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HUNTERS POINT
SSIC NO. 5090.3

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26 MAR 1991

From: Commander, Western Division, Naval Facilities Engineering Command
To: Distribution

Subj: DRAFT FINAL ENVIRONMENTAL SAMPLING AND ANALYSIS PLAN

Encl: (1) Revised Tables 3,6,7 and 8

1. In accordance with the Federal Facility Agreement for Naval Station, Treasure Island, Hunters Point Annex, enclosure (1) is forwarded for review and comment. Enclosure (1) has been prepared to clarify tables contained in the subject document.

2. Should you have any questions regarding this matter, the point of contact is Commander, Western Division, Naval Facilities Engineering Command (Attn: Louise T. Lew, Code 1811, (415) 244-2551).

3. Submit written comments, if any, to Mr. Eddie Sarmiento, Commanding Officer, Naval Station, Treasure Island, Building 1 (Code 84), San Francisco, CA 94130, with a copy to Western Division, Naval Facilities Engineering Command (Attn: Louise T. Lew, Code 1811, 900 Commodore Drive, San Bruno, CA 94066).

4. By copy of this letter, this document is also being provided to other concerned regulatory agencies.

Original signed by:

MICHAEL A. MIGUEL
By direction

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HUNTERS POINT
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ENVIRONMENTAL SAMPLING AND ANALYSIS PLAN

DATED 14 MARCH 1991

IS ENTERED IN THE DATABASE AND FILED AT ADMINISTRATIVE RECORD NO. **N00217.001948**

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Table 3. Sampling and Analytical Program

Evaluation Program and Sample Location Numbers	Number of Samples[a]	Media Type[b]	Radio-Activity Screen	Toxicity Testing	Physical Testing[c]	Radio-Activity Testing	Inorganics/ Metals	Pesticides/ PCBs	Semi-Volatile Organics	Tributyltin	Volatile Organics
Sediment Toxicity											
S-1 to S-17	17	S	X	X[d]	X	X[e]	X	X	X	X[g]	--
Reference	2	S	X	X	X	X[e]	X	X	X	X[g]	--
Control	1	S	X	X	X	--	--	--	--	--	--
Sediment Cores	19	S	X	--	--	X[e]	X	X	X	X[g]	X
Bioaccumulative Effect											
M-1 to M-17	17	T	X	--	--	X[e]	X[f]	X	X	X[g]	--
Background	1	T	X	--	--	--	X[f]	X	X	X[g]	--
Reference	3	T	X	--	--	--	X[f]	X	X	X[g]	--
Storm Water Toxicity											
ST1 to ST4	4	SW	--	X[h]	--	--	X[i]	X[i]	X[i]	X[i]	X[i]
B-1 to B-4	4	BW	--	X[h]	--	--	X[i]	X[i]	X[i]	X[i]	X[i]
Reference	1	BW	--	X[h]	--	--	--	--	--	--	--

a These numbers describe composited samples and do not include sub-samples removed for screening of radioactivity, toxicity testing, physical testing, chemical analyses, or Quality Control (QC) samples
b Media Type: S = sediment, T = tissue, SW = storm water, BW = bay water
c Physical testing includes determination of grain size
d Toxicity testing of sediment samples involves the use of five replicates in 10-day solid phase bioassays and liquid suspended particulate phase bioassays
e Laboratory testing of radioactivity will be conducted on samples exhibiting radioactivity above background levels as determined by radioactivity screening
f See Table 4 for specific inorganic/metal analysis
g Analytical method: n - Pentyl Derivitization with Gas Chromatography/Flame Photometric Detection
h Toxicity testing of storm and bay water samples involves a five dilution series
i Analysis of storm water samples will be conducted as described in the Proposed Reconnaissance Study of Storm Water Quality (HLA, 1988g)

Table 6. Analytical Methods for Sediment Analyses

Sample Numbers	Sample Matrix	Analytical Method	Analytical Constituents	Approximate Quantitation Limits (µg/Kg)
S-1 - S-17	Sediment	CLP Inorganics	Aluminum	10.0
			Antimony	3.0
			Arsenic	0.5
			Barium	10.0
			Beryllium	0.25
			Cadmium	0.25
			Calcium	250.0
			Chromium (total)	0.5
			Cobalt	0.5
			Copper	0.5
			Iron	5.0
			Lead (total)	0.15
			Magnesium	250.0
			Manganese	0.75
			Mercury	0.01
			Molybdenum	0.50
			Nickel	2.0
			Potassium	250.0
			Selenium	0.25
			Silver	0.5
			Sodium	250.0
			Thallium	0.5
			Tin	0.25
			Vanadium	2.5
			Zinc	1.0
		CLP Pesticides/PCBs	alpha-BHC	8.0
			beta-BHC	8.0
			gamma-BHC (Lindane)	8.0
			delta-BHC	8.0
			Heptachlor	8.0
			Aldrin	8.0
			Heptachlor epoxide	8.0

Table 6. Analytical Methods for Sediment Analyses

Sample Numbers	Sample Matrix	Analytical Method	Analytical Constituents	Approximate Quantitation Limits (µg/Kg)
			Endosulfan I	8.0
			p,p'-DDE	16.0
			Dieldrin	16.0
			Endrin	16.0
			p,p'-DDD	16.0
			Endosulfan II	16.0
			p,p'-DDT	16.0
			Endrin aldehyde	16.0
			Endosulfan sulfate	16.0
			p,p'-Methoxychlor	80.0
			Endrin ketone	16.0
			Technical chlordane	80.0
			Toxaphene	160.0
			Aroclor 1016	80.0
			Aroclor 1221	80.0
			Aroclor 1232	80.0
			Aroclor 1242	80.0
			Aroclor 1248	80.0
			Aroclor 1254	160.0
			Aroclor 1260	160.0
		CLP SOCs	Phenol	330
			bis(2-Chloroethyl) Ether	330
			2-Chlorophenol	330
			1,3-Dichlorobenzene	330
			1,4-Dichlorobenzene	330
			Benzyl Alcohol	330
			1,2-Dichlorobenzene	330
			2-Methylphenol	330
			bis(2-Chloroisopropyl) Ether	330
			4-Methylphenol	330

Table 6. Analytical Methods for Sediment Analyses

Sample Numbers	Sample Matrix	Analytical Method	Analytical Constituents	Approximate Quantitation Limits (µg/Kg)
			N-Nitroso-di-n-Propylamine	330
			Hexachloroethane	330
			Nitrobenzene	330
			Isophorone	330
			2-Nitrophenol	330
			2,4-Dimethylphenol	330
			Benzoic Acid	1600
			bis(2-Chloroethoxy)Methane	330
			2,4-Dichlorophenol	330
			1,2,4-Trichlorobenzene	330
			Naphthalene	330
			4-Chloroaniline	330
			Hexachlorobutadiene	330
			4-Chloro-3-Methylphenol	330
			2-Methylnaphthalene	330
			Hexachlorocyclopentadiene	330
			2,4,6-Trichlorophenol	330
			2,4,5-Trichlorophenol	1600
			2-Chloronaphthalene	330
			2-Nitroaniline	1600
			Dimethylphthalate	330
			Acenaphthylene	330
			3-Nitroaniline	1600
			Acenaphthene	330
			2,4-Dinitrophenol	1600
			4-Nitrophenol	1600
			Dibenzofuran	330
			2,4-Dinitrotoluene	330
			2,6-Dinitrotoluene	330
			Diethylphthalate	330

Table 6. Analytical Methods for Sediment Analyses

Sample Numbers	Sample Matrix	Analytical Method	Analytical Constituents	Approximate Quantitation Limits (µg/Kg)
			4-Chlorophenyl-Phenyl Ether	330
			Fluorene	330
			4-Nitroaniline	1600
			4,6-Dinitro-2-Methylphenol	330
			N-Nitrosodiphenylamine	330
			Azobenzene	330
			4-Bromophenyl-Phenyl Ether	330
			Hexachlorobenzene	330
			Pentachlorophenol	1600
			Phenanthrene	330
			Anthracene	330
			Di-n-Butylphthalate	330
			Fluoranthene	330
			Benzidine	1600
			Pyrene	330
			Butylbenzylphthalate	330
			3,3'-Dichlorobenzidine	660
			Benzo(a)Anthracene	330
			bis(2-Ethylhexl)phthalate	330
			Chrysene	330
			Di-n-Octylphthalate	330
			Benzo(b)Fluoranthene	330
			Benzo(k)Fluoranthene	330
			Benzo(a)Pyrene	330
			Indeno(1,2,3-cd)Pyrene	330
			Dibenz(a,h)Anthracene	330
			Benzo(g,h,i)Perylene	330

Table 6. Analytical Methods for Sediment Analyses

Sample Numbers	Sample Matrix	Analytical Method	Analytical Constituents	Approximate Quantitation Limits (µg/Kg)
		GC/FPD[a] with n-pentyl-derivization	Tributyltin	10
		Radiation		
		EPA Method 9310	Alpha	2[b]
		EPA Method 9310	Beta	4[b]
		Spectroscopy	Gamma	0.5[b]
	Sediment[c]	CLP VOCs	Chloromethane	10
			Vinyl Chloride	10
			Bromomethane	10
			Chloroethane	10
			Trichlorofluoromethane	5
			1,1-Dichloroethene	5
			Trichlorotrifluoroethane	5
			Acetone	20
			Carbondisulfade	5
			Methylene Chloride	5
			trans-1,2-Dichloroethene	5
			1,1-Dichloroethane	5
			2-Butanone	20
			cis-1,2-Dichloroethene	5
			Chloroform	5
			1,1,1-Trichloroethane	5
			Carbon Tetrachloride	5
			Benzene	5
			1,2-Dichloroethane	5
			Trichloroethene	5
			1,2-Dichloropropane	5
			Bromodichloromethane	5
			2-Chloroethylvinyl Ether	5
			Vinyl Acetate	10
			trans-1,3-Dichloropropene	5
			4-Methyl-2-Pentanone	10

Table 6. Analytical Methods for Sediment Analyses

Sample umbers	Sample Matrix	Analytical Method	Analytical Constituents	Approximate Quantitation Limits (μg/Kg)
			Toluene	5
			cis-1,3-Dichloropropene	5
			1,1,2-Trichloroethane	5
			Tetrachloroethene	5
			2-Hexanone	10
			Dibromochloromethane	5
			Chlorobenzene	5
			Ethylbenzene	5
			Total Xylenes	5
			Styrene	5
			Bromoform	5
			1,1,2,2-Tetrachloroethane	5
			1,3-Dichlorobenzene	5
			1,4-Dichlorobenzene	5
			1,2-Dichlorobenzene	5

a. Gas chromatography/flame photometric detection
b. Radiation units are picocuries/gram (pCi/gm)
c. Analysis for VOCs will be performed on sediment core samples only.

Table 7 . Analytical Methods for Mussel Tissue Analyses

Sample Numbers	Sample Matrix	Analytical Method	Analytical Constituents	Reporting Limit (µg/Kg)
M-1 - M-17	Mussel Tissue	Metals - 6010/ICP[a]	Aluminum	200
			Antimony	60
		7060/AA[b]	Arsenic	NA
			Barium	100
			Beryllium	10
			Cadmium	10
			Calcium	1000
			Chromium (total)	10
			Cobalt	50
			Copper	25
			Iron	100
		7421/AA[b]	Lead (total)	40
			Magnesium	1000
			Manganese	15
			Molybdenum	10
			Nickel	40
			Potassium	1000
		7740/AA[b]	Selenium	NA
			Silver	10
			Sodium	1000
		7841/AA[b]	Thallium	80
			Tin	40
			Vanadium	50
			Zinc	20
		7471/Cold Vapor AA[b]	Mercury	10
		Pest/PCBs - 8080/GC/MS[c]	alpha-BHC	NA
			beta-BHC	NA
			gamma-BHC (Lindane)	NA
			delta-BHC	NA

Table 7 . Analytical Methods for Mussel Tissue Analyses

Sample Numbers	Sample Matrix	Analytical Method	Analytical Constituents	Reporting Limit (µg/Kg)
			Heptachlor	NA
			Aldrin	NA
			Heptachlor epoxide	NA
			Endosulfan I	10.0
			p,p'-DDE	NA
			Dieldrin	2.0
			Endrin	2.0
			p,p'-DDD	NA
			Endosulfan II	2.0
			p,p'-DDT	NA
			Endrin aldehyde	NA
			Endosulfan sulfate	25.0
			p,p'-Methoxychlor	NA
			Endrin ketone	NA
			Technical chlordane	25.0
			Toxaphene	30.0
			Aroclor 1016	20.0
			Aroclor 1221	20.0
			Aroclor 1232	20.0
			Aroclor 1242	20.0
			Aroclor 1248	20.0
			Aroclor 1254	20.0
			Aroclor 1260	20.0
		SOCs - 8270/GC/MS[c]	Phenol	160.0
			bis(2-Chloroethyl) Ether	160.0
			2-Chlorophenol	160.0
			1,3-Dichlorobenzene	160.0
			1,4-Dichlorobenzene	160.0
			Benzyl Alcohol	160.0
			1,2-Dichlorobenzene	160.0
			2-Methylphenol	160.0

Table 7 . Analytical Methods for Mussel Tissue Analyses

Sample Numbers	Sample Matrix	Analytical Method	Analytical Constituents	Reporting Limit (µg/Kg)
			bis(2-Chloroisopropyl) Ether	160.0
			4-Methylphenol	160.0
			N-Nitroso-di-n-Propylamine	160.0
			Hexachloroethane	160.0
			Nitrobenzene	160.0
			Isophorone	160.0
			2-Nitrophenol	160.0
			2,4-Dimethylphenol	160.0
			Benzoic Acid	800.0
			bis(2-Chloroethoxy)Methane	160.0
			2,4-Dichlorophenol	160.0
			1,2,4-Trichlorobenzene	160.0
			Naphthalene	160.0
			4-Chloroaniline	160.0
			Hexachlorobutadiene	160.0
			4-Chloro-3-Methylphenol	160.0
			2-Methylnaphthalene	160.0
			Hexachlorocyclopentadiene	160.0
			2,4,6-Trichlorophenol	160.0
			2,4,5-Trichlorophenol	800.0
			2-Chloronaphthalene	160.0
			2-Nitroaniline	800.0
			Dimethylphthalate	160.0
			Acenaphthylene	160.0
			3-Nitroaniline	800.0
			Acenaphthene	160.0
			2,4-Dinitrophenol	800.0
			4-Nitrophenol	800.0
			Dibenzofuran	160.0
			2,4-Dinitrotoluene	160.0
			2,6-Dinitrotoluene	160.0
			Diethylphthalate	160.0

Table 7 • Analytical Methods for Mussel Tissue Analyses

Sample Numbers	Sample Matrix	Analytical Method	Analytical Constituents	Reporting Limit (µg/Kg)
			4-Chlorophenyl-Phenyl Ether	160.0
			Fluorene	160.0
			4-Nitroaniline	800.0
			4,6-Dinitro-2-Methylphenol	800.0
			N-Nitrosodiphenylamine	160.0
			Azobenzene	160.0
			4-Bromophenyl-Phenyl Ether	160.0
			Hexachlorobenzene	160.0
			Pentachlorophenol	800.0
			Phenanthrene	160.0
			Anthracene	160.0
			Di-n-Butylphthalate	160.0
			Fluoranthene	160.0
			Benzidine	800.0
			Pyrene	160.0
			Butylbenzylphthalate	160.0
			3,3'-Dichlorobenzidine	320.0
			Benzo(a)Anthracene	160.0
			bis(2-Ethylhexl)phthalate	160.0
			Chrysene	160.0
			Di-n-Octylphthalate	160.0
			Benzo(b)Fluoranthene	160.0
			Benzo(k)Fluoranthene	160.0
			Benzo(a)Pyrene	160.0
			Indeno(1,2,3-cd)Pyrene	160.0
			Dibenz(a,h)Anthracene	160.0
			Benzo(g,h,i)Perylene	160.0

Table 7 - Analytical Methods for Mussel Tissue Analyses

Sample Numbers	Sample Matrix	Analytical Method	Analytical Constituents	Reporting Limit (µg/Kg)
		GC/FPD[d] with n-pentyl-derivitization	Tributyltin	100
		Radiation EPA Method 9310	Alpha	4[e]
		EPA Method 9310	Beta	2[e]
		Spectroscopy	Gamma	0.5[e]

a. ICP; Inductively Coupled Plasma Spectroscopy
b. AA; Atomic Absorption
c. GC/MS; Gas Chromatography/Mass Spectroscopy
d. GC/FPD; Gas Chromatography/Flame Photometric Detection
e. Radiation units are picocuries/gram (pCi/gm)
NA - Not available

Table 8. Analytical Methods for Storm Water Runoff Analyses

Sample Numbers	Sample Matrix	Analytical Method	Analytical Constituents	Approximate Quantitation Limits (µg/L)
ST-1 - ST-4 B-1 - B-4	Water	CLP Inorganics	Aluminum	200.0
			Antimony	3.0
			Arsenic	10
			Barium	100.0
			Beryllium	5.0
			Cadmium	5.0
			Calcium	1000
			Chromium (total)	10.0
			Cobalt	50.0
			Copper	25
			Iron	100
			Lead (total)	3.0
			Magnesium	1000
			Manganese	15.0
			Mercury	0.5
			Molybdenum	10.0
			Nickel	40.0
			Potassium	1000
			Selenium	5.0
			Silver	10.0
			Sodium	1000
			Thallium	10.0
			Tin	40.0
			Vanadium	50.0
			Zinc	20.0
		CLP Pesticides/PCBs	alpha-BHC	0.05
			beta-BHC	0.05
			gamma-BHC (Lindane)	0.05
			delta-BHC	0.05
			Heptachlor	0.05
			Aldrin	0.05

Table 8. Analytical Methods for Storm Water Analyses

Sample Numbers	Sample Matrix	Analytical Method	Analytical Constituents	Approximate Quantitation Limits (µg/L)
			Heptachlor epoxide	0.05
			Endosulfan I	0.1
			p,p'-DDE	0.1
			Dieldrin	0.1
			Endrin	0.1
			p,p'-DDD	0.1
			Endosulfan II	0.1
			p,p'-DDT	0.1
			Endrin aldehyde	0.1
			Endosulfan sulfate	0.1
			p,p'-Methoxychlor	0.5
			Endrin ketone	0.1
			Technical chlordane	0.5
			Toxaphene	1.0
			Aroclor 1016	0.5
			Aroclor 1221	0.5
			Aroclor 1232	0.5
			Aroclor 1242	0.5
			Aroclor 1248	0.5
			Aroclor 1254	1.0
			Aroclor 1260	1.0
		CLP SOCs	Phenol	10
			bis(2-Chloroethyl) Ether	10
			2-Chlorophenol	10
			1,3-Dichlorobenzene	10
			1,4-Dichlorobenzene	10
			Benzyl Alcohol	10
			1,2-Dichlorobenzene	10
			2-Methylphenol	10
			bis(2-Chloroisopropyl) Ether	10
			4-Methylphenol	10

Table 8. Analytical Methods for Storm Water Analyses

Sample Numbers	Sample Matrix	Analytical Method	Analytical Constituents	Approximate Quantitation Limits (μg/L)
			N-Nitroso-di-n-Propylamine	10
			Hexachloroethane	10
			Nitrobenzene	10
			Isophorone	10
			2-Nitrophenol	10
			2,4-Dimethylphenol	10
			Benzoic Acid	50
			bis(2-Chloroethoxy)Methane	10
			2,4-Dichlorophenol	10
			1,2,4-Trichlorobenzene	10
			Naphthalene	10
			4-Chloroaniline	10
			Hexachlorobutadiene	10
			4-Chloro-3-Methylphenol	10
			2-Methylnaphthalene	10
			Hexachlorocyclopentadiene	10
			2,4,6-Trichlorophenol	10
			2,4,5-Trichlorophenol	50
			2-Chloronaphthalene	10
			2-Nitroaniline	50
			Dimethylphthalate	10
			Acenaphthylene	10
			3-Nitroaniline	50
			Acenaphthene	10
			2,4-Dinitrophenol	50
			4-Nitrophenol	50
			Dibenzofuran	10
			2,4-Dinitrotoluene	10
			2,6-Dinitrotoluene	10
			Diethylphthalate	10

Table 8. Analytical Methods for Storm Water Analyses

Sample Numbers	Sample Matrix	Analytical Method	Analytical Constituents	Approximate Quantitation Limits (μg/L)
			4-Chlorophenyl-Phenyl Ether	10
			Fluorene	10
			4-Nitroaniline	50
			4,6-Dinitro-2-Methylphenol	10
			N-Nitrosodiphenylamine	10
			Azobenzene	10
			4-Bromophenyl-Phenyl Ether	10
			Hexachlorobenzene	10
			Pentachlorophenol	50
			Phenanthrene	10
			Anthracene	10
			Di-n-Butylphthalate	10
			Fluoranthene	10
			Benzidine	50
			Pyrene	10
			Butylbenzylphthalate	10
			3,3'-Dichlorobenzidine	20
			Benzo(a)Anthracene	10
			bis(2-Ethylhexl)phthalate	10
			Chrysene	10
			Di-n-Octylphthalate	10
			Benzo(b)Fluoranthene	10
			Benzo(k)Fluoranthene	10
			Benzo(a)Pyrene	10
			Indeno(1,2,3-cd)Pyrene	10
			Dibenz(a,h)Anthracene	10
			Benzo(g,h,i)Perylene	10
		GC/FPD[a] with n-pentyl-derivitization	Tributyltin	10

Table 8. Analytical Methods for Storm Water Analyses

Sample Numbers	Sample Matrix	Analytical Method	Analytical Constituents	Approximate Quantitation Limits (µg/L)
ST1-ST4	Water	CLP VOCs	Chloromethane	10
			Vinyl Chloride	10
			Bromomethane	10
			Chloroethane	10
			Trichlorofluoromethane	5
			1,1-Dichloroethene	5
			Trichlorotrifluoroethane	5
			Acetone	20
			Carbondisulfide	5
			Methylene Chloride	5
			trans-1,2-Dichloroethene	5
			1,1-Dichloroethane	5
			2-Butanone	20
			cis-1,2-Dichloroethene	5
			Chloroform	5
			1,1,1-Trichloroethane	5
			Carbon Tetrachloride	5
			Benzene	5
			1,2-Dichloroethane	5
			Trichloroethene	5
			1,2-Dichloropropane	5
			Bromodichloromethane	5
			2-Chloroethylvinyl Ether	5
			Vinyl Acetate	10
			trans-1,3-Dichloropropene	5
			4-Methyl-2-Pentanone	10
			Toluene	5
			cis-1,3-Dichloropropene	5
			1,1,2-Trichloroethane	5
			Tetrachloroethene	5
			2-Hexanone	10

Table 8. Analytical Methods for Storm Water Analyses

Sample Numbers	Sample Matrix	Analytical Method	Analytical Constituents	Approximate Quantitation Limits (µg/L)
			Dibromochloromethane	5
			Chlorobenzene	5
			Ethylbenzene	5
			Total Xylenes	5
			Styrene	5
			Bromoform	5
			1,1,2,2-Tetrachloroethane	5
			1,3-Dichlorobenzene	5
			1,4-Dichlorobenzene	5
			1,2-Dichlorobenzene	5

a. Gas chromatography/flame photometric detection