

Bolsa Chica Full Tidal Area Contaminant Cleanup Plan

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July 8, 2004

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Table of Contents

I. Background.....	1
A. Introduction.....	1
B. Definitions.....	1
II. Development of Cleanup Concentrations	2
A. COECs Not Selected for Cleanup.....	3
B. COECs Selected for Cleanup.....	6
C. Sampling History	7
III. Contaminated Sediments	8
A. Particle Size Mapping and Contaminant Sampling Results	8
B. Excluded Zones and Areas of Contamination	8
IV. Construction Constraints Related to Contamination.....	8
A. Clearing and Grubbing.....	8
B. Surface and Subsurface Contamination	9
C. Unsuspected Contamination Uncovered during Engineering Activities	9
D. Contaminated Material Excavation.....	9
E. Use of Contaminated Material Onsite.....	10
F. Site Dewatering Plan – See Appendix C	12
V. Compliance with Cleanup Plan and other Environmental Concerns.....	12
A. Oversight.....	12
B. Verification Sampling.....	12
VI. Cleanup Strategy.....	13
A. Delineation of Contamination Boundaries.....	13
B. Site-Specific Cleanup Criteria	15
C. Cleanup Quantities - July 8, 2004 version.....	36

Tables and Figures

Figure 1. Bolsa Chica Wetland Restoration Features – 2004.....	39
Figure 2. Bolsa Chica Wetlands Cleanup Plan Full Tidal Area.....	40
Figure 3. Areas Excluded for Placement in the Ebb Shoal due to Fines or Contamination.....	41
Figure 4. Bolsa Chica Wetlands Cleanup Plan Full Tidal Cleanup Locations.....	42
Figures 5 through 14.....	43 to 52
Table 1. Analytes Sampled Between 1996 and 2000 (N=237).....	4
Table 2. Summary Table of Cleanup Values. All values in parts per million (mg/kg).	7
Table 3. Sample Location CAR_14_1A, TPHDWO.....	15

Table 4. Sample Location FOPC0201_1, TPHDWO.....	15
Table 5. Sample Location CAR_20_2A, TPHDWO.....	15
Table 6. Sample Location CAR_27_1A, TPHDWO, Dredge Footprint.....	16
Table 7. Sample Location CAR_28_1A, TPHDWO, Dredge Footprint.....	16
Table 8. Sample Location B-50-0.5, Copper.....	17
Table 9. Sample Location EO_03A, TPHDWO, Dredge Footprint.....	17
Table 10. Sample Location DC34-1, TPHDWO, Dredge Footprint.....	17
Table 11. Sample Location CAR_31_2A, TPHDWO.....	18
Table 12. Sample Location EO_02A, TPHDWO, Dredge Footprint.....	18
Table 13. Sample Location SS-61, Barium.....	19
Table 14. Sample Location CAR_38_2A, TPHDWO.....	19
Table 15. Sample Location CAR_37_1A, TPHDWO.....	19
Table 16. Sample Location BS_41_0.5_HA, Copper and Lead.....	20
Table 17. Sample Location EO_05A, Lead.....	20
Table 18. Sample Location CAR_60_1A, Dredge Footprint, Copper.....	21
Table 19. Sample Location CAR_59_1A, Sample Location CAR_59_2A, and Sample Location RD_07_01, TPHDWO.....	21
Table 20. Sample Location CAR_67_1A, TPHDWO.....	22
Table 21. Sample Location CAR_68_1B, Sample Location CAR_68_2A and Sample Location F3R-2-1, TPHDWO and Arsenic.....	22
Table 22. Sample Location RD_03_02, Copper and Nickel.....	23
Table 23. Sample Location RD_03_03, TPHDWO.....	24
Table 24. Sample Location DCMN3-1, DCRDA0308-1, CAR_76_4B, CAR_76_1A&B, Dredge Footprint.....	24
Table 25. Sample Location FORB42-1, CAR_76_2B, DCRDAO309-1, Dredge Footprint, TPHDWO.....	26
Table 26. Sample Location DC86-1, Dredge Footprint, TPHDWO.....	26
Table 27. Sample Location CAR_77_1A, CAR_77_2A, Dredge Footprint, TPHDWO, Oil and Grease, Lead.....	26
Table 28. Sample Location EO_09A, TPHDWO.....	27
Table 29. Sample Location EO_08A, TPHDWO.....	27
Table 30. Sample Location RD_IB_20, Sample Location DCRDA1B21-1 and Sample Location CAR_89_1A, Partly in Dredge Footprint.....	28
Table 31. Sample Location CAR_79_1A, EO_11A, Dredge Footprint.....	30
Table 32. Sample Location BS14-0.5.....	30
Table 33. Sample Location SS-62, Barium.....	31
Table 34. Sample Location CAR_90_1A&B, S_P_01A and FS01-1-1, TPHDWO and Nickel (FS01-1-1 only).....	31
Table 35. Sample Location B_18_0.5, DDT.....	33
Table 36. Sample Location CAR_91_1A&B, CAR_91_2A&B.....	33
Table 37. Sample BS18_0.5, Mercury.....	34
Table 38. Sample Location CAR_107_1A, CAR_108_1B, BS10-0.5, S_R_01A&B, TPHDWO, Arsenic, Copper, Barium.....	34
Table 39. Cleanup Volume and Disposition.....	36

Drawings

Drawing 1. Nest Site #1	10
Drawing 2. Nest Site #2	10
Drawing 3. Nest Site #3	11
Drawing 4. Typical South Levee Section	11
Drawing 5. Typical North Levee Section	11
Drawing 6. Typical Overlook Section	12

Appendices

Appendix A – Quality Assurance Project Plan	1
1. Introduction	1
2. QAPP Format and Guidance	1
3. Project Organization and Responsibilities	2
4. Quality Assurance/Quality Control Program	2
5. Sampling Procedures	10
6. Field Analytical Methods	11
7. Data Validation	14
8. Data Management	26
9. Corrective Action	26
10. Preventive Maintenance	27
11. Audits	29
Appendix B – Analytical Requirements	1
Appendix C – Dewatering Plan	1
(1) Background	1
(2) Discharge Water Characterization	2
(3) Receiving Waters Characterization	2
(4) Water Discharge Rates	2
(5) Water Discharge Frequency and Duration	4
(6) Discharge Water Treatment	6
(7) Water Discharge Locations Map	6
(8) References	7

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Bolsa Chica Full Tidal Area Contaminant Cleanup Plan

I. Background

A. Introduction

In 1997, the Bolsa Chica Lowland Restoration Project (Project) began with the acquisition of private property that had supported oil exploration for decades and a continuing oil field operation subject to a Surface Use Agreement and an Operating Assurances Agreement with the State of California. A prerequisite to that acquisition was completion of a voluntary Cleanup Agreement among the State Lands Commission (SLC), the oil company operating the oil field lease, CalResources LLC, and the property seller, Signal Bolsa Corporation. The Cleanup Agreement established that the Project would characterize the nature and extent of contamination on the site, the parties would agree on cleanup goals, and the oil company and seller would see that the contamination was cleaned up under the oversight of the Regional Water Quality Control Board (RWQCB). Since 1997, the Project has completed the Environmental Impact Report/Statement, obtained permits, and nearly completed final plans and specifications. The Project expects to be under construction by October 1, 2004 and complete the restoration in spring of 2007. Figure 1 depicts the features of the restoration project.

After undertaking sediment and water sampling on the site and completing an Ecological Risk Assessment, cleanup goals were established. The parties (now SLC, Aera Energy LLC, and Hearthside Homes) have been reconsidering the sequence of events and who will perform specific tasks of the 1997 cleanup process for Bolsa Chica, in light of the restoration construction schedule. The Project now intends to clean up contamination in the Full Tidal Area (FTA) during the earthmoving and construction of the wetland restoration features. Hence, through the Fish and Wildlife Service as technical advisor on contaminants and as construction lead agency, a Project Cleanup Plan is being provided to the RWQCB for concurrence.

This document describes the Cleanup Plan for the Full Tidal area only. A Cleanup Plan for the remainder of the site will be developed separately.

The parties have established cleanup Goals for Bolsa Chica, pursuant to the voluntary cleanup agreement. These cleanup goals were developed from the Ecological Risk Assessment where they were described as delineation concentrations. A complete description of the process that was followed to develop these cleanup concentrations is summarized in Section II of this document.

B. Definitions

Full Tidal Area (FTA). Bolsa Chica Lowlands has been divided into several areas descriptive of their post-restoration function (Bolsa Bay, Full Tidal, Seasonal Ponds, Muted Tidal, and Future Full Tidal). This cleanup plan has been developed for the Full Tidal Area only (Figures 2 and 3).

Dredge Footprint. The Dredge Footprint is the area that will be excavated to create the tidal basin. All material in this area will be removed to dredge depth and either is (a) clean material placed in the ebb shoal, (b) clean material used as Common Material for project related fill, (c) contaminated material sequestered on-site in areas of biological unavailability (buried), or (d) contaminated material hauled off site.

Excluded Area. Within the Dredge Footprint component of the Full Tidal area, sediments that were either physically unsuitable (not enough sand) or contained contaminants at levels that remained of concern were categorized as “excluded areas” within the dredge footprint meaning they are excluded from placement in the Ebb Shoal.

Common Material. Excavated material that is suitable for use as fill with no limitation based on contamination or physical suitability (percent sand).

Contaminated Material. Excavated material that is taken from any surface or Subsurface area designated in this plan to be cleaned up. Most of this material has been determined to be suitable for onsite sequestering. Some of this material has been identified to exceed “Haul-off” concentrations. No material with exceedances above “Haul off” concentrations will remain onsite.

Haul-off concentrations. Contaminant concentrations that were considered to pose an unacceptable risk to wildlife, even if buried or sequestered, were established. Material that exceeds haul-off concentrations will be kept segregated from Common Material and other Contaminated Material. This material will be hauled off site to an appropriate landfill.

II. Development of Cleanup Concentrations

The Bolsa Chica Technical Committee was established to evaluate the on-site contaminants and develop a cleanup plan. The committee consisted of agency personnel from Fish and Wildlife Service, California Department of Fish and Game, NOAA, EPA and California State Lands Commission and included consultation with the Regional Water Quality Control Board. The Technical Committee developed clean-up criteria by considering the following factors and using a “weight-of-evidence” approach: (a) field data, (b) outcome of the analysis conducted through the Ecological Risk Assessment (ERA)¹, and (c) available literature information^{2 3 4}. Specific

1 USFWS and CH2M Hill. July 2002. Revised Final Ecological Risk Assessment for Bolsa Chica Lowlands Project, Huntington Beach, California. Contract 1448-10181-97D068(TS)

2 Long, E.R. et al., 1995. Incidence of adverse biological effects within the ranges of chemical concentrations in marine and estuarine sediments. *Environmental Management* 19: 81-97.

3 Long, E.R., and L.G. Morgan. 1990. The potential for biological effects of sediment-sorbed contaminants tested in the National Status and Trends Program. NOAA Tech. Memo. NOS OMA 52. US National Oceanic and Atmospheric Administration, Seattle, Washington. 175 pp.

4 Field, L.J., D.D. MacDonald, S.B. Norton, C.G. Ingersoll, C.G. Severn, D. Smorong, and R. Lindskoog. 2002. Predicting amphipod toxicity from sediment chemistry using logistic regression models. *Environmental Toxicology and Chemistry* 21: 1993-2005.

information on the ERA process can be found in the report, “Ecological Risk Assessment for the Bolsa Chica Lowlands Project” (CH2M HILL, 2002) that is briefly summarized below. The ERA identified the chemicals of ecological concern (COECs) on the site (1996 to 2000) based on their presence, concentration, and risk of adverse effects to fish and wildlife or their food sources at the site (Table 1).

These evaluations resulted in the development of a Hazard Quotient (HQ) for each contaminant for each of the representative plants or animals considered in the ERA. The HQ is a comparison of potential on-site exposure to the reference toxicity values (RTVs). If the potential exposure level exceeded the toxicity value it represented a level of concern, and the resulting HQ exceeded 1. Contaminants that resulted in HQs greater than 1 for any of the representative plants or animals were identified as COECs. COECs are the contaminants that were considered further for possible site clean-up.

A. COECs Not Selected for Cleanup

For 14 of the 47 COECs, a specific cleanup concentration was identified (shown in uppercase Bold in Table 1). Table 1 also lists the 33 other COECs for which no specific cleanup concentrations were developed (shown in lowercase bold in Table 1). These 33 analytes are considered equally important as the 14 that were carried forward for cleanup. However, for a variety of reasons, no cleanup concentrations were selected for these COECs. The decision to include or exclude a COEC from the cleanup suite of COECs was based on a consensus of the Technical Committee using the best professional judgment of the group after consideration of the following factors:

- ❖ Strongly Correlated with Other Analytes
- ❖ Low Detection Frequency
- ❖ Co-Location of Exceedances
- ❖ Lack of Appropriate RTVs
- ❖ Best Professional Judgment

Table 1. Analytes Sampled Between 1996 and 2000 (N=237)

Analytes that were not identified as COECs are shown in italics

Analytes that are COECs are bold

ANALYTES THAT HAVE CLEANUP GOALS ARE BOLD AND OUTLINED

<i>1,1,1,2-tetrachloroethane</i>	<i>1,1,1-trichloroethane</i>	<i>1,1,2,2-tetrachloromethane</i>
<i>1,1,2-trichloromethane</i>	<i>1,1-dichloroethane</i>	<i>1,1-dichloroethene</i>
<i>1,1-dichloropropene</i>	<i>1,2,3-trichlorobenzene</i>	<i>1,2,3-trichloropropene</i>
<i>1,2,4-trichlorobenzene</i>	<i>1,2,4-trimethylbenzene</i>	<i>1,2-dibromo-3-chloropropane</i>
<i>1,2-dibromoethane</i>	<i>1,2-dichlorobenzene</i>	<i>1,2-dichloroethane</i>
<i>1,2-dichloroethene (cis)</i>	<i>1,2-dichloroethene (total)</i>	<i>1,2-dichloroethene (trans)</i>
<i>1,2-dichloropropane</i>	<i>1,3,5-trimethylbenzene</i>	<i>1,3-dichlorobenzene</i>
<i>1,3-dichloropropane</i>	<i>1,3-dichloropropene (cis)</i>	<i>1,3-dichloropropene (trans)</i>
<i>1,4-dichlorobenzene</i>	<i>2,2-dichloropropane</i>	<i>2,3,7,8-TCDD</i>
<i>2,3,7,8-TCDF</i>	<i>2,4,5-T</i>	<i>2,4,5-TP (Silvex)</i>
<i>2,4,5-trichlorophenol</i>	<i>2,4,6-trichlorophenol</i>	<i>2,4-D</i>
<i>2,4-DB</i>	<i>2,4-dichlorophenol</i>	<i>2,4-dimethylphenol</i>
<i>2,4-dinitrophenol</i>	<i>2-butanone</i>	<i>2-chloroethyl vinyl ether</i>
<i>2-chlorophenol</i>	<i>2-chlorotoluene</i>	<i>2-hexanone</i>
<i>2-methylphenol</i>	<i>2-nitrophenol</i>	4,4'-DDD
4,4'-DDE	4,4'-DDT	<i>4,6-dinitro-2-methylphenol</i>
<i>4-chloro-3-methylphenol</i>	<i>4-chlorotoluene</i>	<i>4-isopropyltoluene</i>
<i>4-methyl-2-pentanone</i>	<i>4-methylphenol</i>	<i>4-nitrophenol</i>
acenaphthene	acenaphthylene	<i>acetone</i>
aldrin	<i>ammonia as nitrogen</i>	anthracene
<i>antimony</i>	ARSENIC 22mg/kg	<i>azinphos-methyl (Guthion)</i>
BARIUM 1000 mg/kg	<i>Baytex (Fenthion)</i>	<i>benzene</i>
benzo(a)anthracene	benzo(a)pyrene	benzo(b)fluoranthene
<i>benzo(e)pyrene</i>	<i>benzo(g,h,i)perylene</i>	<i>benzo(k)fluoranthene</i>
BERYLLIUM 10 mg/kg	<i>BHC-alpha</i>	<i>BHC-beta</i>
<i>BHC-delta</i>	<i>BHC-gamma</i>	<i>biphenyl</i>
<i>bis(2-ethylhexyl)phthalate</i>	<i>Bolstar</i>	<i>bromobenzene</i>
<i>bromochloromethane</i>	<i>bromodichloromethane</i>	<i>bromoform</i>
<i>bromomethane</i>	<i>butylbenzylphthalate</i>	cadmium
<i>carbon disulfide</i>	<i>carbon tetrachloride</i>	chlordan (technical)
chlordan-alpha	chlordan-gamma	<i>chloride</i>
<i>chlorobenzene</i>	<i>chloroethane</i>	<i>chloroform</i>
<i>chloromethane</i>	<i>chlorpyrifos</i>	CHROMIUM 110 mg/kg
chrysene	COBALT 21.5 mg/kg	COPPER 35 mg/kg
<i>Coumaphos</i>	<i>Dalapon</i>	<i>Demeton</i>
<i>Diazinon</i>	dibenz(a,h)anthracene	<i>dibenzothiophene</i>
<i>dibromochloromethane</i>	<i>dibromomethane</i>	<i>Dicamba</i>
<i>dichlorodifluoromethane</i>	<i>Dichloroprop</i>	<i>Dichlorvos</i>
dieldrin	<i>diesel Fuel #2</i>	<i>diethylphthalate</i>

<i>dimethoate</i>	<i>dimethylphthalate</i>	<i>di-n-butylphthalate</i>
di-n-octylphthalate	<i>Dinoseb</i>	<i>Disulfoton</i>
<i>endosulfan I</i>	<i>endosulfan II</i>	<i>endosulfan sulfate</i>
endrin	endrin aldehyde	endrin ketone
<i>EPN (ENT)</i>	<i>Ethoprop</i>	<i>ethylbenzene</i>
<i>Fensulfothion</i>	<i>Fenthion</i>	fluoranthene
fluorene	<i>gasoline</i>	<i>heptachlor</i>
<i>heptachlor epoxide</i>	<i>hexachlorobutadiene</i>	high MW PAHs
<i>indeno(1,2,3-c,d)pyrene</i>	<i>isopropylbenzene</i>	LEAD 96 mg/kg
low MW PAHs	<i>Malathion</i>	<i>MCPA</i>
<i>MCPP</i>	MERCURY 0.43 mg/kg	<i>Merphos</i>
<i>methoxychlor</i>	<i>methyl parathion</i>	<i>methylene chloride</i>
<i>Mevinphos</i>	<i>molybdenum</i>	<i>Monocrotophos</i>
<i>Naled</i>	naphthalene	<i>n-butylbenzene</i>
NICKEL 58.1 mg/kg	<i>nitrate as N</i>	<i>nitrate plus nitrite as N</i>
<i>nitrite as N</i>	<i>n-propylbenzene</i>	OIL AND GREASE 12873 mg/kg
<i>Parathion, ethyl</i>	<i>Parathion, methyl</i>	<i>PCB 008</i>
<i>PCB 018</i>	<i>PCB 028</i>	<i>PCB 044</i>
<i>PCB 052</i>	<i>PCB 066</i>	<i>PCB 101</i>
<i>PCB 1016</i>	<i>PCB 105</i>	<i>PCB 114</i>
<i>PCB 118</i>	<i>PCB 1221</i>	<i>PCB 123</i>
<i>PCB 1232</i>	<i>PCB 1242</i>	<i>PCB 1248</i>
<i>PCB 1254</i>	<i>PCB 126</i>	<i>PCB 1260</i>
<i>PCB 128</i>	<i>PCB 138</i>	<i>PCB 153</i>
<i>PCB 170</i>	<i>PCB 180</i>	<i>PCB 187</i>
<i>PCB 195</i>	<i>PCB 206</i>	<i>PCB 209</i>
<i>pentachlorophenol</i>	<i>perylene</i>	phenanthrene
<i>phenol</i>	<i>Phorate (Thimet)</i>	<i>phosphorus, total as P</i>
<i>phosphorus, total as PO4</i>	pyrene	<i>Ronnel</i>
<i>sec-butylbenzene</i>	selenium	silver
<i>styrene</i>	<i>sulfate</i>	<i>sulfide</i>
<i>Sulfotep</i>	<i>TEPH_wo_and_d</i>	<i>tert-butylbenzene</i>
<i>tetrachloroethene</i>	<i>tetrachlorvinphos</i>	thallium
<i>Tokuthion (Prothiophos)</i>	<i>toluene</i>	Total DDT
TEPH 1000 mg/kg	TOTAL PCB 0.282 mg/kg	<i>Total phenol</i>
<i>Total phthalate esters</i>	<i>Total volatile solids</i>	<i>toxaphene</i>
<i>TPH-diesel</i>	<i>trichloroethene</i>	<i>trichlorofluoromethane</i>
<i>trichloronate</i>	VANADIUM 135 mg/kg	<i>vinyl acetate</i>
<i>vinyl chloride</i>	<i>waste oil</i>	<i>xylene (m,p-)</i>
<i>xylene (o-)</i>	<i>xylene (total)</i>	ZINC 224 mg/kg

B. COECs Selected for Cleanup

Several alternative approaches were considered during the development of the suite of Cleanup Concentrations for the remaining 14 COECs ranging from more- to less-protective levels for fish or wildlife or their food sources. The selected approach resulted in the selection of either the: site-specific LC50 sediment/soil concentration for aquatic organisms; literature-derived, aquatic-based upper confidence interval for the T20 or lower confidence interval for the T50⁴. For nonaquatic organisms, literature-derived LOEC or NOEC, or default to twice the background concentrations (see Table two for values).

The Full Tidal Area is not the most contaminated area of the Bolsa Chica Lowlands. Thirty-six sites area been identified for clean-up. Most of the contaminated material that has been identified in the Full Tidal Area is below the designated “Haul-off Concentration.” The haul-off concentration designates the upper concentration limit for each analyte that is not appropriate for on-site burial or sequestering.

Table 2. Summary Table of Cleanup Values. All values in parts per million (mg/kg).

	Cleanup Goal	Source	Haul-off Concentration	Source	
Arsenic	19.9	LC20	210	ERMx3	No exceedances of Haul-off Concentration in Full Tidal Area
Barium	1000 (see note)	NOEC plant	3000 (see note)	NOECx3	Terrestrial Restoration Areas only, Does not apply in Full Tidal
Beryllium	10	LOEC plant	30	LOECx3	No exceedances of Haul-off Concentration in Full Tidal Area
Chromium	110	LC50	1110	ERMx3	No exceedances of Haul-off Concentration in Full Tidal Area
Cobalt	21.5	LC50	900	LOECx3	No exceedances of Haul-off Concentration in Full Tidal Area
Copper	32	T20	810	ERMx3	No exceedances of Haul-off Concentration in Full Tidal Area
Lead	84	LCI T50	654	ERMx3	No exceedances of Haul-off Concentration in Full Tidal Area
Mercury	0.43	LCI T50	1.42	ERMx2	Two areas in Full Tidal Area exceed Haul-off Concentration
Nickel	58.1	LC50	103.2	ERMx3	Four areas in Full Tidal Area exceed Haul-off Concentration
Oil and Grease	12873	LC50	38619	LC50x3	No exceedances of Haul-off Concentration in Full Tidal Area
Total PCB	0.282	LCI T50	0.36	ERMx2	No exceedances of Haul-off Concentration in Full Tidal Area
TPHDWO	1000				
Vanadium	135	LC50	405	LC50x3	No exceedances of Haul-off Concentration in Full Tidal Area
Zinc	224	LCI T50	1230	ERMx3	No exceedances of Haul-off Concentration in Full Tidal Area

C. Sampling History

Several sampling efforts have been completed, each increasing the overall number of sample locations based on the known history of the site and the results of previous sampling efforts. All

results have been considered and were included in the Ecological Risk Assessment. Within the Full Tidal Area, sampling locations were based on a systematic grid as well as on known or suspected contamination areas. Additional delineation sampling was conducted in 2004 to further define the boundaries on points of contamination outside the dredge footprint, but inside the Full Tidal Area.

III. Contaminated Sediments

A. Particle Size Mapping and Contaminant Sampling Results

Figure 3 depicts the areas of the dredge footprint where more than 30 or 40 percent silt or clay was found. Some areas of the dredge footprint were delineated as unsuitable for discharge to the ocean for ebb shoal construction and were labeled as “excluded” from that use. This was done to assure that the net discharge of material for construction of the ebb shoal would not be less than 80% sand.

Figure 4 includes the point locations within the FTA where a contaminant exceeded the cleanup goal. Since the sample locations within the dredge footprint are dense and systematically arrayed, no further delineation was conducted and the area and volume of contamination to be cleaned up was considered to be included within the depicted rectangles or polygons. The red rectangles depict surface contamination only and the corners were determined by a circle of 100-foot (30m) radius from the point of contamination. The Subsurface contamination was defined as half the distance to the next nearest clean point and to the bottom of the dredge cut, although no contamination was found at that depth.

B. Excluded Zones and Areas of Contamination

Contaminated areas of the FTA are designated in the final grading plans and on Figure 2 of this document. Co-mingling of clean and contaminated material during excavation is to be avoided, as managed and inspected pursuant to the specifications. Also, co-mingling of contaminated material and dewatering water will be avoided as described in the dewatering plan. Surface contamination gathered during the clear and grub phase will be separated from other debris and placed in the designated areas for contaminated material.

IV. Construction Constraints Related to Contamination

A. Clearing and Grubbing

Clearing shall consist of the felling, trimming and cutting vegetation into sections and the satisfactory disposal of the vegetation designated for removal. Grubbing shall consist of the

removal and disposal of small stumps, roots larger than three-inches in diameter, and matted roots from the designated grubbing areas. The designated grubbing areas include the entirety of the dredge footprint which is shown on Figure 2. It will also include areas indicated as construction areas, such as areas for structures and areas to be paved. Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18-inches below the original ground surface. Depressions made by grubbing shall be filled with suitable, uncontaminated material and compacted to make the surface conform to the adjacent surface. Sediment resulting from grubbing within contaminated areas shall be segregated and placed in areas shown on the drawings for contaminated materials.

B. Surface and Subsurface Contamination

Most of the contamination found throughout the overall project area including the FTA consists of shallow surface contamination. The extent and nature of the contaminated materials within the FTA are shown on Figures 5 through 15. Surface contamination will generally be removed to the top 0.5 feet unless otherwise specified in Section VI. Subsurface contamination within the dredge footprint will generally be removed to the depth of the final grade (typically 6 ft). No contamination exceeding cleanup concentrations were found at the depth of the final grade, hence, this approach is more than sufficient. Outside of the dredge footprint, subsurface contamination will be removed to a depth where clean soils were identified.

C. Unsuspected Contamination Uncovered during Engineering Activities

On-site contractors will identify any areas of suspected contamination uncovered during the construction activities. Excavation of previously unidentified impacted soil and removal to an appropriate area designated for handling of contaminated materials. Limits of required excavations (depth and lateral extent) shall be determined in the field and verified by the Environmental Consultant.

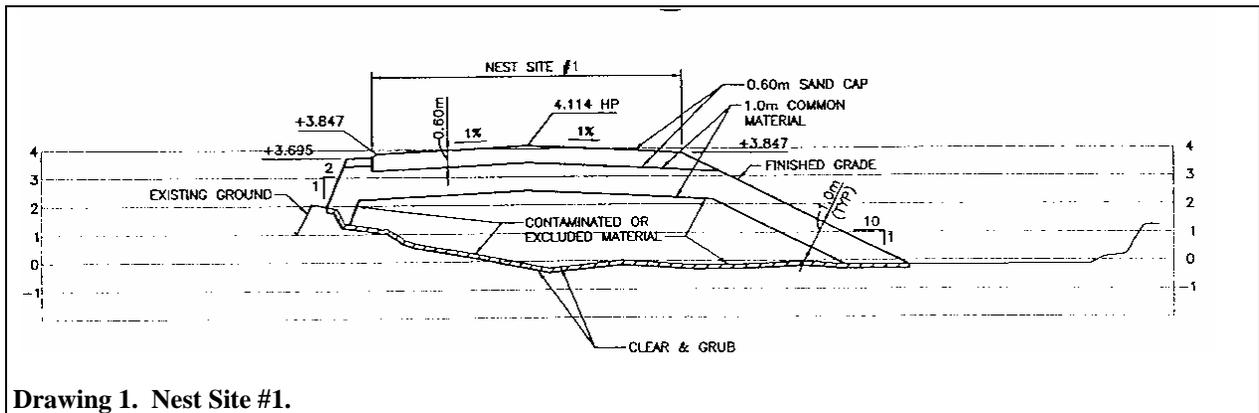
D. Contaminated Material Excavation

Contaminated materials will be segregated from other material types in such a way as to avoid mixing during excavation, transporting and filling operations. Contaminated material stockpiles shall be covered and protected from erosion. A buffer zone of no less than 25 meters shall be maintained around suspected or known contaminated areas until testing procedures can define a more precise interface between contaminated areas and non-contaminated areas. Contractor shall anticipate that discovery of contaminated areas as the work progresses may cause a disruption of operations and plan accordingly.

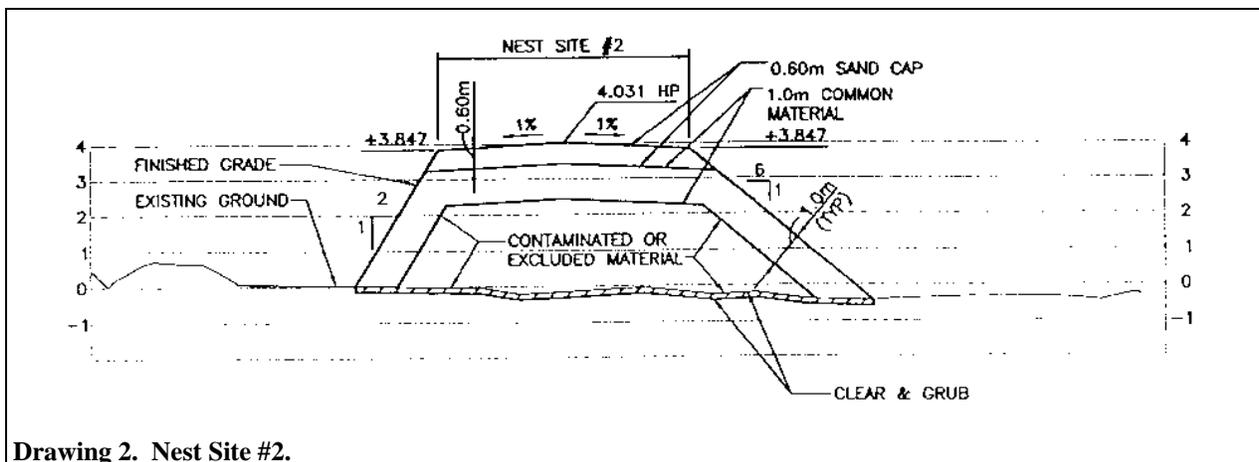
E. Use of Contaminated Material Onsite

The use of contaminated materials shall be limited to placement within the core sections of levees and other embankments including nesting islands. Embankments shall be carefully constructed as necessary to ensure complete encasement of contaminated materials providing clear cover with common materials or uncontaminated excluded materials no less in thickness than 1.0 meter.

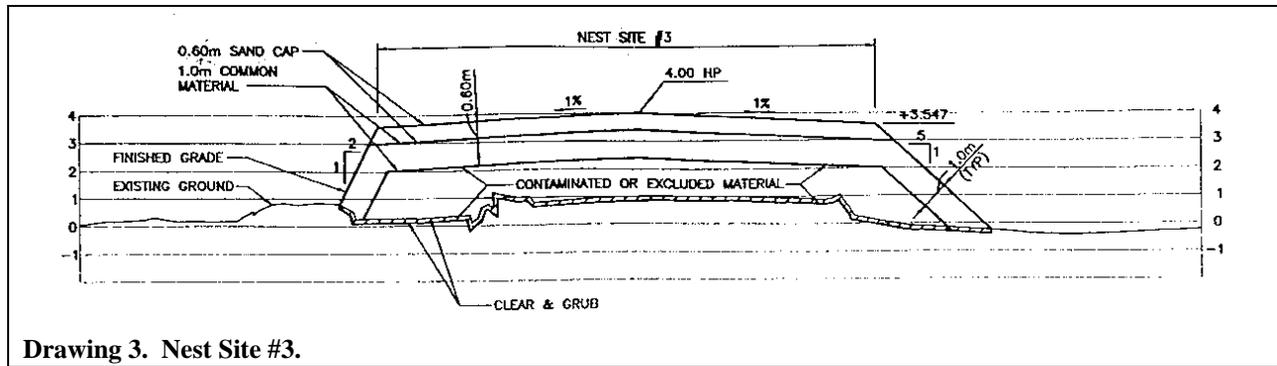
All contaminated material originating from the FTA will be placed into the core of an FTA levee or core of nest sites 1, 2, or 3 in the manner as shown on the drawings (C67, C73 and C74). Most of the material will be placed within the large nest site 1. Embankments shall be carefully constructed as necessary to ensure complete encasement of contaminated materials providing clear cover with common materials or uncontaminated excluded materials no less in thickness than 1.0 meter. The contaminated material is to be placed in 0.20 m lifts. The specifications include manner of placement, compaction, and encasement. Typical drawings for contaminated material placement are shown in Drawings 1-6.



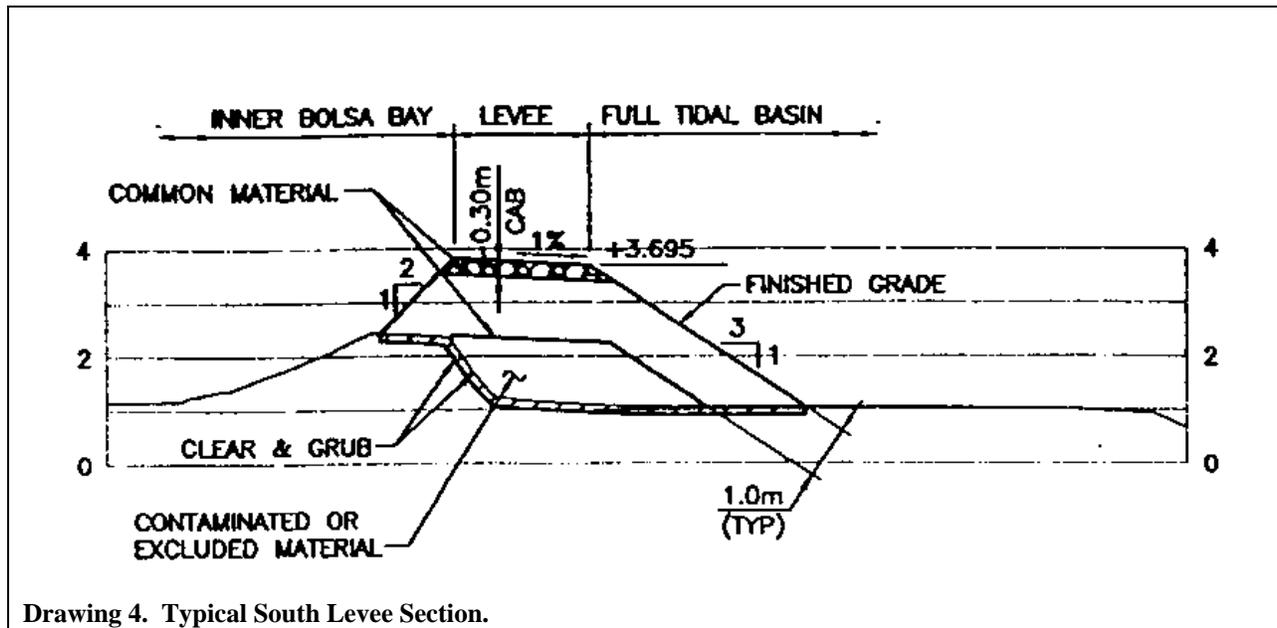
Drawing 1. Nest Site #1.



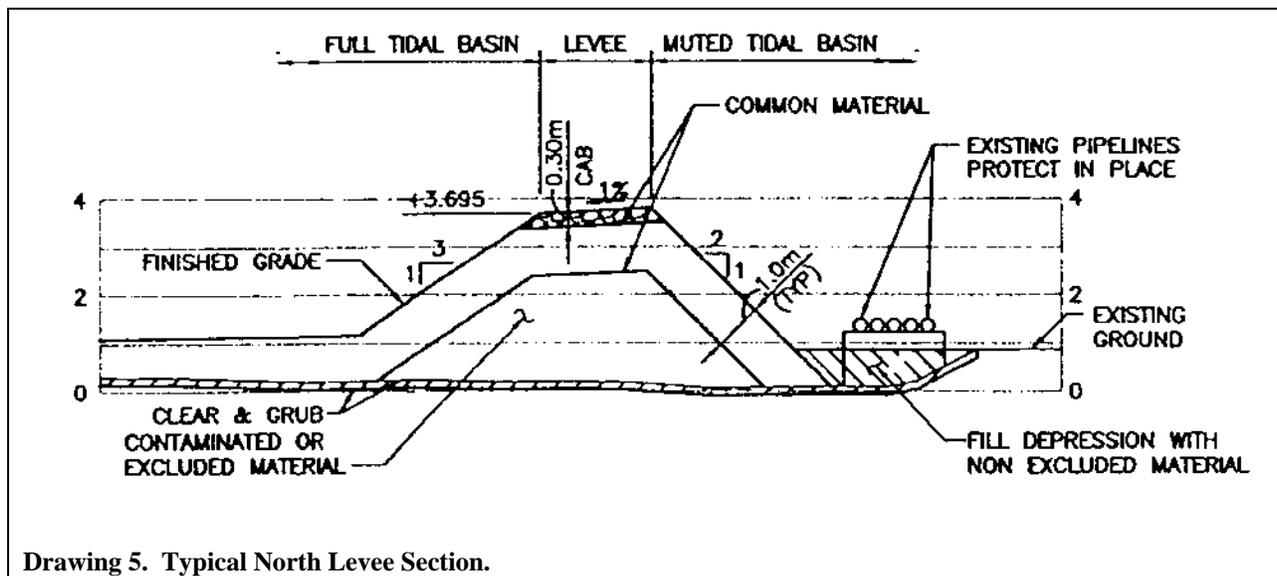
Drawing 2. Nest Site #2.



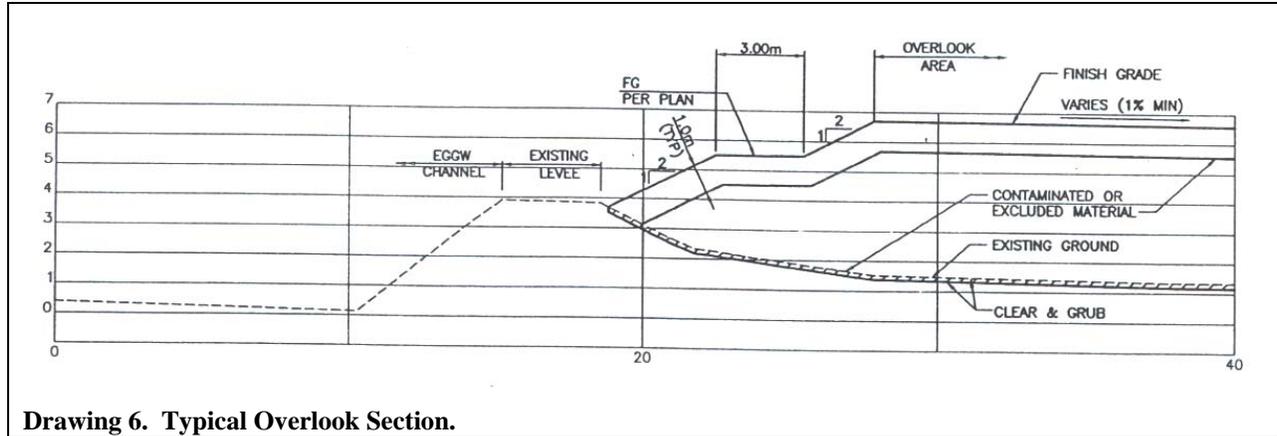
Drawing 3. Nest Site #3.



Drawing 4. Typical South Levee Section.



Drawing 5. Typical North Levee Section.



F. Site Dewatering Plan – See Appendix C

V. Compliance with Cleanup Plan and other Environmental Concerns

A. Oversight

The Service will have a full-time resident engineering contract manager and part-time presence of the Project Manager to assure compliance with the Project plans and specifications and to deal with unpredicted circumstances, should they occur. The Service will also have a full-time Construction Management contractor to assist with the implementation of the construction contract. The Construction Contractor will have safety and health compliance managers and environmental compliance managers. The Environmental Protection Section 01355 describes general oversight, plans, and procedures. Specifically, the construction contractor is to have a third-party Environmental Consultant for compliance and tracking of contaminated material. The third-part environmental consulting firm contracted by the Contractor will oversee the mass grading on the project site to ensure all operations are consistent with the contaminated material removal plans set forth in this document and in the engineering documents. More importantly, the Regional Water Quality Control Board representative is expected to review and oversee the cleanup plan implementation and compliance.

B. Verification Sampling

No verification sampling will be conducted within the dredge footprint areas excavated to 6 feet or greater. Throughout the Full Tidal area, no exceedances of cleanup concentrations were found below this depth. Since the Dredge area will be entirely excavated to dredge depths, including contaminated and uncontaminated material, exceedances of cleanup concentrations at the new ground surface at 6 feet or greater are believed to be unlikely.

Verification sampling will be conducted throughout the remainder of the cleanup area for the contaminants listed at that site. A combination of field techniques and laboratory techniques will be used, as appropriate (see Appendix A). Verification sampling will be done to test for the constituent that was being removed to the levels of the cleanup concentrations or below. Testing shall be done by the Contractor. Testing shall be by accepted methods either using field techniques (up to 90% of samples) verified by analysis with an accredited laboratory (a minimum of 10% of the samples). The test shall be conducted at five locations within each identified site for every 1,000 yd³ of excavated material. At a minimum, north, south, east and west extremity and center locations of the cleanup area will be tested. Where more than 5 samples are collected, sample locations will be placed more frequently along the extremities of the cleanup area. See Table 39 for summary of verification sampling by site. Results shall be provided to the Project.

Additional cleanup shall be conducted if verification sampling indicates that cleanup goals were not realized.

VI. Cleanup Strategy

A. Delineation of Contamination Boundaries

The previous studies including the delineation sampling, culminated in a three-dimensional delineation boundary around each contaminated facility, feature or single point location within the Full Tidal area of the Bolsa Chica Lowlands. The delineation boundary defines the areal extent (horizontal and vertical) of concentrations of contaminants of ecological concern that exceed delineation/cleanup concentrations.

The Ecological Risk Assessment established that contamination present in the Bolsa Chica wetlands is generally at moderate levels, below human health concerns. Within the Full Tidal area, contamination was categorized in one of the following ways:

- ❖ Within the Dredge Footprint component of the Full Tidal area, sediment quality and sediment characteristics (percent silt, percent sand, percent clay) were evaluated to determine suitability for placement in the ebb shoal. Most of the evaluated sediments were determined to be suitable for placement in the ebb shoal based on the data collected prior to 2004 and no additional evaluation or cleanup was conducted.
- ❖ Within the Dredge Footprint component of the Full Tidal area, sediments that were either physically unsuitable (not enough sand) or contained contaminants at levels that remained of concern were categorized as “excluded areas” within the dredge footprint. The contaminated sediments in the “excluded areas” will be removed from their current location and either sequestered in a berm or nesting island, or removed from the site to an appropriate disposal area as follows. Generally, the horizontal boundaries of surface and subsurface contamination were defined by a square placed within a circle of 100-foot (30m) radius, from the

point of contamination. Thus, the areas and volume of material assumed to be contaminated in our grading plans is probably greater than the actual areas of contamination. Where additional sampling data showed “clean” locations within this “square,” boundaries were adjusted as appropriate (see section VI.) In all cases, delineation sampling results indicated that this approach was more than adequate to contain all known contaminated sediments.

- ❖ Outside of the Dredge Footprint, numerous point locations were identified that had surface contamination (0 to 0.5 feet) that exceeded delineation/cleanup concentrations. During the clear and grub operation, material from these sites will be removed to 0.5 feet. However, additional sampling was conducted just below each of these points from (0.75 feet to 1.25 feet) to ascertain whether the contamination extended into the Subsurface. Within the Full Tidal area, most point locations with only surface contamination had No subsurface contamination (75% of sites; sampling results for these sites shown in Tables 3 through 38). Thus, the horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius, from the point of contamination. Where Subsurface contamination is present, the horizontal boundaries were demarked similarly, however, the vertical boundaries extended to the bottom of the excavation. Thus, the areas and volume of material assumed to be contaminated in our grading plans is probably greater than the actual areas of contamination. In all cases, delineation sampling results indicated that this approach was more than adequate to contain all known contaminated sediments.
- ❖ Both within and outside the Dredge Footprint, several sites having contamination that exceeds haul-off concentrations were identified. For these sites, contaminated material will be excavated to specified depths (see Tables 20, 22, 28, 29 and 34) and removed from site to an appropriate landfill.
- ❖ One additional site (B_18_0.5), located within the area to be moved to the ebb shoal (see (1) above) was resampled to determine if surface contamination (0.03 ppm 4, 4' DDT) extended into the Subsurface at concentrations of concern. No additional Subsurface DDT concentrations at levels of concern were detected at this site (see Table 35).
- ❖ Generally, the horizontal boundaries of surface and subsurface contamination were defined by a square placed within a circle of 100-foot (30m) radius, from the point of contamination. Thus, the areas and volume of material assumed to be contaminated in our grading plans is probably greater than the actual areas of contamination. Also, most of the contamination in the FTA is TPH and wherever oil is encountered it will be excavated and removed. A field test for fast and reliable verification of successful cleanup of TPH will also be employed during excavation of identified FTA cleanup areas, as well as unexpected discoveries of TPH during the FTA construction.

B. Site-Specific Cleanup Criteria

Results in **BOLD Red text** exceed the cleanup concentration for this analyte

Table 3. Sample Location CAR_14_1A, TPHDWO, Figure 5

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified.

Verification Sampling: 5 samples

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth: None

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000
58	Cleanup Agreement and Release Sampling	CAR_14_1A	Mar-00	0	0.5	ft	1010
58	Delineation Sampling	DS_CAR_14_1	Nov-03	9	15	in	390

Table 4. Sample Location FOPC0201_1, TPHDWO, Figure 5

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location except that the circle is constrained by three “clean” sample locations and the boundary of the Full Tidal area. Material will be excavated to 0.15m. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified.

Verification Sampling: 5 samples

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth: None

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000
51	Focused Sampling	FOPC0201-1	Apr-99	0	0.5	ft	1239
51	Random Sampling	R51C1-1	Apr-99	0	0.5	ft	128.2
51	Random Sampling	R51C1-2	Apr-99	2.5	6	ft	87
51	Delineation Sampling	DS_PC02_1	Nov-03	9	15	in	83

Table 5. Sample Location CAR_20_2A, TPHDWO, Figure 6

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified.

Verification Sampling: 5 samples
 Surface Excavation Depth: 0.5 feet
 Subsurface Excavation Depth: None

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000
58	Cleanup Agreement and Release Sampling	CAR_20_2A	Feb-00	0	0.5	ft	2385
58	Delineation Sampling	DS_CAR_20_2	Nov-03	9	15	in	31

Table 6. Sample Location CAR_27_1A, TPHDWO, Dredge Footprint, Figure 6

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location except that the circle is constrained by one “clean” sample location. Contaminated material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified. After contaminated material is removed, this site will be excavated to dredge depth (6 feet).

Verification Sampling: None (will be over excavated to 6 feet within the dredge footprint)
 Surface Excavation Depth: 0.5 feet
 Subsurface Excavation Depth: Dredge Depth

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	Pb 96
59	Cleanup Agreement and Release Sampling	CAR_27_1A	4/18/2000	0	0.5	ft	99
59	Cleanup Agreement and Release Sampling	CAR_27_1B	4/18/2000	2.5	6	ft	3.3
59	Cleanup Agreement and Release Sampling	CAR_27_2A	4/18/2000	0	0.5	ft	15
59	Cleanup Agreement and Release Sampling	CAR_27_2B	4/18/2000	2.5	6	ft	1.5

Table 7. Sample Location CAR_28_1A, TPHDWO, Dredge Footprint, Figure 6

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified. After contaminated material is removed, this site will be excavated to dredge depth (6 feet).

Verification Sampling: None (will be over excavated to 6 feet within the dredge footprint)
 Surface Excavation Depth: 0.5 feet
 Subsurface Excavation Depth: Dredge Depth

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000
60	Cleanup Agreement and Release Sampling	CAR_28_1A	Mar-00	0	0.5	ft	1005
60	Delineation Sampling	DS_CAR_28	Nov-03	9	15	in	220
60	Tetra Tech Phase II	B51-0.5		0	1	ft	--

Table 8. Sample Location B-50-0.5, Copper, Figure 7

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location except that the circle is constrained by two “clean” sample locations. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified.

Verification Sampling: 5 samples
 Surface Excavation Depth: 0.5 feet
 Subsurface Excavation Depth: None

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	Cu 35
44	Tetra Tech Phase II	B-50-0.5		0	1	ft	35.5
44	Cleanup Agreement and Release Sampling	CAR_41_1A	3/23/2000	0	0.5	ft	6.2
44	Cleanup Agreement and Release Sampling	CAR_41_2A	3/23/2000	0	0.5	ft	11
44	Cleanup Agreement and Release Sampling	CAR_41_2B	3/23/2000	2.5	6	ft	3.7
44	Cleanup Agreement and Release Sampling	CAR_41_1B	3/23/2000	2.5	6	ft	3.3

Table 9. Sample Location EO_03A, TPHDWO, Dredge Footprint, Figure 7

The horizontal boundaries of surface and subsurface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location. Surface material will be excavated to 0.5 feet. Subsurface material will be excavated to 2 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. After contaminated material is removed, this site will be excavated to dredge depth (6 feet).

Verification Sampling: None (will be over excavated to 6 feet within the dredge footprint)
 Surface Excavation Depth: 0.5 feet
 Subsurface Excavation Depth: 2 feet for contaminated soils, then dredge depth

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000
06	Partially Characterized Sampling	EO_03A	5/2/2000	0	2	ft	1350

Table 10. Sample Location DC34-1, TPHDWO, Dredge Footprint, Figure 7

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location except that the circle is constrained by two “clean” sample locations. Surface material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified. After contaminated material is removed, this site will be excavated to dredge depth (6 feet).

Verification Sampling: None (will be over excavated to 6 feet within the dredge footprint)

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth: Dredge Depth

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000	Cobalt 21.5
17	Dredge Sampling	DC34-1	2/24/1999	0	1.95	ft	1035	23
17	Dredge Sampling	DC34-2	2/24/1999	1.95	4.97	ft	--	3.2

Table 11. Sample Location CAR_31_2A, TPHDWO, Figure 8

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location except that the circle is constrained by the boundaries of the Full Tidal Area. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified.

Verification Sampling: 5 samples

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth: None

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000
62	Cleanup Agreement and Release Sampling	CAR_31_2A	Aug-00	0	0.5	ft	1150
62	Cleanup Agreement and Release Sampling	CAR_31_2B	Aug-00	2.5	6	ft	37
62	Delineation Sampling	DS_CAR_207_1	Nov-03	9	15	in	810
62	Delineation Sampling	DS_CAR_31	Nov-03	9	15	in	800

Table 12. Sample Location EO_02A, TPHDWO, Dredge Footprint, Figure 8

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location. Surface material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified. After contaminated material is removed, this site will be excavated to dredge depth (6 feet).

Verification Sampling: None (will be over excavated to 6 feet within the dredge footprint)

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth: Dredge Depth

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000
06	Partially Characterized Sampling	EO_02A	5/2/2000	0	0.5	ft	1760
06	Cleanup Agreement and Release Sampling	CAR_39_1A	2/3/2000	0	0.5	ft	352
06	Cleanup Agreement and Release Sampling	CAR_39_1B	8/8/2000	2.5	6	ft	39
06	Cleanup Agreement and Release Sampling	CAR_39_2A	2/3/2000	0	0.5	ft	113
06	Cleanup Agreement and Release Sampling	CAR_39_2B	8/7/2000	2.5	6	ft	39

Table 13. Sample Location SS-61, Barium, Figure 8

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location. Surface material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified.

Verification Sampling: 5 samples

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth: None

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	Barium 1000
06	Dredge Sampling	SS-61	2/24/1999	0	0.5	ft	5820

Table 14. Sample Location CAR_38_2A, TPHDWO, Figure 8

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified.

Verification Sampling: 5 samples

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth: None

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000
06	Cleanup Agreement and Release Sampling	CAR_38_2A	Mar-00	0	0.5	ft	2245
06	Delineation Sampling	DS_CAR_38_2A_1A	Dec-03	30	36	in	20.5
06	Delineation Sampling	DS_CAR_38_2A_1B	Dec-03	66	72	in	37
06	Delineation Sampling	DS_CAR_38_2A_2A	Dec-03	30	36	in	16.7
06	Delineation Sampling	DS_CAR_38_2A_2B	Dec-03	66	72	in	36
06	Delineation Sampling	DS_CAR_209_1	Dec-03	30	36	in	41
06	Delineation Sampling	DS_CAR_38_2A_3A	Dec-03	30	36	in	39
06	Delineation Sampling	DS_CAR_38_2A_3B	Dec-03	66	72	in	36

Table 15. Sample Location CAR_37_1A, TPHDWO, Figure 8

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location except that the circle is constrained by one "clean" sample location. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent

sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified.

Verification Sampling: 5 samples
 Surface Excavation Depth: 0.5 feet
 Subsurface Excavation Depth: None

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	Barium 1000
04	Cleanup Agreement and Release Sampling	CAR_37_1A	4/26/2000	0	0.5	ft	1200
04	Cleanup Agreement and Release Sampling	CAR_37_1B	4/26/2000	2.5	6	ft	25.9
04	Cleanup Agreement and Release Sampling	CAR_37_2A	4/26/2000	0	0.5	ft	51
04	Cleanup Agreement and Release Sampling	CAR_37_2B	4/26/2000	2.5	6	ft	29.8

Table 16. Sample Location BS_41_0.5_HA, Copper and Lead, Figure 9

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location except that the circle is constrained by two “clean” sample locations. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified.

Verification Sampling: 5 samples
 Surface Excavation Depth: 0.5 feet
 Subsurface Excavation Depth: None

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	Cu 35	Pb 96
44	Tetra Tech Phase II	BS-41-0.5-HA	(blank)	0	0.5	ft	39.5	122
44	Delineation Sampling	DS_BS_41	Nov-03	9	15	in	7.27	4.13
44	Partially Characterized Sampling	S_D_01A	4/25/2000	0	0.5	ft	9.2	14
44	Partially Characterized Sampling	S_D_01B	4/25/2000	2.5	3	ft	6.1	3.3
44	Partially Characterized Sampling	S_D_01C	4/25/2000	5.5	6	ft	7.6	2.5

Table 17. Sample Location EO_05A, Lead, Figure 9

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location except that the circle is constrained by two “clean” sample locations. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified.

Verification Sampling: 5 samples
 Surface Excavation Depth: 0.5 feet
 Subsurface Excavation Depth: None

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	Pb 96
44	Partially Characterized Sampling	EO_05A	May-00	0	0.5	ft	131
44	Delineation Sampling	DS_CAR_201_1	Nov-03	9	15	in	4.51
44	Delineation Sampling	DS_EO_05	Nov-03	9	15	in	6.47
44	Cleanup Agreement and Release Sampling	CAR_52_3A	3/24/2000	0	0.5	ft	11
44	Cleanup Agreement and Release Sampling	CAR_52_3B	3/24/2000	2.5	6	ft	6.2

Table 18. Sample Location CAR_60_1A, Dredge Footprint, Copper, Figure 10

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location except that the circle is constrained by one “clean” sample location. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified. After contaminated material is removed, this site will be excavated to dredge depth (6 feet).

Verification Sampling: None (will be over excavated to 6 feet within the dredge footprint)
 Surface Excavation Depth: 0.5 feet
 Subsurface Excavation Depth: Dredge Depth

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	Cu 35
16	Cleanup Agreement and Release Sampling	CAR_60_1A	3/27/2000	0	0.5	ft	46
16	Cleanup Agreement and Release Sampling	CAR_60_1B	3/27/2000	2.5	6	ft	4.9
16	Cleanup Agreement and Release Sampling	CAR_60_2A	3/27/2000	0	0.5	ft	31
16	Cleanup Agreement and Release Sampling	CAR_60_2B	3/27/2000	2.5	6	ft	7.6

Table 19. Sample Location CAR_59_1A, Sample Location CAR_59_2A, and Sample Location RD_07_01, TPHDWO, Figure 10

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location. Two locations were merged to create these boundaries. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified.

Verification Sampling: 5 samples
 Surface Excavation Depth: 0.5 feet
 Subsurface Excavation Depth: None

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000
07	Cleanup Agreement and Release Sampling	CAR_59_1A	Mar-00	0	0.5	ft	4910
07	Random Follow Up Sampling	RD_07_01	Jan-00	0	0.5	ft	16900
07	Cleanup Agreement and Release Sampling	CAR_59_2A	Mar-00	0	0.5	ft	4480
07	Delineation Sampling	DS_CAR_59_1	Nov-03	9	15	in	370
07	Delineation Sampling	DS_RD_07_01	Nov-03	9	15	in	19.4
07	Delineation Sampling	DS_CAR_59_2	Nov-03	9	15	in	41
07	Cleanup Agreement and Release Sampling	CAR_59_1B	8/28/2000	2.5	6	ft	39
07	Cleanup Agreement and Release Sampling	CAR_59_2B	8/28/2000	2.5	6	ft	41

Table 20. Sample Location CAR_67_1A, TPHDWO, Figure 11

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location except that the circle is constrained by a “clean” sample location. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified.

Verification Sampling: 5 samples
 Surface Excavation Depth: 0.5 feet
 Subsurface Excavation Depth: None

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000
03	Cleanup Agreement and Release Sampling	CAR_67_1A	Feb-00	0	0.5	ft	2861.2
03	Delineation Sampling	DS_CAR_67_1	Nov-03	9	15	in	46
03	Focused Sampling	F3R-1-1	10/30/1998	0	0.5	ft	809
03	Focused Sampling	F3R-1-2	10/30/1998	2.5	3	ft	ND*
03	Focused Sampling	F3R-1-3	10/30/1998	5.5	6	ft	ND*

*TPH-Diesel ND

Table 21. Sample Location CAR_68_1B, Sample Location CAR_68_2A and Sample Location F3R-2-1, TPHDWO and Arsenic, Figure 11

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of each of the surface sample locations. Two locations were merged to create these boundaries. Material will be excavated to 0.5 feet. Subsurface contamination is also present and will be removed as noted on Figure 11 from the surface to 6 feet (72”). Contaminated materials will be kept segregated from common material and will be

moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above.

Verification Sampling: 15 samples

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth: 6 feet

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000	As 22
03	Cleanup Agreement and Release Sampling	CAR_68_1B	Feb-00	2.5	6	ft		22.4
03	Cleanup Agreement and Release Sampling	CAR_68_1B	Aug-00	2.5	6	ft	21200	
03	Cleanup Agreement and Release Sampling	CAR_68_2A	Feb-00	0	0.5	ft	1829.1	
03	Focused Sampling	F3R-2-1	Oct-98	0	0.5	ft	1565	
03	Delineation Sampling	DS_F3R_2	Nov-03	9	15	in	7900	
03	Delineation Sampling	DS_CAR_68_2	Nov-03	9	15	in	1760	
03	Delineation Sampling	DS_CAR_200_1	Nov-03	9	15	in	1510	
03	Delineation Sampling	DS_CAR_68_1B_1A	Dec-03	30	36	in	18.2	2.9
03	Delineation Sampling	DS_CAR_211_1	Dec-03	30	36	in	36	1.2
03	Delineation Sampling	DS_CAR_68_1B_1B	Dec-03	54	60	in	20	0.75
03	Delineation Sampling	DS_CAR_68_2A_1	Jan-04	9	15	in	186	
03	Delineation Sampling	DS_CAR_68_2A_2	Jan-04	9	15	in	9.9	
03	Delineation Sampling	DS_CAR_68_2A_3	Jan-04	9	15	in	380	
03	Delineation Sampling	DS_F3R_2_1_1	Jan-04	9	15	in	94	
03	Delineation Sampling	DS_F3R_2_1_2	Jan-04	9	15	in	720	

Table 22. Sample Location RD_03_02, Copper and Nickel, Figure 11

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location. Contamination at this location exceeds the Haul-off Concentration for Nickel. Material will be excavated to 0.75 feet. Contaminated material will be segregated and hauled off-site. No subsurface contamination identified.

Verification Sampling: 5 samples

Surface Excavation Depth: 0.75 feet

Subsurface Excavation Depth: None

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	Cu 35	Ni 58.1
03	Random Follow Up Sampling	RD_03_02	Apr-00	0	0.5	ft	94	160
03	Delineation Sampling	DS_RD_03_02	Nov-03	9	15	in	21.8	24.2
03	Delineation Sampling	DS_RD_03_02_1E	6/8/2004	0	1	ft		34.5
03	Delineation Sampling	DS_RD_03_02_1N	6/8/2004	0	1	ft		24.4
03	Delineation Sampling	DS_RD_03_02_1S	6/8/2004	0	1	ft		13.1
03	Delineation Sampling	DS_RD_03_02_1W	6/8/2004	0	1	ft		14.4

Table 23. Sample Location RD_03_03, TPHDWO, Figure 11

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified.

Verification Sampling: 5 samples

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth: None

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000
03	Random Follow Up Sampling	RD_03_03	Apr-00	0	0.5	ft	1700
03	Delineation Sampling	DS_RD_03_03	Nov-03	9	15	in	25.1

Table 24. Sample Location DCMN3-1, DCRDA0308-1, CAR_76_4B, CAR_76_1A&B, Dredge Footprint, Figure 11

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of each of the surface sample locations. Three locations were merged to create these boundaries. The mercury contamination at site DCRDA0308 exceeds the “haul-off” concentration, therefore, within the horizontal boundaries established based on DCRDA0308-1 sampling including delineation sampling, material will be excavated to 3.34 feet and hauled off-site. Similarly, the mercury contamination at site CAR_76_1A exceeds the “haul-off” concentration, therefore, within the horizontal boundaries established based on CAR_76_1A sampling including the delineation sampling, material will be excavated to 1.0 feet and hauled off-site. The remaining surface material will be excavated to 0.5 feet. Subsurface contamination is also present and will be removed as noted on Figure 11 from the surface to 3.34 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. After contaminated material is removed, this site will be excavated to dredge depth (6 feet).

Verification Sampling: None (will be over excavated to 6 feet within the dredge footprint)

Surface Excavation Depth DCRDA0308 haul-off area: 3.34 feet (haul-off exceedance)

Surface Excavation Depth CAR_76_1A haul-off area: 1.0 feet (haul-off exceedance)

Surface Excavation Depth Remainder: 0.5 feet

Subsurface Excavation Depth: 3.34 feet for contaminated material, then to Dredge Depth

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	Cu 35	Pb 96	Hg 0.43	Ni 58.1	Oil and Grease 12873	TPH DWO 1000
03	Dredge Sampling Exc to 3.34 ft	DCRDA0308-1	2/26/1999	0	3.3 4	ft	45	140	2.5	72	15000	12200
03	Cleanup Agreement and Release Sampling Exc to 1.0 ft	CAR_76_1A	4/26/2000	0	0.5	ft	19	34	3.4	17	960	600
03	Cleanup Agreement and Release Sampling	CAR_76_4A	4/26/2000	0	0.5	ft	9	8.3	0.054	11	660	730
03	Cleanup Agreement and Release Sampling	CAR_76_1B	4/26/2000	2.5	6	ft	8.4	8.2	0.25	10.7		2260
03	Cleanup Agreement and Release Sampling	CAR_76_4B	4/26/2000	2.5	6	ft	22.2	31.5	0.26	24.1		7700
08	Dredge Sampling	DCMN3-1	12/16/1998	0	3.1	ft	21	45	0.095	90	7700	990
08	Dredge Sampling	DCMN3-2	12/16/1998	3.1	8.1	ft	5.3		ND	9.6		ND
03	Delineation Sampling	DS_CAR_76_1A_1A	6/9/2004	1	2	ft			<0.02			
03	Delineation Sampling	DS_CAR_76_1A_XA	6/9/2004	1	2	ft			<0.02			
03	Delineation Sampling	DS_CAR_76_1A_1B	6/9/2004	2	3	ft			0.03			
03	Delineation Sampling	DS_CAR_76_1A_EA	6/10/2004	1	2	ft			<0.02			
03	Delineation Sampling	DS_CAR_76_1A_EB	6/10/2004	2	3	ft			0.12			
03	Delineation Sampling	DS_CAR_76_1A_SA	6/10/2004	1	2	ft			<0.02			
03	Delineation Sampling	DS_CAR_76_1A_SB	6/10/2004	2	3	ft			<0.02			
03	Delineation Sampling	DS_CAR_76_1A_WA	6/9/2004	1	2	ft			<0.02			
03	Delineation Sampling	DS_CAR_76_1A_WB	6/9/2004	2	3	ft			<0.02			
03	Delineation Sampling	DS_RD_0308_1A_1A	6/9/2004	1	2	ft			0.38			
03	Delineation Sampling	DS_RD_0308_1A_1B	6/9/2004	2	3	ft			0.15			
03	Delineation Sampling	DS_RD_0308_1A_EA	6/9/2004	1	2	ft			<0.02			
03	Delineation Sampling	DS_RD_0308_1A_EB	6/9/2004	2	3	ft			0.03			
03	Delineation Sampling	DS_RD_0308_1A_EC	6/9/2004	3	4	ft			0.55			
03	Delineation Sampling	DS_RD_0308_1A_NA	6/9/2004	1	2	ft			<0.02			
03	Delineation Sampling	DS_RD_0308_1A_NB	6/9/2004	2	3	ft			0.04			
03	Delineation Sampling	DS_RD_0308_1A_NC	6/9/2004	3	4	ft			0.36			
03	Delineation Sampling	DS_RD_0308_1A_SA	6/9/2004	1	2	ft			<0.02			
03	Delineation Sampling	DS_RD_0308_1A_SB	6/9/2004	2	3	ft			<0.02			
03	Delineation Sampling	DS_RD_0308_1A_WA	6/9/2004	1	2	ft			0.06			
03	Delineation Sampling	DS_RD_0308_1A_WB	6/9/2004	2	3	ft			<0.02			

Table 25. Sample Location FORB42-1, CAR_76_2B, DCRDA0309-1, Dredge Footprint, TPHDWO, Figure 11

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of each of the surface sample locations. Three locations were merged to create these boundaries. Surface material will be excavated to 0.5 feet. Subsurface contamination is also present and will be removed as noted on Figure 11 from the surface to 2.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. After contaminated material is removed, this site will be excavated to dredge depth (6 feet).

Verification Sampling: None (will be over excavated to 6 feet within the dredge footprint)

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth: 2.5 for contaminated material, then to dredge depth

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO
03	Cleanup Agreement and Release Sampling	CAR_76_2A	3/7/2000	0	0.5	ft	525
03	Cleanup Agreement and Release Sampling	CAR_76_2B	8/8/2000	2.5	6	ft	1700
03	Dredge Sampling	DCRDA0309-1	2/25/1999	0	6.23	ft	1155
03	Focused Sampling	FORB42-1	4/14/1999	0	0.75	ft	7800
03	Focused Sampling	FORB42-2	4/14/1999	0.75	1.75	ft	36.9
03	Focused Sampling	FORB42-3	4/14/1999	1.75	3	ft	170

Table 26. Sample Location DC86-1, Dredge Footprint, TPHDWO, Figure 11

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified. After contaminated material is removed, this site will be excavated to dredge depth (6 feet).

Verification Sampling: None (will be over excavated to 6 feet within the dredge footprint)

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth: Dredge Depth

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO
03	Dredge Sampling	DC86-1	2/26/1999	0	2.1	ft	1035
03	Dredge Sampling	DC86-2	2/26/1999	2.1	6.16	ft	ND

Table 27. Sample Location CAR_77_1A, CAR_77_2A, Dredge Footprint, TPHDWO, Oil and Grease, Lead, Figure 11

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location. Two locations were merged to create these boundaries. Material will be excavated to 0.5 feet. Contaminated materials will be

kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified. After contaminated material is removed, this site will be excavated to dredge depth (6 feet).

Verification Sampling: None (will be over excavated to 6 feet within the dredge footprint)

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth: Dredge Depth

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000	O&G 12873	Lead 96
08	Cleanup Agreement and Release Sampling	CAR_77_1A	2/17/2000	0	0.5	ft	810	700	110
08	Cleanup Agreement and Release Sampling	CAR_77_2A	3/2/2000	0	0.5	ft	7350	19000	10
08	Tetra Tech Phase II	B47-0.5		0	1	ft			5.2
08	Cleanup Agreement and Release Sampling	CAR_77_1B	2/17/2000	2.5	6	ft	ND		2.4
08	Cleanup Agreement and Release Sampling	CAR_77_3B	2/18/2000	2.5	6	ft	ND		5.6
08	Cleanup Agreement and Release Sampling	CAR_77_2B	3/2/2000	2.5	6	ft	ND		9.3

Table 28. Sample Location EO_09A, TPHDWO, Figure 11

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified.

Verification Sampling: None (will be over excavated to 6 feet within the dredge footprint)

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth: Dredge Depth

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000
08	Partially Characterized Sampling	EO_09A	May-00	0	0.5	ft	2100
08	Delineation Sampling	DS_EO_09	Nov-03	9	15	in	36

Table 29. Sample Location EO_08A, TPHDWO, Figure 11

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified.

Verification Sampling: 5 samples
 Surface Excavation Depth: 0.5 feet
 Subsurface Excavation Depth: None

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000
18	Partially Characterized Sampling	EO_08A	5/2/2000				4050

Table 30. Sample Location RD_IB_20, Sample Location DCRDA1B21-1 and Sample Location CAR_89_1A, Partly in Dredge Footprint, Figure 12

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of each of the surface sample locations. Three locations were merged to create these boundaries. The nickel contamination at site CAR_89_1A exceeds the “haul-off” concentration, therefore, within the horizontal boundaries established based on CAR_79_1A, material will be excavated to 1 foot and hauled off-site. The remaining area will be excavated to 0.5 feet. Subsurface contamination is also present and will be removed as noted on Figure 12 from the surface to dredge depth (6 feet). Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above.

Verification Sampling: 10 (most will be over-excavated to 6 feet within the dredge footprint)

Surface Excavation Depth CAR_79_1A: 1.0 feet (Haul-off Area)

Surface Excavation Depth remainder: 0.5 feet

Subsurface Excavation Depth Within Dredge Footprint: Dredge Depth

Subsurface Excavation Depth Outside Dredge Footprint: 2.5 feet

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000	Cu 35	Ni 58.1
Inner Bolsa	Random Follow Up Sampling	RD_IB_20	8/4/2000	0	0.5	ft	9600	53	77
Inner Bolsa	Cleanup Agreement and Release Sampling	CAR_89_1A	24-Aug-02	0	0.5	ft	3155	83	140
Inner Bolsa	Delineation Sampling	DS_CAR_216_1	Jan-04	0	12	in	--	78.4	121
Inner Bolsa	Delineation Sampling	DS_CAR_89_1A_1	Jan-04	0	12	in	250	68.5	95.8
Inner Bolsa	Dredge Sampling	DCRDAIB21-1	Mar-99	0	2.7	ft	6600	9.9	11
Inner Bolsa	Dredge Sampling	DCRDAIB21-2	Mar-99	2.7	8.22	ft	ND	26	32
Inner Bolsa	Delineation Sampling	DS_CAR_89_1	Nov-03	0	12	in	1940	50	87.2
Inner Bolsa	Delineation Sampling	DS_CAR_205_1	Nov-03	9	15	in	--	13.5	--
Inner Bolsa	Delineation Sampling	DS_RD_IB_20	Nov-03	9	15	in	597	20.9	22.8
Inner Bolsa	Delineation Sampling	DS_DCRDAIB21_1	Nov-03	0	33	in	7300		
Inner Bolsa	Delineation Sampling	DS_CAR_206_1	Nov-03	0	33	in	6100		
Inner Bolsa	Delineation Sampling	DS_CAR_89_1A_2	Jan-04	0	12	in	270	49.8	57.3
Inner Bolsa	Delineation Sampling	DS_CAR_89_1A_3	Jan-04	0	12	in	119	66.1	100
Inner Bolsa	Delineation Sampling	DS_CAR_89_1A_3A1	Feb-04	0	12	in	--	10.6	9.7
Inner Bolsa	Delineation Sampling	DS_CAR_89_1A_3B	Feb-04	0	12	in	--	20.6	19.5
Inner Bolsa	Delineation Sampling	DS_CAR_89_1A_3B1	Feb-04	0	12	in	--	11.8	10.9
Inner Bolsa	Delineation Sampling	DS_CAR_221_1	Mar-04	0	12	in	--	16.4	14.0
Inner Bolsa	Delineation Sampling	DS_CAR_89_1A_2B1A	Mar-04	0	12	in	--	23.2	26.3
Inner Bolsa	Delineation Sampling	DS_CAR_89_1A_2B1B	Mar-04	0	12	in	--	17.5	14.8
Inner Bolsa	Delineation Sampling	DS_CAR_89_1A_2B1C	Mar-04	0	12	in	--	6.5	7.1
Inner Bolsa	Delineation Sampling	CAR_220_1	Feb-04	0	12	in	--	62.4	87.3
Inner Bolsa	Delineation Sampling	DS_CAR_89_1A_2B	Feb-04	0	12	in	--	56.2	100
Inner Bolsa	Delineation Sampling	DS_CAR_89_1A_2B1	Feb-04	0	12	in	--	39.5	54.1
Inner Bolsa	Delineation Sampling	DS_CAR_89_1A_3C	Feb-04	0	12	in	--	58.4	82.3
Inner Bolsa	Delineation Sampling	DS_CAR_89_1A_3A	Feb-04	0	12	in	--	15.9	17.9

Table 31. Sample Location CAR_79_1A, EO_11A, Dredge Footprint, Figure 12

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of each of the surface sample locations. Two locations were merged to create these boundaries. The oil and grease contamination at site CAR_79_1A exceeds the “haul-off” concentration, therefore, within the horizontal boundaries established based on CAR_79_1A, material will be excavated to 2.5 feet and hauled off-site. The remaining area will be excavated to 0.5 feet. Subsurface contamination is also present and will be removed as noted on Figure 8 from the surface to dredge depth (6 feet). Contaminated materials (other than “haul-off” material) will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above.

Verification Sampling: None (will be over excavated to 6 feet within the dredge footprint)

Surface Excavation Depth CAR_79_1A: 2.5 feet (Haul off Area)

Surface Excavation Depth remainder: 0.5 feet

Subsurface Excavation Depth: Dredge Depth

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000	O&G 12873	Ni 58.1
08	Cleanup Agreement and Release Sampling	CAR_79_1A	2/2/2000	0	0.5	ft	26456.4	47000	60
08	Cleanup Agreement and Release Sampling	CAR_79_1B	2/2/2000	2.5	6	ft			8.7
08	Partially Characterized Sampling	EO_11A	5/2/2000				2830		30.5
08	Delineation Sampling	DS_CAR_79_1A_1A	6/9/2004	1	2	ft		840	
08	Delineation Sampling	DS_CAR_79_1A_1B	6/9/2004	2	3	ft		260	
08	Delineation Sampling	DS_CAR_79_1A_EA	6/8/2004	1	2	ft		580	
08	Delineation Sampling	DS_CAR_79_1A_XA	6/8/2004	1	2	ft		960	
08	Delineation Sampling	DS_CAR_79_1A_EB	6/8/2004	2	3	ft		1300	
08	Delineation Sampling	DS_CAR_79_1A_NA	6/9/2004	1	2	ft		1800	
08	Delineation Sampling	DS_CAR_79_1A_NB	6/9/2004	2	3	ft		1200	
08	Delineation Sampling	DS_CAR_79_1A_WA	6/9/2004	1	2	ft		1700	
08	Delineation Sampling	DS_CAR_79_1A_WB	6/9/2004	2	3	ft		740	

Table 32. Sample Location BS14-0.5, Figure 12

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of each of the surface sample locations. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified. After contaminated material is removed, this site will be excavated to dredge depth (6 feet).

Verification Sampling: None (will be over excavated to 6 feet within the dredge footprint)

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth: Dredge Depth

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	Barium 1000
03	Tetra Tech Phase II	BS14-0.5		0	0.5	ft	1090
03	Focused Sampling	F3R-3-1	10/30/1998	0	0.5	ft	160
03	Focused Sampling	F3R-3-2	10/30/1998	2.5	3	ft	41.7
03	Focused Sampling	F3R-3-3	10/30/1998	5.5	6	ft	16.9

Table 33. Sample Location SS-62, Barium, Figure 13

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination was identified. After contaminated material is removed, this site will be excavated to dredge depth (6 feet).

Verification Sampling: None (will be over excavated to 6 feet within the dredge footprint)

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth: Dredge Depth

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	Ba 1000
03	Tetra Tech Phase II	SS-62	(blank)	0	0.5	ft	2090

Table 34. Sample Location CAR_90_1A&B, S_P_01A and FS01-1-1, TPHDWO and Nickel (FS01-1-1 only), Figure 13

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of each of the surface sample locations. Three locations were merged to create these boundaries. Material will be excavated to 0.5 feet. Subsurface contamination is also present and will be removed as noted on Figure 9 from the surface to dredge depth (6 feet). Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above.

Verification Sampling: 15 (most of the cleanup site will be over excavated to 6 feet within the dredge footprint)

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth DCRDAIB21-1: Dredge Depth

Subsurface Excavation Depth CAR_89_1A: 0 to 1.0 feet (Haul-off area)

Subsurface Excavation Depth CAR_89_1A: 1.0 to 2.0 feet

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000	Ni 58.1
01	Cleanup Agreement and Release Sampling	CAR_90_1A	2/22/2000	0	0.5	ft	1360	6.7
01	Cleanup Agreement and Release Sampling	CAR_90_1B	2/22/2000	2.5	6	ft		7.3
01	Cleanup Agreement and Release Sampling	CAR_90_1B	8/29/2000	2.5	6	ft	7400	
01	Partially Characterized Sampling	S_P_01A	4/26/2000	0	0.5	ft	9350	16
01	Focused Sampling	FS01-1-1	11/12/1998	0	0.5		2875	98
01	Delineation Sampling	DS_CAR_204_1	Nov-03	9	15	in	--	--
01	Delineation Sampling	DS_S_P_01	Nov-03	9	15	in	5000	--
01	Delineation Sampling	DS_CAR_203_1	Nov-03	9	15	in	13900	85.8
01	Delineation Sampling	DS_FS_01_1	Nov-03	9	15	in	9300	82.1
01	Delineation Sampling	DS_CAR_90_1A_1A	Dec-03	9	15	in	3520	--
01	Delineation Sampling	DS_CAR_90_1A_1B	Dec-03	30	36	in	1020	--
01	Delineation Sampling	DS_CAR_90_1A_3A	Dec-03	9	15	in	3820	--
01	Delineation Sampling	DS_CAR_90_1A_1C	Dec-03	66	72	in	280	--
01	Delineation Sampling	DS_CAR_208_1	Dec-03	9	15	in	42	--
01	Delineation Sampling	DS_CAR_90_1A_2A	Dec-03	9	15	in	16.7	--
01	Delineation Sampling	DS_CAR_90_1A_2B	Dec-03	30	36	in	39	--
01	Delineation Sampling	DS_CAR_90_1A_2C	Dec-03	66	72	in	22.6	--
01	Delineation Sampling	DS_CAR_90_1A_3B	Dec-03	30	36	in	46	--
01	Delineation Sampling	DS_CAR_90_1A_3C	Dec-03	66	72	in	86.8	--
01	Delineation Sampling	DS_CAR_90_1A_6A	Jan-04	9	15	in	1880	--
01	Delineation Sampling	DS_CAR_215_1	Jan-04	9	15	in	--	--
01	Delineation Sampling	DS_SP_01_1_2	Jan-04	9	15	in	10.1	--
01	Delineation Sampling	DS_CAR_90_1A_4	Jan-04	9	15	in	9.5	--
01	Delineation Sampling	DS_CAR_90_1A_5A	Jan-04	9	15	in	9.4	--
01	Delineation Sampling	DS_CAR_90_1A_5B	Jan-04	30	36	in	10.1	--
01	Delineation Sampling	DS_CAR_214_1	Jan-04	9	15	in	9.9	--
01	Delineation Sampling	DS_CAR_90_1A_6B	Jan-04	30	36	in	10	--
01	Delineation Sampling	DS_CAR_90_1A_7A	Jan-04	9	15	in	420	--
01	Delineation Sampling	DS_CAR_90_1A_7B	Jan-04	30	36	in	10	--
01	Delineation Sampling	DS_CAR_218_1	Feb-04	9	15	in	--	--
01	Delineation Sampling	DS_CAR_90_1A_6A1	Feb-04	9	15	in	44	2.7
01	Delineation Sampling	CAR_219_1	Feb-04	0	12	in	--	6.7
01	Delineation Sampling	DS_FS_01_1_1B	Feb-04	9	15	in	--	24.5
01	Delineation Sampling	DS_FS_01_1_2A	Feb-04	9	15	in	440	8.1
01	Delineation Sampling	DS_FS_01_1_2B	Feb-04	9	15	in	--	17.4
01	Delineation Sampling	DS_FS_01_1_2C	Feb-04	9	15	in	630	6.3

Table 35. Sample Location B_18_0.5, DDT, Figure 13

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location except that the circle is constrained by “clean” sample locations (see table). Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified. After contaminated material is removed, this site will be excavated to dredge depth (6 feet).

Verification Sampling: None (will be over excavated to 6 feet within the dredge footprint)

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth: None

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	DDTs
01	Tetra Tech Phase II	B-18-0.5	(blank)	0	1	ft	0.03 (4,4'-DDT)
01	Delineation Sampling	DS_B18_1A	Dec-03	0	8.5	ft	ND
01	Delineation Sampling	DS_CAR_210_1	Dec-03	0	8.5	ft	ND
01	Delineation Sampling	DS_B18_2A	Dec-03	0	8.5	ft	ND
01	Delineation Sampling	DS_B18_3A	Dec-03	0	8.5	ft	ND
01	Delineation Sampling	DS_B18A	Jan-04	0	0.5	ft	0.0146
01	Delineation Sampling	DS_B18B	Jan-04	0.5	8.5	ft	ND
01	Delineation Sampling	DS_CAR_217_1	Jan-04	0.5	8.5	ft	ND

Table 36. Sample Location CAR_91_1A&B, CAR_91_2A&B, Dredge Footprint, Figure 13

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location. Two locations were merged to create these boundaries.

Contamination at this location exceeds the Haul-off Concentration for Nickel. Material will be excavated to 1.0 feet within the contaminated nickel area exceeding haul-off concentrations (see map). Contaminated material from this area will be segregated and hauled off-site.

No subsurface contamination was identified. After contaminated material is removed, this site will be excavated to dredge depth (6 feet).

Verification Sampling: None (will be over excavated to 6 feet within the dredge footprint)

Haul-off Area Excavation Depth: 1.0 feet within contaminated nickel area

Surface Excavation Depth: 0.5 feet remainder of cleanup site

Subsurface Excavation Depth: Dredge Depth

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000	Cu 35	Ni 58.1
01	Cleanup Agreement and Release Sampling	CAR_91_2A	2/17/2000	0	0.5	ft	1645	72	120
01	Cleanup Agreement and Release Sampling	CAR_91_2B	2/17/2000	2.5	6	ft	ND	6.8	9.6
01	Cleanup Agreement and Release Sampling	CAR_91_1A	2/18/2000	0	0.5	ft	6600	67	110
01	Cleanup Agreement and Release Sampling	CAR_91_1B	2/18/2000	2.5	6	ft	ND	7.4	9.2
01	Delineation Sampling	DS_CAR_91_1AX	6/8/2004	1	2.5	ft			34.1
01	Delineation Sampling	DS_CAR_91_2AN	6/8/2004	1	2.5	ft			40.8
01	Delineation Sampling	DS_CAR_91_2AS	6/8/2004	1	2.5	ft			57.2
01	Delineation Sampling	DS_CAR_91_2AW	6/8/2004	1	2.5	ft			26.3

Table 37. Sample BS18_0.5, Mercury, Figure 13

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of the surface sample location. Material will be excavated to 0.5 feet. Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above. No subsurface contamination identified.

Verification Sampling: 5

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth: None

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	Hg 0.43
01	Tetra Tech Phase II	BS18-0.5	(blank)	0	0.5	ft	0.54
01	Delineation Sampling	DS_BS18	Nov-03	9	15	in	0.03
01	Delineation Sampling	DS_CAR_202_1	Nov-03	9	15	in	0.02

Table 38. Sample Location CAR_107_1A, CAR_108_1B, BS10-0.5, S_R_01A&B, TPHDWO, Arsenic, Copper, Barium, Figure 14

The horizontal boundaries of surface contamination were defined by a square placed within a circle of 100-foot (30m) radius of each of the surface sample locations. Material will be excavated to 0.5 feet. Subsurface contamination is also present and will be removed as noted on Figure 9 from the surface to dredge depth (72"). Contaminated materials will be kept segregated from common material and will be moved either to a permanent sequestered location or to a contaminated material storage area as described in Section IIIA above.

Verification Sampling: 15 (most will be over-excavated to 6 feet within the dredge footprint)

Surface Excavation Depth: 0.5 feet

Subsurface Excavation Depth: 6.0 feet

Cell	Source	Sample ID	Sample Date	Depth From	Depth To	Depth Units	TPHDWO 1000	As 22	Cu 35	Barium 1000
01	Cleanup Agreement and Release Sampling	CAR_107_1A	2/2/2000	0	0.5	ft	8654.7	37	50	160
01A	Cleanup Agreement and Release Sampling	CAR_108_1A	3/31/2000	0	0.5	ft	700	3.8	13	190
01A	Partially Characterized Sampling	S_R_01A	4/27/2000	0	0.5	ft	1895	3.2	12	1400
01A	Tetra Tech Phase II	BS10-0.5		0	0.5	ft		10	26.7	11400
01	Cleanup Agreement and Release Sampling	CAR_107_1B	2/2/2000	2.5	6	ft		6.3	5.9	22.2
01	Cleanup Agreement and Release Sampling	CAR_107_1B	8/11/2000	2.5	6	ft	89			
01A	Cleanup Agreement and Release Sampling	CAR_108_1B	8/15/2000	2.5	6	ft	1300			
01A	Cleanup Agreement and Release Sampling	CAR_108_1B	3/31/2000	2.5	6	ft		6.2	17.5	1330
01A	Partially Characterized Sampling	S_R_01B	4/27/2000	2.5	3	ft	3500	15.2	15.4	3430
01A	Partially Characterized Sampling	S_R_01C	4/27/2000	5.5	6	ft		1.3	2.7	14.4

C. Cleanup Quantities - July 8, 2004 version

Table 39. Cleanup Volume and Disposition (VOLUMES ARE APPROXIMATE, SUBJECT TO REVISION)

Number of Verification Samples	Cell	Surface (without Haul Off)			Subsurface (without Haul Off)			Haul Off			Total		
		FIELD ID	From (ft)	To (ft)	Cubic Yards	FIELD ID	From (ft)	To (ft)	Cubic Yards	FIELD ID		From (ft)	To (ft)
NONE	1	B-18-0.5	0	0.5	51.65								51.65
5	44	B-50-0.5	0	0.5	193.7								193.66
15	1	BS10-0.5, CAR_107_1A, CAR_108_1B, S_R_01A&1B	0	0.5	907.7								907.65
	01A	CAR_108_1B,S_R_01A&1B	0	0.5	49.3								49.3
	01A					CAR_108_1B, S_R_01A & 1B	1	6	5010				5009.99
	01A					CAR_108_1B, S_R_01A & 1B	1	6	544				544
NONE	3	BS14-0.5	0	0.5	360.8								360.81
5	1	BS18-0.5	0	0.5	194.1								194.13
5	44	BS-41-0.5-HA	0	0.5	250.6								250.56
5	58	CAR_14_1A	0	0.5	365.4								365.42
5	58	CAR_20_2A	0	0.5	365.4								365.42
NONE	59	CAR_27_1A	0	0.5	334.2								334.23
NONE	60	CAR_28_1A	0	0.5	349.9								349.85
5	62	CAR_31_2A	0	0.5	257.3								257.27
5	4	CAR_37_1A	0	0.5	237.4								237.37
5	6	CAR_38_2A	0	0.5	145.3								145.29
5	7	CAR_59_1A & 2A, RD_07_01	0	0.5	727.9								727.86
NONE	16	CAR_60_1A	0	0.5	280.3								280.27
5	3	CAR_67_1A	0	0.5	255.6								255.59
15	3	CAR_68_1B & 2A, F3R-2-1	0	0.5	261.9								261.92
	3					CAR_68_2A	3	6	1838.6				1838.57
NONE	3	CAR_76_1A	0	0.5	242.8								242.77
	3	CAR_76_1A, CAR_76_2B, CAR_76_4B, DCRDA0308-1	0	0.5	684								684
	3					CAR_76_1A&B	1	6	1111.6				1111.55
	3					CAR_76_1A, CAR_76_2B, CAR_76_4B, DCRDA0308-1	1	6	7545				7545

	3					CAR_76_1A, CAR_76_2B, CAR_76_4B, DCRDA0308-1	1	6	6139.3					6139.32
	3									CAR_76_1A	0	1	222	222.46
NONE	3	CAR_76_2B, DRCDAO309- 1, FORB42-1	0	0.5	665.1									665.08
NONE	8	CAR_77_1A & 2A	0	0.5	678.1									678.05
NONE	3/8	CAR_79_1A	0	0.5	260.9									260.91
	3/8					CAR_79_1A	1	2.5	314.35					314.35
	3/8									CAR_79_1A	0	1	210	209.81
10	IB					CAR_89_1A	1	2	707.97					707.97
	IB									CAR_89_1A	0	1	712	712.21
	IB					DCRDAIB21-1	1	6	1018.5					1018.5
	IB	DCRDAIB21-1, RD_IB_20	0	0.5	670.5									670.51
15	1	CAR_90_1A & 1B, FS01-1- 1, S_P_01A	0	0.5	943.3									943.31
	1					CAR_90_1A & 1B, S_P_01A, FS01-1-1	1	6	7098.2					7098.17
NONE	1	CAR_91_1A & 2A	0	0.5	327.3									327.33
	1					CAR_91_1A&2A	1	2.5	747.28					747.28
	1									CAR_91_1A & 1B	0	1	499	498.73
NONE	17	DC_34_1	0	0.5	365.4									365.42
NONE	3	DC86-1	0	0.5	365.4									365.42
NONE	8	DCMN3-1	0	0.5	328.7									328.7
NONE	3	DCRDA0308-1	0	0.5	140.3									140.32
	3					DCRDA0308-1	3	6	1201.6					1201.63
	3									DCRDA0308-1	0	3.34	1508	1508.33
NONE	6	EO_02A	0	0.5	365.4									365.42
NONE	6	EO_03A	0	0.5	365.4									365.42
	6					EO_03A	1	6	4029.1					4029.12
5	44	EO_05A	0	0.5	281.3									281.33
5	18	EO_08A	0	0.5	365.4									365.42
NONE	8	EO_09A	0	0.5	365.4									365.42
NONE	8	EO_11A	0	0.5	333.3									333.28
	8					EO_11A	1	6	3674.8					3674.84
5	51	FPCO201-1	0	0.5	169.6									169.6
5	3	RD_03_03	0	0.5	365.4									365.42
5	3									RD_03_02	0	0.75	551	550.52
5	6	SS-61	0	0.5	365.4									365.42
NONE	3	SS-62	0	0.5	365.4									365.42
					14602				40980				3702	59284.6