	Supplier: NAS	# Ordered: 1250
ate pped: 04/27/95	Date/Time Received: 04/28/95 ; 1100	Shipped via: Fed Ex

NITIAL EVALUATION

kage Intact? ☒ Yes ☐ No	Initials: FB	pH: 7.6 units
mperature: 13.1 °C	Dissolved Oxygen: NM mg/l	Sal./Cond.: 31 ① ‰/µmhos
imated # received: 1300		# Dead: 8

anism condition/comments: ① salinity based on NAS records

OLDING/ACCLIMATION

e	Initials	pH (units)	Temp (°C)	D.O. (mg/l)	Sal/Cond (‰/µmhos)	Food	# Dead	Comments
8/95	FB	8.0	15.7	7.5	32.0	—	—	holding tub conditions
29/95	JC	8.0 / 8.0 \ 8.0	15.3 / 15.3 \ 15.4	7.7 / 7.6 \ 7.6	32.9 / 32.9 \ 33.5	—	1 / 5 \ 3	
0/95	JS	8.1 / 8.1 \ 8.1	15.2 / 15.3 \ 15.4	7.7 / 7.6 \ 7.6	33 / 33 \ 33.2	—	5 / 1 \ 0	
01/95	ASB	8.0 / 8.0 \ 8.0	15.5 / 15.5 \ 15.7	7.7 / 7.7 \ 7.6	33 / 33 \ 32.8	—	~~1 / 1 \ 0~~	
/95	JC	8.0 / 8.1 \ 8.1	16.2 / 16.1 \ 16.3	7.7 / 7.8 \ 7.8	33.0 / 33.1 \ 33.1	—	1 / 1 \ 0	
3/95	ASB	8.0 / 8.0 \ 8.0	14.9 / 15.0 \ 15.3	7.9 / 7.9 \ 7.9	32.8 / 33.2 \ 33.2	—	1 / 2 \ 1	
/95	ASB	8.0 / 8.0 \ 8.0	14.7 / 14.9 \ 15.2	7.6 / 7.6 \ 7.6	33.1 / 33.2 \ 33.0	—	1 / 0 \ 0	
5/95	OE	7.9 / 7.9 \ 7.9	15.2 / 15.2 \ 15.4	8.0 / 8.0 \ 8.0	33.1 / 33.0 \ 33.0	—	1 / 0 \ 0	PM - 1 Remaining Tub
/95	JC	8.1	15.4	7.6	32.0	—	0	
7/95	ASB	8.1	15.4	7.6	34.0	—	0	
3/95	ASB	8.0	15.6	7.7	33.8	—	0	
9/95	FB	8.0	15.6	7.5	34.0	—	0	

0/95 Remainder discarded - FB

ST INITIATION

	Initials	Test ID	# Organisms used	Comments
5/95	CRW	T- 12046	1060	ACOE - Humboldt
		T-		
		T-		
		T-		
		T-		

ToxScan, Inc.

Receiving, Evaluation and Acclimation Log Worksheet

REAL (continued)

Nep050595

Species: Nephtys caecoides	Supplier: Brezina & Assoc.	# Ordered: ~~6000~~ 7x425
Date Shipped: 5/5/95	Date/Time Received: 5/5/95	Shipped via: Brezina

Tanks #1, 2, & 5 outside Tr. #2

HOLDING/ACCLIMATION — Feed occassionally

Date	Initials	pH (units)	Temp (°C)	D.O. (mg/l)	Sal/Cond (‰/µmhos)	Food	# Dead	Comments
Received 5/5/95	JC							
Holding 5/5/95	JC	8.2	14.5	8.0	33.0	—	0	
5/6/95	CE	8.0	11.4	8.4	33.0	—	0	
5/7/95	TS	7.9	10.7	8.3	32.5	—	0	
5/8/95	TS	8.0	12.5	8.4	33.0	—	~~0~~ 1	
5/9/95	ASB	8.0	11.3	8.5	33.0	—	0	
5/10/95	ASB	8.1	13.3	—	33.0	—	0	DO meter not working
5/11/95	ASB	8.0	11.8	8.1	33.0	—		
/12/95	CRW	8.0	10.9	8.2	33.3	—	—	
5/13/95	JC	8.0	10.7	—	33.2	√ Tetra Marin		
5/13/95	CE	8.0	11.3	—	34.0	—	—	DO meter not working
5/15/95	CRW	8.0	11.9	8.8	33.3	—	—	
5/16/95	CRW	8.0	12.1	9.0	33.2	—	—	
5/17/95	CRW	7.9	12.4	8.0	33.0	—	—	
5/18/95	TS	8.1	11.9	7.9	33.3	—	—	
5/19/95	CE	8.0	11.5	8.4	33.3	—	—	
5/20/95	CE	8.0	11.9	8.6	33.0	—	—	
5/21/95	CRW	8.0	11.4	8.7	33.1	—	—	
5/22/95	FB	8.0	12.2	9.0	33.0	—	—	
5/23/95	TS	8.0	12.3	8.6	33.2	—	—	
5/24/95	JC	7.9	11.7	8.3	33.3	√ tetra Marin	6 in 3rd tank (flow off)	
5/25/95	CRW	8.0	12.5	8.9	33.1	—	—	
5/26/95	CE	8.0	11.4	8.4	33.5	—	—	
/27/95	CE	8.1	11.5	8.6	33.0	—	—	
5/28/95	CE	8.0	11.8	8.5	33.4	—	—	

Appendix F

Chains of Custody

Location
Frig # 11
Shelf # 16

Chain of Custody Record

Laboratory: ToxScan Inc.
42 Hangar Way
Watsonville, CA 95076
(408) 724-4522

Lab # T-12046

Date Received 04/06/95

Project #:

From:
Kinnetic
Laboratories, Inc.
307 Washington St.
Santa Cruz, CA 95060
(408)426-3900
(408)426-0405 Fax

KLI Project:

P.O.#:

Matrix:

Required Completion Date: 3 weeks

Sample ID #	Station ID #	Lab ID #	Analysis	Containers	Pres.	Sample Date/Time		Condition Upon Receipt
HUM95ARC0001	RF	T-12046 -59	ARCHIVE	1 x 1ℓ WMG	∅/None	3-30-95	1118	Intact
HUM95 ARC 0002	SAM 6-A	-60		500 ML WMG	∅	4-1-95	1125	
HUM95 ARC 0003	SAM 6-B	-61		500 ML WMG		4-1-95	1355	
HUM95ARC0004	SAM 6-C	-62				4-1-95	1600	
HUM95 ARC 0005	FL-4	-63				4-2-95	1400	
HUM95 ARC 0006	FL-1	-64				4-2-95	1517	
HUM95ARC0007	FL-2	-65				4-2-95	1622	
HUM 95 ARC 0008	FL-3	-66				4-2-95	1730	
HUM 95 ARC0009	EK 8	-67				4-3-95	1055	
HUM95 ARC 0010	EK 7	-68				4-3-95	1155	
HUM95ARC0011	EK 6	-69				4-3-95	1255	
HUM 95 ARC 0012	EK 5	-70 ~~-66~~				4-3-95	1416	
HUM95ARC0013	EK 2	-71				4-3 95	1732	
HUM 95 ARC 0014	EK 4	-72				4-4-95	0822	
HUM95 ARC 0015	EK4-A	-73				4-4-95	1042	

Data Reports **MUST** include the following: Sample/Site ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer.

Special Instructions/Comments: WMG = Wide Mouth Glass MATRIX IS SEDIMENT DC

Sampled & Relinquished By:	Date/Time	Transporter	Received By:	Date/Time
Walter Felios	4/6/95 1645	hand	Steen Trump	4/6/95 1545
Relinquished By:	**Date/Time**	**Transporter**	**Received By:**	**Date/Time**
x Steen Trump	4/6/95 1650	hand	Mary Jo Milgate	04/06/95 1650
Relinquished By:	**Date/Time**	**Transporter**	**Received By:**	**Date/Time**

Frig # 11
Shelf # - 16

Chain of Custody Record

Laboratory: ToxScan Inc. 42 Hangar Way Watsonville, CA 95076 (408) 724-4522	**Lab #** T-12046 **Date Received** 04/06/95 **Project #:** Humboldt 541.	**From:** Kinnetic Laboratories,Inc. 307 Washington St. Santa Cruz, CA 95060 (408)426-3900 (408)426-0405 Fax
KLI Project: Humboldt C.O.E.	**P.O.#:**	**Matrix:** Sediment / **Required Completion Date:** 3 weeks

Sample ID #	Station ID #	Lab ID #	Analysis	Containers	Pres.	Sample Date/Time		Condition Upon Receip16
HUM95SED0016	EK 2	T-12046 -31	Sediment Chemistry	1-1L Wide Mouth Glass	None	4-3-95	1732	INTACT
HUM95SED0017	EK 4	-32	↓	↓	None	4-4-95	0822	
HUM95SED0018	EK 4-A	-33			None	4-4-95	1042	
HUM95SED0019	Comp #2	-34			None	4-3-95	1732	↓
HUM95SED0020					None			
HUM95SED0021					None			
HUM95SED0022					None			
HUM95SED0023					None			
HUM95SED0024					None			
HUM95SED0025					None			
HUM95SED0026					None			
HUM95SED0027					None			
HUM95SED0028					None			
HUM95SED0029					None			
HUM95SED0030					None			

Data Reports **MUST** include the following: Sample/Site ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer.

Special Instructions/Comments:

Sampled & Relinquished By:	Date/Time	Transporter	Received By:	Date/Time
Walter Fiore	4/6/95 1545	hand	Steen Trump	same
Relinquished By:	**Date/Time**	**Transporter**	**Received By:**	**Date/Time**
Steen Trump	4/6/95 1650	hand	[illegible]	04/06/95 1650
Relinquished By:	**Date/Time**	**Transporter**	**Received By:**	**Date/Time**

Location
Frig # - 11
Shelf # - 16

Chain of Custody Record

Laboratory: ToxScan Inc.
42 Hangar Way
Watsonville, CA 95076
(408) 724-4522

Lab # T-12046

Date Received 04/06/95

Project #: 541.

From:
Kinnetic
Laboratories, Inc.
307 Washington St.
Santa Cruz, CA 95060
(408)426-3900
(408)426-0405 Fax

KLI Project: Humboldt C.O.E.

P.O.#: NA

Matrix: Sediment

Required Completion Date: 3 weeks

Sample ID #	Station ID #	Lab ID #	Analysis	Containers	Pres.	Sample Date/Time		Condition Upon Receipt
HUM95SED0001	RF	T-12046 -21 ~~-22~~ -16	Sediment Chemistry	1-1L Wide Mouth Glass	None	3-30-95	1118	INTACT
HUM95SED0002	DISCRETE SAM 6-A	-17			None	4-1-95	1125	
HUM95SED0003	DISCRETE SAM 6-B	-18			None	4-1-95	1355	
HUM95SED0004	DISCRETE SAM 6-C	-19			None	4-1-95	1600	
HUM95SED0005	COMP #1	-20			None	4-1-95	1125	
HUM95SED0006	FL-4	-21			None	4-2-95	1400	
HUM95SED0007	FL-1	-22			None	4-2-95	1517	
HUM95SED0008	FL-2	-23			None	4-2-95	1622	
HUM95SED0009	FL-3	-24			None	4-2-95	1730	
HUM95SED0010	COMP #4	-25			None	4-2-95	1400	
HUM95SED0011	EK 8	-26			None	4-3-95	1055	
HUM95SED0012	EK 7	-27			None	4-3-95	1135	
HUM95SED0013	EK 6	-28			None	4-3-95	1255	
HUM95SED0014	EK 5	-29			None	4-3-95	1416	
HUM95SED0015	COMP #3	-30			None	4-3-95	1055	

Data Reports **MUST** include the following: Sample/Site ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer.

Special Instructions/Comments:

Sampled & Relinquished By:	Date/Time	Transporter	Received By:	Date/Time
Scott E. Adams / Walter Filore	4/6/95 1545	hand	Steen Trump	Same
Relinquished By:	Date/Time	Transporter	Received By:	Date/Time
Steen Trump	4/6/95 1650	hand	[illegible]	04/06/95 1650
Relinquished By:	Date/Time	Transporter	Received By:	Date/Time

Frig # - 11
Shelf # - ~~16~~ 17
KV

Chain of Custody Record

Laboratory: ToxScan Inc.
42 Hangar Way
Watsonville, CA 95076
(408) 724-4522

Lab # T-12046

Date Received 04/06/95

Project #:

From:
Kinnetic
Laboratories,Inc.
307 Washington St.
Santa Cruz, CA 95060
(408)426-3900
(408)426-0405 Fax

KLI Project:

P.O.#:

Matrix:

Required Completion Date: 3 weeks

Sample ID #	Station ID #	Lab ID #	Analysis	Containers	Pres.	Sample Date/Time		Condition Upon Receipt
DIOXIN 001	HUMBOLDT-RF	T-12046 ~~-11, -12~~ KV	DIOXIN	1 x 1l wmG	Ø None	3-30-95	1118	INTACT
DIOXIN 002	Comp # 1	~~-12~~ ~~-13, -14~~ KV, KV		500 ml wmG		4-1-95	1125	
DIOXIN 003	Comp # 4	~~-13~~ ~~-15~~ KV ~~-16~~ KV		500 ml wmG		4-2-95	1400	
DIOXIN 004	COMP # 3	~~-14~~ ~~-17, -18~~ KV, KV				4-3-95	1055	
DIOXIN 005	Comp # 7	~~-15~~ ~~-19, -20~~ KV, KV				4-3-95	1732	

Data Reports **MUST** include the following: Sample/Site ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer.

Special Instructions/Comments: MATRIX IS SEDIMENT DC

Sampled & Relinquished By: Scott E. Adams	Date/Time	Transporter	Received By:	Date/Time
Walter Filion	4/6/95 1545	hand	Steen Trump	Same
Relinquished By:	**Date/Time**	**Transporter**	**Received By:**	**Date/Time**
Steen Trump	4/6/95 1650	hand	Mary Ann Milligan	04/06/95 1652
Relinquished By:	**Date/Time**	**Transporter**	**Received By:**	**Date/Time**

LOCATION: FRIG. #11 T-12046-01,-02 : UNDER SHELF # 45 T-12046-03,-04 : UNDER SHELF # 45 T-12046-05,-06 : UNDER SHELF # 06 T-12046-09,-10 : UNDER SHELF # 18

DAVE LEWIS

Chain of Custody Record

Laboratory: ToxScan Inc.
42 Hangar Way
Watsonville, CA 95076
(408) 724-4522

Lab # T-12046

Date Received 04/06/95

Project #: 541.

From:
Kinnetic
Laboratories,Inc.
307 Washington St.
Santa Cruz, CA 95060
(408)426-3900
(408)426-0405 Fax

KLI Project: Humboldt COE | **P.O.#**: | **Matrix**: Sediment/~~Water~~ DC | Required Completion Date: 3 weeks

Sample ID #	Station ID #	Lab ID #	Analysis	Containers	Pres.	Sample Date/Time		Condition Upon Receipt
HUM95BIO0001	COMP #1 (SAM 6)	T-12046 -01 -02	Bioassay/Bio-accumulation	2 Lined Coolers	None	4-1-95 ~~4-30-95~~	1125 ~~1115~~ SA	Intact
HUM95BIO0002	COMP #2	T-12046 -03, -04			None	4-3-95	1732	
HUM95BIO0003	COMP #3	~~T-12046-03~~ -05 ~~T-12046-05~~ -06 ~~T-12046-06~~			None	4-3-95	1055	
HUM95BIO0004	FIELD'S LANDING COMP #4	~~T-12046-07~~ T-12046-07,08			None	4-2-95	1400	
HUM95BIO0005					None			
HUM95BIO0006					None			
HUM95BIO0007					None			
HUM95BIO0008					None			
~~HUM95BIO0009~~	Reference COMP		Bioassay/Bio-accumulation	2 Lined Coolers	None	3-30-95	4-7-95 Today 1118	NOT RECEIVED DC
~~HUM95BIO0010~~ SEA	Reference		~~Elutriate Water~~	3-5Gallon Cubitainers	None			
HUM95BIO0010	RF	T-12046 -09,-10	BIOASSAY/BIOACCUMULATION	2 LINED COOLERS	NONE	30 APR 95	1118	INTACT DC

Data Reports **MUST** include the following: Sample/Site ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer.

Special Instructions/Comments: * SAMPLING INFORMATION COPIED FROM SAMPLE LABEL DC

Sampled & Relinquished By: = SCOTT ADAMS KLI - SEA	Date/Time	Transporter	Received By:	Date/Time
Walter Fulmer	4/6/95 1545	hand	Steen Trump	same
Relinquished By:	**Date/Time**	**Transporter**	**Received By:**	**Date/Time**
Steen Trump	4/6/95 1650	hand	Mary Smilley	04.06.95 1650
Relinquished By:	**Date/Time**	**Transporter**	**Received By:**	**Date/Time**

Location
Frig # - 11
Shelf # - 16

Chain of Custody Record

Laboratory: ToxScan Inc.
42 Hangar Way
Watsonville, CA 95076
(408) 724-4522

Lab # T-12046

Date Received 04/06/95

Project #: Humbolt 541.

From:
Kinnetic
Laboratories,Inc.
307 Washington St.
Santa Cruz, CA 95060
(408)426-3900
(408)426-0405 Fax

KLI Project: Humbodt C.O.E.

P.O.#: NA

Matrix: Sediment

Required Completion Date: 3 weeks

Sample ID #	Station ID #	Lab ID #	Analysis	Containers	Pres.	Sample Date/Time		Condition Upon Receipt
HUM95PSD0001	BAR 1	T-12046 -35	Particle Size Distribution	1-250ml HDPE	None	3-30-95	1402	INTACT
HUM95PSD0002	NB 9	-36	↓	↓	↓	3-30-95	1623	↓
HUM95PSD0003	NB 1	-37				3-30-95	1650	
HUM95PSD0004	ENT 1	-38				3-30-95	1702	
HUM95PSD0005	ENT 2	-39				3-30-95	1714	
HUM95PSD0006	SAM 5	-40				3-31-95	1635	
HUM95PSD0007	SAM 7	-41				3-31-95	1750	
HUM95PSD0008	SAM 1	-42				4-1-95	0900	
HUM95PSD0009	SAM 3	-43				4-1-95	1020	
HUM95PSD0010	SAM 4	-44				4-1-95	1726	
HUM95PSD0011	SAM 2	-45				4-1-95	1751	
HUM95PSD0012	NB 5	-46				4-2-95	0955	
HUM95PSD0013	NB 3	-47				4-2-95	~~1126~~	
HUM95PSD0014	NB 4	-48				4-2-95	1142	
HUM95PSD0015	NB 6	-49	↓	↓	↓	4-2-95	1200	↓

Data Reports **MUST** include the following: Sample/Site ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer.

Special Instructions/Comments:

Sampled & Relinquished By:	Date/Time	Transporter	Received By:	Date/Time
Scott E. Adams / Walter Fuller	4/6/95 1545	hand	Steen Trump	Same
Relinquished By:	Date/Time	Transporter	Received By:	Date/Time
Steen Trump	4/6/95 1650	hand	Mary Ann Milligan	04/06/95 1650
Relinquished By:	Date/Time	Transporter	Received By:	Date/Time

Location
Frig # 11
Shelf # 16

Chain of Custody Record

Page 6 of 7

Laboratory: ToxScan Inc.
42 Hangar Way
Watsonville, CA 95076
(408) 724-4522

Lab # T-12046
Date Received 04/06/95
Project #:

From:
Kinnetic
Laboratories,Inc.
307 Washington St.
Santa Cruz, CA 95060
(408)426-3900
(408)426-0405 Fax

KLI Project: Humbodt C.O.E. | **P.O.#:** NA | **Matrix:** Sediment | **Required Completion Date:** 3 weeks

Sample ID #	Station ID #	Lab ID #	Analysis	Containers	Pres.	Sample Date/Time		Condition Upon Receipt
HUM95PSD0016	NB 7	T-12046 -50	Particle Size Distribution	1-250ml HDPE	None	4-2-95	12 11	Intact
HUM95PSD0017	NB 8	-51				4-2-95	1222	
HUM95PSD0018	FL 7	-52				4-2-95	1310	
HUM95PSD0019	FL 6	-53				4-2-95	1330	
HUM95PSD0020	FL 5	-54				4-2-95	1343	
HUM95PSD0021	EK1	-55				4-3-95	1638	
HUM95PSD0022	EK3	-56				4-4-95	0942	
HUM95PSD0023	FL 6	-57				4-4 95	1220	*
HUM95PSD0024	NB 2	-58				4-4-95	1255	
HUM95PSD0025								
HUM95PSD0026								
HUM95PSD0027								
HUM95PSD0028								
HUM95PSD0029								
HUM95PSD0030								

ata Reports **MUST** include the following: Sample/Site ID, Analytical Method, Detection Limit, Date of Extraction if applicable, Date of Analysis, Analytical Results and Signature of QA Reviewer.

ecial Instructions/Comments:

mpled & Relinquished By:	Date/Time	Transporter	Received By:	Date/Time
Walter Felios	4/6/95 1545	hand	Steen Trump	4/6/95 1545
linquished By:	Date/Time	Transporter	Received By:	Date/Time
Steen Trump	4/6/95 1650	hand	Mary Lou Mikkyo	04/06/95 1650
linquished By:	Date/Time	Transporter	Received By:	Date/Time

OXSCAN CHAIN-OF-CUSTODY DOCUMENT T-12046 PAGE 1 OF 1

COMPANY NAME: TOXSCAN BIOASSAY DIV.
ATTN: DR. RAY MARKEL
ADDRESS: 42 HANGAR WAY
WATSONVILLE, CA
PHONE: 408-724-4522
FAX:
PROJECT NAME: HUMBOLDT C.O.E.
PROJECT NUMBER:

COMMENTS / SPECIAL INSTRUCTIONS:
SAMPLING LOCATION:
Tomales Bay, Ca.
Near mouth of Bay
SAMPLES PROVIDED AS HOME SEDIMENT.
*SAMPLES T-12046-74,-75 LOCATED UNDER SHELF #06
SAMPLES T-12046-76,-77 LOCATED UNDER SHELF #12 DC
SEND INVOICE TO:
P.O. / CONTRACT NO:

ANALYSIS(ES) REQUESTED

TOXSCAN INC.
42 Hangar Way
Watsonville, CA 95076
PHONE: 408/724-4522
FAX: 408/724-3188

LAB USE ONLY:
STORAGE LOCATION *
FREEZER #
REFRIGERATOR # 11
SHELF #

Lab Use Only — ID Number	Client Sample Identification	Sample Information: Sampling Date	Sampling Time	Sample Type	Bottle or Container Information: Sample Preservative	Bottle Type:	Bottle Size:	No. of Bottles:	CHECK THE APPROPRIATE BOX BELOW	SAMPLE CONDITION
T-12046 74,75 76,77	HOME SEDIMENT	4/9/95	10 AM	SEDIMENT		HDPE	5 GAL	4		INTACT

SAMPLER'S SIGNATURE AND PRINTED NAME:

RELINQUISHED BY (SIGNATURE AND PRINTED NAME):	RECEIVED BY (SIGNATURE AND PRINTED NAME):	DATE:	TIME:
John Brezina John Brezina Brezina & Associates VIA FED EX	Douglas Clark DOUGLAS CLARK	11-12 APR 95	1030

SAMPLE T-12046-74 RECEIVED 11 APR 95. SAMPLES T-12046-75, 76, 77 RECEIVED 12 APR 95 DC

FS DATA ICOC pdl