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SITE INSPECTION (SI) REPORT

FOR

NAVAL AIR FACILITY (NAF)

MIDWAY ISLAND

VOLUME I: TECHNICAL REPORT
PART 2 OF 3

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Section 13

SECTION 13
ABANDONED POWER PLANT, BUILDING 144 (SITE 08)

This report describes the results of the SI field work conducted intermittently at the Abandoned Power Plant Sand Island, (Site 08) from August through November 1994. The purpose of the review was to determine whether Site 08 received hazardous substances, and to assess the likelihood for soil and ground-water contamination at the Site. A discussion of the work conducted during the SI, along with findings, conclusions, and recommendations, is presented below.

This report is organized as follows: Site background information is documented in Section 13.1; a description of SI field sampling activities is presented in Section 13.2; methods used for sample analysis are summarized in Section 13.3; physical characteristics of the Site observed during the investigation activities are discussed in Section 13.4; a summary of the analytical results is presented in Section 13.5; the SERA is described in Section 13.6; and conclusions and recommendations for the Site are presented in Section 13.7.

13.1 BACKGROUND INFORMATION

The "Abandoned" Power Plant, Building 144, is a former diesel power plant and saltwater pumping station on Sand Island (Figure 13.1-1). During the 1993 EBS Site visit, the building was observed to be in very poor condition. Due to spalling concrete on the walls and flooring, entry was considered unsafe. The building contains three diesel engines, several oil-filled drums, and oil-filled switching equipment, all showing evidence of leakage. An abandoned sea chest/sump on the eastern side of Building 144 is directly connected to the Inner Harbor via a 24-inch seawater intake pipe. One UST (S284) was also associated with this building. Transformers were reportedly stored outside along the southwestern side of the building while awaiting shipment off island (Ogden 1994b).

Potential contaminant sources at the Site include the diesel engines, oil-filled drums, the UST, transformers and switching equipment (potentially containing PCB oil), and drums

containing POL. Chemical contaminants that may have been released at the Site and associated analytical categories are listed in Table 13.1-1.

Table 13.1-1

POTENTIAL CHEMICAL CONTAMINANTS, ABANDONED POWER PLANT, BUILDING 144, SITE 08

Waste Type	Years of Disposal	Potential Chemical Constituents	Analytical Category
Diesel Fuel	Pre-World War II	Petroleum Hydrocarbons	Total Fuel Hydrocarbons Volatile Organic Compounds, Semi Volatile Organic Compounds
Lubricating and Waste Oil	Pre-World War II	Heavy-end Hydrocarbons, PCBs, Metals, Solvents	Total Fuel Hydrocarbons, Volatile Organic Compounds, Semi Volatile Organic Compounds, PCBs, Metals

13.2 SAMPLING METHODS AND LOCATIONS

Soil Vapor

A soil vapor survey was conducted at the Site to detect petroleum hydrocarbons and VOCs in subsurface soils and ground water, and to delineate the extent of potential contamination. The survey, conducted on September 12 and 13, 1994 by TEG and Ogden personnel, utilized 16 sampling locations (Figure 13.2-1) around the perimeter of Building 144 and along the 24-inch diameter seawater intake pipe leading to the Inner Harbor. The typical soil vapor sampling depth was 6 fbgs.

Direct-push

To screen for subsurface contamination, six direct-push soil and ground-water samples were collected around the perimeter of Building 144 on September 29, October 3, and October 20, 1994 by PRC and Ogden personnel (Figure 13.2-2). Depth to water at the direct-push sampling Sites ranged from 6.6 to 10.3 fbgs. The 10.3 fbgs water level was encountered at direct-push sampling location number six (DP-06), located on a mound of sand adjacent to the abandoned UST on the west side of Building 144.

Surface Soils

To test for surface soil contamination, four surface soil samples and two collocated QC duplicate samples were collected from locations east, south, and west of Building 144 (Figure 13.2-3). Although the FSP specified eight sample locations for this Site, only four locations were actually sampled. The samples proposed for the north and northeast side of the power plant were not collected because construction activities had disturbed the soil surface, and a stockpile of soil covered the area. Sampling points were located in undisturbed areas, areas outside of doorways, and in areas where spills or disposal of hazardous materials might have occurred.

Soil Borings

To test for subsurface soil and water contamination and to investigate the lithology of the Site, three soil borings were drilled, each to a depth of 16 fbgs, with a 4-inch inside diameter HSA. Results of the soil vapor survey were used to select soil boring locations. Soil samples for lithologic classification and screening with the OVM were collected continuously from each borehole with a 2.5-inch diameter environmental split-spoon sampler driven within the HSA. One soil sample from each boring was submitted to the offsite laboratory for chemical analysis. Analytical soil samples were typically collected just above the capillary fringe zone, and from areas which produced an OVM response.

Monitoring Wells

After soil sample recovery, each boring was completed as a monitoring well to test for possible ground-water contamination and record data for hydrogeologic evaluation (Figure 13.2-4). Based upon the depth to the water table, of 7 to 10 fbgs, the three shallow wells were completed to a depth of approximately 15.5 fbgs. One ground-water sample was obtained from each well. One QC duplicate ground-water sample was also collected. Table 13.2.1 summarizes construction details of the monitoring wells. Each well was developed by surging and then by overpumping immediately after the annular space around the casing was filled with filter pack material. During overpumping, ground-water samples were collected at five-gallon flow intervals for chemical analysis and physical characterization. Detailed well development logs are presented in Appendix F.

Wipe Sampling

To screen for PCB contamination, PCB wipe samples were collected at seven locations (Figure 13.2-5). One QC duplicate wipe sample was collected at location 6.

Table 13.2-1

SUMMARY OF MONITORING WELL CONSTRUCTION DETAILS, ABANDONED POWER PLANT, BUILDING 144, SITE 08

Well ID	Ground Surface Elevation (MLLW)	Top of Casing Elevation (MLLW)	Total Depth of Boring (BGS)	Total Depth of Well (BGS)	Well Screen Interval (BGS)	Static Ground-Water Level (date of completion) (BGS)
M08MW01	8.69	11.13	16.0	15.6	5.6-15.6	7.4 (11/9/94)
M08MW02	8.24	10.90	16.0	15.1	5.1-15.1	7.0 (11/9/94)
M08MW03	7.70	10.26	16.0	15.5	5.5-15.5	6.5 (11/10/94)

All measurements in feet

Water Level Measurements

Following well construction and development, and prior to ground-water sampling, static water level measurements were made in each well. These data, in conjunction with precise top-of-well-casing survey data, were used to evaluate the local hydraulic gradient.

Ground Water

Each monitoring well was purged with a Redi-Flo 2 Grundfos pump before ground-water samples were collected for chemical analysis. Water samples were collected at five-gallon flow intervals during the purging procedure to evaluate field parameters (temperature, pH, specific conductivity) and to characterize water quality. One ground-water sample for chemical analysis was collected from each well to test for contamination and to evaluate the impact of disposal activities on the ground water. Detailed ground-water sampling logs are presented in Appendix F.

Aquifer Testing

Two methods were used to estimate K at Site 08: *in situ* slug testing and permeameter testing of soil cores obtained from boreholes at the Site.

Well M08MW01 was slug tested to estimate the horizontal hydraulic conductivity (K_H) in the immediate vicinity of the well. A fixed-volume slug was rapidly injected into, or withdrawn from, the well. The rate of change of the water level in the well was then recorded via a pressure transducer connected to an In-Situ Corp. Hermit Data Logger. Slug test data were analyzed using the Bouwer and Rice (1976) and Cooper-Jacob 1946) methods for evaluating partially penetrating wells in an unconfined aquifer. Slug test data are included in Appendix H.

Two soil core samples from Site 08, M08BS01 and M08BS03, were tested in a constant-head permeameter at the geotechnical laboratory at Ogden Technical Services in Oak Ridge, TN.

Geotechnical Testing

Two relatively undisturbed soil samples were collected from soil borings at the Site for geotechnical testing to establish engineering parameters of the overlying soils. Geotechnical parameters are presented in Appendix G.

Marine Sampling

The objective of the marine sampling program was to identify habitat types and to characterize the biological community. Sediment, seawater, tissue, and infauna samples were collected at the Site (Figure 13.2-6). The Site was divided into two locations: one at the mouth of the intake pipe (Location 01) and the second approximately 16 feet (5 m) away from the seawall (Location 02). Vertical core samples could not be recovered at this Site because the core sampler was able to penetrate the sediment to depths of only 8 to 12 inches; therefore, horizontal sediment core samples were taken. Horizontal sediment samples for chemical analysis were taken at both locations; one QC duplicate sample was collected at Location 02. The sample from Location 01 was collected inside the intake pipe. One seawater sample and one QC duplicate sample were collected from inside the intake pipe (Location 01). Whole organisms were collected for tissue analysis

along the seawall as close as possible to the intake pipe. The organisms representing the following trophic levels were collected:

- primary producers (*Dictyota* sp.)
- herbivores (*Acanthurus triostegus* and *Echinometra mathaei*)
- suspension feeders (*Chama iostoma*)

13.3 ANALYTICAL METHODS

Analytical methods for all soil, sediment, surface water, ground water, and tissue samples collected at the Site are presented in Table 13.3-1.

Soil Vapor

Soil vapor samples were collected at 16 locations and analyzed immediately in the field by portable GC for TPH, VOCs, and to determine the percent CO_2/percent O_2 ratio. Analytical results are listed in Appendix C.

Direct-push

Direct-push soil and water samples were analyzed at the field screening laboratory for TPH, VOCs, Pesticides/PCBs, and PAHs.

Surface Soil

Surface soil samples were analyzed for fuels, CLP SVOCs, CLP pesticides/PCBs, and CLP metals. SVOCs, PCBs, metals, and pesticides were analyzed by low detection level methods. Total organic carbon concentrations were also quantified.

Wipe Sampling

Wipe samples were submitted to an offsite laboratory for PCB quantification by EPA Method 8080.

Boring Soil

Boring soil samples were submitted to the offsite laboratory for analysis of fuels, CLP VOCs, CLP SVOCs, CLP pesticides/PCBs, and CLP metals.

Monitoring Wells

One ground-water sample from each of the three monitoring wells, as well as one QC duplicate sample, were submitted for analysis of fuels and CLP VOCs. SVOCs, pesticides, PCBs, and metals were analyzed by low level methods.

Geotechnical

The two samples were analyzed by Ogden Technical Services for natural moisture content, unit weight (wet and dry), specific gravity, permeability. The samples were classified using the USCS. Samples and geotechnical testing methods are listed in Appendix G of *CTO 0136-Geotechnical Laboratory Analyses.*

Marine Samples

The sediment, seawater, and tissue samples were analyzed by low-level methods for SVOCs, pesticides, PCBs, and metals. For the sediment samples, total organic carbon concentrations, grain size, and toxicity (echinoderm bioassays) were also quantified.

PCB Wipe Samples

Seven PCB wipe samples and one duplicate sample were analyzed by the Routine Analytical Laboratory by EPA Method 8080.

13.4 PHYSICAL CHARACTERISTICS

Building 144 is approximately 80 feet long, 40 feet wide, and is located near the northeastern shore of Sand Island (Figure 13.1-1).

13.4.1 Topography

The building is situated on a level 100 ft by 150 ft Site approximately eight feet above MLLW. A sea-water intake pipe, 24 inches in diameter, extends 300 feet from the building to the inner harbor sea wall.

13.4.2 Geology and Soils

Three exploratory geologic soil borings were drilled at the Site to screen for subsurface contamination and investigate the lithology (Figure 13.2-4). Each boring was explored to a depth of approximately 16 fbgs. Silty fine- to coarse-grained coralline sands were encountered between the surface and 16 fbgs. In the upper 1 foot, the sands are pale yellow and poorly sorted. Below 1 foot, the sands become light gray and well sorted with minor amounts of coral gravel and fines. Geotechnical parameters determined from the two samples collected at the Site are summarized in Table 13.4-1.

Table 13.4-1

GEOTECHNICAL LABORATORY TEST RESULTS

Sample Location	Depth of Sample (fbgs)	Natural Moisture Content (%)	Unit Weight Bulk Density Wet (lbs/ft^3)	Unit Weight Bulk Density Dry (lbs/ft^3)	Specific Gravity	Hydraulic Conductivity (cm/sec)	USCS	TOC (WB) (%)
M08BS01	2.0	6.1	94.9	89.4	2.76	1.1E-04	SP	0.37
M08BS03	4.0	8.7	91.5	84.2	2.73	6.9E-04	SP	0.03

USCS = Unified Soil Classification System SP = Sand, Poorly graded
TOC = Total Organic Carbon

13.4.3 Hydrogeology

Three monitoring wells were installed at the Site to evaluate hydrogeologic and ground-water quality characteristics. Ground-water levels, hydraulic gradient, well production, and aquifer characteristics are discussed in this section.

Field observations suggest that the ground water at Site 08 exists under unconfined conditions within a calcareous sand formation. To assess the local hydraulic gradient and aquifer characteristics, ground-water levels were measured in each well. Water levels in the three monitoring wells ranged from 0.93 to 0.98 feet above MLLW (Table 13.4-2).

Table 13.4-2

GROUND-WATER ELEVATION DATA

WELL ID	Top of Casing elevation (MLLW)	Date	Time	Depth to Water (BTOC)	Water Level Elevation (MLLW)
M08MW01	11.13	11/15/94	1014	10.20	0.93
M08MW02	10.90	11/15/94	1113	9.96	0.94
M08MW03	10.26	11/15/94	1306	9.28	0.98

Measurements in feet

At the time of measurement, ground-water level data indicated a local hydraulic gradient of approximately 4.5E-04 ft/ft to the east. Because the gradient is low and the water table is shallow, the hydraulic gradient is significantly influenced by tidal fluctuations. Figure 13.4-1 illustrates the water table contours and average gradient direction and magnitude as determined from the data in Table 13.4-2.

Slug test data were used to generate two regression curves: The first curve models K_H, the second curve models both transmissivity (T) and storativity (S). Water table elevations were found to parallel tidal variations (as obtained from CTO147 *Sand Island Water Level Fluctuation Monitoring)*. K_H was determined to be 1,372 ft/day (Table 13.4-3). T and S were found to be 3.85E05 ft^2/day and 1.0E-08, respectively. Aqtesolv curves are shown in Appendix H.

For further review of this coefficient, K values estimated from slug testing at four other Sites on Sand Island were compared to the slug test K value obtained at Site 08 (Table 13.4-4). Slug test data from five Sand Island Sites yielded K values ranging from 349 ft/day to 3,200 ft/day, with a mean K of 1,462 ft/day.

Permeameter testing yielded comparatively low K values; 0.3 ft/day and 2.0 ft/day, respectively. These values are probably not representative of actual field conditions because the small sample used in the permeameter test, which may have been compacted

or disturbed in transport, cannot simulate the true characteristics of *in situ* aquifer materials. In addition, core sample permeameter testing yields an estimate of the vertical component of hydraulic conductivity (K_V), which is generally much lower than K_H.

Along with the K values estimated from slug testing and permeameter testing, published average K values for clean and silty sands (Freeze and Cherry, 1979) were used for comparison and to aid in estimating a representative value for Site 08 (Table 13.4-3).

K was also calculated by averaging the values obtained by all methods at Site 08. The resulting mean K was 281 ft/day (the range was 0.3 ft/day to 1,372 ft/day). This mean K value represents the best estimate of K available.

Following well development and purging, the quantity of suspended sediment in water samples from all three monitoring wells ranged from none to a moderate amount. The samples exhibited a slight turbidity. Specific conductivities, which were measured during well development and purging, ranged from a low of 4,940 μS/cm in well M08MW03 to a high of 9,720 μS/cm in well M08MW02. Table 13.4-5 presents final field parameters (temperature, pH, and specific conductivity) measured just prior to the collection of ground-water samples for chemical analysis.

Table 13.4-5

FINAL MEASUREMENTS OF FIELD PARAMETERS AND VOLUME WITHDRAWN DURING WELL PURGING

Well ID	Date	Time	Temperature (°C)	pH	Specific Conductivity (μS/cm)	Total Purged Volume (Gal)	Total Purged Volume (well volumes)
M08MW01	11/15/94	1014	27.1	7.74	6,230	30	3.9
M08MW02	11/15/94	1113	26.8	7.68	9,720	30	4.0
M08MW03	11/15/94	1306	27.7	7.80	4,940	30	3.5

13.5 SUMMARY OF ANALYTICAL RESULTS

The sections and tables below summarize the results of laboratory analyses performed on Site 08 samples. For soil samples, analytical results for organic and inorganic compounds are shown in Tables 13.5-1 and 13.5-2, respectively. For ground-water samples, analytical results for the organic and inorganic compounds are presented in Tables 13.5-3 and 13.5-4. Similarly, Tables 13.5-5 and 13.5-6 summarize marine sediment sample results and Tables 13.5-7 and 13.5-8 present seawater sample results. Table 13.5-9 presents the PCB wipe sample results.

The tables list the analytical methods, the number of detects, the total number of samples, the number of samples rejected during data validation, the minimum undetected concentration, the maximum undetected concentration, the minimum detected concentration, the maximum detected concentration, and the sample with the maximum concentration. In addition, the concentrations of compounds detected at Site 08 are compared to Sand Island background levels. Analytical results for all samples and analytes are contained in Appendix L. Complete CLP and low-level analytical data are available at PACNAVFACENGCOM offices at Pearl Harbor, Hawaii.

13.5.1 Soil Vapor

Elevated TFH levels were detected at four sampling locations (Figure 13.1-1). The maximum level was 3.7 ppmv at SV-13. All other soil vapor samples were non-detects. The complete TEG soil vapor survey report is included in Appendix C.

13.5.2 Surface soil

Among the Site 08 surface soil samples, concentrations of 13 of the 19 pesticide analytes (CLP and low level) and 35 of the 37 metal analytes (CLP and low level) were above mean Sand Island background levels. The pesticide detected at the highest concentration by CLP methods was 4,4'-DDT at 57 µg/kg. Low-level methods detected 4,4'-DDT at a maximum concentration of 27 µg/kg. The PCB Aroclor-1260 was detected by CLP methods at a concentration of 440 µg/kg. Fourteen PCB congeners were detected by low-level methods. PCB-180 was the congener with the maximum concentration (30 µg/kg).

PAHs were detected in surface soils, with the highest concentration being fluoranthene at 1,400 µg/kg. The PAHs are most likely related to heavy-end petroleum hydrocarbons. The maximum lead concentration detected among these samples was 2,310 µg/kg. Figures 13.5-1, 13.5-2, 13.5-3, 13.5-4, and 13.5-5 depict the surface soil sampling locations and selected concentration values.

13.5.3 Subsurface soil

Pesticide/PCB concentrations in subsurface soil samples were below (CLP) detection limits. Among the subsurface (boring) soil samples, concentrations of 12 of 17 CLP metal analytes were greater than the mean Sand Island background levels. PAHS were detected in subsurface soil samples. The highest concentration detected was pyrene at 400 µg/kg. The maximum lead concentration detected in a subsurface soil sample was 7.1 µg/kg. Figure 13.5-6 depicts subsurface soil sampling locations and VOC concentrations.

13.5.4 Ground Water

Among the Site 08 ground-water samples tested by low level detection methods, concentrations of 2 of the 10 pesticide analytes, and 11 of the 17 metal analytes, were above mean Sand Island background levels. The maximum pesticide concentration detected was 0.009 µg/L of alpha-BHC. Mean Sand Island background levels have been established for only two of the nine PCB congeners detected in ground-water samples from Site 08 (PCB-206 and -209). Maximum detected concentrations of both PCB-206 and PCB-209 were slightly above background levels. Low levels of VOCs and PAHs were detected in ground-water samples. The highest VOC concentration was 1,2-dichloroethene at 6 µg/L. The highest PAH was naphthalene at 19 µg/L. Most of the VOCs and PAHs detected are associated with petroleum hydrocarbons. The maximum lead concentration detected in a ground-water sample was 7.9 µg/L. Figures 13.5-7, 13.5-8, 13.5-9, and 13.5-10 depict the ground-water sampling locations with selected concentration values.

13.5.5 Marine Sediment

Among the marine sediment samples, concentrations of 8 of the 15 low level metal analytes were above mean Sand Island background metals concentrations. Mean concentrations of pesticides were not quantified for Sand Island marine sediment background samples. The maximum pesticide concentration detected at Site 08 was 1.0 μg/kg of alpha-BHC. Mean background levels have been established for only one of the 17 PCB congeners detected by low-level methods in ground-water samples from Site 08 (PCB-28). The maximum detected concentration of PCB-28 (0.24 μg/kg) was above the established background level (0.0271 μg/kg). PAHs were detected in marine sediment samples at concentrations above background levels. The highest concentration was fluoranthene at 680 μg/kg. The maximum lead concentration detected in a marine sediment sample was 47.3 mg/kg. Figures 13.5-11, 13.5-12, and 13.5-13 depict the marine sediment sampling locations and selected concentration values.

13.5.6 Seawater

Pesticide and PCB concentrations in the seawater samples were below detection levels. Seven of the 14 metal analytes were found to exceed maximum Sand Island background levels. PAHs were detected in seawater samples. Fluoranthene had the highest concentration detected (1.2 μg/L). The maximum lead concentration detected in a seawater sample was 0.384 mg/L.

13.5.7 Tissue

Tissue analytical results are presented in section 13.6.

13.5.8 PCB Wipe Samples

Aroclor-1260 was detected at a concentration of 0.93 μg/100 cm^2 in sample WW-02. PCBs were not detected in the other wipe samples from this Site (Figure 13.5-14).

13.6 SCREENING ECOLOGICAL RISK ASSESSMENT

13.6.1 Problem Formulation

Tasks to be accomplished during Problem Formulation include (a) developing a Site description based on current Site investigations, existing literature, any prior preliminary assessments, and Site history; (b) identifying potential stressors, exposure pathways, and ecological receptors (habitats and species); (c) discussing the nature of adverse effects associated with a given stressor; (d) defining ecologically appropriate assessment and measurement endpoints; and (e) making an initial evaluation of risks posed by the Site.

For a Site to present the potential for risk, it must exhibit the following three criteria: contain stressors in abiotic media at detectable and biologically significant concentrations, provide exposure pathways linking stressors to ecological receptors, and have ecological receptors (those associated with assessment endpoints) that either utilize the Site, are present nearby, or are in range of stressors migrating from the Site. If Problem Formulation determines that one or more of these criteria are absent, the Site is recommended for NFA and the risk assessment is concluded at this point. If all criteria are met, then completion of the SERA process is required.

13.6.1.1 Site Description

Site 08 is a former diesel power plant and saltwater pumping station on Sand Island. The habitats surrounding the building include non-native herb habitat, *Casuarina* forest, ruderal, and disturbed habitat (Figure 13.6-1). Several seabird species nest on and adjacent to the Site. A seawater intake pipe leads from Building 144 to the Inner Harbor.

The seawater intake protrudes through the sheetpile about 3 feet (1 m) below the surface of the water at a protected location inside the Inner Harbor. A deflection plate above the top of the pipe extends about 1 foot beyond the pipe and fills the normal indentation in the sheetpile. Water depth at the of base of the corroding sheetpiling is approximately 6.5 feet (2 m). In addition to the intake pipe there is a wrecked barge approximately 65 feet (20m) in length on the floor of the Inner Harbor in the vicinity of the marine sediment sampling locations.

13.6.1.2 Stressor Identification

Because of the early availability of chemical analysis data, ECs were computed and CPECs identified at this point in the SERA process using the methods described in Sections 4.3.1.1.1 and 4.3.1.1.2. Detailed results for surface soils (< 6 inches bgs) are shown in Table 13.6-1; for subsurface soils (4-10 fbgs) in Table 13.6-2; for ground water in Table 13.6-3; for marine sediment in Table 13.6-4; and for marine surface water in Table 13.6-5. Results are summarized in Table 13.6-6. CPECs in Site soils include metals, pesticides, and PAHs. Ground-water CPECs are primarily PAHs and PCBs. CPECs in marine sediments included five metals, 6 PAHs, four chlorinated pesticides, and 17 PCB congeners. CPECs in seawater samples included 21 PAHs, but no chlorinated pesticides or PCBs. Three PAH CPECs (acenaphthylene, benzo(a)anthracene, and fluorene) were present in both seawater and sediment samples with higher concentrations in the sediments. Of the chlorinated hydrocarbon CPECs in the sediments, two (Mirex and Photomirex) were also present as CPECs in surface soils, but not in other media. The presence of alkyl-substituted fluorenes in the seawater suggests that fuel hydrocarbons may have been the source of the PAHs in seawater.

13.6.1.3 Potential Ecological Effects

CPECs identified onsite that may adversely affect receptors onsite include ΣDDT, PCBs, SVOCs, PAHs, and metals. CPEC physicochemical properties and toxicology, as they relate to potential exposure routes and sensitive ecological receptors, are summarized in Section 4.2.3 and described in detail in Appendix J.

13.6.1.4 Ecological Receptor Identification

Potential terrestrial ecological receptors at Site 08 include the Laysan albatross, Bonin petrel and/or wedge-tailed shearwater, red-tailed tropicbird, white tern, bristle-thighed curlew, and Pacific golden-plover (Section 4.2.4). Many red-tailed tropicbirds were observed nesting onsite. It is also expected that high numbers of albatross, wedge-tailed shearwaters and/or Bonin petrels will nest throughout the Site, based on the number of nests and old burrows observed.

The primary ecological receptors for contaminants transported into the marine environment are the Pacific green sea turtle and the Hawaiian monk seal. Additional receptors include marine fishes, invertebrates, and algae, which form a food web with the sea turtle and monk seal at the higher trophic levels. Fishes, invertebrates, and algae observed onsite are discussed below.

Barnacles, marine snails *(Nerita* sp., *Littorina* sp. and *Cellana* sp.*)*, and the large isopod crustacean *(Ligia* sp.*)* were observed intertidally on the sheetpiling. A zone of mixed sand, coral rubble, and debris forms a gently sloping platform about 10 feet (3 m) wide. The bottom then slopes more steeply to the floor of the harbor. The green alga *Caulerpa* sp. was extremely common next to the quay wall. The quay wall supported fairly high abundances of the hard coral *Pocillopora* spp. and an attached clam (*Chama* sp.). The sea urchin *Echinometra mathaei* was also common on the quay wall and in the rubble. Only a few fish species were observed, including tobies (*Canthigaster* spp.), surgeonfish (*Acanthurus* spp.), butterflyfishes (*Chaetodon* spp.), goatfish (*Parupeneus* spp.), gobies (*Psilogobius* spp.), damselfish (*Stegastes* spp.), and wrasses (*Thalassoma* spp.). Green turtles were commonly observed in this portion of the Inner Harbor, possibly attracted by the *Caulerpa* spp. Away from the quay wall and zone of coral rubble and debris is a broad area of fine sediment with the mounds and holes of burrowing organisms such as ghost shrimp (thalassinids), snapping shrimp (alpheids), and mantis shrimp (stomatopods).

13.6.1.5 Exposure Pathway Identification

The CSM for Midway Atoll with components appropriate to Site 08 is shown in Figure 4.2-2. Potentially complete terrestrial exposure routes for Site 08 include direct exposure to contaminated soil through dermal contact, inhalation of vapors while in burrows, incidental ingestion of contaminated surface soil, and ingestion of contaminated prey items. Incidental ingestion and dermal contact with contaminated surface soils are of primary concern for the albatross and tropicbird onsite. Inhalation of vapors and dermal exposure are principal routes for the two burrowing bird species, the wedge-tailed shearwater and Bonin petrel. Direct ingestion of contaminated prey items (i.e., insects)

by the bristle-thighed curlew and Pacific golden-plover are the principle pathway of concern for these shorebird species.

The migration of CPECs from Site 08 into the offsite marine environment in the Inner Harbor may potentially occur through ground-water migration, surface water runoff during rainstorms, and through the saltwater intake pipe that leads from Building 144 to the Inner Harbor. The contaminants may remain suspended in the marine surface water or may precipitate into the sediment. Potential exposure routes to marine receptors would include direct contact with contaminated sediment and surface water, ingestion of sediment, and ingestion of contaminated prey.

13.6.1.6 Endpoints

Assessment endpoints and testable hypotheses are listed in Sections 4.2.6.1 and 4.2.6.2, respectively. Measurement endpoints selected for this Site include all those listed in Section 4.2.6.3, with the exception of #7.

13.6.1.7 Summary

Based on the preceding information, it was concluded that this Site met the three criteria that indicate the potential for risk and that completion of the SERA process was required.

13.6.2 Exposure Analysis

Terrestrial Species

Terrestrial target receptors for Site 08 include the Laysan albatross, red-tailed tropicbird, Bonin petrel and/or wedge-tailed shearwater, bristle-thighed curlew, and Pacific golden-plover. Exposure pathway models (c.f., Section 4.3.1.3) applicable to burrowing birds (#1), ground-nesting birds (#2), and shorebirds (#3) were used for the various species that occur onsite. Bonin petrels or wedge-tailed shearwaters identified onsite by the presence of burrows were evaluated for exposure to contaminants in subsurface soils through dermal exposure, incidental ingestion of soil, and inhalation of vapors. The Laysan albatross was evaluated for dermal absorption and incidental ingestion of contaminants in surface soils. The Pacific golden-plover, a representative of the shorebirds onsite

(bristle-thighed curlew), was evaluated for ingestion of invertebrates (insects) onsite that have been exposed to contaminants in surface soils. Equations for calculating EPVs are described in Section 4.3.1.4. Exposures via each pathway for each target receptor are listed in Table 13.6-7.

Marine Species

Exposure was evaluated for the marine species at these locations using the following three approaches:

1. Food chain models were used to estimate CPEC exposure in higher trophic level receptors. Exposure pathway models (c.f., Section 4.3.1.3) applicable to the marine aspects of this Site were for sea turtles (#4) and monk seals (#5). These exposure pathways and endpoints were evaluated using models described in Section 4.3.1.4. Results of these evaluations are shown in Table 13.6-7.
2. Sediment bioassays, in addition to demonstrating toxicity, provide corroborating evidence as to the potential for bioavailability of contaminants.
3. Chemical analysis of tissues to demonstrate bioavailability and bioaccumulation. Tissues collected included a primary producer (brown alga, *Dictyota acutiloba*), a suspension feeder (attached clam, *Chama iostoma*), and herbivores (sea urchin, *Echinometra mathaei* and tang, *Acanthurus triostegus*), collected onsite and from a background Site well out of contact with any Site-related contaminants. Results are shown in Table 13.6-8.

Both the tissue chemistry data and the bioassay results suggest that some Site-related CPECs are bioavailable and capable of bioaccumulation. Chemical data from marine tissues (Table 13.6-8) indicate that concentrations of many inorganic and organic analytes at Site 08 exceed background levels for at least one of the tissues sampled. Several chemicals exceeded background levels for all four tissues including six metals (aluminum, arsenic, lead, manganese, mercury, and zinc), DDE, and 10 PCB congeners. Several contaminants (selenium, gamma-chlordane, methoxychlor) were detected in tissue samples but not in other media from the Site. Others such as chrysenes (C3- and C4-alkyl substituted), fluoranthenes+pyrenes (C1-, C2-, C3- alkyl substituted), naphthalene, and phenantrenes+anthracenes (C2-, C3-, and C4-alkyl substituted) were

present in some Site-related abiotic media but not screened-in as CPECs. It should be noted that background tissue analysis results also indicate some contaminants (e.g., PCB-18) at levels well above those found in onsite tissues. This suggests either an offsite source or an atoll-wide distribution for these contaminants.

Conservative food chain modeling estimated that higher trophic level species could receive doses from direct exposure to CPECs in abiotic media and from secondary exposure to Site related CPECs that have bioaccumulated in their prey of forage items.

13.6.3 Ecological Effects Analysis

The potential for adverse ecological effects was evaluated using the following three approaches:

1. Marine sediment bioassays which considered both chronic (percentage normality [% normal]) and acute (percentage survival [% survival]) endpoints. The bioassay results are shown in Table 13.6-9.
2. Comparison of onsite and reference area benthic infaunal macroinvertebrate communities in terms of the presence/absence of specific species, species diversity (H' index), and assemblage evenness (J index).
3. Literature-derived data on CPEC toxicity with respect to specific target receptors, and when such data were not available, to appropriate surrogate test species. Toxicity reference values were calculated as described in Section 4.3.2.2 and Appendix J, and are presented in Table 13.6-11. Toxicity profiles are provided in Appendix J.

Sediment bioassay results indicate that mean % normal was significantly less ($P<0.05$) in onsite sediments than in those taken from background Sites. These results suggest that sediment-related contaminants have the potential to induce chronic adverse effects in benthic invertebrates by affecting larval development. The samples taken at different locations at the Site showed different results for percent survival. There was a significant difference ($P<0.05$) in mean % survival between the sediment sample collected inside the intake pipe and background samples. This suggests that onsite contaminants at this location may induce acute effects; however, the other sediment sample collected

approximately 16 feet from the quay wall showed no significant difference in mean percent survival with background samples, indicating that onsite contaminants at this location are present below levels that would induce acute effects. Over time, however, chronic effects could lead to a reduction in the availability of prey for receptors at higher trophic levels.

Infauna was sampled at one location for Site 08. This location was along the south side of the quay wall directly offshore of the mouth of the intake pipe. Two shallow reference Sites were sampled to place the results in perspective. Descriptive statistics were calculated on the mean of the three replicates collected at each location and presented below. The term taxa is used to refer to the taxonomic categories present in each sample that were identified to the family level or to a higher level if identification to family would be time-consuming.

The diversity was higher in the Site 08 sample than at the reference Sites (Table 13.6-10). While both Site 08 and the reference sites contained a number of oligochaetes, nematodes, and families of polychaetes, Site 08 infauna also included a mollusk, an amphipod, an echinoderm, a sponge, and several phoronids. One of the reference sites did support some gastropods, but the number of different classes of organisms found indicates a more diverse environment. One possible reason for the higher diversity of Site 08 is that it is somewhat sheltered in the Inner Harbor and is potentially a more stable environment. Due to the greater number and types of organisms at this Site compared with the reference sites, there does not appear to be a visible effect from CPECs on the infaunal community, unless the taxa that occur onsite are pollution tolerant.

Table 13.6-10

SITE 08-INFAUNA SUMMARY STATISTICS

	Number of Individuals Mean	SE	Number of Taxa	Species Diversity (H')	Evenness (J)
Site 08 Sampling Locations					
M08MI02S01	47.0	7.77	15	0.89	0.76
Shallow Reference Site Sampling Locations					
M00MI01S01	119.0	6.11	10	0.13	0.13
M00MI02S01	42.7	10.53	8	0.42	0.46

13.6.4 Risk Characterization

Risk was estimated using a quotient methodology described in Section 4.3.3.1. Results of these calculations are shown in Table 13.6-11. Results of the risk description weight-of-evidence analyses are summarized in Table 13.6-12 and are discussed below.

Terrestrial Species

Antimony, copper, and lead had TQs greater than zero indicating a moderate to high potential for adverse effects to the ground-nesting birds. Lead is of the greatest concern to the birds because of the known serious toxic effects to wildlife. There were no CPECs that indicated risks to burrowing birds or shorebirds. Potential for adverse effects from antimony, copper, and lead is suggested by a TQ analysis based on total metal concentrations. However, because only the soluble metal fraction is generally available to biota, the actual risk presented by most of these metals is likely to be lower than suggested by the TQ analysis.

Marine Species

Toxicity quotient analysis indicates that benthic marine invertebrates may be at risk from CPECs present in sediment; these findings agree with those from the bioassay tests. Results identify acenaphthene and anthracene as primary risk drivers for invertebrates in marine sediments with TQs that indicate extremely high risk. In addition, three metals

(lead, manganese, and mercury), two PCB congeners (52 and 118), and the PAH phenanthrene had TQs indicating high risk. Egg and larval stages of invertebrates exposed to dissolved PAHs exhibit sublethal effects such as inhibited embryo and larval development (Eisler 1987; Neff 1985). Comparisons of the benthic infauna community at the one location sampled with background Sites, however, show that descriptive statistics (number of individuals, number of taxa [family level and higher], species diversity [H'], and species evenness [J]) of the samples taken at the Abandoned Power Plant location were in the midrange of those observed at the Reference locations. These comparisons suggest that the infaunal community at this location is within the normal range of variability.

TQ analysis suggests no potential for adverse effects in the green sea turtle. Tissue data for the algae (*Dictyota acutiloba*) were used for exposure calculations wherever possible. Although PCBs, pesticides, metals, and PAHs were detected in the tissues, no adverse effects to turtles were indicated by the TQ analysis.

Analysis of risk to monk seals benefited from the availability of TRVs, benthic invertebrate, and fish tissue data. Although the two marine invertebrates sampled are not necessarily monk seal food items, they were used as surrogates to establish the possibility for CPEC bioaccumulation in this important food source. TQs indicate that monk seals could be at high risk from manganese. Environmental concentrations of all metals onsite are total concentrations, not soluble concentrations; therefore, the risk to marine species via direct uptake of these metals may be lower than suggested by the TQ analysis. A possible food source for seals, the tang *Acanthurus triostegus*, had measurable levels of inorganic and organic CPECs in their tissues. Some CPECs in tissues and sediments had higher concentrations at reference locations than at the Site, suggesting the possibility of atoll-wide distribution for some contaminants and the possibility that Site related CPECs are not the only sources of risk to mobile marine species such as the monk seal.

13.6.5 Uncertainty Analysis

All uncertainties discussed in Section 4.3.3.3 apply to this Site.

13.6.6 SERA Conclusions

Terrestrial Species

The assessment endpoint for special status bird species is not expected to be met because of the potential risk to bird species from metals, particularly lead. Lead and copper concentrations may pose a low risk to the birds, while antimony concentrations probably pose a lower risk due to the insoluble nature of this metal.

Marine Species

The assessment endpoint for benthic infauna species is not expected to be met because the potential for risk from Site-related contaminants in sediments and surface waters is moderate to high. Results of the toxicity test also indicate chronic and potentially acute effects onsite. The infaunal community did not appear to have any adverse effects at this time; however, results were inconclusive. The assessment endpoint for special status marine species is not expected to be met because of the potential for risk from Site-related contaminants in sediments, surface water, and tissues. A negligible risk to green sea turtles is indicated by the TQ analysis; however, there is a low to moderate risk to monk seals from lead and manganese. The source of these elevated metals concentrations is not clear and there remains the possibility that these are non-Site-related contaminants.

13.7 Conclusions and Recommendations

Metals were detected in surface soils surrounding this Site. Based on the results of the SERA, the detected levels of antimony, copper, and lead appear to present a low risk to ground-nesting birds. Since only total metals were analyzed, insufficient data are available to determine the extent to which metals are bioavailable. There were no indications of risk to burrowing birds or shorebirds. Results of the SERA indicate a moderate to high risk to benthic infauna species, and a low to moderate risk to monk seals, primarily from metals.

PAHs, metals, and PCBs, were detected in ground water beneath the Site and in marine sediments. Data from PCB wipe sampling indicate low concentrations of PCBs on concrete surfaces within the power plant building. Data developed in this SI and SERA are not adequate to determine the relative contributions of the Abandoned Power Plant,

possible offsite sources located in the Inner Harbor, and other offsite sources (atmospheric deposition, etc.) to contaminant loading in the Inner Harbor. The presence of certain PCB congeners in marine samples, not detected in ground-water samples, may indicate that the Abandoned Power Plant is not a major source of all detected PCBs. The possibility exists that the seawater intake pipe may act as a discharge conduit for ground water into the Inner Harbor, though no data exists to support this possibility.

Moderately high levels of constituents related to fuel hydrocarbons detected in subsurface soils and ground water are believed to be related to releases of fuels from underground storage tanks and underground fuel transfer lines located at the Site. Evaluation and cleanup of these constituents in soils and ground water beneath Site 08 is currently being implemented as part of the Midway closure process. No further investigation or action is recommended for fuel hydrocarbons and related constituents.

Currently, all remaining electrical equipment and transformers on Midway are being tested for PCBs and retrofilled or removed, as necessary, as part of the base closure process. PCB wipe samples collected from interior surfaces of Bldg. 144 were found to contain a maximum concentration of 0.93 $\mu g/100cm^2$ of Aroclor-1260. The levels of PCBs detected in wipe samples are not considered high enough to warrant cleanup, or special handling considerations for building demolition debris. No further action is recommended regarding the presence of PCBs on the interior surfaces of Bldg. 144.

The SERA indicates that risks associated with metals in surficial soils and marine sediments exist for both terrestrial and marine wildlife; however, results from sampling, conducted to date are inconclusive on whether the metals are in a form available to the wildlife.

Based upon the data collected during this investigation and on the results of the SERA for this Site, the following recommendations are made to minimize risk to the extent technically and economically feasible:

- Further investigation or active remediation (i.e., dredging) of sediments apparently impacted by metals in the vicinity of seawater intake pipe is not recommended at this time. We recommend a combined strategy of pollution

prevention and source control combined with natural attenuation through biodegradation, chemical degradation, and burial through normal deposition. The seawater intake pipe should be sealed with grout and closed in order to eliminate it as a possible ground-water discharge conduit into the Inner Harbor.

- A marine reconnaissance should be conducted to identify debris in the water adjacent to the Site that could be a potential source of contaminants in the marine environment. Some of the debris, particularly drums, containers, and anything that may appear to be a source of contaminants located within 100 feet of the Site, should be removed from the marine environment and disposed of properly. Debris removal will help clarify actual contaminant sources, reduce levels of contaminant-trapping particulates, and eliminate features that attract food items (fish) to the vicinity of the Site.

- After the marine debris has been removed a marine monitoring program should be implemented. As part of the monitoring program, caged bivalves should be placed around the Inner Harbor to monitor contaminant uptake by marine invertebrates through time. This monitoring effort will address not only potential contamination from Site 08, but also from other areas around the Inner Harbor.

Tables
Section 13

TABLE 13.3-1 (Page 1 of 3)
ANALYTICAL METHODS
ABANDONED POWER PLANT, BUILDING 144 (SITE 08)

		FIELD SCREENING LABORATORY				ROUTINE ANALYTICAL LABORATORY					SPECIAL ANALYTICAL LABORATORY						
	ANALYTICAL METHOD	8021	8015 B	8080	8100	8015 M/OG	OLM01.8V	OLM01.8B	OLM01.8P	ILM03.OX	STIV141A	STIV141C	STIII213	STIV141E	9060 M	ASTM GRSZ	TOXICITY
EPA ID	OGDEN ID	VOL	TPH	PEST/ PCB	PAH	FUELS	VOC	SVOC	OC PEST/PCB	METALS	LL SVOC	LL PCB	L METAL	LL PEST	TOC		
SURFACE SOIL SAMPLES																	
MF023	M08SS01S01D0025	-	-	-	-	X	-	X	X	X	-	-	-	-	-	-	-
MF024	M08SS01S02D0025	-	-	-	-	-	-	-	-	-	X	X	X	X	X	-	-
MF025	M08SS02S01D0025	-	-	-	-	X	-	X	X	X	-	-	-	-	-	-	-
MF026	M08SS02S02D0025	-	-	-	-	-	-	-	-	-	X	X	X	X	X	-	-
MF027	M08SS02D02D0025	-	-	-	-	-	-	-	-	-	X	X	X	X	X	-	-
MF028	M08SS03S01D0025	-	-	-	-	X	-	X	X	X	-	-	-	-	-	-	-
MF029	M08SS03S02D0025	-	-	-	-	-	-	-	-	-	X	X	X	X	X	-	-
MF030	M08SS04S01D0025	-	-	-	-	X	-	X	X	X	-	-	-	-	-	-	-
MF031	M08SS04D01D0025	-	-	-	-	X	-	X	X	X	-	-	-	-	-	-	-
MF032	M08SS04S02D0025	-	-	-	-	-	-	-	-	-	X	X	X	X	X	-	-
DIRECT PUSH SOIL SAMPLES																	
MF002	M08PS01S01D065	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-
MF004	M08PS02S01D065	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-
MF006	M08PS03S01D075	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-
MF008	M08PS04S01D066	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-
MF010	M08PS05S01D068	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-
MF012	M08PS06S01D100	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-
BORING SOIL SAMPLES																	
MF042	M08BS01S01D040	-	-	-	-	X	X	X	X	X	-	-	-	-	-	-	-
MF043	M08BS02S01D065	-	-	-	-	X	X	X	X	X	-	-	-	-	-	-	-
MF044	M08BS03S01D055	-	-	-	-	X	X	X	X	X	-	-	-	-	-	-	-
MF045	M08BS03D01D050	-	-	-	-	X	X	X	X	X	-	-	-	-	-	-	-

"X" = Indicates analytical method performed on sample.

TABLE 13.3-1 (Page 2 of 3)
ANALYTICAL METHODS
ABANDONED POWER PLANT, BUILDING 144 (SITE 08)

		FIELD SCREENING LABORATORY				ROUTINE ANALYTICAL LABORATORY					SPECIAL ANALYTICAL LABORATORY						
	ANALYTICAL METHOD	8021	8015 B	8080	8100	8015 M/OG	OLM01.8V	OLM01.8B	OLM01.8P	ILM03.OX	STIV141A	STIV141C	STIII213	STIV141E	9060 M	ASTM GRSZ	TOXICITY
EPA ID	OGDEN ID	VOL	TPH	PEST/ PCB	PAH	FUELS	VOC	SVOC	OC PEST/PCB	METALS	LL SVOC	LL PCB	L METAL	LL PEST	TOC		
MARINE SEDIMENT SAMPLES																	
MF013	M08MS01S01D000	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X
MF014	M08MS02S01D000	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X
MF015	M08MS02D01D000	-	-	-	-	-	-	-	-	-	X	X	X	X	X	X	X
MARINE TISSUE SAMPLES																	
MF016	M08MT01S01D009	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	-
MF017	M08MT01S01D010	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	-
MF018	M08MT01S01D017	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	-
MF019	M08MT01S01D018	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	-
MF020	M08MT01D01D018	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	-
MARINE SEA WATER SAMPLES																	
MF021	M08SW01S01D040	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	-
MF022	M08SW01D01D040	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	-
DIRECT PUSH WATER SAMPLES																	
MF001	M08PW01S01D068	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-
MF003	M08PW02S01D107	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-
MF005	M08PW03S01D075	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-
MF007	M08PW04S01D120	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-
MF009	M08PW05S01D068	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-
MF011	M08PW06S01D100	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-
MONITORING WELL SAMPLES																	
MF046	M08MW01S01D160	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-

"X" = Indicates analytical method performed on sample.

TABLE 13.3-1 (Page 3 of 3)
ANALYTICAL METHODS
ABANDONED POWER PLANT, BUILDING 144 (SITE 08)

		FIELD SCREENING LABORATORY				ROUTINE ANALYTICAL LABORATORY					SPECIAL ANALYTICAL LABORATORY						
	ANALYTICAL METHOD	8021	8015 B	8080	8100	8015 M/OG	OLM01.8V	OLM01.8B	OLM01.8P	ILM03.OX	STIV141A	STIV141C	STIII213	STIV141E	9060 M	ASTM GRSZ	TOXICITY
EPA ID	OGDEN ID	VOL	TPH	PEST/ PCB	PAH	FUELS	VOC	SVOC	OC PEST/PCB	METALS	LL SVOC	LL PCB	L METAL	LL PEST	TOC		
MF047	M08MW01S02D160	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	-
MF048	M08MW01D02D160	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	-
MF049	M08MW02S01D150	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-
MF050	M08MW02S02D150	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	-
MF051	M08MW03S01D160	-	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-
MF052	M08MW03S02D160	-	-	-	-	-	-	-	-	-	X	X	X	X	-	-	-
PCB WIPE SAMPLES																	
MF033	M08WW01S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
MF034	M08WW02S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
MF035	M08WW03S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
MF036	M08WW04S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
MF037	M08WW05S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
MF038	M08WW06S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
MF039	M08WW06D01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
MF040	M08WW07S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
TRIP BLANK SAMPLES																	
MF054	M08XW01T00D000	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-
MF055	M08XW01T00D000	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-

"X" = Indicates analytical method performed on sample.

Table 13.4-3

HYDRAULIC CONDUCTIVITY ESTIMATES BASED ON SLUG TESTING, PERMEAMETER TESTING AND PUBLISHED DATA. SITE 08-November 1994-January 1995

SOURCE	WELL OR SAMPLE #	WATER TABLE ELEVATION (feet above MLLW)	DEPTH SAMPLED (fbgs)	HYDRAULIC CONDUCTIVITY (K) (cm/sec)	(ft/day)
SLUG TEST	M08MW03	0.93		4.84E-01	1,372
PERMEAMETER TEST	M08BS01		2.0	1.1E-04	0.3
PERMEAMETER TEST	M08BS03		4.0	6.9E-04	2.0
PUBLISHED AVERAGE	CLEAN SANDS			1.0E-02	28.3
PUBLISHED AVERAGE	SILTY SANDS			1.0E-03	2.8
			MAXIMUM	4.84E-01	1,372
			MINIMUM	1.1E-04	0.3
			AVERAGE	9.92E-02	281

Table 13.4-4

HYDRAULIC CONDUCTIVITY ESTIMATES BASED ON SLUG TESTING DATA SAND ISLAND November 14-16, 1994

SITE	WELL	WATER TABLE ELEVATION (feet above MLLW)	HYDRAULIC CONDUCTIVITY (cm/sec)	(ft/day)
Abandoned Power Plant, Site 08	M08MW03	0.93	0.48	1,372
Runway Landfill, Site 02	M02MW03	0.85	0.12	349
Superblock, Site SB	MSBMW03	1.58	1.13	3,200
Bulky Waste Landfill, Site 01	M01MW01	1.09	0.25	718
Area 401, Site 05	M05MW01	1.40	0.60	1,638
		MAXIMUM	1.13	3,200
		MINIMUM	0.12	349
		AVERAGE	0.52	1,455

Table 13.5-1
Summary of Soil Results for Organics
Abandoned Power Plant (Bldg 144), Sand Island (Site 8)

			Site 8									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL																			
8015B/OG	C06-C11 (Gasoline Range)	MG/KG	3	4	0	6.1	6.1	9.8	19	M08SS03S01		0	8	0	5.2	6.1			
8015B/OG	C11-C14 (Kerosene Range)	MG/KG	3	4	0	6.1	6.1	6.6	17	M08SS03S01		0	8	0	5.2	6.1			
8015B/OG	C14-C20 (Diesel Range)	MG/KG	4	4	0			19	60	M08SS03S01		1	8	0	5.2	5.9	10	10	3.27
8015B/OG	C20-C30 (Lubricant Oil Range)	MG/KG	4	4	0			450	1900	M08SS03S01		1	8	0	21	24	44	44	13.3
9060M	Total Organic Carbon	UG/G	4	4	0			38600	224000	M08SS03S02	J								
OLM01.0B	Acenaphthene	UG/KG	1	5	1	400	2100	79	79	M08SS02S01	J	0	8	0	350	410			
OLM01.0B	Anthracene	UG/KG	2	5	1	400	2100	26	210	M08SS02S01	J	0	8	0	350	410			
OLM01.0B	Benzo(a)Anthracene	UG/KG	1	5	1	370	2100	170	170	M08SS01S01	J	0	8	0	350	410			
OLM01.0B	Benzo(a)Pyrene	UG/KG	2	5	1	400	2100	180	320	M08SS02S01	J	0	8	0	350	410			
OLM01.0B	Benzo(b)Fluoranthene	UG/KG	2	5	1	400	2100	340	410	M08SS02S01	J	0	8	0	350	410			
OLM01.0B	Benzo(g,h,i)perylene	UG/KG	1	5	1	370	2100	99	99	M08SS01S01	J	0	8	0	350	410			
OLM01.0B	Benzo(k)Fluoranthene	UG/KG	1	5	1	370	2100	110	110	M08SS01S01	J	0	8	0	350	410			
OLM01.0B	bis(2-Ethylhexyl)phthalate	UG/KG	1	5	1	370	2100	73	73	M08SS01S01	J	1	8	0	350	410	1600	1600	246
OLM01.0B	Carbazole	UG/KG	2	5	1	400	2100	71	270	M08SS02S01	J	0	8	0	350	410			
OLM01.0B	Chrysene	UG/KG	3	5	1	2100	2100	55	880	M08SS02S01		0	8	0	350	410			
OLM01.0B	Dibenzofuran	UG/KG	1	5	1	400	2100	20	20	M08SS02S01	J	0	8	0	350	410			
OLM01.0B	Fluoranthene	UG/KG	3	5	1	2100	2100	52	760	M08SS02S01		0	8	0	350	410			
OLM01.0B	Fluorene	UG/KG	1	5	1	400	2100	46	46	M08SS02S01	J	0	8	0	350	410			
OLM01.0B	Phenanthrene	UG/KG	2	5	1	400	2100	95	510	M08SS02S01		0	8	0	350	410			
OLM01.0B	Pyrene	UG/KG	2	5	1	400	2100	410	1000	M08SS02S01		0	8	0	350	410			
OLM01.0P	4,4'-DDE	UG/KG	3	4	0	18	18	4.4	20	M08SS01S01		4	10	2	3.4	4	5.2	1900	13.1
OLM01.0P	4,4'-DDT	UG/KG	4	4	0			3.6	57	M08SS02S01		2	10	2	3.4	4	200	320	6.3
OLM01.0P	Aroclor-1260	UG/KG	4	4	0			92	440	M08SS01S01		0	10	2	34	160			
STIV141A	Acenaphthene	UG/KG	4	5	1			3.7	110	M08SS02S02		3	9	1	0.17	0.18	0.072	5.2	0.154
STIV141A	Acenaphthylene	UG/KG	4	5	1			2	7	M08SS01S02	J	4	9	1	0.16	0.17	0.35	3.1	0.267
STIV141A	Anthracene	UG/KG	4	5	1			10	170	M08SS02S02		8	9	1			0.086	24	0.531
STIV141A	Benzo(a)Anthracene	UG/KG	4	5	1			56	590	M08SS02S02		8	9	1			1	260	4.1
STIV141A	Benzo(a)Pyrene	UG/KG	4	5	1			66	520	M08SS02S02		8	9	1			0.84	270	3.89
STIV141A	Benzo(b)Fluoranthene	UG/KG	4	5	1			110	720	M08SS02S02		8	9	1			0.94	300	6.13

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles
8015B/OG = Total Fuel Hydrocarbons
OLM01.0P = CLP Pesticides/PCBs
OLM01.0B = CLP Semi Volatiles

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 13.5-1
Summary of Soil Results for Organics
Abandoned Power Plant (Bldg 144), Sand Island (Site 8)

			Site 8									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL - continued																			
STIV141A	Benzo(e)pyrene	UG/KG	4	5	1			59	330	M08SS02S02		8	9	1			0.83	160	3.97
STIV141A	Benzo(g,h,i)perylene	UG/KG	4	5	1			60	340	M08SS02S02		8	9	1			0.79	55	3.27
STIV141A	Benzo(k)Fluoranthene	UG/KG	4	5	1			35	220	M08SS02S02		8	9	1			0.55	130	2.75
STIV141A	Biphenyl	UG/KG	2	5	1	4.7	5.3	1.8	2.3	M08SS02S02	J	0	8	0	0.049	0.2			
STIV141A	Chrysene	UG/KG	4	5	1			78	730	M08SS02S02		8	9	1			1.6	300	6.46
STIV141A	Chrysenes, C1-alkyl-substitute	UG/KG	4	5	1			36	270	M08SS02S02		8	9	1			0.57	180	2.97
STIV141A	Chrysenes, C2-alkyl-substitute	UG/KG	3	5	1	7.7	7.7	23	110	M08SS02S02		6	9	1	0.26	0.26	0.84	59	1.58
STIV141A	Chrysenes, C3-alkyl-substitute	UG/KG	3	5	1	7.7	7.7	19	69	M08SS02S02		3	9	1	0.26	0.28	7.1	22	0.731
STIV141A	Chrysenes, C4-alkyl-substitute	UG/KG	2	5	1	0.38	7.7	14	37	M08SS02S02		3	9	1	0.26	0.28	5	11	0.608
STIV141A	Dibenzo(a,h)Anthracene	UG/KG	4	5	1			11	79	M08SS02S02		8	9	1			0.15	20	0.676
STIV141A	Dibenzothiophene	UG/KG	4	5	1			1.5	45	M08SS02S02		4	9	1	0.16	0.17	0.097	4	0.149
STIV141A	Dibenzothiophenes, C1-alkyl-su	UG/KG	2	5	1	4.3	4.8	11	21	M08SS02S02		4	9	1	0.16	0.17	0.08	3.5	0.147
STIV141A	Dibenzothiophenes, C2-alkyl-su	UG/KG	2	5	1	4.3	4.8	17	18	M08SS01S02	J	4	9	1	0.16	0.17	0.2	6.5	0.243
STIV141A	Dibenzothiophenes, C3-alkyl-su	UG/KG	2	5	1	4.3	4.8	10	16	M08SS01S02	J	3	9	1	0.16	0.18	0.29	5.2	0.225
STIV141A	Fluoranthene	UG/KG	4	5	1			96	1400	M08SS02S02		8	9	1			2	370	8.68
STIV141A	Fluoranthenes+Pyrenes, C1-alk	UG/KG	4	5	1			47	470	M08SS02S02		8	9	1			1.1	200	3.98
STIV141A	Fluoranthenes+Pyrenes, C2-alk	UG/KG	4	5	1			36	290	M08SS02S02		7	9	1	0.2	0.2	0.97	140	3
STIV141A	Fluoranthenes+Pyrenes, C3-alk	UG/KG	4	5	1			13	70	M08SS01S02	J	5	9	1	0.2	0.2	0.71	38	0.976
STIV141A	Fluorene	UG/KG	4	5	1			2.3	76	M08SS02S02		4	9	1	0.22	0.22	0.064	3	0.146
STIV141A	Fluorenes, C1-alkyl-substitute	UG/KG	2	5	1	5.8	6.6	5	17	M08SS02S02		1	9	1	0.22	0.25	2	2	0.164
STIV141A	Fluorenes, C2-alkyl-substitute	UG/KG	2	5	1	5.8	6.6	8.8	15	M08SS02S02		1	8	0	0.22	0.25	3	3	0.173
STIV141A	Indeno(1,2,3-cd)pyrene	UG/KG	4	5	1			57	360	M08SS02S02		8	9	1			0.67	180	3.2
STIV141A	Naphthalene	UG/KG	1	5	1	6.9	8.2	4.6	4.6	M08SS01S02	J	0	9	1	0.23	0.26			
STIV141A	Naphthalenes, C1-alkyl-substit	UG/KG	2	5	1	6.1	6.9	8.9	11	M08SS02S02		1	8	0	0.23	0.26	0.29	0.29	0.133
STIV141A	Naphthalenes, C2-alkyl-substit	UG/KG	2	5	1	6.1	6.9	12	17	M08SS02S02		1	8	0	0.23	0.26	0.58	0.58	0.146
STIV141A	Naphthalenes, C3-alkyl-substit	UG/KG	2	5	1	6.1	6.9	15	18	M08SS02S02		1	8	0	0.23	0.26	1.1	1.1	0.158
STIV141A	Naphthalenes, C4-alkyl-substit	UG/KG	2	5	1	6.1	6.9	14	16	M08SS01S02	J	1	8	0	0.23	0.26	1.6	1.6	0.166
STIV141A	Perylene	UG/KG	4	5	1			18	120	M08SS02S02		8	9	1			0.22	51	1.38
STIV141A	Phenanthrene	UG/KG	4	5	1			35	990	M08SS02S02		8	9	1			0.33	89	1.78

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles
STIV141C = NOAA Status and Trends PCBs

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 13.5-1
Summary of Soil Results for Organics
Abandoned Power Plant (Bldg 144), Sand Island (Site 8)

			Site 8									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL - continued																			
STIV141A	Phenanthrenes+Anthra., C1-alk	UG/KG	4	5	1			17	280	M08SS02S02		8	9	1			0.44	59	1.46
STIV141A	Phenanthrenes+Anthra., C2-alk	UG/KG	4	5	1			14	130	M08SS02S02		7	9	1	0.28	0.28	0.5	43	1.16
STIV141A	Phenanthrenes+Anthra., C3-alk	UG/KG	4	5	1			9	54	M08SS02S02		4	9	1	0.27	0.29	0.43	21	0.54
STIV141A	Phenanthrenes+Anthra., C4-alk	UG/KG	4	5	1			28	150	M08SS02S02		5	8	0	0.27	0.29	1.4	75	1.19
STIV141A	Pyrene	UG/KG	4	5	1			98	1300	M08SS02S02		8	9	1			2.1	390	8.67
STIV141C	PCB-101 (2,2',3,5,5')	UG/KG	2	5	1	0.029	0.029	0.13	2.4	M08SS01S02		4	8	0	0.011	0.012	0.1	1.7	0.054
STIV141C	PCB-105 (2,3,3',4,4')	UG/KG	4	5	1			0.39	2	M08SS01S02		5	8	0	0.012	0.014	0.11	1.2	0.0884
STIV141C	PCB-118 (2,3',4,4',5)	UG/KG	4	5	1			0.84	4.3	M08SS01S02		8	8	0			0.085	2.8	0.506
STIV141C	PCB-126 (3,3',4,4',5)	UG/KG	1	5	1	0.087	0.098	0.21	0.21	M08SS01S02		0	8	0	0.033	0.037			
STIV141C	PCB-128 (2,2',3,3',4,4')	UG/KG	2	5	1	0.039	0.042	0.76	3.8	M08SS01S02		7	8	0	0.014	0.014	0.048	1.2	0.16
STIV141C	PCB-138 (2,2',3,4,4',5')	UG/KG	4	6	2			5.9	25	M08SS01S02		8	8	0			0.27	5.5	1.24
STIV141C	PCB-153 (2,2',4,4',5,5')	UG/KG	4	6	2			7	19	M08SS01S02		8	9	1			0.46	5.9	1.64
STIV141C	PCB-170 (2,2',3,3',4,4',5)	UG/KG	4	6	2			3.6	15	M08SS01S02		7	8	0	0.059	0.059	0.14	1.4	0.293
STIV141C	PCB-180 (2,2',3,4,4',5,5')	UG/KG	4	6	2			8.1	30	M08SS01S02		8	8	0			0.23	2	0.846
STIV141C	PCB-187 (2,2',3,4',5,5',6)	UG/KG	2	6	2	0.067	0.074	13	23	M08SS01S02		6	8	0	0.027	0.027	0.14	1.4	0.238
STIV141C	PCB-195 (2,2',3,3',4,4',5,6)	UG/KG	4	5	1			0.65	3.5	M08SS01S02		8	8	0			0.032	0.38	0.127
STIV141C	PCB-206 (2,2',3,3',4,4',5,5',6	UG/KG	4	5	1			0.2	3.2	M08SS02S02		7	8	0	0.011	0.011	0.036	0.76	0.0866
STIV141C	PCB-209 (2,2',3,3',4,4',5,5',6	UG/KG	3	5	1	0.032	0.032	0.07	1.2	M08SS01S02		7	8	0	0.013	0.013	0.037	0.94	0.0931
STIV141C	PCB-44 (2,2',3,5')	UG/KG	1	5	1	0.034	0.038	0.11	0.11	M08SS01S02		1	8	0	0.013	0.014	0.27	0.27	0.0106
STIV141E	2,4'-DDD	UG/KG	1	5	1	0.04	0.045	6.5	6.5	M08SS01S02		6	8	0	0.015	0.016	0.045	8.7	0.21
STIV141E	2,4'-DDT	UG/KG	4	4	0			1	3	M08SS02S02		7	10	2	0.024	0.024	0.19	62	0.931
STIV141E	4,4'-DDD	UG/KG	2	4	0	0.069	0.076	0.25	5.2	M08SS01S02		5	8	0	0.026	0.029	0.063	8.3	0.169
STIV141E	4,4'-DDE	UG/KG	4	5	1			5	11	M08SS01S02		8	12	4			0.6	1300	13.2
STIV141E	4,4'-DDT	UG/KG	3	6	2	0.03	0.03	6.4	27	M08SS02S02		8	10	2			0.091	260	3.57
STIV141E	alpha-Chlordane	UG/KG	1	4	0	0.039	0.044	1.9	1.9	M08SS01S02		6	8	0	0.014	0.015	0.03	4.1	0.107
STIV141E	delta-BHC	UG/KG	1	4	0	0.032	0.036	0.14	0.14	M08SS01S02		0	8	0	0.012	0.014			
STIV141E	Dieldrin	UG/KG	1	4	0	0.051	0.058	2.3	2.3	M08SS01S02		2	8	0	0.019	0.022	0.059	0.15	0.0177
STIV141E	gamma-BHC (Lindane)	UG/KG	3	4	0	0.022	0.022	0.092	0.14	M08SS03S02		2	8	0	0.015	0.017	0.073	0.11	0.0145
STIV141E	gamma-Chlordane	UG/KG	1	4	0	0.042	0.047	1	1	M08SS01S02		4	8	0	0.016	0.018	0.029	1.8	0.0345

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles
STIV141C = NOAA Status and Trends PCBs
STIV141E = NOAA Status and Trends Pesticides

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation.
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 13.5-1
Summary of Soil Results for Organics
Abandoned Power Plant (Bldg 144), Sand Island (Site 8)

			Site 8									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL - continued																			
STIV141E	Hexachlorobenzene	UG/KG	2	4	0	0.048	0.052	0.045	0.061	M08SS01S02		6	8	0	0.018	0.019	0.0089	0.027	0.0121
STIV141E	Methoxychlor	UG/KG	3	4	0	0.11	0.11	1.8	4	M08SS03S02		0	8	0	0.076	0.086			
STIV141E	Mirex	UG/KG	4	4	0			0.092	0.85	M08SS01S02		8	8	0			0.13	2.8	0.609
STIV141E	Oxychlorostyrene	UG/KG	2	4	0	0.022	0.042	0.092	0.12	M08SS03S02		2	8	0	0.015	0.017	0.058	0.13	0.0147
STIV141E	Photomirex	UG/KG	1	4	0	0.063	0.071	1.2	1.2	M08SS01S02		1	8	0	0.024	0.027	0.45	0.45	0.0197
STIV141E	trans-Nonachlor	UG/KG	4	4	0			0.24	0.73	M08SS01S02		8	9	1			0.043	18	0.699
SUBSURFACE SOIL																			
8015B/OG	C14-C20 (Diesel Range)	MG/KG	1	3	0	5.4	6.2	290	290	M08BS02S01		0	12	0	5.5	6.7			
8015B/OG	C20-C30 (Lubricant Oil Range)	MG/KG	2	3	0	25	25	58	1200	M08BS02S01		0	12	0	22	27			
OLM01.0B	Benzo(a)Anthracene	UG/KG	1	3	0	420	1800	240	240	M08BS01S01	J	0	12	0	370	580			
OLM01.0B	Benzo(a)Pyrene	UG/KG	1	3	0	420	1800	190	190	M08BS01S01	J	0	12	0	370	580			
OLM01.0B	Benzo(b)Fluoranthene	UG/KG	1	3	0	420	1800	190	190	M08BS01S01	J	0	12	0	370	580			
OLM01.0B	Benzo(g,h,i)perylene	UG/KG	1	3	0	420	1800	120	120	M08BS01S01	J	0	12	0	370	580			
OLM01.0B	Benzo(k)Fluoranthene	UG/KG	1	3	0	420	1800	210	210	M08BS01S01	J	0	12	0	370	580			
OLM01.0B	Chrysene	UG/KG	1	3	0	420	1800	310	310	M08BS01S01	J	0	12	0	370	580			
OLM01.0B	Fluoranthene	UG/KG	1	3	0	420	1800	340	340	M08BS01S01	J	0	12	0	370	580			
OLM01.0B	Indeno(1,2,3-cd)pyrene	UG/KG	1	3	0	420	1800	140	140	M08BS01S01	J	0	12	0	370	580			
OLM01.0B	Phenanthrene	UG/KG	1	3	0	420	1800	63	63	M08BS01S01	J	0	12	0	370	580			
OLM01.0B	Pyrene	UG/KG	1	3	0	420	1800	400	400	M08BS01S01		0	12	0	370	580			
OLM01.0V	(Meta+Para)-Xylene	UG/KG	1	3	0	1	1	2	2	M08BS02S01		1	12	0	1	1	2	2	0.561
OLM01.0V	Acetone	UG/KG	3	3	0			10	49	M08BS03S01	J	12	12	0			16	200	39.1
OLM01.0V	Methylene Chloride	UG/KG	2	3	0	5	5	16	20	M08BS03S01		2	12	0	5	7	1	2	2.6

Notes:

STIV141E = NOAA Status and Trends Pesticides
8015B/OG = Total Fuel Hydrocarbons
OLM01.0B = CLP Semi Volatiles
OLM01.0V = CLP Volatiles

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 13.5-2
Summary of Soil Results for Inorganics
Abandoned Power Plant (Bldg 144), Sand Island (Site 8)

			Site 8									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL																			
ILM03.0	Aluminum	MG/KG	4	4	0			309	2310	M08SS01S01		4	8	0	2.9	3.2	127	879	25.2
ILM03.0	Antimony	MG/KG	1	4	0	2.6	3	23.4	23.4	M08SS01S01	J	0	8	0	2.5	2.9			
ILM03.0	Arsenic	MG/KG	2	4	0	0.52	0.56	1.4	31.8	M08SS01S01		1	8	0	0.29	0.34	0.46	0.46	0.179
ILM03.0	Barium	MG/KG	4	4	0			19.9	3360	M08SS01S01		8	8	0			6	15.3	8.68
ILM03.0	Beryllium	MG/KG	2	4	0	0.13	0.15	0.14	0.25	M08SS01S01		8	8	0			0.19	0.45	0.3
ILM03.0	Cadmium	MG/KG	4	4	0			0.37	8.7	M08SS01S01		8	8	0			0.39	0.99	0.617
ILM03.0	Calcium	MG/KG	4	4	0			193000	299000	M08SS03S01		8	8	0			32400	343000	244000
ILM03.0	Chromium	MG/KG	4	4	0			8	69.1	M08SS01S01		8	8	0			4.1	8	5.48
ILM03.0	Cobalt	MG/KG	2	4	0	1.1	1.2	2.1	15.2	M08SS01S01		2	8	0	0.97	1.1	1.5	2.2	0.712
ILM03.0	Copper	MG/KG	4	4	0			18.6	24800	M08SS01S01	J	1	8	0	1	4.3	5.6	5.6	1.57
ILM03.0	Iron	MG/KG	4	4	0			2150	44600	M08SS01S01	J	8	8	0			37.4	1240	206
ILM03.0	Lead	MG/KG	4	4	0			41.7	2310	M08SS01S01		8	8	0			2.7	10.5	6.28
ILM03.0	Magnesium	MG/KG	4	4	0			10300	15200	M08SS03S01		8	8	0			14000	16800	15700
ILM03.0	Manganese	MG/KG	4	4	0			27.7	273	M08SS01S01	J	8	8	0			4.3	36.7	9.02
ILM03.0	Mercury	MG/KG	1	4	0	0.05	0.06	3.8	3.8	M08SS01S01		3	8	0	0.05	0.06	0.05	0.09	0.039
ILM03.0	Nickel	MG/KG	2	4	0	1.6	1.7	4.6	36.6	M08SS01S01		1	8	0	1.4	1.6	2.3	2.3	0.848
ILM03.0	Potassium	MG/KG	4	4	0			143	205	M08SS02S01	J	8	8	0			55.4	143	83.9
ILM03.0	Sodium	MG/KG	4	4	0			1590	2430	M08SS04S01	J	8	8	0			2350	2550	2440
ILM03.0	Vanadium	MG/KG	4	4	0			3.1	13.4	M08SS01S01		8	8	0			1.1	3.5	1.71
ILM03.0	Zinc	MG/KG	4	4	0			183	2810	M08SS01S01	J	8	8	0			7.5	121	22.1
STIII213	Antimony	MG/KG	4	4	0			2.22	73.7	M08SS01S02		8	8	0			0.288	1.06	0.537
STIII213	Arsenic	MG/KG	4	4	0			2.5	239	M08SS01S02		3	8	0	1.6	1.6	1.62	2	1.09
STIII213	Cadmium	MG/KG	4	4	0			0.864	8.07	M08SS01S02		8	8	0			0.53	1.44	0.946
STIII213	Chromium	MG/KG	4	4	0			8.3	110	M08SS01S02		1	8	0	7.66	10	12.4	12.4	4.74
STIII213	Copper	MG/KG	4	4	0			16.9	3520	M08SS01S02		5	8	0	3.32	3.32	5.6	7.8	3.83
STIII213	Iron	MG/KG	4	4	0			1810	45400	M08SS02S02		8	8	0			64.2	2060	334
STIII213	Lead	MG/KG	4	4	0			42.4	2790	M08SS01S02		5	8	0	4.37	4.37	5.8	9.7	4.61
STIII213	Manganese	MG/KG	4	4	0			27.8	305	M08SS02S02		3	8	0	14	17	21	37.6	12.6
STIII213	Mercury	MG/KG	4	4	0			0.043	1.8	M08SS01S02		3	8	0	0.025	0.025	0.029	0.062	0.0203
STIII213	Nickel	MG/KG	2	4	0	2.9	4	16.1	50.8	M08SS01S02		2	8	0	5.7	7.3	5.9	9.8	3.84

Notes:

STIII213 = NOAA Status and Trends Low Level Metals
ILM03.0 = CLP Metals

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
Mean = Geometric Mean

Table 13.5-2
Summary of Soil Results for Inorganics
Abandoned Power Plant (Bldg 144), Sand Island (Site 8)

			Site 8									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL - continued																			
STIII213	Selenium	MG/KG	2	4	0	0.3	0.3	0.361	0.669	M08SS01S02	J	4	8	0	0.3	0.3	0.322	0.594	0.25
STIII213	Silicon	MG/KG	2	4	0	1600	1800	1780	80100	M08SS01S02		2	8	0	2200	2400	2900	5600	1560
STIII213	Silver	MG/KG	4	4	0			0.045	0.856	M08SS01S02		7	8	0	0.04	0.04	0.0413	0.741	0.073
STIII213	Thallium	MG/KG	1	4	0	0.032	0.032	0.109	0.109	M08SS01S02		6	8	0	0.024	0.024	0.026	0.036	0.0238
STIII213	Tin	MG/KG	4	4	0			1.12	70.1	M08SS01S02	J	2	8	0	0.072	0.197	5	6.06	0.186
STIII213	Zinc	MG/KG	4	4	0			230	3040	M08SS01S02		8	8	0			7.8	75.8	19.6
SUBSURFACE SOIL																			
ILM03.0	Barium	MG/KG	3	3	0			5.2	6.41	M08BS01S01	J	12	12	0			4.3	92.3	8.19
ILM03.0	Beryllium	MG/KG	3	3	0			0.16	0.47	M08BS03S01		8	12	0	0.33	0.5	0.21	0.57	0.264
ILM03.0	Cadmium	MG/KG	3	3	0			0.06	0.18	M08BS03S01		7	12	0	0.04	0.06	0.04	0.35	0.0615
ILM03.0	Calcium	MG/KG	3	3	0			311000	328000	M08BS03S01	J	12	12	0			34100	350000	276000
ILM03.0	Chromium	MG/KG	3	3	0			5.2	7.01	M08BS01S01		12	12	0			4.1	19	6.09
ILM03.0	Iron	MG/KG	3	3	0			21.7	3550	M08BS01S01	J	11	12	0	2.7	2.7	2	6910	33.6
ILM03.0	Lead	MG/KG	1	3	0	0.28	0.32	7.06	7.06	M08BS01S01		5	12	0	0.19	0.28	0.29	171	0.402
ILM03.0	Magnesium	MG/KG	3	3	0			14000	17000	M08BS02S01		12	12	0			14900	20800	17200
ILM03.0	Manganese	MG/KG	3	3	0			3.2	33.1	M08BS01S01	J	12	12	0			3.2	124	7.21
ILM03.0	Selenium	MG/KG	3	3	0			1.1	1.9	M08BS03S01		12	12	0			1.3	2.2	1.83
ILM03.0	Sodium	MG/KG	3	3	0			2330	2790	M08BS03S01	J	12	12	0			2250	4110	2680
ILM03.0	Vanadium	MG/KG	3	3	0			1.1	2.19	M08BS01S01		11	12	0	0.76	0.76	0.9	12.5	1.58

Notes:

STIII213 = NOAA Status and Trends Low Level Metals
ILM03.0 = CLP Metals

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
Mean = Geometric Mean

Table 13.5-3
Summary of Groundwater Results for Organics
Abandoned Power Plant (Bldg 144), Sand Island (Site 8)
Page 1 of 2

			Site 8										Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
8015B/OG	C06-C11 (Gasoline Range)	MG/L	1	3	0	0.5	0.5	0.52	0.52	M08MW02S01		0	4	0	0.5	0.5			
8015B/OG	C11-C14 (Kerosene Range)	MG/L	1	3	0	0.5	0.5	1.8	1.8	M08MW02S01		0	4	0	0.5	0.5			
8015B/OG	C14-C20 (Diesel Range)	MG/L	2	3	0	0.5	0.5	2.2	7	M08MW02S01	J	0	4	0	0.5	0.5			
8015B/OG	C20-C30 (Lubricant Oil Range)	MG/L	2	3	0	2	2	11	21	M08MW02S01		0	4	0	2	2			
GEN. MIN.	Alkalinity	MG/L	3	3	0			522	679	M08MW01S01	J								
GEN. MIN.	Bicarbonate	MG/L	3	3	0			522	679	M08MW01S01	J								
GEN. MIN.	pH	MG/L	3	3	0			7.3	7.5	M08MW02S01	J								
OLM01.0V	1,2-Dichloroethene(total)	UG/L	1	3	0	1	1	6	6	M08MW02S01		0	4	0	1	1			
OLM01.0V	Benzene	UG/L	2	3	0	1	1	2	2	M08MW01S01		0	4	0	1	1			
OLM01.0V	Ethylbenzene	UG/L	1	3	0	1	1	2	2	M08MW02S01		0	4	0	1	1			
STIV141A	Acenaphthene	UG/L	3	4	1			0.14	0.5	M08MW01S02	J	0	4	0	0.0015	0.0015			
STIV141A	Anthracene	UG/L	3	4	1			0.0095	0.08	M08MW02S02	J	2	4	0	0.0056	0.0057	0.0033	0.012	0.00422
STIV141A	Benzo(a)Anthracene	UG/L	2	4	1	0.0086	0.0086	0.0019	0.0074	M08MW02S02	J	0	4	0	0.0088	0.0091			
STIV141A	Benzo(a)Pyrene	UG/L	2	4	1	0.007	0.007	0.00058	0.0035	M08MW02S02	J	0	4	0	0.0072	0.0074			
STIV141A	Benzo(b)Fluoranthene	UG/L	2	4	1	0.0088	0.0088	0.0013	0.007	M08MW02S02	J	0	4	0	0.0091	0.0093			
STIV141A	Benzo(e)pyrene	UG/L	2	4	1	0.0071	0.0071	0.00064	0.004	M08MW02S02	J	0	4	0	0.0073	0.0076			
STIV141A	Benzo(g,h,i)perylene	UG/L	1	4	1	0.0083	0.0083	0.0017	0.0017	M08MW02S02	J	0	4	0	0.0085	0.0087			
STIV141A	Benzo(k)Fluoranthene	UG/L	2	4	1	0.0069	0.0069	0.00028	0.0022	M08MW02S02	J	0	4	0	0.0071	0.0073			
STIV141A	Biphenyl	UG/L	3	4	1			0.006	1.4	M08MW02S02	J	2	4	0	0.0034	0.0035	0.0013	0.0016	0.00158
STIV141A	Chrysene	UG/L	2	4	1	0.0032	0.0032	0.0027	0.0091	M08MW02S02	J	0	4	0	0.0033	0.0034			
STIV141A	Chrysenes, C1-alkyl-substitute	UG/L	1	4	1	0.0032	0.0032	0.004	0.004	M08MW02S02	J	0	4	0	0.0033	0.0034			
STIV141A	Chrysenes, C2-alkyl-substitute	UG/L	1	4	1	0.0032	0.0032	0.0028	0.0028	M08MW02S02	J	0	4	0	0.0033	0.0034			
STIV141A	Dibenzothiophene	UG/L	2	4	1	0.0021	0.0021	0.35	0.91	M08MW02S02	J	2	4	0	0.0022	0.0022	0.00098	0.0068	0.00169
STIV141A	Dibenzothiophenes, C1-alkyl-su	UG/L	2	4	1	0.0021	0.0021	0.38	1	M08MW02S02	J	0	4	0	0.0022	0.0023			
STIV141A	Dibenzothiophenes, C2-alkyl-su	UG/L	2	4	1	0.0021	0.0021	0.2	0.61	M08MW02S02	J	0	4	0	0.0022	0.0023			
STIV141A	Dibenzothiophenes, C3-alkyl-su	UG/L	2	4	1	0.0021	0.0021	0.062	0.25	M08MW02S02	J	0	4	0	0.0022	0.0023			
STIV141A	Fluoranthene	UG/L	3	4	1			0.032	0.066	M08MW02S02	J	4	4	0			0.0011	0.0039	0.00187
STIV141A	Fluoranthenes+Pyrenes, C1-alk	UG/L	2	4	1	0.0025	0.0025	0.017	0.026	M08MW02S02	J	0	4	0	0.0025	0.0026			
STIV141A	Fluoranthenes+Pyrenes, C2-alk	UG/L	1	4	1	0.0025	0.0025	0.013	0.013	M08MW02S02	J	0	4	0	0.0025	0.0026			
STIV141A	Fluoranthenes+Pyrenes, C3-alk	UG/L	1	4	1	0.0025	0.0025	0.0087	0.0087	M08MW02S02	J	0	4	0	0.0025	0.0026			
STIV141A	Fluorene	UG/L	2	4	1	0.0031	0.0031	0.73	1.8	M08MW02S02	J	1	4	0	0.0032	0.0033	0.0024	0.0024	0.00178
STIV141A	Fluorenes, C1-alkyl-substitute	UG/L	3	4	1			0.0068	1.7	M08MW02S02	J	0	4	0	0.0032	0.0033			
STIV141A	Fluorenes, C2-alkyl-substitute	UG/L	2	4	1	0.0031	0.0031	0.49	0.86	M08MW02S02	J	0	4	0	0.0032	0.0033			
STIV141A	Fluorenes, C3-alkyl-substitute	UG/L	2	4	1	0.0031	0.0031	0.15	0.28	M08MW02S02	J	0	4	0	0.0032	0.0033			
STIV141A	Indeno(1,2,3-cd)pyrene	UG/L	1	4	1	0.0066	0.0066	0.0022	0.0022	M08MW02S02	J	0	4	0	0.0068	0.0069			
STIV141A	Naphthalene	UG/L	3	4	1			0.034	4.8	M08MW02S02		0	4	0	0.0054	0.0092			

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 13.5-3
Summary of Groundwater Results for Organics
Abandoned Power Plant (Bldg 144), Sand Island (Site 8)

			Site 8									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
STIV141A	Naphthalenes, C1-alkyl-substit	UG/L	3	4	1			0.15	13	M08MW02S02		4	4	0			0.0042	0.0069	0.00547
STIV141A	Naphthalenes, C2-alkyl-substit	UG/L	3	4	1			1.6	19	M08MW02S02		3	4	0	0.0045	0.0045	0.0047	0.0086	0.00485
STIV141A	Naphthalenes, C3-alkyl-substit	UG/L	3	4	1			0.12	9	M08MW02S02		0	4	0	0.0044	0.0046			
STIV141A	Naphthalenes, C4-alkyl-substit	UG/L	3	4	1			0.12	2.5	M08MW01S02	J	0	4	0	0.0044	0.0046			
STIV141A	Perylene	UG/L	1	4	1	0.0068	0.0068	0.00082	0.00082	M08MW02S02	J	1	4	0	0.007	0.0071	0.0023	0.0023	0.00316
STIV141A	Phenanthrene	UG/L	3	4	1			0.013	1.3	M08MW02S02	J	4	4	0			0.0026	0.0042	0.0034
STIV141A	Phenanthrenes+Anthra., C1-alk	UG/L	2	4	1	0.0084	0.0084	0.52	0.91	M08MW02S02	J	0	4	0	0.0018	0.0019			
STIV141A	Phenanthrenes+Anthra., C2-alk	UG/L	2	4	1	0.011	0.011	0.19	0.34	M08MW02S02	J	0	4	0	0.0018	0.0019			
STIV141A	Phenanthrenes+Anthra., C3-alk	UG/L	1	4	1	0.0065	0.035	0.095	0.095	M08MW02S02	J	0	4	0	0.0018	0.0019			
STIV141A	Pyrene	UG/L	3	4	1			0.024	0.062	M08MW02S02	J	2	4	0	0.0045	0.0046	0.0019	0.0038	0.00247
STIV141C	PCB-118 (2,3',4,4',5)	UG/L	2	3	0	0.00034	0.00034	0.0087	0.036	M08MW01S02		0	4	0	0.00036	0.00037			
STIV141C	PCB-126 (3,3',4,4',5)	UG/L	1	3	0	0.00045	0.00045	0.0001	0.0001	M08MW01S02	J	0	4	0	0.00046	0.00047			
STIV141C	PCB-138 (2,2',3,4,4',5')	UG/L	3	3	0			0.0012	0.0027	M08MW03S01B		0	4	0	0.0005	0.00052			
STIV141C	PCB-170 (2,2',3,3',4,4',5)	UG/L	2	3	0	0.0026	0.0026	0.00031	0.00043	M08MW02S02	J	0	4	0	0.0027	0.0028			
STIV141C	PCB-195 (2,2',3,3',4,4',5,6)	UG/L	2	3	0	0.00056	0.00056	0.00014	0.00018	M08MW03S01B	J	0	4	0	0.00058	0.0006			
STIV141C	PCB-206 (2,2',3,3',4,4',5,5',6	UG/L	3	3	0			0.000076	0.00064	M08MW02S02		1	4	0	0.00045	0.00046	0.00081	0.00081	0.000313
STIV141C	PCB-209 (2,2',3,3',4,4',5,5',6	UG/L	3	3	0			0.000035	0.00057	M08MW02S02		1	4	0	0.00054	0.00055	0.00072	0.00072	0.000348
STIV141C	PCB-44 (2,2',3,5')	UG/L	2	3	0	0.00031	0.00031	0.0035	0.0058	M08MW01S02		0	4	0	0.00032	0.00032			
STIV141C	PCB-66 (2,3',4,4')	UG/L	1	3	0	0.0003	0.0003	0.0045	0.0045	M08MW01S02		0	4	0	0.0003	0.00031			
STIV141E	2,4'-DDE	UG/L	1	3	0	0.00033	0.00033	0.0024	0.0024	M08MW01S02		0	4	0	0.00034	0.00035			
STIV141E	2,4'-DDT	UG/L	1	3	0	0.0003	0.0003	0.0051	0.0051	M08MW02S02		0	4	0	0.0003	0.00031			
STIV141E	4,4'-DDT	UG/L	1	3	0	0.00068	0.00069	0.0017	0.0017	M08MW01S02		0	4	0	0.0007	0.00072			
STIV141E	alpha-BHC	UG/L	2	3	0	0.00039	0.00039	0.0017	0.009	M08MW01S02		2	4	0	0.0004	0.00041	0.0012	0.0013	0.000503
STIV141E	beta-BHC	UG/L	1	3	0	0.00025	0.00025	0.0042	0.0042	M08MW01S02		0	4	0	0.00026	0.00026			
STIV141E	delta-BHC	UG/L	1	3	0	0.0003	0.0003	0.00036	0.00036	M08MW03S01B		0	4	0	0.0003	0.00031			
STIV141E	Dieldrin	UG/L	2	3	0	0.00038	0.00038	0.0023	0.0049	M08MW01S02		0	4	0	0.00039	0.0004			
STIV141E	Endrin ketone	UG/L	1	3	0	0.0003	0.0003	0.0003	0.0003	M08MW02S02	J	0	4	0	0.00031	0.00032			
STIV141E	Methoxychlor	UG/L	2	3	0	0.00077	0.00077	0.0027	0.0083	M08MW01S02		0	4	0	0.00079	0.00081			

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles
STIV141C = NOAA Status and Trends PCBs
STIV141E = NOAA Status and Trends Pesticides

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 13.5-4
Summary of Groundwater Results for Inorganics
Abandoned Power Plant (Bldg 144), Sand Island (Site 8)

			Site 8									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
STIII213	Aluminum	UG/L	3	3	0			18	169	M08MW02S02	J	3	4	0	0.81	0.81	1.1	172	3.89
STIII213	Antimony	UG/L	3	3	0			1.36	4.4	M08MW01S02	J	4	4	0			0.65	8.61	2.23
STIII213	Arsenic	UG/L	3	3	0			5.33	23.3	M08MW01S02		4	4	0			1.79	18	5.81
STIII213	Cadmium	UG/L	3	3	0			0.0389	0.0593	M08MW02S02		2	4	0	0.008	0.0099	0.018	0.056	0.0119
STIII213	Chromium	UG/L	1	3	0	0.572	0.84	6.89	6.89	M08MW02S02	J	3	4	0	0.3	0.3	0.77	1.03	0.567
STIII213	Copper	UG/L	3	3	0			0.175	0.745	M08MW02S02		4	4	0			0.445	4.4	1.22
STIII213	Iron	UG/L	3	3	0			64	454	M08MW02S02	J	4	4	0			323	1210	558
STIII213	Lead	UG/L	3	3	0			2.34	7.89	M08MW02S02		2	4	0	0.036	0.046	0.147	0.231	0.0612
STIII213	Manganese	UG/L	3	3	0			590	656	M08MW01S02	J	4	4	0			2.49	22.1	5
STIII213	Mercury	UG/L	3	3	0			0.0081	0.0091	M08MW02S02		0	4	0	0.0005	0.0018			
STIII213	Nickel	UG/L	3	3	0			5.39	12.6	M08MW02S02		4	4	0			1.13	4.19	2.02
STIII213	Thallium	UG/L	3	3	0			0.013	0.0345	M08MW01S02		4	4	0			0.018	0.104	0.0375
STIII213	Tin	UG/L	3	3	0			0.269	0.314	M08MW01S02		4	4	0			0.087	0.299	0.12
STIII213	Zinc	UG/L	3	3	0			1.56	2.82	M08MW02S02	J	4	4	0			1.27	12.2	3.52

Notes:

STIII213 = NOAA Status and Trends Low Level Metals

#D = No. of Detects

#S = Total No. of Samples

#R = No. of Samples Rejected During Data Validation

FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)

Mean = Geometric Mean

Table 13.5-5
Summary of Marine Sediment Results for Organics
Abandoned Power Plant (Bldg 144), Sand Island (Site 8)

			Site 8									Atoll Background (Shallow Sites)							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
9060M	Total Organic Carbon	UG/G	2	2	0			3700	17800	M08MS01S01	J	4	4	0			300	3600	1290
STIV141A	Acenaphthene	UG/KG	1	3	1	0.22	0.22	64	64	M08MS01S01	J	0	6	2	0.24	0.25			
STIV141A	Acenaphthylene.	UG/KG	2	3	1			1.5	3.6	M08MS01S01	J	0	6	2	0.24	0.25			
STIV141A	Anthracene	UG/KG	2	3	1			2.3	100	M08MS01S01		0	6	2	0.22	0.23			
STIV141A	Benzo(a)Anthracene	UG/KG	2	3	1			6.1	300	M08MS01S01		0	6	2	0.28	0.29			
STIV141A	Benzo(a)Pyrene	UG/KG	2	3	1			24	160	M08MS01S01		0	6	2	0.17	0.18			
STIV141A	Benzo(b)Fluoranthene	UG/KG	2	3	1			40	430	M08MS01S01		1	6	2	0.38	0.4	0.058	0.058	0.143
STIV141A	Benzo(e)pyrene	UG/KG	1	3	1	0.32	0.32	20	20	M08MS02S01		0	6	2	0.31	0.33			
STIV141A	Benzo(g,h,i)perylene	UG/KG	1	3	1	0.37	0.37	28	28	M08MS02S01		0	6	2	0.37	0.39			
STIV141A	Benzo(k)Fluoranthene	UG/KG	2	3	1			15	140	M08MS01S01		0	6	2	0.32	0.35			
STIV141A	Biphenyl	UG/KG	1	3	1	0.24	0.24	3.4	3.4	M08MS01S01	J	0	6	2	0.25	0.27			
STIV141A	Chrysene	UG/KG	2	3	1			7.7	300	M08MS01S01		0	6	2	0.37	0.39			
STIV141A	Chrysenes, C1-alkyl-substitute	UG/KG	2	3	1			13	47	M08MS01S01		0	6	2	0.37	0.39			
STIV141A	Chrysenes, C2-alkyl-substitute	UG/KG	1	3	1	0.37	0.37	10	10	M08MS02S01		0	6	2	0.37	0.39			
STIV141A	Chrysenes, C3-alkyl-substitute	UG/KG	1	3	1	0.37	0.37	9.5	9.5	M08MS02S01		0	6	2	0.37	0.39			
STIV141A	Chrysenes, C4-alkyl-substitute	UG/KG	1	3	1	0.37	0.37	6.3	6.3	M08MS02S01		0	6	2	0.37	0.39			
STIV141A	Dibenzo(a,h)Anthracene	UG/KG	2	3	1			5.3	6.7	M08MS02S01		0	6	2	0.41	0.44			
STIV141A	Fluoranthene	UG/KG	2	3	1			4.9	680	M08MS01S01		2	6	2	0.28	0.3	0.04	0.054	0.0821
STIV141A	Fluoranthenes+Pyrenes, C1-alk	UG/KG	1	3	1	0.29	0.29	7.5	7.5	M08MS02S01		0	6	2	0.28	0.3			
STIV141A	Fluoranthenes+Pyrenes, C2-alk	UG/KG	2	3	1			8.6	36	M08MS01S01		0	6	2	0.28	0.3			
STIV141A	Fluoranthenes+Pyrenes, C3-alk	UG/KG	2	3	1			1.6	8.6	M08MS02S01		0	6	2	0.28	0.3			
STIV141A	Fluorene	UG/KG	1	3	1	0.3	0.3	58	58	M08MS01S01	J	0	6	2	0.31	0.33			
STIV141A	Fluorenes, C1-alkyl-substitute	UG/KG	1	3	1	0.3	0.3	7.8	7.8	M08MS01S01	J	0	6	2	0.31	0.33			
STIV141A	Indeno(1,2,3-cd)pyrene	UG/KG	1	3	1	0.28	0.28	30	30	M08MS02S01		0	6	2	0.28	0.3			
STIV141A	Naphthalene	UG/KG	2	3	1			0.53	21	M08MS01S01	J	0	6	2	0.33	0.35			
STIV141A	Naphthalenes, C1-alkyl-substit	UG/KG	1	3	1	0.33	0.33	0.33	0.33	M08MS02S01		2	6	2	0.33	0.35	0.12	0.2	0.162
STIV141A	Perylene	UG/KG	1	3	1	0.13	0.13	5.7	5.7	M08MS02S01		0	6	2	0.13	0.13			
STIV141A	Phenanthrene	UG/KG	2	3	1			1.7	440	M08MS01S01		2	6	2	0.39	0.41	0.071	0.076	0.121
STIV141A	Phenanthrenes+Anthra., C1-alk	UG/KG	2	3	1			0.2	33	M08MS01S01		0	6	2	0.39	0.41			
STIV141A	Phenanthrenes+Anthra., C2-alk	UG/KG	2	3	1			0.16	11	M08MS01S01		0	6	2	0.39	0.41			

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles

#D = No. of Detects

#S = Total No. of Samples

#R = No. of Samples Rejected During Data Validation

FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)

*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)

Mean = Geometric Mean

SI08MSS.XLS

Table 13.5-5
Summary of Marine Sediment Results for Organics
Abandoned Power Plant (Bldg 144), Sand Island (Site 8)

		Site 8										Atoll Background (Shallow Sites)							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
STIV141A	Pyrene	UG/KG	2	3	1			6.4	600	M08MS01S01		2	6	2	0.28	0.3	0.035	0.067	0.0838
STIV141C	PCB-101 (2,2',3,5,5')	UG/KG	2	2	0			0.38	0.7	M08MS01S01		0	4	0	0.015	0.016			
STIV141C	PCB-105 (2,3,3',4,4')	UG/KG	1	2	0	0.016	0.016	0.12	0.12	M08MS01S01		0	4	0	0.017	0.018			
STIV141C	PCB-118 (2,3',4,4',5)	UG/KG	2	2	0			0.27	0.72	M08MS01S01		0	4	0	0.024	0.025			
STIV141C	PCB-128 (2,2',3,3',4,4')	UG/KG	1	2	0	0.02	0.02	0.19	0.19	M08MS02S01		0	4	0	0.02	0.022			
STIV141C	PCB-138 (2,2',3,4,4',5')	UG/KG	2	2	0			1.3	2.4	M08MS01S01		0	4	0	0.022	0.024			
STIV141C	PCB-153 (2,2',4,4',5,5')	UG/KG	2	3	1			2.1	7	M08MS01S01		0	4	0	0.02	0.021			
STIV141C	PCB-170 (2,2',3,3',4,4',5)	UG/KG	2	2	0			0.79	1.9	M08MS01S01		0	4	0	0.079	0.084			
STIV141C	PCB-180 (2,2',3,4,4',5,5')	UG/KG	2	3	1			1.9	6.2	M08MS01S01		0	4	0	0.023	0.024			
STIV141C	PCB-187 (2,2',3,4',5,5',6)	UG/KG	2	3	1			1.3	4.5	M08MS01S01		0	4	0	0.035	0.038			
STIV141C	PCB-195 (2,2',3,3',4,4',5,6)	UG/KG	2	2	0			0.21	1.3	M08MS01S01		0	4	0	0.016	0.017			
STIV141C	PCB-206 (2,2',3,3',4,4',5,5',6	UG/KG	2	2	0			0.38	1.1	M08MS01S01		0	4	0	0.014	0.015			
STIV141C	PCB-209 (2,2',3,3',4,4',5,5',6	UG/KG	2	3	1			3	15	M08MS01S01		0	4	0	0.017	0.018			
STIV141C	PCB-28 (2,4,4')	UG/KG	2	2	0			0.16	0.24	M08MS02S01		1	4	0	0.037	0.039	0.079	0.079	0.0271
STIV141C	PCB-44 (2,2',3,5')	UG/KG	1	2	0	0.017	0.017	0.019	0.019	M08MS01S01		0	4	0	0.018	0.02			
STIV141C	PCB-52 (2,2',5,5')	UG/KG	2	2	0			0.12	0.13	M08MS01S01		0	4	0	0.016	0.017			
STIV141C	PCB-77 (3,3',4,4')	UG/KG	1	2	0	0.03	0.03	0.44	0.44	M08MS02S01		0	4	0	0.03	0.032			
STIV141C	PCB-8 (2,4')	UG/KG	1	2	0	0.025	0.025	0.12	0.12	M08MS01S01		0	4	0	0.026	0.028			
STIV141E	2,4'-DDD	UG/KG	1	2	0	0.021	0.021	0.29	0.29	M08MS02S01		0	4	0	0.021	0.023			
STIV141E	2,4'-DDT	UG/KG	1	2	0	0.31	0.31	0.36	0.36	M08MS01S01		0	4	0	0.033	0.035			
STIV141E	4,4'-DDD	UG/KG	1	2	0	0.037	0.037	0.15	0.15	M08MS02S01		0	4	0	0.037	0.039			
STIV141E	4,4'-DDE	UG/KG	2	2	0			0.18	0.28	M08MS01S01		0	4	0	0.02	0.022			
STIV141E	alpha-BHC	UG/KG	1	2	0	0.016	0.016	1	1	M08MS01S01		0	4	0	0.017	0.018			
STIV141E	gamma-BHC (Lindane)	UG/KG	1	2	0	0.022	0.022	0.12	0.12	M08MS02S01		0	4	0	0.022	0.023			
STIV141E	Mirex	UG/KG	2	2	0			0.013	0.13	M08MS01S01		0	4	0	0.025	0.027			
STIV141E	Photomirex	UG/KG	2	2	0			0.016	0.06	M08MS01S01		0	4	0	0.034	0.036			

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles
STIV141C = NOAA Status and Trends PCBs
STIV141E = NOAA Status and Trends Pesticides

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 13.5-6
Summary of Marine Sediment Results for Inorganics
Abandoned Power Plant (Bldg 144), Sand Island (Site 8)

			Site 8									Atoll Background (Shallow Sites)							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SHALLOW SITES																			
STIII213	Antimony	MG/KG	2	2	0			0.233	1.19	M08MS01S01		0	4	2	0.231	0.233			
STIII213	Arsenic	MG/KG	2	2	0			4.6	8	M08MS01S01		0	4	0	2.4	2.9			
STIII213	Cadmium	MG/KG	2	2	0			0.156	0.184	M08MS01S01	J	4	4	0			0.048	0.076	0.0584
STIII213	Chromium	MG/KG	1	2	0	9.7	9.7	17.5	17.5	M08MS01S01		0	4	0	9.1	12			
STIII213	Copper	MG/KG	2	2	0			15.4	25.9	M08MS01S01		4	4	0			5.7	8.3	6.96
STIII213	Iron	MG/KG	2	2	0			4600	7940	M08MS01S01		4	4	0			15.6	59.7	32.2
STIII213	Lead	MG/KG	2	2	0			10.5	47.3	M08MS01S01		0	4	0	4.37	5.4			
STIII213	Manganese	MG/KG	2	2	0			26	33	M08MS01S01		0	4	0	21	34			
STIII213	Mercury	MG/KG	2	2	0			0.136	0.229	M08MS01S01		0	4	0	0.025	0.033			
STIII213	Nickel	MG/KG	2	2	0			4.85	5.72	M08MS01S01		0	4	0	2.98	2.98			
STIII213	Silicon	MG/KG	1	2	0	3000	3000	4100	4100	M08MS01S01		0	4	0	3200	5100			
STIII213	Silver	MG/KG	1	2	0	0.04	0.04	0.098	0.098	M08MS01S01		0	4	0	0.04	0.04			
STIII213	Thallium	MG/KG	1	2	0	0.032	0.032	0.04	0.04	M08MS01S01	J	2	4	0	0.024	0.024	0.029	0.031	0.019
STIII213	Tin	MG/KG	2	2	0			0.866	1.96	M08MS01S01		2	4	0	0.047	0.047	0.052	0.055	0.0355
STIII213	Zinc	MG/KG	2	2	0			27.2	40.6	M08MS01S01		0	4	0	2.9	3.8			

Notes:

STIII213 = NOAA Status and Trends Low Level Metals

#D = No. of Detects

#S = Total No. of Samples

#R = No. of Samples Rejected During Data Validation

FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)

Mean = Geometric Mean

Table 13.5-7
Summary of Seawater Results for Organics
Abandoned Power Plant (Bldg 144), Sand Island (Site 8)

			Site 8									Background						
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETEC	MAX DETECT
STIV141A	Acenaphthene	UG/L	1	1	0			0.1	0.1	M08SW01S01	J	0	1	0	0.0014	0.0014		
STIV141A	Acenaphthylene	UG/L	1	1	0			0.0037	0.0037	M08SW01S01	J	0	1	0	0.0041	0.0041		
STIV141A	Anthracene	UG/L	1	1	0			0.037	0.037	M08SW01S01	J	0	1	0	0.0055	0.0055		
STIV141A	Benzo(a)Anthracene	UG/L	1	1	0			0.059	0.059	M08SW01S01	J	0	1	0	0.0087	0.0087		
STIV141A	Benzo(a)Pyrene	UG/L	1	1	0			0.0068	0.0068	M08SW01S01	J	0	1	0	0.0071	0.0071		
STIV141A	Benzo(b)Fluoranthene	UG/L	1	1	0			0.019	0.019	M08SW01S01	J	0	1	0	0.0089	0.0089		
STIV141A	Benzo(e)pyrene	UG/L	1	1	0			0.0076	0.0076	M08SW01S01	J	0	1	0	0.0072	0.0072		
STIV141A	Benzo(g,h,i)perylene	UG/L	1	1	0			0.00079	0.00079	M08SW01S01	J	0	1	0	0.0084	0.0084		
STIV141A	Benzo(k)Fluoranthene	UG/L	1	1	0			0.0046	0.0046	M08SW01S01	J	0	1	0	0.007	0.007		
STIV141A	Biphenyl	UG/L	1	1	0			0.0013	0.0013	M08SW01S01	J	0	1	0	0.0034	0.0034		
STIV141A	Chrysene	UG/L	1	1	0			0.033	0.033	M08SW01S01	J	0	1	0	0.0032	0.0032		
STIV141A	Chrysenes, C1-alkyl-substitute	UG/L	1	1	0			0.0085	0.0085	M08SW01S01	J	0	1	0	0.0032	0.0032		
STIV141A	Dibenzothiophene	UG/L	1	1	0			0.026	0.026	M08SW01S01	J	0	1	0	0.0022	0.0022		
STIV141A	Dibenzothiophenes, C1-alkyl-s	UG/L	1	1	0			0.051	0.051	M08SW01S01	J	0	1	0	0.0022	0.0022		
STIV141A	Dibenzothiophenes, C2-alkyl-s	UG/L	1	1	0			0.055	0.055	M08SW01S01	J	0	1	0	0.0022	0.0022		
STIV141A	Fluoranthene	UG/L	1	1	0			1.2	1.2	M08SW01S01	J	0	1	0	0.0025	0.0025		
STIV141A	Fluoranthenes+Pyrenes, C1-alk	UG/L	1	1	0			0.19	0.19	M08SW01S01	J	0	1	0	0.0025	0.0025		
STIV141A	Fluoranthenes+Pyrenes, C2-alk	UG/L	1	1	0			0.036	0.036	M08SW01S01	J	0	1	0	0.0025	0.0025		
STIV141A	Fluoranthenes+Pyrenes, C3-alk	UG/L	1	1	0			0.0039	0.0039	M08SW01S01	J	0	1	0	0.0025	0.0025		
STIV141A	Fluorene	UG/L	1	1	0			0.0068	0.0068	M08SW01S01	J	0	1	0	0.0031	0.0031		
STIV141A	Fluorenes, C1-alkyl-substitute	UG/L	1	1	0			0.16	0.16	M08SW01S01	J	0	1	0	0.0031	0.0031		
STIV141A	Fluorenes, C2-alkyl-substitute	UG/L	1	1	0			0.11	0.11	M08SW01S01	J	0	1	0	0.0031	0.0031		
STIV141A	Fluorenes, C3-alkyl-substitute	UG/L	1	1	0			0.037	0.037	M08SW01S01	J	0	1	0	0.0031	0.0031		
STIV141A	Indeno(1,2,3-cd)pyrene	UG/L	1	1	0			0.00089	0.00089	M08SW01S01	J	0	1	0	0.0066	0.0066		
STIV141A	Perylene	UG/L	1	1	0			0.001	0.001	M08SW01S01	J	0	1	0	0.0069	0.0069		
STIV141A	Phenanthrene	UG/L	1	1	0			0.0068	0.0068	M08SW01S01	J	0	1	0	0.0018	0.0018		
STIV141A	Phenanthrenes+Anthra., C2-alk	UG/L	1	1	0			0.045	0.045	M08SW01S01	J	0	1	0	0.0018	0.0018		
STIV141A	Phenanthrenes+Anthra., C3-alk	UG/L	1	1	0			0.022	0.022	M08SW01S01	J	0	1	0	0.0018	0.0018		
STIV141A	Phenanthrenes+Anthra., C4-alk	UG/L	1	1	0			0.038	0.038	M08SW01S01	J	0	1	0	0.0018	0.0018		
STIV141A	Pyrene	UG/L	1	1	0			0.93	0.93	M08SW01S01	J	0	1	0	0.0044	0.0044		

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles

#D = No. of Detects

#S = Total No. of Samples

#R = No. of Rejected Samples

FL = Data Validation Qualifier (Flag)

Table 13.5-8
Summary of Seawater Results for Inorganics
Abandoned Power Plant (Bldg 144), Sand Island (Site 8)

Site 8												Atoll Background						
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETEC	MAX DETEC	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT
STIII213	Aluminum	UG/L	1	1	0			2.3	2.3	M08SW01S01		0	1	0	0.81	0.81		
STIII213	Antimony	UG/L	1	1	0			0.571	0.571	M08SW01S01		1	1	0			0.458	0.458
STIII213	Arsenic	UG/L	1	1	0			2.61	2.61	M08SW01S01		1	1	0			1.29	1.29
STIII213	Chromium	UG/L	1	1	0			3.7	3.7	M08SW01S01	J	0	1	0	0.209	0.209		
STIII213	Copper	UG/L	1	1	0			0.324	0.324	M08SW01S01		0	1	0	0.118	0.118		
STIII213	Iron	UG/L	1	1	0			59	59	M08SW01S01	J	0	1	0	0.85	0.85		
STIII213	Lead	UG/L	1	1	0			0.384	0.384	M08SW01S01		0	1	0	0.019	0.019		
STIII213	Manganese	UG/L	1	1	0			0.955	0.955	M08SW01S01		1	1	0			0.463	0.463
STIII213	Thallium	UG/L	1	1	0			0.071	0.071	M08SW01S01		1	1	0			0.151	0.151
STIII213	Tin	UG/L	1	1	0			0.775	0.775	M08SW01S01		1	1	0			0.181	0.181

Notes:

STIII213 = NOAA Status and Trends Low Level Meta

#D =No. of Detects

#S = Total No. of Samples

#R = No. of Samples Rejected During Data Validation

FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)

Table 13.6-1
Surface Soil CPEC Selection - Site 08

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic									
Aluminum	100		3.09E+02	2.31E+03	5.78E+02	2.13E+03	2.23E+02	2.52E+01	No(p)
Antimony	100		2.22E+00	7.37E+01	6.31E+00	6.32E+01	2.87E-01	5.37E-01	YES
Arsenic	100		2.50E+00	2.39E+02	1.85E+01	2.39E+02	1.90E+01	1.79E-01	YES
Barium	100		1.99E+01	3.37E+03	2.01E+02	3.36E+03	3.85E+01	8.68E+00	No(p)
Beryllium	50	1.30E-01	1.40E-01	2.50E-01	1.14E-01	2.50E-01	3.41E+00	3.00E-01	No(5)
Cadmium	100		3.70E-01	8.70E+00	1.04E+00	7.78E+00	5.63E+00	6.17E-01	YES
Calcium	100		1.93E+05	2.99E+05	2.52E+05	2.99E+05		2.44E+05	No(3)
Chromium	100		8.30E+00	1.10E+02	2.47E+01	1.10E+02	3.99E+00	5.48E+00	YES
Cobalt	50	1.10E+00	2.10E+00	1.52E+01	1.80E+00	1.44E+01		7.12E-01	YES
Copper	100		1.86E+01	2.48E+04	1.40E+02	1.72E+04	1.00E+02	1.57E+00	YES
Iron	100		1.81E+03	4.54E+04	1.19E+04	4.54E+04		2.06E+02	No(p)
Lead	100		4.24E+01	2.79E+03	2.40E+02	2.79E+03	7.28E+00	6.28E+00	YES
Magnesium	100		1.04E+04	1.52E+04	1.30E+04	1.52E+04		1.57E+04	No(3)
Manganese	100		2.78E+01	3.05E+02	1.03E+02	3.05E+02	4.54E+02	9.02E+00	No(6)
Mercury	25	5.00E-02	3.80E+00	3.80E+00	9.62E-02	3.40E+00	2.40E-02	3.90E-02	YES
Nickel	50	2.90E+00	1.61E+01	5.08E+01	6.98E+00	5.08E+01	2.65E+02	8.48E-01	No(6)
Potassium	100		1.43E+02	2.05E+02	1.72E+02	2.05E+02		8.39E+01	No(3)
Selenium	50	3.00E-01	3.61E-01	6.69E-01	2.72E-01	6.69E-01	1.85E+00	1.93E+00	No(5)
Silicon	50	1.60E+03	1.78E+03	8.01E+04	3.18E+03	6.55E+04			No(3)
Silver	100		4.50E-02	8.56E-01	1.24E-01	8.00E-01		8.14E-01	No(5)
Sodium	100		1.59E+03	2.42E+03	2.11E+03	2.43E+03		2.44E+03	No(3)
Thallium	25	3.20E-02	1.09E-01	1.09E-01	2.58E-02	1.04E-01	3.90E-02	2.66E-02	YES
Tin	100		1.12E+00	7.01E+01	4.66E+00	6.36E+01		3.14E-01	YES
Vanadium	100		3.10E+00	1.34E+01	4.75E+00	1.25E+01	4.44E+01	1.71E+00	No(6)
Zinc	100		2.30E+02	3.04E+03	4.82E+02	2.69E+03	1.11E+01	2.21E+01	YES
Organic									
2,4'-DDD	25	4.00E-05	6.50E-03	6.50E-03	8.80E-05	5.71E-03	1.58E-02		No(6)
2,4'-DDT	100		1.00E-03	3.00E-03	1.64E-03	3.00E-03	1.58E-02		No(6)
4,4'-DDD	50	6.90E-05	2.50E-04	5.20E-03	2.03E-04	4.66E-03	1.58E-02		No(6)
4,4'-DDE	75	1.80E-02	4.40E-03	2.00E-02	7.97E-03	2.00E-02	1.58E-02		YES
4,4'-DDT	100		3.60E-03	5.70E-02	1.39E-02	5.70E-02	1.58E-02		YES
Acenaphthene	100		3.70E-03	1.10E-01	1.51E-02	1.09E-01	2.30E+00		No(6)
Acenaphthylene	100		2.00E-03	7.00E-03	3.53E-03	7.00E-03	2.30E+00		No(6)
alpha-Chlordane	25	3.90E-05	1.90E-03	1.90E-03	6.35E-05	1.74E-03	3.20E+00		No(6)
Anthracene	40	4.00E-01	2.60E-02	2.10E-01	1.84E-01	2.10E-01	2.30E+00		No(6)
Aroclor-1260	100		9.20E-02	4.40E-01	1.64E-01	4.40E-01	1.24E-01		YES
Benzo(a)anthracene	100		5.60E-02	5.90E-01	1.72E-01	5.75E-01	2.30E+00		No(6)
Benzo(a)pyrene	100		6.60E-02	5.20E-01	1.73E-01	4.92E-01	2.30E+00		No(6)

Table 13.6-1
Surface Soil CPEC Selection - Site 08

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Benzo(b)fluoranthene	100		1.10E-01	7.20E-01	2.75E-01	7.20E-01	2.30E+00		No(6)
Benzo(e)pyrene	100		5.90E-02	3.30E-01	1.36E-01	3.30E-01	2.30E+00		No(6)
Benzo(g,h,i)perylene	100		6.00E-02	3.40E-01	1.42E-01	3.40E-01	2.30E+00		No(6)
Benzo(k)fluoranthene	100		3.50E-02	2.20E-01	8.63E-02	2.20E-01	2.30E+00		No(6)
Biphenyl	50	4.70E-03	1.80E-03	2.30E-03	2.25E-03	2.30E-03	2.30E+00		No(6)
bis(2-Ethylhexyl)phthalate	25	3.70E-01	7.30E-02	7.30E-02	2.31E-01	7.30E-02	2.22E+00		No(1)
Carbazole	50	4.00E-01	7.10E-02	2.70E-01	2.52E-01	2.70E-01			YES
Chrysene	75	2.10E+00	5.50E-02	8.80E-01	3.45E-01	8.80E-01	2.30E+00		No(6)
Chrysenes, C1-alky	100		3.60E-02	2.70E-01	9.37E-02	2.70E-01	2.30E+00		No(6)
Chrysenes, C2-alky	75	7.70E-03	2.30E-02	1.10E-01	2.81E-02	1.10E-01	2.30E+00		No(6)
Chrysenes, C3-alky	75	7.70E-03	1.90E-02	6.90E-02	1.97E-02	6.90E-02	2.30E+00		No(6)
Chrysenes, C4-alky	50	3.80E-04	1.40E-02	3.70E-02	4.41E-03	3.70E-02	2.30E+00		No(6)
delta-BHC	25	3.20E-05	1.40E-04	1.40E-04	2.86E-05	1.33E-04	1.12E+00		No(6)
Dibenzo(a,h)anthracene	100		1.10E-02	7.90E-02	2.74E-02	7.90E-02	2.30E+00		No(6)
Dibenzofuran	25	4.00E-01	2.00E-02	2.00E-02	1.72E-01	2.00E-02			YES
Dibenzothiophene	100		1.50E-03	4.50E-02	6.57E-03	4.50E-02	2.30E+00		No(6)
Dibenzothiophenes, C1-alky	50	4.30E-03	1.10E-02	2.10E-02	5.88E-03	2.10E-02	2.30E+00		No(6)
Dibenzothiophenes, C2-alky	50	4.30E-03	1.70E-02	1.80E-02	6.30E-03	1.80E-02	2.30E+00		No(6)
Dibenzothiophenes, C3-alky	50	4.30E-03	1.00E-02	1.60E-02	5.36E-03	1.60E-02	2.30E+00		No(6)
Dieldrin	25	5.10E-05	2.30E-03	2.30E-03	8.15E-05	2.09E-03	2.22E-01		No(6)
Fluoranthene	100		9.60E-02	1.40E+00	3.55E-01	1.40E+00	2.30E+00		No(6)
Fluoranth+Pyr, C1-alky	100		4.70E-02	4.70E-01	1.37E-01	4.70E-01	2.30E+00		No(6)
Fluoranth+Pyr, C2-alky	100		3.60E-02	2.90E-01	1.09E-01	2.90E-01	2.30E+00		No(6)
Fluoranth+Pyr, C3-alky	100		1.30E-02	7.00E-02	3.06E-02	7.00E-02	2.30E+00		No(6)
Fluorene	100		2.30E-03	7.60E-02	8.82E-03	7.03E-02	2.30E+00		No(6)
Fluorenes, C1-alky	50	5.80E-03	5.00E-03	1.70E-02	5.34E-03	1.63E-02	2.30E+00		No(6)
Fluorenes, C2-alky	50	5.80E-03	8.80E-03	1.50E-02	5.96E-03	1.50E-02	2.30E+00		No(6)
gamma-BHC (Lindane)	75	2.20E-05	9.20E-05	1.40E-04	6.67E-05	1.40E-04	7.41E+00		No(6)
gamma-Chlordane	25	4.20E-05	1.00E-03	1.00E-03	5.71E-05	9.26E-04	3.20E+00		No(6)
Hexachlorobenzene	50	4.80E-05	4.50E-05	6.10E-05	3.62E-05	6.10E-05			YES
Indeno(1,2,3-cd)pyrene	100		5.70E-02	3.60E-01	1.39E-01	3.60E-01	2.30E+00		No(6)
Methoxychlor	75	1.10E-04	1.80E-03	4.00E-03	9.87E-04	4.00E-03	2.06E+01		No(6)
Mirex	100		9.20E-05	8.50E-04	2.39E-04	8.16E-04			YES
Naphthalene	25	6.90E-03	4.60E-03	4.60E-03	3.98E-03	4.60E-03	2.30E+00		No(6)
Naphthalenes, C1-alky	50	6.10E-03	8.90E-03	1.10E-02	5.67E-03	1.10E-02	2.30E+00		No(6)
Naphthalenes, C2-alky	50	6.10E-03	1.20E-02	1.70E-02	6.81E-03	1.70E-02	2.30E+00		No(6)
Naphthalenes, C3-alky	50	6.10E-03	1.50E-02	1.80E-02	7.30E-03	1.80E-02	2.30E+00		No(6)
Naphthalenes, C4-alky	50	6.10E-03	1.40E-02	1.60E-02	6.97E-03	1.60E-02	2.30E+00		No(6)
Oxychlorostyrene	50	2.20E-05	9.20E-05	1.20E-04	4.00E-05	1.20E-04			YES

Table 13.6-1
Surface Soil CPEC Selection - Site 08

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
PCB-44	25	3.40E-05	1.10E-04	1.10E-04	2.81E-05	1.05E-04	1.24E-01		No(6)
PCB-101	50	2.90E-05	1.30E-04	2.40E-03	9.00E-05	2.19E-03	1.24E-01		No(6)
PCB-105	100		3.90E-04	2.00E-03	7.10E-04	1.94E-03	1.24E-01		No(6)
PCB-118	100		8.40E-04	4.30E-03	1.40E-03	4.03E-03	1.24E-01		No(6)
PCB-126	25	8.70E-05	2.10E-04	2.10E-04	6.68E-05	2.00E-04	1.24E-01		No(6)
PCB-128	50	3.90E-05	7.60E-04	3.80E-03	1.85E-04	3.74E-03	1.24E-01		No(6)
PCB-138	100		5.90E-03	2.50E-02	9.97E-02	2.50E-02	1.24E-01		No(6)
PCB-153	100		7.00E-03	1.90E-02	9.74E-02	1.83E-02	1.24E-01		No(6)
PCB-170	100		3.60E-03	1.50E-02	6.69E-03	1.50E-02	1.24E-01		No(6)
PCB-180	100		8.10E-03	3.00E-02	1.39E-02	3.00E-02	1.24E-01		No(6)
PCB-187	50	6.70E-05	1.30E-02	2.30E-02	7.80E-04	2.30E-02	1.24E-01		No(6)
PCB-195	100		6.50E-04	3.50E-03	1.84E-03	3.50E-03	1.24E-01		No(6)
PCB-206	100		2.00E-04	3.20E-03	1.17E-03	3.20E-03	1.24E-01		No(6)
PCB-209	75	3.20E-05	7.00E-05	1.20E-03	1.13E-04	1.12E-03	1.24E-01		No(6)
Perylene	100		1.80E-02	1.20E-01	3.72E-02	1.20E-01	2.30E+00		No(6)
Phenanthrene	100		3.50E-02	9.90E-01	1.44E-01	9.90E-01	2.30E+00		No(6)
Phenanth+Anthra., C1-alky	100		1.70E-02	2.80E-01	6.22E-02	2.80E-01	2.30E+00		No(6)
Phenanth+Anthra., C2-alky	100		1.40E-02	1.30E-01	4.17E-02	1.30E-01	2.30E+00		No(6)
Phenanth+Anthra., C3-alky	100		9.00E-03	5.40E-02	2.14E-02	5.40E-02	2.30E+00		No(6)
Phenanth+Anthra., C4-alky	100		2.80E-02	1.50E-01	6.52E-02	1.50E-01	2.30E+00		No(6)
Photomirex	25	6.30E-05	1.20E-03	1.20E-03	8.13E-05	1.11E-03			YES
Pyrene	100		9.80E-02	1.30E+00	3.46E-01	1.30E+00	2.30E+00		No(6)
trans-Nonachlor	100		2.40E-04	7.30E-04	3.92E-04	7.30E-04			YES

*TBC values are NOAEL dietary concentrations assuming a diet of 100% soil, from Opresko et. al. (1994) ; values for B(a)P were substituted for PAHs without a dose in Opresko, and the value for Arochlor 1248 was substituted for all the PCB congeners.
**Mean value of background surface soil samples taken on Sand Island.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 13.6-2
Subsurface Soil CPEC Selection - Site 08

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic									
Barium	100		5.20E+00	6.41E+00	5.82E+00	6.41E+00	3.85E+01	8.19E+00	No(p)
Beryllium	100		1.60E-01	4.70E-01	3.10E-01	4.70E-01	3.41E+00	2.64E-01	No(p)
Cadmium	100		6.00E-02	1.80E-01	1.00E-01	1.80E-01	5.63E+00	6.15E-02	No(6)
Calcium	100		3.10E+05	3.30E+05	3.18E+05	3.28E+05		2.76E+05	No(3)
Chromium	100		5.20E+00	7.01E+00	6.16E+00	7.01E+00	3.99E+00	6.09E+00	No(5)
Iron	100		2.17E+01	3.53E+03	2.17E+02	3.55E+03		3.36E+01	No(p)
Lead	33.3	2.80E-01	7.06E+00	7.06E+00	5.41E-01	7.06E+00	7.28E+00	4.02E-01	No(6)
Magnesium	100		1.40E+04	1.70E+04	1.55E+04	1.70E+04		1.72E+04	No(3)
Manganese	100		3.20E+00	3.31E+01	7.38E+00	3.31E+01	4.54E+02	7.21E+00	No(6)
Selenium	100		1.10E+00	1.90E+00	1.52E+00	1.90E+00	1.85E+00	1.83E+00	No(5)
Sodium	100		2.34E+03	2.80E+03	2.51E+03	2.79E+03		2.68E+03	No(3)
Vanadium	100		1.10E+00	2.19E+00	1.38E+00	2.19E+00	4.44E+01	1.58E+00	No(5)
Organic									
(Meta+Para)-Xylene	33.3	1.00E-03	2.00E-03	2.00E-03	7.94E-04	2.00E-03			YES
Acetone	100		1.00E-02	4.90E-02	2.58E-02	4.90E-02	5.16E+01		No(1)
Benzo(a)Anthracene	33.3	4.20E-01	2.40E-01	2.40E-01	3.57E-01	2.40E-01	2.30E+00		No(6)
Benzo(a)Pyrene	33.3	4.20E-01	1.90E-01	1.90E-01	3.30E-01	1.90E-01	2.30E+00		No(6)
Benzo(b)Fluoranthene	33.3	4.20E-01	1.90E-01	1.90E-01	3.30E-01	1.90E-01	2.30E+00		No(6)
Benzo(g,h,i)perylene	33.3	4.20E-01	1.20E-01	1.20E-01	2.83E-01	1.20E-01	2.30E+00		No(6)
Benzo(k)Fluoranthene	33.3	4.20E-01	2.10E-01	2.10E-01	3.41E-01	2.10E-01	2.30E+00		No(6)
Chrysene	33.3	4.20E-01	3.10E-01	3.10E-01	3.88E-01	3.10E-01	2.30E+00		No(6)
Fluoranthene	33.3	4.20E-01	3.40E-01	3.40E-01	4.01E-01	3.40E-01	2.30E+00		No(6)
Indeno(1,2,3-cd)pyrene	33.3	4.20E-01	1.40E-01	1.40E-01	2.98E-01	1.40E-01	2.30E+00		No(6)
Methylene Chloride	66.7	5.00E-03	1.60E-02	2.00E-02	9.28E-03	2.00E-02	3.02E+01		No(1)
Phenanthrene	33.3	4.20E-01	6.30E-02	6.30E-02	2.28E-01	6.30E-02	2.30E+00		No(6)
Pyrene	33.3	4.20E-01	4.00E-01	4.00E-01	4.23E-01	4.00E-01	2.30E+00		No(6)

*TBC values are NOAEL dietary concentrations assuming a diet of 100% soil, from Opresko et. al. (1994) ; values for B(a)P were substituted for PAHs without a dose in Opresko, and the value for Arochlor 1248 was substituted for all the PCB congeners.
**Mean value of background subsurface soil samples taken on Sand Island.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 13.6-3
Groundwater CPEC Selection - Site 08

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (ug/l)	Range of detected Concentrations Minimum (ug/l)	Range of detected Concentrations Maximum (ug/l)	Mean Concentration (ug/l)	Environmental Concentration (EC) (ug/l)	ARAR Values* (ug/l)	Background Concentration** (ug/l)	CPEC?
Inorganic									
Aluminum	100		1.80E+01	1.69E+02	4.18E+01	1.69E+02	2.60E+02	3.89E+00	No(p)
Antimony	100		1.36E+00	4.40E+00	2.02E+00	4.40E+00	1.60E+03	2.23E+00	No(5)
Arsenic	100		5.33E+00	2.33E+01	9.23E+00	2.33E+01	3.60E+01	5.81E+00	No(6)
Cadmium	100		3.89E-02	5.93E-02	4.55E-02	5.93E-02	9.30E+00	1.19E-02	No(6)
Chromium	100		5.72E-01	6.89E+00	1.49E+00	6.89E+00	5.00E+01	2.03E+00	No(6)
Copper	100		1.75E-01	7.45E-01	3.11E-01	7.45E-01	2.90E+00	1.22E+00	No(5)
Iron	100		6.40E+01	4.54E+02	1.28E+02	4.54E+02	1.00E+03	5.58E+02	No(p)
Lead	100		2.34E+00	7.89E+00	3.80E+00	7.89E+00	5.60E+00	6.12E-02	YES
Manganese	100		5.90E+02	6.56E+02	6.32E+02	6.56E+02	1.10E+01	5.89E+00	YES
Mercury	100		8.10E-03	9.10E-03	8.42E-03	9.10E-03	3.00E-02		No(6)
Nickel	100		5.39E+00	1.26E+01	7.22E+00	1.26E+01	8.30E+00	2.02E+00	YES
Thallium	100		1.30E-02	3.45E-02	1.92E-02	3.45E-02	4.00E+01	3.75E-02	No(5)
Tin	100		2.69E-01	3.14E-01	2.98E-01	3.14E-01		1.20E-01	YES
Zinc	100		1.56E+00	2.82E+00	1.99E+00	2.82E+00	8.60E+01	1.58E+01	No(5)
Organic									
1,2-Dichloroethene(total)	33.3	1.00E+00	6.00E+00	6.00E+00	1.14E+00	6.00E+00			YES
2,4'-DDE	33.3	3.30E-04	2.40E-03	2.40E-03	4.03E-04	2.40E-03	1.00E-03		YES
2,4'-DDT	33.3	3.00E-04	5.10E-03	5.10E-03	4.86E-04	5.10E-03	1.00E-03		YES
4,4'-DDT	33.3	6.80E-04	1.70E-03	1.70E-03	5.84E-04	1.70E-03	1.00E-03		YES
Acenaphthene	100		1.40E-01	5.00E-01	3.13E-01	5.00E-01	7.10E+02		No(6)
alpha-BHC	66.7	3.90E-04	1.70E-03	9.00E-03	1.44E-03	9.00E-03	2.40E-01		No(6)
Anthracene	100		9.50E-03	8.00E-02	3.53E-02	8.00E-02			YES
Benzene	66.7	1.00E+00	2.00E+00	2.00E+00	1.26E+00	2.00E+00	7.00E+02		No(6)
Benzo(a)anthracene	66.7	8.60E-03	1.90E-03	7.40E-03	3.92E-03	7.40E-03	2.70E-03		YES
Benzo(a)pyrene	66.7	7.00E-03	5.80E-04	3.50E-03	1.92E-03	3.50E-03	1.30E-03		YES
Benzo(b)fluoranthene	66.7	8.80E-03	1.30E-03	7.00E-03	3.42E-03	7.00E-03			YES
Benzo(e)pyrene	66.7	7.10E-03	6.40E-04	4.00E-03	2.09E-03	4.00E-03			YES
Benzo(g,h,i)perylene	33.3	8.30E-03	1.70E-03	1.70E-03	3.08E-03	1.70E-03			YES
Benzo(k)fluoranthene	66.7	6.90E-03	2.80E-04	2.20E-03	1.29E-03	2.20E-03			YES
beta-BHC	33.3	2.50E-04	4.20E-03	4.20E-03	4.03E-04	4.20E-03	2.40E-01		No(6)
Biphenyl	100		6.00E-03	1.40E+00	1.06E-01	1.40E+00			YES
Chrysene	66.7	3.20E-03	2.70E-03	9.10E-03	3.40E-03	9.10E-03			YES
Chrysenes, C1-alky	33.3	3.20E-03	4.00E-03	4.00E-03	2.17E-03	4.00E-03			YES
Chrysenes, C2-alky	33.3	3.20E-03	2.80E-03	2.80E-03	1.93E-03	2.80E-03			YES
delta-BHC	33.3	3.00E-04	3.60E-04	3.60E-04	2.01E-04	3.60E-04	2.40E-01		No(6)

Table 13.6-3
Groundwater CPEC Selection - Site 08

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (ug/l)	Range of detected Concentrations Minimum (ug/l)	Range of detected Concentrations Maximum (ug/l)	Mean Concentration (ug/l)	Environmental Concentration (EC) (ug/l)	ARAR Values* (ug/l)	Background Concentration** (ug/l)	CPEC?
Dibenzothiophene	66.7	2.10E-03	3.50E-01	9.10E-01	6.94E-02	9.10E-01			YES
Dibenzothiophenes, C1-alky	66.7	2.10E-03	3.80E-01	1.00E+00	7.36E-02	1.00E+00			YES
Dibenzothiophenes, C2-alky	66.7	2.10E-03	2.00E-01	6.10E-01	5.04E-02	6.10E-01			YES
Dibenzothiophenes, C3-alky	66.7	2.10E-03	6.20E-02	2.50E-01	2.53E-02	2.50E-01			YES
Dieldrin	66.7	3.80E-04	2.30E-03	4.90E-03	1.29E-03	4.90E-03	1.90E-03		YES
Endrin ketone	33.3	3.00E-04	3.00E-04	3.00E-04	1.89E-04	3.00E-04	2.30E-03		No(6)
Ethylbenzene	33.3	1.00E+00	2.00E+00	2.00E+00	7.94E-01	2.00E+00	3.00E+01		No(6)
Fluoranthene	100		3.20E-02	6.60E-02	4.94E-02	6.60E-02	1.60E+01		No(6)
Fluoranth+Pyr, C1-alky	66.7	2.50E-03	1.70E-02	2.60E-02	8.21E-03	2.60E-02	1.60E+01		No(6)
Fluoranth+Pyr, C2-alky	33.3	2.50E-03	1.30E-02	1.30E-02	2.73E-03	1.30E-02	1.60E+01		No(6)
Fluoranth+Pyr, C3-alky	33.3	2.50E-03	8.70E-03	8.70E-03	2.39E-03	8.70E-03	1.60E+01		No(6)
Fluorene	66.7	3.10E-03	7.30E-01	1.80E+00	1.27E-01	1.80E+00			YES
Fluorenes, C1-alky	100		6.80E-03	1.70E+00	2.15E-01	1.70E+00			YES
Fluorenes, C2-alky	66.7	3.10E-03	4.90E-01	8.60E-01	8.68E-02	8.60E-01			YES
Fluorenes, C3-alky	66.7	3.10E-03	1.50E-01	2.80E-01	4.02E-02	2.80E-01			YES
Indeno(1,2,3-cd)pyrene	33.3	6.60E-03	2.20E-03	2.20E-03	2.88E-03	2.20E-03			YES
Methoxychlor	66.7	7.70E-04	2.70E-03	8.30E-03	2.05E-03	8.30E-03	3.00E-02		No(6)
Naphthalene	100		3.40E-02	4.80E+00	2.97E-01	4.80E+00	6.20E+02		No(6)
Naphthalenes, C1-alky	100		1.50E-01	1.30E+01	2.03E+00	1.30E+01	6.20E+02		No(6)
Naphthalenes, C2-alky	100		1.60E+00	2.00E+01	7.52E+00	1.90E+01	6.20E+02		No(6)
Naphthalenes, C3-alky	100		1.20E-01	1.20E+01	2.11E+00	9.00E+00	6.20E+02		No(6)
Naphthalenes, C4-alky	100		1.20E-01	3.20E+00	9.09E-01	2.50E+00	6.20E+02		No(6)
PCB-44	66.7	3.10E-04	3.50E-03	5.80E-03	1.47E-03	5.80E-03			YES
PCB-66	33.3	3.00E-04	4.50E-03	4.50E-03	4.66E-04	4.50E-03			YES
PCB-118	66.7	3.40E-04	8.70E-03	3.60E-02	3.76E-03	3.60E-02			YES
PCB-126	33.3	4.50E-04	1.00E-04	1.00E-04	1.72E-04	1.00E-04			YES
PCB-138	100		1.20E-03	2.70E-03	1.66E-03	2.70E-03			YES
PCB-170	66.7	2.60E-03	3.10E-04	4.30E-04	5.58E-04	4.30E-04			YES
PCB-195	66.7	5.60E-04	1.40E-04	1.80E-04	1.92E-04	1.80E-04			YES
PCB-206	100		7.60E-05	6.40E-04	2.06E-04	6.40E-04			YES
PCB-209	100		3.50E-05	5.70E-04	9.92E-05	5.70E-04			YES
Perylene	33.3	6.80E-03	8.20E-04	8.20E-04	2.12E-03	8.20E-04			YES
Phenanthrene	100		1.30E-02	1.30E+00	2.05E-01	1.30E+00	4.30E-01		YES
Phenanth+Anthra., C1-alky	66.7		8.40E-03	9.10E-01	1.26E-01	9.10E-01	4.30E-01		YES
Phenanth+Anthra., C2-alky	66.7		1.10E-02	3.40E-01	7.08E-02	3.40E-01	4.30E-01		No(6)
Phenanth+Anthra., C3-alky	33.3		6.50E-03	9.50E-02	1.75E-02	9.50E-02	4.30E-01		No(6)

Table 13.6-3
Groundwater CPEC Selection - Site 08

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (ug/l)	Range of detected Concentrations Minimum (ug/l)	Range of detected Concentrations Maximum (ug/l)	Mean Concentration (ug/l)	Environmental Concentration (EC) (ug/l)	ARAR Values* (ug/l)	Background Concentration** (ug/l)	CPEC?
Pyrene	100		2.40E-02	6.20E-02	4.23E-02	6.20E-02			YES

*The lowest marine chronic value from the NAWQC and HWQC was used when available, then freshwater chronic and freshwater and marine acute values were used if no chronic numbers were listed. For PAHs with no NAWQC or HWQC the value for Fluoranthene (16 ug/L) was used.
**Mean value of background ground water samples taken on Sand Island.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 13.6-4
Marine Sediment CPEC Selection - Site 08

Analyte	MS01S01 (mg/kg)	MS02S01 (mg/kg)	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic						
Antimony	1.19E+00	2.33E-01	1.19E+00	2.00E+00		No(6)
Arsenic	8.00E+00	4.60E+00	8.00E+00	8.20E+00		No(6)
Cadmium	1.84E-01	1.56E-01	1.84E-01	1.20E+00	5.84E-02	No(6)
Chromium	1.75E+01		1.75E+01	8.10E+01		No(6)
Copper	2.59E+01	1.54E+01	2.59E+01	3.40E+01	6.96E+00	No(6)
Iron	7.94E+03	4.60E+03	7.94E+03		3.22E+01	No(p)
Lead	4.73E+01	1.05E+01	4.73E+01	4.67E+01		YES
Manganese	3.30E+01	2.60E+01	3.30E+01			YES
Mercury	2.29E-01		2.29E-01	1.50E-01		YES
Nickel	5.72E+00	4.85E+00	5.72E+00	2.09E+01		No(6)
Silver	9.80E-02		9.80E-02	1.00E+00		No(6)
Thallium	4.00E-02		4.00E-02		1.90E-02	YES
Tin	1.96E+00	8.66E-01	1.96E+00		3.55E-02	YES
Zinc	4.06E+01	2.72E+01	4.06E+01	1.50E+02		No(6)
Organic						
2,4'-DDD		2.90E-04	2.90E-04	2.00E-03		No(6)
2,4'-DDT	3.60E-04		3.60E-04	1.58E-03		No(6)
4,4'-DDD		1.50E-04	1.50E-04	2.00E-03		No(6)
4,4'-DDE	2.80E-04	1.80E-04	2.80E-04	2.20E-03		No(6)
Acenaphthene	6.40E-02		6.40E-02	1.60E-02		YES
Acenaphthylene	3.60E-03	1.50E-03	3.60E-03	4.40E-02		No(6)
alpha-BHC	1.00E-03		1.00E-03			YES
Anthracene	1.00E-01	2.30E-03	1.00E-01	8.53E-02		YES
Benzo(a)anthracene	3.00E-01	6.10E-03	3.00E-01	2.61E-01		YES
Benzo(a)pyrene	1.60E-01	2.40E-02	1.60E-01	4.30E-01		No(6)
Benzo(b)fluoranthene	4.30E-01	4.00E-02	4.30E-01	1.70E+00		No(6)
Benzo(e)pyrene		2.00E-02	2.00E-02	1.70E+00		No(6)
Benzo(g,h,i)perylene		2.80E-02	2.80E-02	1.70E+00		No(6)
Benzo(k)fluoranthene	1.40E-01	1.50E-02	1.40E-01	1.70E+00		No(6)
Biphenyl	3.40E-03		3.40E-03	5.52E-01		No(6)
Chrysene	3.00E-01	7.70E-03	3.00E-01	3.84E-01		No(6)
Chrysenes, C1-alky	4.70E-02	1.30E-02	4.70E-02	3.84E-01		No(6)
Chrysenes, C2-alky		1.00E-02	1.00E-02	3.84E-01		No(6)
Chrysenes, C3-alky		9.50E-03	9.50E-03	3.84E-01		No(6)
Chrysenes, C4-alky		6.30E-03	6.30E-03	3.84E-01		No(6)
Dibenzo(a,h)anthracene	5.30E-03	6.70E-03	6.70E-03	6.34E-02		No(6)
Fluoranthene	6.80E-01	4.90E-03	6.80E-01	6.00E-01		YES
Fluoranth+Pyr, C1-alky		7.50E-03	7.50E-03	6.00E-01		No(6)
Fluoranth+Pyr, C2-alky	3.60E-02	8.60E-03	3.60E-02	6.00E-01		No(6)
Fluoranth+Pyr, C3-alky	1.60E-03	8.60E-03	8.60E-03	6.00E-01		No(6)
Fluorene	5.80E-02		5.80E-02	1.90E-02		YES
Fluorenes, C1-alky	7.80E-03		7.80E-03	1.90E-02		No(6)
gamma-BHC (Lindane)		1.20E-04	1.20E-04			YES
Indeno(1,2,3-cd)pyrene		3.00E-02	3.00E-02	1.70E+00		No(6)
Mirex	1.30E-04	1.30E-05	1.30E-04			YES
Naphthalene	2.10E-02	5.30E-04	2.10E-02	1.60E-01		No(6)
Naphthalenes, C1-alky		3.30E-04	3.30E-04	1.60E-01		No(6)
PCB-8	1.20E-04		1.20E-04			YES
PCB-28	1.60E-04	2.40E-04	2.40E-04			YES
PCB-44	1.90E-05		1.90E-05			YES
PCB-52	1.30E-04	1.20E-04	1.30E-04			YES
PCB-77		4.40E-04	4.40E-04			YES
PCB-101	7.00E-04	3.80E-04	7.00E-04			YES
PCB-105	1.20E-04		1.20E-04			YES
PCB-118	7.20E-04	2.70E-04	7.20E-04			YES

Table 13.6-4
Marine Sediment CPEC Selection - Site 08

Analyte	MS01S01 (mg/kg)	MS02S01 (mg/kg)	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
PCB-128		1.90E-04	1.90E-04			YES
PCB-138	2.40E-03	1.30E-03	2.40E-03			YES
PCB-153	7.00E-03	2.10E-03	7.00E-03			YES
PCB-170	1.90E-03	7.90E-04	1.90E-03			YES
PCB-180	6.20E-03	1.90E-03	6.20E-03			YES
PCB-187	4.50E-03	1.30E-03	4.50E-03			YES
PCB-195	1.30E-03	2.10E-04	1.30E-03			YES
PCB-206	1.10E-03	3.80E-04	1.10E-03			YES
PCB-209	1.50E-02	3.00E-03	1.50E-02			YES
Perylene		5.70E-03	5.70E-03	1.70E+00		No(6)
Phenanthrene	4.40E-01	1.70E-03	4.40E-01	2.40E-01		YES
Phenanth+Anthra., C1-alky	3.30E-02	2.00E-04	3.30E-02	2.40E-01		No(6)
Phenanth+Anthra., C2-alky	1.10E-02	1.60E-04	1.10E-02	2.40E-01		No(6)
Photomirex	6.00E-05	1.60E-05	6.00E-05			YES
Pyrene	6.00E-01	6.40E-03	6.00E-01	6.65E-01		No(6)

*TBC values used for sediments are the ER-L values from Long and Morgan (1992 and 1994). Values for PAHs were used for alkyl substitued PAHS as well.
**Mean value of marine sediment samples taken at Midway Atoll.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 13.6-5
Seawater CPEC Selection - Site 08

Analyte	Environmental Concentration (mg/L)	ARAR Value (mg/L)	Background Concentration** (mg/L)	CPEC?
Inorganic				
Aluminum	2.30E-03	2.60E-01		No(6)
Antimony	5.71E-04	1.60E+00	4.58E-01	No(5)
Arsenic	2.61E-03	3.60E-02	1.29E+00	No(5)
Chromium	3.70E-03	5.00E-02		No(6)
Copper	3.24E-04	2.90E-03		No(6)
Iron	5.90E-02	1.00E+00		No(6)
Lead	3.84E-04	5.60E-03		No(6)
Manganese	9.55E-04	1.10E-02	4.63E-01	No(5)
Thallium	7.10E-05	4.00E-02	1.51E-01	No(5)
Tin	7.75E-04		1.81E-01	No(5)
Organic				
Acenaphthene	1.00E-04	7.10E-01		No(6)
Acenaphthylene	3.70E-06			YES
Anthracene	3.70E-05			YES
Benzo(a)anthracene	5.90E-05	2.70E-06		YES
Benzo(a)pyrene	6.80E-06	1.30E-06		YES
Benzo(b)fluoranthene	1.90E-05			YES
Benzo(e)pyrene	7.60E-06			YES
Benzo(g,h,i)perylene	7.90E-07			YES
Benzo(k)fluoranthene	4.60E-06			YES
Biphenyl	1.30E-06			YES
Chrysene	3.30E-05			YES
Chrysenes, C1-alky	8.50E-06			YES
Dibenzothiophene	2.60E-05			YES
Dibenzothiophenes, C1-alky	5.10E-05			YES
Dibenzothiophenes, C2-alky	5.50E-05			YES
Fluoranthene	1.20E-03	1.60E-02		No(6)
Fluoranthenes+Pyrenes, C1-alkyl-sub	1.90E-04	1.60E-02		No(6)
Fluoranthenes+Pyrenes, C2-alkyl-sub	3.60E-05	1.60E-02		No(6)
Fluoranthenes+Pyrenes, C3-alkyl-sub	3.90E-06	1.60E-02		No(6)
Fluorene	6.80E-06			YES
Fluorenes, C1-alky	1.60E-04			YES
Fluorenes, C2-alky	1.10E-04			YES
Fluorenes, C3-alky	3.70E-05			YES
Indeno(1,2,3-cd)pyrene	8.90E-07			YES
Perylene	1.00E-06			YES
Phenanthrene	6.80E-06	4.30E-04		No(6)
Phenanthrenes+Anthra., C2-alkyl-sub	4.50E-05	4.30E-04		No(6)
Phenanthrenes+Anthra., C3-alkyl-sub	2.20E-05	4.30E-04		No(6)
Phenanthrenes+Anthra., C4-alkyl-sub	3.80E-05	4.30E-04		No(6)
Pyrene	9.30E-04			YES

*The lowest marine chronic value from the NAWQC and HWQC was used when available, then freshwater chronic and freshwater and marine acute values were used if no chronic numbers were listed.
**Mean value of seawater samples taken at Midway Atoll.

CPEC SELECTION CODE
YES: selected as CPEC
No(1): common lab contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concen. < 2x background concen.
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 13.6-6
CPEC Environmental Concentrations in all Abiotic Media - Site 08

Analyte	EC (mg/kg) Surface Soil	EC (mg/kg) Subsurface Soil	EC (mg/L) Groundwater	EC (mg/kg) Sediment	EC (mg/L) Seawater
Inorganic					
Antimony	6.32E+01				
Arsenic	2.39E+02				
Cadmium	7.78E+00				
Chromium	1.10E+02				
Cobalt	1.44E+01				
Copper	1.72E+04				
Lead	2.79E+03		7.89E-03	4.73E+01	
Manganese			6.56E-01	3.30E+01	
Mercury	3.40E+00			2.29E-01	
Nickel			1.26E-02		
Thallium	1.04E-01			4.00E-02	
Tin	6.36E+01		3.14E-04	1.96E+00	
Zinc	2.69E+03				
Organic					
(Meta+Para)-Xylene		2.00E-03			
1,2-Dichloroethene(total)			6.00E-03		
2,4'-DDT			5.10E-06		
4,4'-DDE	2.00E-02				
4,4'-DDT	5.70E-02		1.70E-06		
Acenaphthene				6.40E-02	
Acenaphthylene					3.70E-06
alpha-BHC				1.00E-03	
Anthracene			8.00E-05	1.00E-01	3.70E-05
Aroclor-1260	4.40E-01				
Benzo(a)anthracene			7.40E-06	3.00E-01	5.90E-05
Benzo(a)pyrene			3.50E-06		6.80E-06
Benzo(b)fluoranthene			7.00E-06		1.90E-05
Benzo(e)pyrene			4.00E-06		7.60E-06
Benzo(g,h,i)perylene			1.70E-06		7.90E-07
Benzo(k)fluoranthene			2.20E-06		4.60E-06
Biphenyl			1.40E-03		1.30E-06
Carbazole	2.70E-01				
Chrysene			9.10E-06		3.30E-05
Chrysenes, C1-alky			4.00E-06		8.50E-06
Chrysenes, C2-alky			2.80E-06		
Dibenzofuran	2.00E-02				
Dibenzothiophene			9.10E-04		2.60E-05
Dibenzothiophenes, C1-alky			1.00E-03		5.10E-05
Dibenzothiophenes, C2-alky			6.10E-04		5.50E-05
Dibenzothiophenes, C3-alky			2.50E-04		
Dieldrin			4.90E-06		
Fluoranthene				6.80E-01	
Fluorene			1.80E-03	5.80E-02	6.80E-06
Fluorenes, C1-alky			1.70E-03		1.60E-04
Fluorenes, C2-alky			8.60E-04		1.10E-04
Fluorenes, C3-alky			2.80E-04		3.70E-05
Hexachlorobenzene	6.10E-05				
Indeno(1,2,3-cd)pyrene			2.20E-06		8.90E-07
gamma-BHC (Lindane)				1.20E-04	

Table 13.6-6
CPEC Environmental Concentrations in all Abiotic Media - Site 08

Analyte	EC (mg/kg) Surface Soil	EC (mg/kg) Subsurface Soil	EC (mg/L) Groundwater	EC (mg/kg) Sediment	EC (mg/L) Seawater
Mirex	8.16E-04			1.30E-04	
Oxychlorostyrene	1.20E-04				
PCB-8				1.20E-04	
PCB-28				2.40E-04	
PCB-44			5.80E-06	1.90E-05	
PCB-52				1.30E-04	
PCB-66			4.50E-06		
PCB-77				4.40E-04	
PCB-101				7.00E-04	
PCB-105				1.20E-04	
PCB-118			3.60E-05	7.20E-04	
PCB-126			1.00E-07		
PCB-128				1.90E-04	
PCB-138			2.70E-06	2.40E-03	
PCB-153				7.00E-03	
PCB-170			4.30E-07	1.90E-03	
PCB-180				6.20E-03	
PCB-187				4.50E-03	
PCB-195			1.80E-07	1.30E-03	
PCB-206			6.40E-07	1.10E-03	
PCB-209			5.70E-07	1.50E-02	
Perylene			8.20E-07		1.00E-06
Phenanthrene			1.30E-03	4.40E-01	
Phenanth+Anthra., C1-alky			9.10E-04		
Photomirex	1.11E-03			6.00E-05	
Pyrene			6.20E-05		9.30E-04
trans-Nonachlor	7.30E-04				

Blanks indicate that the analyte was not chosen as a CPEC for that medium

Table 13.6-7
Target Receptor Exposure Point Values - Site 08

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates	Ground-nesting Bird (Laysan albatross)			Burrowing Bird (Bonin petrel)				Shorebird (golden-plover)	
	EPV_{inv} (mg/L)	dermal (mg/kg-d)	ingestion (mg/kg-d)	EPV_{gn} (mg/kg-d)	dermal (mg/kg-d)	ingestion (mg/kg-d)	vapor (mg/kg-d)	EPV_{bb} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{sb} (mg/kg-d)
Inorganic										
Antimony	ND	6.62E-02	2.03E-02	8.66E-02	ND	ND	ND	ND	7.40E-08	7.40E-08
Arsenic	ND	2.51E-01	7.69E-02	3.27E-01	ND	ND	ND	ND	5.59E-07	5.59E-07
Cadmium	ND	8.16E-03	2.50E-03	1.07E-02	ND	ND	ND	ND	5.01E-09	5.01E-09
Chromium	ND	1.15E-01	3.54E-02	1.51E-01	ND	ND	ND	ND	7.08E-07	7.08E-07
Cobalt	ND	1.51E-02	4.63E-03	1.97E-02	ND	ND	ND	ND	3.37E-07	3.37E-07
Copper	ND	1.80E+01	5.53E+00	2.36E+01	ND	ND	ND	ND	2.01E-04	2.01E-04
Lead	5.26E-02	2.92E+00	8.97E-01	3.82E+00	ND	ND	ND	ND	9.80E-07	9.80E-07
Manganese	5.08E-01	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mercury	2.29E-02	3.56E-03	1.09E-03	4.66E-03	ND	ND	ND	ND	9.95E-07	9.95E-07
Nickel	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	6.15E-05	1.09E-04	3.34E-05	1.42E-04	ND	ND	ND	ND	4.87E-09	4.87E-09
Tin	7.84E-03	6.67E-02	2.05E-02	8.71E-02	ND	ND	ND	ND	5.95E-06	5.95E-06
Zinc	ND	2.82E+00	8.65E-01	3.68E+00	ND	ND	ND	ND	3.15E-04	3.15E-04
Organic										
(Meta+Para)-Xylene	ND	ND	ND	ND	2.94E-04	1.88E-06	2.12E-06	2.98E-04	ND	ND
1,2-Dichloroethene(total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4'-DDT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ND	2.10E-04	6.43E-06	2.16E-04	ND	ND	ND	ND	6.41E-04	6.41E-04
4,4'-DDT	ND	5.97E-04	1.83E-05	6.16E-04	ND	ND	ND	ND	2.57E-03	2.57E-03
Acenaphthene	2.43E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-BHC	1.26E-04	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	2.88E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1260	ND	2.31E-02	1.41E-04	2.32E-02	ND	ND	ND	ND	1.03E-01	1.03E-01
Benzo(a)anthracene	5.99E-04	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(e)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Biphenyl	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	1.42E-02	8.68E-05	1.42E-02	ND	ND	ND	ND	2.66E-04	2.66E-04

Table 13.6-7

Target Receptor Exposure Point Values - Site 08

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates	Ground-nesting Bird (Laysan albatross)			Burrowing Bird (Bonin petrel)				Shorebird (golden-plover)	
	EPV_{inv} (mg/L)	dermal (mg/kg-d)	ingestion (mg/kg-d)	EPV_{gn} (mg/kg-d)	dermal (mg/kg-d)	ingestion (mg/kg-d)	vapor (mg/kg-d)	EPV_{bb} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{sb} (mg/kg-d)
Chrysene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysenes, C1-alky	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysenes, C2-alky	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	ND	1.05E-03	6.43E-06	1.05E-03	ND	ND	ND	ND	DG	DG
Dibenzothiophene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzothiophenes, C1-alky	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzothiophenes, C2-alky	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzothiophenes, C3-alky	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	9.17E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	3.12E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorenes, C1-alky	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorenes, C2-alky	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorenes, C3-alky	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ND	3.20E-06	1.96E-08	3.22E-06	ND	ND	ND	ND	3.65E-06	3.65E-06
Indeno(1,2,3-cd)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
gamma-BHC (Lindane)	1.86E-05	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mirex	1.06E-01	4.28E-05	2.62E-07	4.30E-05	ND	ND	ND	ND	DG	DG
Oxychlorostyrene	ND	6.29E-06	3.86E-08	6.33E-06	ND	ND	ND	ND	DG	DG
PCB-8	3.01E-07	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-28	4.68E-07	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-44	3.30E-09	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-52	1.30E-05	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-66	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-77	3.26E-07	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-101	4.32E-05	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-105	9.76E-07	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-118	5.85E-06	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-126	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-128	5.61E-09	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-138	3.98E-07	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-153	1.08E-06	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-170	1.38E-07	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-180	3.82E-07	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 13.6-7

Target Receptor Exposure Point Values - Site 08

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates	Ground-nesting Bird (Laysan albatross)			Burrowing Bird (Bonin petrel)				Shorebird (golden-plover)	
	EPV_{inv} (mg/L)	dermal (mg/kg-d)	ingestion (mg/kg-d)	EPV_{gn} (mg/kg-d)	dermal (mg/kg-d)	ingestion (mg/kg-d)	vapor (mg/kg-d)	EPV_{bb} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{sb} (mg/kg-d)
PCB-187	2.36E-07	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-195	1.06E-07	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-206	6.48E-10	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-209	7.87E-11	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	1.24E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanth+Anthra., C1-alky	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Photomirex	4.88E-02	5.82E-05	3.57E-07	5.85E-05	ND	ND	ND	ND	DG	DG
Pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-Nonachlor	ND	3.83E-05	2.35E-07	3.85E-05	ND	ND	ND	ND	DG	DG

ND = not detected/not selected as CPEC

DG = data gap; no parameter available for exposure calculation

Table 13.6-7
Target Receptor Exposure Point Values - Site 08

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Reptile (green sea turtle)			Marine Mammal (monk seal)	
	ingestion (sw)* (mg/kg-d)	ingestion (gw)** (mg/kg-d)	EPV_{st} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{ms} (mg/kg-d)
Inorganic					
Antimony	ND	ND	ND	ND	ND
Arsenic	ND	ND	ND	ND	ND
Cadmium	ND	ND	ND	ND	ND
Chromium	ND	ND	ND	ND	ND
Cobalt	ND	ND	ND	ND	ND
Copper	ND	ND	ND	ND	ND
Lead	ND	2.49E-02	2.49E-02	6.67E-02	6.67E-02
Manganese	ND	5.12E-02	5.12E-02	2.88E-01	2.88E-01
Mercury	ND	ND	ND	1.27E-02	1.27E-02
Nickel	ND	9.25E-03	9.25E-03	1.13E-01	1.13E-01
Selenium	ND	ND	ND	ND	ND
Thallium	ND	ND	ND	9.33E-02	9.33E-02
Tin	ND	1.79E-03	1.79E-03	8.43E-03	8.43E-03
Zinc	ND	ND	ND	ND	ND
Organic					
(Meta+Para)-Xylene	ND	ND	ND	ND	ND
1,2-Dichloroethene(total)	ND	1.45E-06	1.45E-06	3.14E-04	3.14E-04
2,4'-DDT	ND	3.17E-05	3.17E-05	1.80E-05	1.80E-05
4,4'-DDE	ND	ND	ND	ND	ND
4,4'-DDT	ND	1.06E-05	1.06E-05	2.34E-04	2.34E-04
Acenaphthene	ND	ND	ND	1.58E-04	1.58E-04
Acenaphthylene	7.89E-06	ND	7.89E-06	3.00E-05	3.00E-05
alpha-BHC	ND	ND	ND	1.23E-05	1.23E-05
Anthracene	2.23E-05	2.23E-05	4.47E-05	8.72E-05	8.72E-05
Aroclor-1260	ND	ND	ND	ND	ND
Benzo(a)anthracene	1.34E-05	1.34E-05	2.68E-05	5.57E-05	5.57E-05
Benzo(a)pyrene	1.79E-05	1.79E-05	3.58E-05	2.62E-05	2.62E-05
Benzo(b)fluoranthene	9.98E-05	9.98E-05	2.00E-04	3.26E-04	3.26E-04
Benzo(e)pyrene	4.02E-05	4.02E-05	8.04E-05	1.28E-04	1.28E-04
Benzo(g,h,i)perylene	5.81E-05	5.81E-05	1.16E-04	3.12E-03	3.12E-03
Benzo(k)fluoranthene	2.83E-05	2.83E-05	5.66E-05	1.31E-04	1.31E-04
Biphenyl	2.98E-06	2.98E-06	5.96E-06	2.26E-05	2.26E-05
Carbazole	ND	ND	ND	ND	ND

Table 13.6-7
Target Receptor Exposure Point Values - Site 08

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Reptile (green sea turtle)			Marine Mammal (monk seal)	
	ingestion (sw)* (mg/kg-d)	ingestion (gw)** (mg/kg-d)	EPV_{st} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{ms} (mg/kg-d)
Chrysene	3.72E-05	3.72E-05	7.45E-05	5.49E-03	5.49E-03
Chrysenes, C1-alky	1.46E-04	1.46E-04	2.92E-04	1.65E-03	1.65E-03
Chrysenes, C2-alky	ND	1.59E-05	1.59E-05	3.96E-04	3.96E-04
Dibenzofuran	ND	ND	ND	ND	ND
Dibenzothiophene	DG	DG	DG	2.66E-05	2.66E-05
Dibenzothiophenes, C1-alky	DG	DG	DG	4.59E-05	4.59E-05
Dibenzothiophenes, C2-alky	DG	DG	DG	1.33E-04	1.33E-04
Dibenzothiophenes, C3-alky	ND	DG	DG	1.93E-04	1.93E-04
Dieldrin	ND	1.13E-07	1.13E-07	1.07E-05	1.07E-05
Fluoranthene	ND	ND	ND	7.26E-04	7.26E-04
Fluorene	1.94E-05	1.94E-05	3.87E-05	1.04E-04	1.04E-04
Fluorenes, C1-alky	1.71E-05	1.82E-04	1.99E-04	1.10E-02	1.10E-02
Fluorenes, C2-alky	1.18E-05	9.20E-05	1.04E-04	5.71E-03	5.71E-03
Fluorenes, C3-alky	3.96E-06	3.00E-05	3.39E-05	1.87E-03	1.87E-03
Hexachlorobenzene	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	7.15E-05	7.15E-05	1.43E-04	1.34E-04	1.34E-04
gamma-BHC (Lindane)	ND	ND	ND	9.85E-06	9.85E-06
Mirex	ND	ND	ND	9.32E-08	9.32E-08
Oxychlorostyrene	ND	ND	ND	ND	ND
PCB-8	ND	ND	ND	7.28E-06	7.28E-06
PCB-28	ND	ND	ND	1.52E-05	1.52E-05
PCB-44	ND	1.71E-04	1.71E-04	2.67E-03	2.67E-03
PCB-52	ND	ND	ND	1.96E-05	1.96E-05
PCB-66	ND	1.33E-04	1.33E-04	2.07E-03	2.07E-03
PCB-77	ND	ND	ND	1.37E-05	1.37E-05
PCB-101	ND	ND	ND	4.66E-05	4.66E-05
PCB-105	ND	ND	ND	3.73E-05	3.73E-05
PCB-118	ND	7.60E-07	7.60E-07	1.21E-04	1.21E-04
PCB-126	ND	6.81E-08	6.81E-08	2.47E-06	2.47E-06
PCB-128	ND	ND	ND	2.76E-05	2.76E-05
PCB-138	ND	9.91E-06	9.91E-06	3.01E-04	3.01E-04
PCB-153	ND	ND	ND	8.86E-04	8.86E-04
PCB-170	ND	3.05E-06	3.05E-06	1.95E-04	1.95E-04
PCB-180	ND	ND	ND	4.73E-04	4.73E-04

Table 13.6-7
Target Receptor Exposure Point Values - Site 08

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Reptile (green sea turtle)			Marine Mammal (monk seal)	
	ingestion (sw)* (mg/kg-d)	ingestion (gw)** (mg/kg-d)	EPV_{st} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{ms} (mg/kg-d)
PCB-187	ND	ND	ND	3.22E-04	3.22E-04
PCB-195	ND	1.71E-06	1.71E-06	3.28E-05	3.28E-05
PCB-206	ND	3.43E-06	3.43E-06	5.79E-05	5.79E-05
PCB-209	ND	1.65E-05	1.65E-05	1.48E-04	1.48E-04
Perylene	4.77E-06	4.77E-06	9.53E-06	2.93E-04	2.93E-04
Phenanthrene	ND	9.83E-06	9.83E-06	2.13E-04	2.13E-04
Phenanth+Anthra., C1-alky	ND	1.83E-04	1.83E-04	8.85E-03	8.85E-03
Photomirex	ND	ND	ND	DG	DG
Pyrene	1.94E-05	1.94E-05	3.87E-05	4.34E-04	4.34E-04
trans-Nonachlor	ND	ND	ND	ND	ND

* assumes ingestion of aquatic macrophytes exposed to surface waters
** assumes ingestion of aquatic macrophytes exposed to undiluted ground water discharged into surface waters
ND = not detected/not selected as CPEC
DG = data gap; no parameter available for exposure calculation

Table 13.6-8
Marine Tissue Chemical Analysis Results - Site 08

Analyte	bivalve *Chama iostoma* Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?	sea urchin *Echinometra mathaei* Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?
Inorganic						
Aluminum	ND	ND	no	ND	ND	no
Antimony	1.90E-01	1.90E-01	no	1.90E-01	1.90E-01	no
Arsenic	8.40E+01	4.87E+01	yes	3.48E+00	3.20E+00	yes
Cadmium	2.98E+00	1.94E+01	no	2.12E-01	8.89E-01	no
Chromium	7.27E+00	7.44E+00	no	5.80E-01	1.86E-01	yes
Copper	2.16E+01	6.63E+00	yes	6.80E+00	5.90E+00	yes
Iron	4.44E+03	3.43E+01	yes	2.86E+02	1.47E+01	yes
Lead	8.26E+00	1.02E-01	yes	2.35E+00	1.24E-01	yes
Manganese	4.13E+01	1.08E+00	yes	6.09E+00	1.40E+00	yes
Mercury	9.80E-01	3.25E-01	yes	3.60E-02	2.80E-02	yes
Nickel	1.40E+01	1.61E+01	no	1.38E+00	2.55E+00	no
Selenium	2.13E+00	2.60E+00	no	1.20E+00	1.40E+00	no
Silicon	1.40E+03	9.20E+02	yes	1.09E+04	7.40E+03	yes
Silver	2.20E-01	2.78E+00	no	ND	ND	no
Thallium	4.00E-02	4.00E-02	no	4.00E-02	4.00E-02	no
Tin	3.86E-01	1.68E-01	yes	2.00E-01	2.18E-01	no
Zinc	2.99E+02	2.47E+02	yes	6.70E+00	2.90E+00	yes
Organic						
1,2,4-trichlorobenzene	2.40E-03	2.90E-03	no	5.40E-04	4.90E-04	yes
1,3,5-trichlorobenzene	2.00E-03	2.50E-03	no	4.70E-04	4.20E-04	yes
2,4'-DDD	1.20E-03	6.80E-04	yes	9.50E-04	3.10E-04	yes
2,4'-DDE	4.90E-04	6.10E-04	no	1.10E-04	1.00E-04	yes
2,4'-DDT	3.20E-04	3.90E-04	no	7.20E-05	6.60E-05	yes
2,4-dinitrophenol	4.40E+01	5.50E+01	no	1.00E+01	9.20E+00	yes
4,4'-DDD	1.30E-03	1.70E-03	no	3.00E-04	2.80E-04	yes
4,4'-DDE	1.00E-03	2.60E-03	no	7.90E-04	4.40E-04	yes
4,4'-DDT	4.80E-04	6.00E-04	no	1.10E-04	1.00E-04	yes
Acenaphthene	1.40E-03	1.80E-03	no	6.60E-04	3.00E-04	yes
Acenaphthylene	1.80E-03	2.20E-03	no	4.20E-04	3.70E-04	yes
aldrin	8.90E-04	1.10E-03	no	2.00E-04	1.90E-04	yes
alpha-BHC	3.00E-04	3.80E-04	no	3.40E-04	6.40E-05	yes
alpha-chlordane	4.90E-04	6.10E-04	no	1.10E-04	1.00E-04	yes
Anthracene	9.80E-03	1.70E-03	yes	7.70E-04	2.90E-04	yes
Benzo(a)anthracene	7.50E-03	3.10E-03	yes	1.10E-03	3.80E-04	yes
Benzo(a)pyrene	3.60E-03	4.70E-03	no	8.60E-04	7.80E-04	yes
Benzo(b)fluoranthene	4.70E-02	5.50E-03	yes	1.80E-03	1.70E-04	yes
Benzo(e)pyrene	1.80E-02	5.50E-03	yes	1.60E-03	9.30E-04	yes
Benzo(g,h,i)perylene	1.10E-02	6.70E-03	yes	1.30E-03	1.10E-03	yes
Benzo(k)fluoranthene	1.90E-02	5.50E-03	yes	5.80E-04	4.50E-05	yes
beta-BHC	2.40E-04	3.00E-04	no	5.60E-05	5.10E-05	yes
Biphenyl	2.30E-03	1.10E-03	yes	3.60E-04	3.20E-04	yes
Chrysene	1.40E-02	4.40E-03	yes	1.70E-03	1.50E-04	yes
Chrysenes, C1-alky	7.00E-03	4.40E-03	yes	8.10E-04	7.40E-04	yes
Chrysenes, C2-alky	5.50E-03	4.40E-03	yes	8.10E-04	7.40E-04	yes
Chrysenes, C3-alky	5.00E-03	4.40E-03	yes	8.10E-04	7.40E-04	yes
Chrysenes, C4-alky	2.70E-03	4.40E-03	no	8.10E-04	7.40E-04	yes
Dibenzo(a,h)anthracene	2.20E-03	7.30E-03	no	2.00E-04	1.20E-03	no
Dibenzothiophene	2.70E-03	1.50E-03	yes	2.70E-04	2.50E-04	yes
Dibenzothiophenes, C1-alky	6.90E-03	1.50E-03	yes	2.70E-04	2.50E-04	yes
Dibenzothiophenes, C2-alky	2.00E-02	1.50E-03	yes	2.70E-04	2.50E-04	yes
Dibenzothiophenes, C3-alky	2.90E-02	1.50E-03	yes	2.70E-04	2.50E-04	yes
dieldrin	3.20E-04	4.00E-04	no	7.40E-05	6.80E-05	yes
endosulfan sulfate	6.50E-04	8.10E-04	no	1.50E-04	1.40E-04	yes
endrin	1.80E-04	2.20E-04	no	4.10E-05	3.80E-05	yes
endrin ketone	4.50E-04	5.60E-04	no	1.00E-04	9.30E-05	yes
Fluoranth+Pyr, C1-alky	2.80E-02	4.40E-03	yes	8.10E-04	7.40E-04	yes

Table 13.6-8
Marine Tissue Chemical Analysis Results - Site 08

Analyte	bivalve *Chama iostoma* Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?	sea urchin *Echinometra mathaei* Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?
Fluoranth+Pyr, C2-alky	1.20E-02	4.40E-03	yes	8.10E-04	7.40E-04	yes
Fluoranth+Pyr, C3-alky	1.10E-02	4.40E-03	yes	8.10E-04	7.40E-04	yes
Fluoranthene	9.60E-02	4.40E-03	yes	9.00E-03	3.60E-04	yes
Fluorene	5.60E-03	2.70E-03	yes	5.80E-04	4.50E-04	yes
Fluorenes, C1-alky	2.10E-03	2.70E-03	no	4.90E-04	4.50E-04	yes
Fluorenes, C2-alky	2.10E-03	2.70E-03	no	4.90E-04	4.50E-04	yes
Fluorenes, C3-alky	2.10E-03	2.70E-03	no	4.90E-04	4.50E-04	yes
gamma-BHC (Lindane)	2.50E-04	3.10E-04	no	5.80E-05	5.20E-05	yes
gamma-chlordane	8.80E-04	1.10E-03	no	2.00E-04	1.80E-04	yes
Hexachlorobenzene	2.00E-04	3.40E-04	no	9.20E-05	4.20E-05	yes
Indeno(1,2,3-cd)pyrene	1.90E-02	8.00E-03	yes	1.10E-03	7.50E-05	yes
methoxychlor	3.80E-04	4.70E-04	no	1.80E-04	7.90E-05	yes
mirex	3.10E-04	1.90E-04	yes	1.40E-05	6.40E-05	no
Naphthalene	3.80E-03	4.70E-03	no	3.00E-03	1.80E-03	yes
Naphthalenes, C1-alky	7.10E-03	5.30E-03	yes	8.60E-04	7.80E-04	yes
Naphthalenes, C2-alky	1.30E-02	3.90E-03	yes	1.50E-03	7.80E-04	yes
Naphthalenes, C3-alky	2.60E-02	4.70E-03	yes	8.60E-04	7.80E-04	yes
Naphthalenes, C4-alky	3.60E-02	4.70E-03	yes	8.60E-04	7.80E-04	yes
oxychlordane	3.00E-04	3.70E-04	no	6.80E-05	6.20E-05	yes
Oxychlorostyrene	1.60E-04	2.00E-04	no	3.70E-05	3.30E-05	yes
PCB-8	2.20E-04	2.70E-04	no	9.30E-05	4.60E-05	yes
PCB-18	2.80E-04	3.60E-04	no	6.50E-05	6.00E-05	yes
PCB-28	2.70E-04	1.20E-02	no	6.30E-05	5.70E-05	yes
PCB-44	2.30E-04	2.90E-04	no	5.30E-05	4.80E-05	yes
PCB-52	5.00E-04	6.20E-04	no	4.50E-04	1.00E-04	yes
PCB-66	3.80E-04	4.80E-04	no	8.80E-05	8.00E-05	yes
PCB-77	5.10E-04	6.40E-04	no	1.20E-04	1.10E-04	yes
PCB-101	1.80E-03	1.50E-03	yes	1.40E-03	2.50E-04	yes
PCB-105	2.60E-03	3.50E-04	yes	7.00E-04	1.40E-04	yes
PCB-118	1.50E-03	1.70E-03	no	1.20E-03	2.90E-04	yes
PCB-126	4.20E-04	5.20E-04	no	9.60E-05	8.70E-05	yes
PCB-128	6.70E-04	8.40E-04	no	3.40E-04	1.40E-04	yes
PCB-138	7.20E-03	1.90E-03	yes	4.40E-03	7.30E-05	yes
PCB-153	1.30E-02	2.70E-03	yes	6.00E-03	4.50E-04	yes
PCB-170	2.30E-03	4.10E-04	yes	2.50E-04	6.90E-05	yes
PCB-180	6.00E-03	8.70E-04	yes	6.80E-04	4.40E-05	yes
PCB-187	6.40E-03	1.20E-03	yes	4.10E-03	2.00E-04	yes
PCB-195	3.30E-04	8.10E-05	yes	8.50E-05	9.90E-05	no
PCB-206	5.90E-04	2.30E-04	yes	7.40E-05	2.90E-05	yes
PCB-209	2.20E-03	2.20E-04	yes	4.10E-04	4.60E-05	yes
Perylene	7.90E-04	4.30E-03	no	8.00E-04	7.30E-04	yes
Phenan+Anthra, C1-alky	1.50E-02	1.40E-03	yes	2.60E-04	2.30E-04	yes
Phenan+Anthra, C2-alky	2.30E-02	1.40E-03	yes	2.60E-04	2.30E-04	yes
Phenan+Anthra, C3-alky	1.70E-02	1.40E-03	yes	2.60E-04	2.30E-04	yes
Phenan+Anthra, C4-alky	1.90E-02	1.40E-03	yes	2.60E-04	2.30E-04	yes
Phenanthrene	1.60E-02	2.70E-03	yes	1.30E-03	2.30E-04	yes
photomirex	4.60E-04	5.70E-04	no	1.00E-04	9.60E-05	yes
Pyrene	6.20E-02	3.50E-03	yes	2.90E-03	3.10E-04	yes
trans-nonachlor	4.60E-04	5.70E-04	no	1.00E-04	9.60E-05	yes

ND = not detected

Table 13.6-8
Marine Tissue Chemical Analysis Results - Site 08

Analyte	fish *Acanthurus triostegus* Site Concentration (mg/kg)	fish Background Concentration (mg/kg)	fish Site Exceeds Background?	alga *Dictyota acutiloba* Mean Site Concentration* (mg/kg)	alga Background Concentration (mg/kg)	alga Site Exceeds Background?
Inorganic						
Aluminum	ND	ND	no	7.37E+02	1.78E+01	yes
Antimony	1.90E-01	1.90E-01	no	5.67E-01	1.90E-01	yes
Arsenic	7.21E+00	2.39E+00	yes	2.14E+01	1.39E+01	yes
Cadmium	8.10E-02	1.66E+00	no	9.93E-02	4.81E-01	no
Chromium	1.96E+00	9.36E-01	yes	1.07E+01	3.36E+00	yes
Copper	1.56E+01	3.18E+00	yes	1.66E+01	8.60E+00	yes
Iron	1.42E+02	8.11E+01	yes	4.21E+03	7.57E+01	yes
Lead	1.76E+00	1.83E-01	yes	1.67E+01	7.74E-01	yes
Manganese	1.90E+00	1.40E+00	yes	3.43E+01	5.06E+00	yes
Mercury	9.20E-02	5.90E-02	yes	1.34E-01	3.40E-02	yes
Nickel	2.92E+00	1.01E+00	yes	6.21E+00	3.80E+00	yes
Selenium	9.30E-01	9.30E-01	no	1.20E+00	1.40E+00	no
Silicon	1.70E+03	1.50E+03	yes	7.55E+03	3.70E+03	yes
Silver	2.20E-01	2.20E-01	no	ND	ND	no
Thallium	4.00E-02	4.27E-02	no	4.00E-02	4.00E-02	no
Tin	8.80E-01	4.30E-02	yes	1.20E+00	1.17E+00	yes
Zinc	6.22E+01	3.65E+01	yes	3.12E+01	4.50E+00	yes
Organic						
1,2,4-trichlorobenzene	3.90E-03	3.40E-03	yes	4.00E-03	4.80E-03	no
1,3,5-trichlorobenzene	3.40E-03	2.90E-03	yes	3.40E-03	4.20E-03	no
2,4'-DDD	9.00E-04	7.70E-04	yes	4.55E-03	5.60E-04	yes
2,4'-DDE	8.20E-04	7.00E-04	yes	4.15E-04	5.10E-04	no
2,4'-DDT	2.70E-03	4.50E-04	yes	2.65E-04	3.20E-04	no
2,4-dinitrophenol	7.30E+01	6.30E+01	yes	7.45E+01	9.10E+01	no
4,4'-DDD	7.40E-03	1.90E-03	yes	1.00E-03	1.40E-03	no
4,4'-DDE	4.00E-03	3.00E-03	yes	5.10E-04	2.20E-03	no
4,4'-DDT	8.00E-04	6.80E-04	yes	4.05E-04	4.90E-04	no
Acenaphthene	2.30E-02	4.90E-03	yes	2.45E-03	5.80E-03	no
Acenaphthylene	2.90E-03	2.50E-03	yes	4.65E-03	3.60E-03	yes
aldrin	1.50E-03	1.30E-03	yes	7.50E-04	9.10E-04	no
alpha-BHC	1.50E-03	6.80E-04	yes	2.55E-03	4.20E-03	no
alpha-chlordane	8.20E-04	7.00E-04	yes	4.15E-04	5.10E-04	no
Anthracene	3.30E-03	2.00E-03	yes	1.25E-02	2.90E-03	yes
Benzo(a)anthracene	8.60E-04	3.60E-03	no	6.95E-03	5.20E-03	yes
Benzo(a)pyrene	3.40E-04	5.30E-03	no	9.10E-03	7.70E-03	yes
Benzo(b)fluoranthene	1.90E-03	6.20E-03	no	5.10E-02	9.00E-03	yes
Benzo(e)pyrene	1.20E-03	6.30E-03	no	2.05E-02	9.10E-03	yes
Benzo(g,h,i)perylene	8.90E-03	7.60E-03	yes	2.90E-02	1.10E-02	yes
Benzo(k)fluoranthene	7.30E-04	6.30E-03	no	1.45E-02	9.10E-03	yes
beta-BHC	4.00E-04	3.50E-04	yes	1.12E-03	2.50E-04	yes
Biphenyl	1.10E-03	1.30E-03	no	1.70E-03	1.90E-03	no
Chrysene	5.90E-03	5.00E-03	yes	1.70E-02	7.30E-03	yes
Chrysenes, C1-alky	5.90E-03	5.00E-03	yes	6.85E-03	7.30E-03	no
Chrysenes, C2-alky	5.90E-03	5.00E-03	yes	6.00E-03	7.30E-03	no
Chrysenes, C3-alky	5.90E-03	5.00E-03	yes	6.00E-03	7.30E-03	no
Chrysenes, C4-alky	5.90E-03	5.00E-03	yes	6.00E-03	7.30E-03	no
Dibenzo(a,h)anthracene	9.80E-03	8.40E-03	yes	4.85E-03	1.20E-02	no
Dibenzothiophene	1.30E-03	1.70E-03	no	2.00E-03	2.40E-03	no
Dibenzothiophenes, C1-alky	2.00E-03	1.70E-03	yes	2.00E-03	2.40E-03	no
Dibenzothiophenes, C2-alky	2.00E-03	1.70E-03	yes	2.00E-03	2.40E-03	no
Dibenzothiophenes, C3-alky	2.00E-03	1.70E-03	yes	2.00E-03	2.40E-03	no
dieldrin	1.60E-03	4.60E-04	yes	2.75E-04	3.30E-04	no
endosulfan sulfate	1.10E-03	9.30E-04	yes	5.50E-04	3.10E-03	no
endrin	3.00E-04	2.60E-04	yes	1.55E-04	1.90E-04	no
endrin ketone	7.40E-04	5.20E-03	no	3.80E-04	4.50E-03	no
Fluoranth+Pyr, C1-alky	5.90E-03	5.00E-03	yes	1.02E-02	7.30E-03	yes

Table 13.6-8
Marine Tissue Chemical Analysis Results - Site 08

Analyte	fish *Acanthurus triostegus* Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?	alga *Dictyota acutiloba* Mean Site Concentration* (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?
Fluoranth+Pyr, C2-alky	5.90E-03	5.00E-03	yes	6.00E-03	7.30E-03	no
Fluoranth+Pyr, C3-alky	5.90E-03	5.00E-03	yes	6.00E-03	7.30E-03	no
Fluoranthene	1.30E-02	2.80E-04	yes	1.39E-02	7.30E-03	yes
Fluorene	1.00E-02	3.00E-03	yes	3.65E-03	4.40E-03	no
Fluorenes, C1-alky	3.60E-03	3.00E-03	yes	3.65E-03	4.40E-03	no
Fluorenes, C2-alky	3.60E-03	3.00E-03	yes	3.65E-03	4.40E-03	no
Fluorenes, C3-alky	3.60E-03	3.00E-03	yes	3.65E-03	4.40E-03	no
gamma-BHC (Lindane)	4.20E-04	3.60E-04	yes	3.50E-04	2.60E-04	yes
gamma-chlordane	1.40E-03	1.20E-03	yes	1.70E-03	9.00E-04	yes
Hexachlorobenzene	4.40E-04	4.90E-04	no	1.70E-04	2.10E-04	no
Indeno(1,2,3-cd)pyrene	1.10E-03	9.10E-03	no	3.60E-02	1.30E-02	yes
methoxychlor	6.30E-04	5.40E-04	yes	1.02E-04	3.90E-04	no
mirex	3.40E-04	8.60E-04	no	1.57E-03	6.10E-04	yes
Naphthalene	6.20E-03	5.30E-03	yes	7.90E-03	2.40E-03	yes
Naphthalenes, C1-alky	7.40E-03	5.30E-03	yes	3.10E-03	7.70E-03	no
Naphthalenes, C2-alky	1.60E-02	5.30E-03	yes	6.35E-03	7.70E-03	no
Naphthalenes, C3-alky	6.20E-03	5.30E-03	yes	6.35E-03	7.70E-03	no
Naphthalenes, C4-alky	6.20E-03	5.30E-03	yes	6.35E-03	7.70E-03	no
oxychlordane	4.90E-04	4.20E-04	yes	2.50E-04	3.10E-04	no
Oxychlorostyrene	2.60E-04	2.30E-04	yes	1.35E-04	1.60E-04	no
PCB-8	1.00E-03	3.10E-04	yes	1.85E-04	2.30E-04	no
PCB-18	4.70E-04	4.00E-04	yes	2.35E-03	5.10E-03	no
PCB-28	9.40E-04	3.90E-04	yes	2.35E-04	2.80E-04	no
PCB-44	3.80E-04	3.30E-04	yes	1.95E-04	2.40E-04	no
PCB-52	2.50E-03	3.70E-03	no	1.45E-02	5.10E-04	yes
PCB-66	6.40E-04	5.50E-04	yes	3.25E-04	4.00E-04	no
PCB-77	8.50E-04	7.30E-04	yes	4.30E-04	5.30E-04	no
PCB-101	5.20E-03	1.70E-03	yes	1.43E-03	1.20E-03	yes
PCB-105	3.00E-03	4.00E-04	yes	2.35E-04	2.90E-04	no
PCB-118	1.70E-02	1.90E-03	yes	7.00E-04	1.40E-03	no
PCB-126	6.90E-04	5.90E-04	yes	3.50E-04	4.30E-04	no
PCB-128	3.80E-03	9.60E-04	yes	4.90E-04	6.90E-04	no
PCB-138	3.80E-02	3.80E-03	yes	6.65E-03	2.80E-03	yes
PCB-153	1.20E-01	1.20E-03	yes	8.20E-03	2.20E-03	yes
PCB-170	2.70E-02	1.70E-04	yes	2.05E-03	6.80E-04	yes
PCB-180	6.50E-02	9.60E-04	yes	5.70E-03	1.30E-03	yes
PCB-187	4.20E-02	8.00E-04	yes	1.15E-02	1.00E-03	yes
PCB-195	4.60E-03	6.80E-04	yes	1.15E-03	4.90E-04	yes
PCB-206	8.10E-03	5.60E-04	yes	2.30E-03	4.00E-04	yes
PCB-209	2.00E-02	3.10E-04	yes	1.11E-02	2.20E-04	yes
Perylene	5.80E-03	5.00E-03	yes	2.35E-03	7.20E-03	no
Phenan+Anthra, C1-alky	1.90E-03	1.60E-03	yes	1.90E-03	2.30E-03	no
Phenan+Anthra, C2-alky	1.90E-03	1.60E-03	yes	1.90E-03	2.30E-03	no
Phenan+Anthra, C3-alky	1.90E-03	1.60E-03	yes	1.90E-03	2.30E-03	no
Phenan+Anthra, C4-alky	1.90E-03	1.60E-03	yes	1.90E-03	2.30E-03	no
Phenanthrene	1.60E-02	7.20E-03	yes	4.85E-03	2.30E-03	yes
photomirex	7.60E-04	6.50E-04	yes	3.90E-04	4.70E-04	no
Pyrene	3.20E-03	6.50E-04	yes	9.85E-03	5.00E-03	yes
trans-nonachlor	1.70E-03	6.50E-04	yes	7.10E-04	3.70E-03	no

*mean concentration if two or more data points available, otherwise, one data point reported
ND = not detected

Table 13.6-9
Sediment Bioassay Test Results - Site 08

SAMPLE TYPE / ID#	EPA	REP	VIAL	# NORMAL	# ABNORMAL	TOTAL/ML	% NORMAL	% ABNORMAL	% SURVIVAL	AVERAGE % NORMALITY	AVERAGE % SURVIVAL
Control	CONTROL 2	A	1	192	14	206	93.2	6.8	82.4		
	CONTROL 2	B	4	168	17	185	90.8	9.2	74.0		
	CONTROL 2	C	10	294	35	329	89.4	10.6	131.6		
	CONTROL 2	D	20	291	24	315	92.4	7.6	126.0		
	CONTROL 2	E	11	207	11	218	95.0	5.0	87.2	92.1	100.2
Reference											
M00MS01S01	MA665	A	52	133	14	147	90.5	9.5	63.9		
	MA665	B	87	111	6	117	94.9	5.1	50.9		
	MA665	C	104	186	7	193	96.4	3.6	83.9		
	MA665	D	137	163	6	169	96.4	3.6	73.5		
	MA665	E	53	174	18	192	90.6	9.4	83.5	93.8	71.1
M00MS02S01	MA668	A	9	149	7	156	95.5	4.5	67.8		
	MA668	B	116	160	8	168	95.2	4.8	73.0		
	MA668	C	12	220	8	228	96.5	3.5	99.1		
	MA668	D	115	145	3	148	98.0	2.0	64.3		
	MA668	E	69	210	10	220	95.5	4.5	95.7		
M00MS02D01	MA670	A	28	223	25	248	89.9	10.1	107.8		
	MA670	B	78	258	5	263	98.1	1.9	114.3		
	MA670	C	105	134	2	136	98.5	1.5	59.1		
	MA670	D	118	166	6	172	96.5	3.5	74.8		
	MA670	E	85	174	6	180	96.7	3.3	78.3	96.0	83.4
Onsite											
M08MS01SO1	MF 013	A	12	5	71	76	6.6	93.4	30.4		
	MF 013	B	18	13	66	79	16.5	83.5	31.6		
	MF 013	C	22	6	42	48	12.5	87.5	19.2		
	MF 013	D	30	18	63	81	22.2	77.8	32.4		
	MF 013	E	29	43	33	76	56.6	43.4	30.4	22.9	28.8
M08MS02S01	MF 014	A	2	160	36	196	81.6	18.4	78.4		
	MF 014	B	46	184	127	311	59.2	40.8	124.4		
	MF 014	C	49	166	5	171	97.1	2.9	68.4		
	MF 014	D	3	210	43	253	83.0	17.0	101.2		
	MF 014	E	39	181	17	198	91.4	8.6	79.2		
M08MS02D01	MF 015	A	26	197	10	207	95.2	4.8	82.8		
	MF 015	B	14	152	7	159	95.6	4.4	63.6		
	MF 015	C	35	172	9	181	95.0	5.0	72.4		
	MF 015	D	41	64	9	73	87.7	12.3	29.2		
	MF 015	E	42	189	36	225	84.0	16.0	90.0	87.0	79.0

Table 13.6-11
Toxicity Quotients for Target Receptors - Site 08

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates			Ground-nesting Bird (Laysan albatross)			Burrowing Bird (Bonin petrel)			Shorebird (golden-plover)		
	EPV	TRV	TQ *	EPV	TRV	TQ *	EPV	TRV	TQ *	EPV	TRV	TQ *
Inorganic												
Antimony	ND	1.60E+00		8.66E-02	3.50E-03	1.39	ND	3.50E-03		7.40E-08	3.50E-03	
Arsenic	ND	3.60E-02		3.27E-01	1.02E+00		ND	1.02E+00		5.59E-07	1.02E+00	
Cadmium	ND	9.30E-03		1.07E-02	5.60E+01		ND	5.60E+01		5.01E-09	5.60E+01	
Chromium	ND	5.00E-02		1.51E-01	2.00E-01		ND	2.00E-01		7.08E-07	2.00E-01	
Cobalt	ND	2.90E-04		1.97E-02	5.40E-02		ND	5.40E-02		3.37E-07	5.40E-02	
Copper	ND	2.90E-03		2.36E+01	8.40E+00	0.45	ND	8.40E+00		2.01E-04	8.40E+00	
Lead	5.26E-02	5.60E-03	0.97	3.82E+00	8.40E-01	0.66	ND	8.40E-01		9.80E-07	8.40E-01	
Manganese	5.08E-01	1.10E-02	1.66	ND	3.60E+00		ND	3.60E+00		ND	3.60E+00	
Mercury	2.29E-02	3.00E-05	2.88	4.66E-03	8.62E+01		ND	8.62E+01		9.95E-07	8.62E+01	
Nickel	ND	8.30E-03		ND	7.74E+01		ND	7.74E+01		ND	7.74E+01	
Selenium	ND	5.40E-02		ND	1.08E+02		ND	1.08E+02		ND	1.08E+02	
Silver	ND	1.00E-03		ND	1.00E+01		ND	1.00E+01		ND	1.00E+01	
Thallium	6.15E-05	4.00E-02		1.42E-04	2.40E+00		ND	2.40E+00		4.87E-09	2.40E+00	
Tin	7.84E-03	0.00E+00		8.71E-02	5.00E-01		ND	5.00E-01		5.95E-06	5.00E-01	
Zinc	ND	8.60E-02		3.68E+00	1.18E+02		ND	1.18E+02		3.15E-04	1.18E+02	
Organic												
(Meta+Para)-Xylene	ND	1.46E-03		ND	2.06E-01		2.98E-04	2.06E-01		ND	2.06E-01	
1,2-Dichloroethene(total)	ND	3.40E-04		ND	1.13E+01		ND	1.13E+01		ND	1.13E+01	
2,4'-DDD	ND	4.20E-07		ND	4.10E+00		ND	4.10E+00		ND	4.10E+00	
2,4'-DDE	ND	1.00E-06		ND	3.00E-02		ND	3.00E-02		ND	3.00E-02	
2,4'-DDT	ND	1.00E-06		ND	1.10E-01		ND	1.10E-01		ND	1.10E-01	
4,4'-DDD	ND	4.20E-07		ND	4.10E+00		ND	4.10E+00		ND	4.10E+00	
4,4'-DDE	ND	1.00E-06		2.16E-04	3.00E-02		ND	3.00E-02		6.41E-04	3.00E-02	
4,4'-DDT	ND	1.00E-06		6.16E-04	1.10E-01		ND	1.10E-01		2.57E-03	1.10E-01	
Acenaphthene	2.43E-03	7.10E-01		ND	2.02E+00		ND	2.02E+00		ND	2.02E+00	
Acenaphthylene	ND	1.30E-06		ND	3.40E+00		ND	3.40E+00		ND	3.40E+00	
alpha-BHC	1.26E-04	2.40E-04		ND	6.50E-01		ND	6.50E-01		ND	6.50E-01	
Anthracene	2.88E-03	1.30E-06	3.35	ND	2.22E+00		ND	2.22E+00		ND	2.22E+00	
Aroclor-1260	ND	1.10E-04		2.32E-02	8.40E-02		ND	8.40E-02		1.03E-01	8.40E-02	0.09

Table 13.6-11
Toxicity Quotients for Target Receptors - Site 08

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates			Ground-nesting Bird (Laysan albatross)			Burrowing Bird (Bonin petrel)			Shorebird (golden-plover)		
	EPV	TRV	TQ *	EPV	TRV	TQ *	EPV	TRV	TQ *	EPV	TRV	TQ *
Benzo(a)anthracene	5.99E-04	2.70E-06	2.35	ND	1.50E+01		ND	1.50E+01		ND	1.50E+01	
Benzo(a)pyrene	ND	1.30E-06		ND	1.00E+00		ND	1.00E+00		ND	1.00E+00	
Benzo(b)fluoranthene	ND	1.30E-06		ND	4.00E-01		ND	4.00E-01		ND	4.00E-01	
Benzo(e)pyrene	ND	1.30E-06		ND	4.00E+02		ND	4.00E+02		ND	4.00E+02	
Benzo(g,h,i)perylene	ND	1.30E-06		ND	4.00E+02		ND	4.00E+02		ND	4.00E+02	
Benzo(k)fluoranthene	ND	1.30E-06		ND	7.20E-01		ND	7.20E-01		ND	7.20E-01	
Biphenyl	ND	1.30E-06		ND	5.00E+00		ND	5.00E+00		ND	5.00E+00	
Carbazole	ND	DG		1.42E-02	5.00E+00		ND	5.00E+00		2.66E-04	5.00E+00	
Chrysene	ND	1.30E-06		ND	9.90E-01		ND	9.90E-01		ND	9.90E-01	
Chrysenes, C1-alky	ND	1.30E-06		ND	9.90E-01		ND	9.90E-01		ND	9.90E-01	
Chrysenes, C2-alky	ND	1.30E-06		ND	9.90E-01		ND	9.90E-01		ND	9.90E-01	
Dibenzofuran	ND	2.00E-03		1.05E-03	2.04E+00		ND	2.04E+00		DG	2.04E+00	DG
Dibenzothiophene	ND	1.30E-06		ND	9.40E-01		ND	9.40E-01		ND	9.40E-01	
Dibenzothiophenes, C1-alky	ND	1.30E-06		ND	9.40E-01		ND	9.40E-01		ND	9.40E-01	
Dibenzothiophenes, C2-alky	ND	1.30E-06		ND	9.40E-01		ND	9.40E-01		ND	9.40E-01	
Dibenzothiophenes, C3-alky	ND	1.30E-06		ND	9.40E-01		ND	9.40E-01		ND	9.40E-01	
Dieldrin	ND	1.90E-06		ND	7.62E+00		ND	7.62E+00		ND	7.62E+00	
Fluoranthene	9.17E-03	1.60E-02		ND	1.50E+01		ND	1.50E+01		ND	1.50E+01	
Fluorene	3.12E-03	1.30E-06	3.38	ND	2.02E+00		ND	2.02E+00		ND	2.02E+00	
Fluorenes, C1-alky	ND	1.30E-06		ND	2.02E+00		ND	2.02E+00		ND	2.02E+00	
Fluorenes, C2-alky	ND	1.30E-06		ND	2.02E+00		ND	2.02E+00		ND	2.02E+00	
Fluorenes, C3-alky	ND	1.30E-06		ND	2.02E+00		ND	2.02E+00		ND	2.02E+00	
Hexachlorobenzene	ND	1.29E-01		3.22E-06	1.00E+00		ND	1.00E+00		3.65E-06	1.00E+00	
Indeno(1,2,3-cd)pyrene	ND	1.30E-06		ND	7.20E-01		ND	7.20E-01		ND	7.20E-01	
gamma-BHC (Lindane)	1.86E-05	8.00E-05		ND	8.60E-01		ND	8.60E-01		ND	8.60E-01	
Mirex	1.06E-01	1.00E-06	5.02	4.30E-05	5.10E-01		ND	5.10E-01		DG	5.10E-01	DG
Oxychlorostyrene	ND	DG		6.33E-06	DG	DG	ND	DG		DG	DG	DG
PCB-8	3.01E-07	2.00E-07	0.18	ND	6.30E-01		ND	6.30E-01		ND	6.30E-01	
PCB-28	4.68E-07	2.00E-07	0.37	ND	3.30E+00		ND	3.30E+00		ND	3.30E+00	
PCB-44	3.30E-09	2.00E-07		ND	4.00E-03		ND	4.00E-03		ND	4.00E-03	

Table 13.6-11
Toxicity Quotients for Target Receptors - Site 08

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates			Ground-nesting Bird (Laysan albatross)			Burrowing Bird (Bonin petrel)			Shorebird (golden-plover)		
	EPV	TRV	TQ *	EPV	TRV	TQ *	EPV	TRV	TQ *	EPV	TRV	TQ *
PCB-52	1.30E-05	2.00E-07	1.81	ND	4.00E-01		ND	4.00E-01		ND	4.00E-01	
PCB-66	ND	2.00E-07		ND	1.30E-01		ND	1.30E-01		ND	1.30E-01	
PCB-77	3.26E-07	2.00E-07	0.21	ND	7.32E-03		ND	7.32E-03		ND	7.32E-03	
PCB-101	4.32E-05	2.00E-07	2.33	ND	4.50E+00		ND	4.50E+00		ND	4.50E+00	
PCB-105	9.76E-07	2.00E-07	0.69	ND	9.00E+00		ND	9.00E+00		ND	9.00E+00	
PCB-118	5.85E-06	2.00E-07	1.47	ND	2.56E+01		ND	2.56E+01		ND	2.56E+01	
PCB-126	ND	2.00E-07		ND	3.30E-03		ND	3.30E-03		ND	3.30E-03	
PCB-128	5.61E-09	2.00E-07		ND	1.93E+02		ND	1.93E+02		ND	1.93E+02	
PCB-138	3.98E-07	2.00E-07	0.30	ND	1.47E+02		ND	1.47E+02		ND	1.47E+02	
PCB-153	1.08E-06	2.00E-07	0.73	ND	1.93E+02		ND	1.93E+02		ND	1.93E+02	
PCB-170	1.38E-07	2.00E-07		ND	2.60E-01		ND	2.60E-01		ND	2.60E-01	
PCB-180	3.82E-07	2.00E-07	0.28	ND	9.50E+01		ND	9.50E+01		ND	9.50E+01	
PCB-187	2.36E-07	2.00E-07	0.07	ND	1.90E-01		ND	1.90E-01		ND	1.90E-01	
PCB-195	1.06E-07	2.00E-07		ND	9.50E-02		ND	9.50E-02		ND	9.50E-02	
PCB-206	6.48E-10	2.00E-07		ND	4.01E+00		ND	4.01E+00		ND	4.01E+00	
PCB-209	7.87E-11	2.00E-07		ND	5.25E+00		ND	5.25E+00		ND	5.25E+00	
Perylene	ND	1.30E-06		ND	4.00E+02		ND	4.00E+02		ND	4.00E+02	
Phenanthrene	1.24E-02	4.30E-04	1.46	ND	2.26E+00		ND	2.26E+00		ND	2.26E+00	
Phenan+Anthra, C1-alky	ND	4.30E-04		ND	2.26E+00		ND	2.26E+00		ND	2.26E+00	
Photomirex	4.88E-02	1.00E-06	4.69	5.85E-05	5.10E-01		ND	5.10E-01		DG	5.10E-01	DG
Pyrene	ND	1.30E-06		ND	7.50E+00		ND	7.50E+00		ND	7.50E+00	
trans-Nonachlor	ND	DG		3.85E-05	1.20E+00		ND	1.20E+00		DG	1.20E+00	DG

* TQ = log(EPV/TRV); only data gaps (DG) and TQ values greater than or equal to 0 are shown
ND = not detected/not selected as CPEC
DG = data gap; no parameter available for exposure calculation

Table 13.6-11
Toxicity Quotients for Target Receptors - Site 08

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Reptile (green sea turtle)			Marine Mammal (monk seal)		
	EPV	TRV	TQ *	EPV	TRV	TQ *
Inorganic						
Antimony	ND	3.50E-03		ND	3.50E-02	
Arsenic	ND	2.00E-01		ND	1.20E-01	
Cadmium	ND	1.00E-01		ND	1.20E+01	
Chromium	ND	6.00E-01		ND	1.40E+00	
Cobalt	ND	5.40E-02		ND	5.40E-01	
Copper	ND	9.72E+00		ND	3.07E+01	
Lead	2.49E-02	2.16E+01		6.67E-02	7.70E-01	
Manganese	5.12E-02	1.80E+01		2.88E-01	1.80E+02	
Mercury	ND	1.28E+00		7.14E-03	2.75E+01	
Nickel	9.25E-03	9.90E-01		1.13E-01	5.00E+00	
Selenium	ND	7.50E-03		ND	1.70E+02	
Silver	ND	1.00E+01		ND	1.00E+02	
Thallium	ND	7.40E-04		5.33E-04	7.40E-03	
Tin	1.79E-03	1.40E+00		5.86E-03	1.40E+01	
Zinc	ND	5.04E+01		ND	8.40E+01	
Organic						
(Meta+Para)-Xylene	ND	2.06E-01		ND	2.06E+00	
1,2-Dichloroethene(total)	1.45E-06	1.13E+01		3.14E-04	1.13E+02	
2,4'-DDD	ND	5.70E-02		ND	2.20E-01	
2,4'-DDE	ND	2.53E-01		ND	3.50E-01	
2,4'-DDT	3.17E-05	1.10E-02		1.80E-05	4.60E-01	
4,4'-DDD	ND	3.50E+01		ND	2.20E-01	
4,4'-DDE	ND	2.53E-01		ND	3.50E-01	
4,4'-DDT	1.06E-05	1.10E-02		2.34E-04	4.60E-01	
Acenaphthene	ND	3.50E+01		1.62E-04	1.75E+02	
Acenaphthylene	ND	3.50E+01		3.00E-05	3.40E+01	
alpha-BHC	ND	1.10E-01		1.23E-05	4.90E-01	
Anthracene	2.23E-05	3.50E+01		8.72E-05	3.60E+03	
Aroclor-1260	ND	5.70E-02		ND	2.00E-03	

Table 13.6-11
Toxicity Quotients for Target Receptors - Site 08

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Reptile (green sea turtle)			Marine Mammal (monk seal)		
	EPV	TRV	TQ *	EPV	TRV	TQ *
Benzo(a)anthracene	1.34E-05	3.50E+01		5.57E-05	1.50E+02	
Benzo(a)pyrene	1.79E-05	3.50E+01		2.62E-05	1.00E+01	
Benzo(b)fluoranthene	9.98E-05	3.50E+01		3.26E-04	4.00E+00	
Benzo(e)pyrene	4.02E-05	3.60E+01		1.28E-04	6.00E-02	
Benzo(g,h,i)perylene	5.81E-05	3.60E+01		3.12E-03	6.00E-02	
Benzo(k)fluoranthene	2.83E-05	3.50E+01		1.31E-04	7.20E+00	
Biphenyl	2.98E-06	5.00E+00		2.26E-05	5.00E+01	
Carbazole	ND	3.50E+01		ND	5.00E+01	
Chrysene	3.72E-05	3.50E+01		5.49E-03	9.90E+00	
Chrysenes, C1-alky	1.46E-04	3.50E+01		1.65E-03	9.90E+00	
Chrysenes, C2-alky	1.59E-05	3.50E+01		3.96E-04	9.90E+00	
Dibenzofuran	ND	3.50E+01		ND	2.04E+01	
Dibenzothiophene	DG	3.50E+01	DG	2.66E-05	9.40E+00	
Dibenzothiophenes, C1-alky	DG	3.50E+01	DG	4.59E-05	9.40E+00	
Dibenzothiophenes, C2-alky	DG	3.50E+01	DG	1.33E-04	9.40E+00	
Dibenzothiophenes, C3-alky	DG	3.50E+01	DG	1.93E-04	9.40E+00	
Dieldrin	1.13E-07	7.00E-02		1.07E-05	2.60E-02	
Fluoranthene	ND	3.50E+01		7.26E-04	6.00E+03	
Fluorene	1.94E-05	3.50E+01		1.04E-04	1.25E+02	
Fluorenes, C1-alky	1.82E-04	3.50E+01		1.10E-02	1.25E+02	
Fluorenes, C2-alky	9.20E-05	3.50E+01		5.71E-03	1.25E+02	
Fluorenes, C3-alky	3.00E-05	3.50E+01		1.87E-03	1.25E+02	
Hexachlorobenzene	ND	1.00E+00		ND	1.00E-02	
Indeno(1,2,3-cd)pyrene	7.15E-05	3.50E+01		1.34E-04	7.20E+00	
gamma-BHC (Lindane)	ND	1.10E-01		1.66E-06	3.60E-01	
Mirex	ND	2.20E-01		2.06E-06	3.69E+00	
Oxychlorostyrene	ND	DG		ND	DG	
PCB-8	ND	2.82E-01		8.12E-06	5.40E-05	
PCB-28	ND	2.82E-01		1.52E-05	5.40E-05	
PCB-44	1.71E-04	1.40E-01		2.67E-03	6.60E-03	

Table 13.6-11
Toxicity Quotients for Target Receptors - Site 08

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Reptile (green sea turtle)			Marine Mammal (monk seal)		
	EPV	TRV	TQ *	EPV	TRV	TQ *
PCB-52	ND	2.82E-01		2.00E-05	1.36E-03	
PCB-66	1.33E-04	2.72E+02		2.07E-03	6.60E-03	
PCB-77	ND	1.89E-01		1.37E-05	3.90E-04	
PCB-101	ND	2.38E-01		4.66E-05	2.82E-03	
PCB-105	ND	1.89E+00		3.73E-05	3.20E-04	
PCB-118	7.60E-07	1.52E-01		1.23E-04	8.90E-04	
PCB-126	6.81E-08	1.89E-02		2.47E-06	8.70E-06	
PCB-128	ND	3.75E+01		2.98E-05	3.96E-03	
PCB-138	9.91E-06	1.68E-01		3.01E-04	3.76E-02	
PCB-153	ND	2.38E-01		8.86E-04	4.51E-02	
PCB-170	3.05E-06	2.60E-02		1.95E-04	5.92E-03	
PCB-180	ND	8.20E-02		4.73E-04	2.87E-03	
PCB-187	ND	8.70E-02		3.22E-04	4.73E-02	
PCB-195	1.71E-06	2.38E-01		3.28E-05	2.87E-03	
PCB-206	3.43E-06	2.38E-01		5.79E-05	2.87E-03	
PCB-209	1.65E-05	2.38E-01		1.48E-04	2.87E-03	
Perylene	4.77E-06	3.50E+01		2.93E-04	6.00E-02	
Phenanthrene	9.83E-06	3.50E+01		2.13E-04	5.00E+03	
Phenan+Anthra, C1-alky	1.83E-04	3.50E+01		8.75E-03	3.40E+03	
Photomirex	ND	2.20E-01		DG	3.69E+00	DG
Pyrene	1.94E-05	3.50E+01		4.34E-04	7.20E+03	
trans-Nonachlor	ND	8.60E-02		ND	1.00E+01	

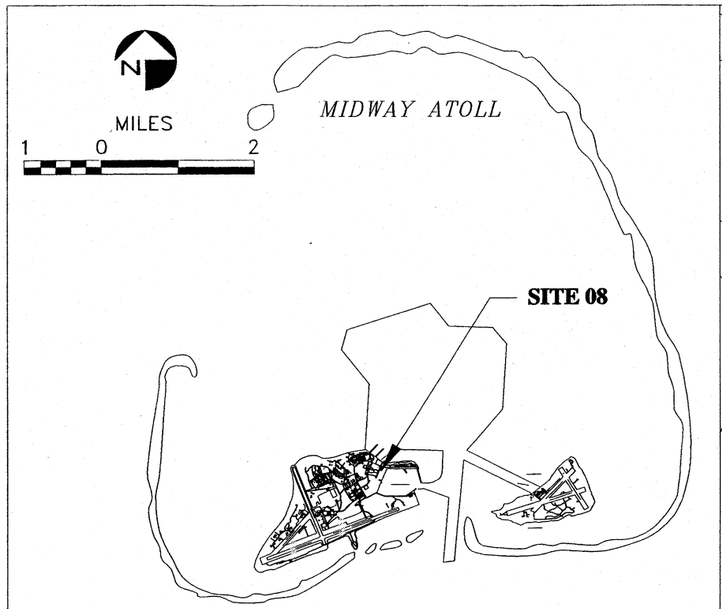
* TQ = log(EPV/TRV); only data gaps (DG) and TQ values greater than or equal to 0 are shown
ND = not detected/not selected as CPEC
DG = data gap; no parameter available for exposure calculation

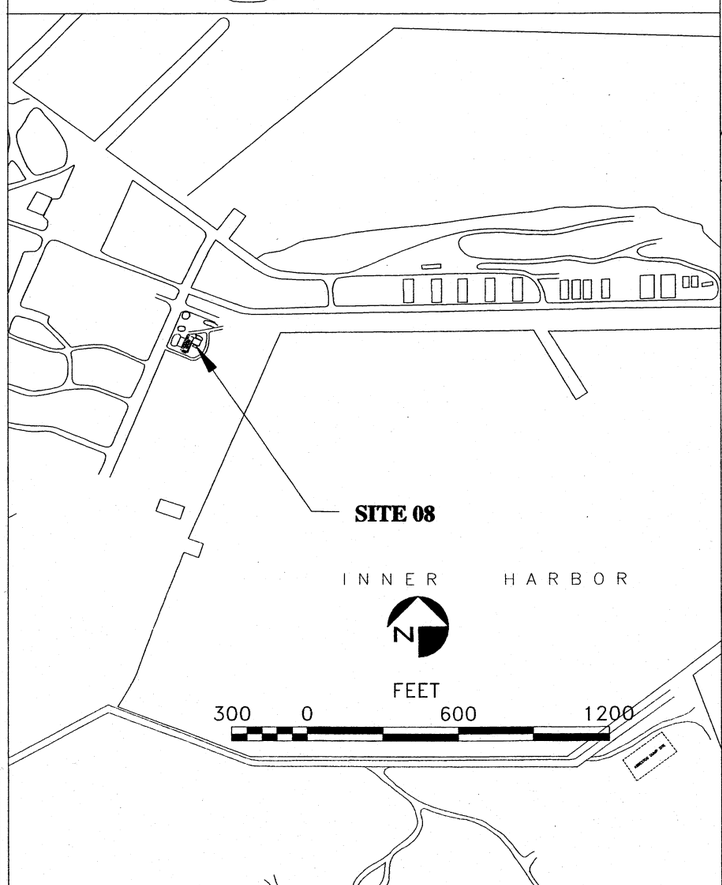
Table 13.6-12
Risk Description (Weight-of-Evidence) Summary - Site 08

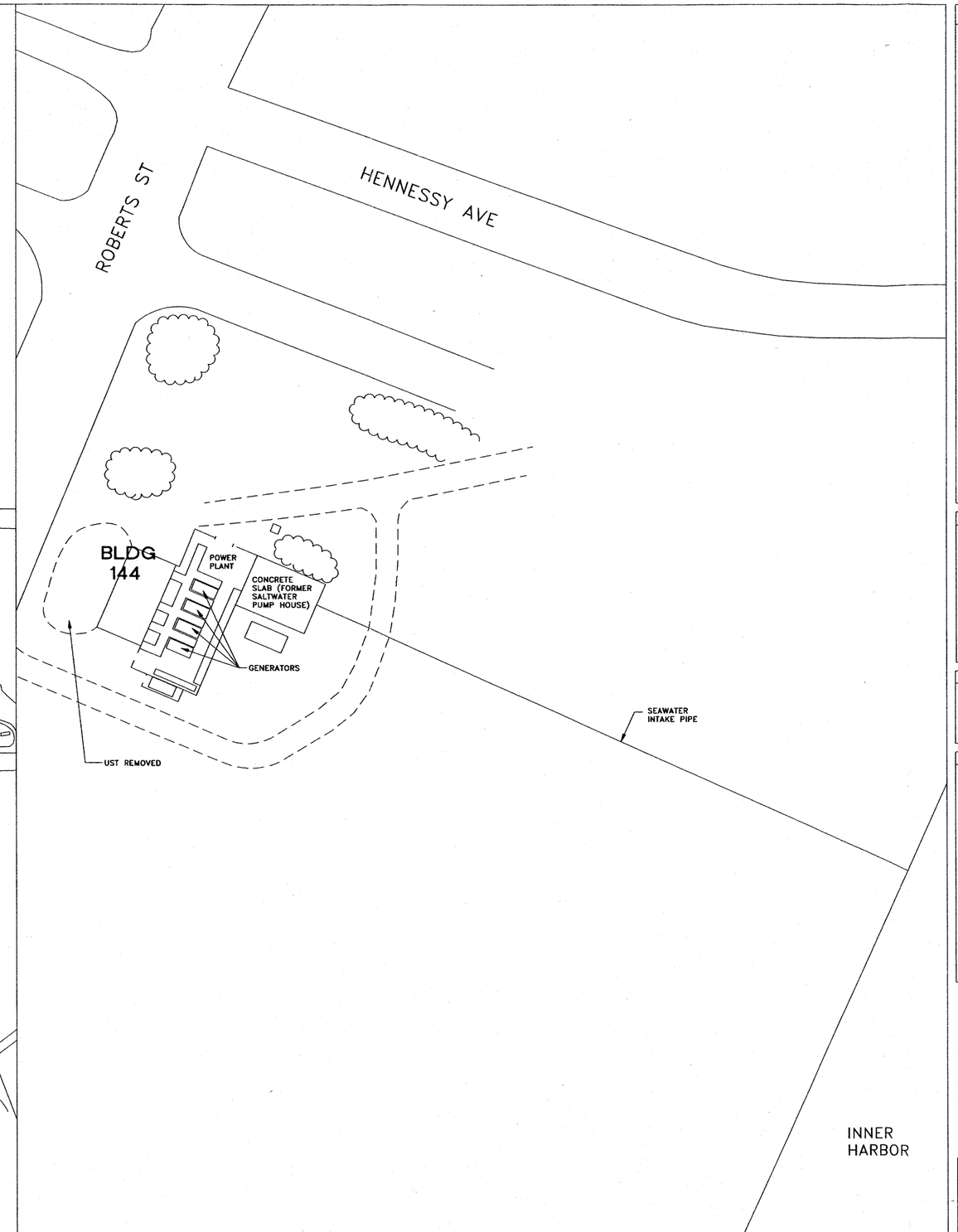
ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
• Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
Maintenance of a benthic infaunal and reef fish community not affected by acute or chronic exposure to site-related CPEC.							NO
• Direct testing of acute and chronic toxicity of CPEC in sediment	CPEC present in several abiotic media		several TQs>0		Significant (P<0.05) adverse effects in 1 of the 2 samples	Significant (P<0.05) adverse effects in all samples	
• Direct measurement of tissue chemistry (tissue concentration)		CPEC found in tissues of two species of invertebrates					
• Several metrics describing the abundance and trophic structure of the benthic infaunal macroinvertebrate community				Site has a greater variety of organisms than reference sites.			
No probability for acute or chronic adverse affects in any individuals of special status bird species from direct and/or secondary exposure to site-related CPEC.							NO
• Impairment of reproduction in ground-nesting birds	CPEC present in several abiotic media		several TQ for metals > 0				
• Impairment of reproduction in burrowing birds	CPEC present in several abiotic media		all TQ < 0				
• Impairment of reproduction in shorebirds	CPEC present in several abiotic media		all TQ < 0				
No probability for acute or chronic adverse affects in any individuals of special status marine species from direct and/or secondary exposure to site-related CPEC.							NO
• Chronic toxicity in green sea turtles	CPEC present in several abiotic media	CPEC present in one species of algae	all TQ < 0				
• Impairment of reproduction in Hawaiian monk seals	CPEC present in several abiotic media	CPEC found in tissues of two invertebrates and one fish	several TQ > 0				

DG = data gap precludes possibility of analysis

Figures
Section 13







LEGEND

VEGETATION

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING ENGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE08\04269508.DWG DATE: 4-26-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

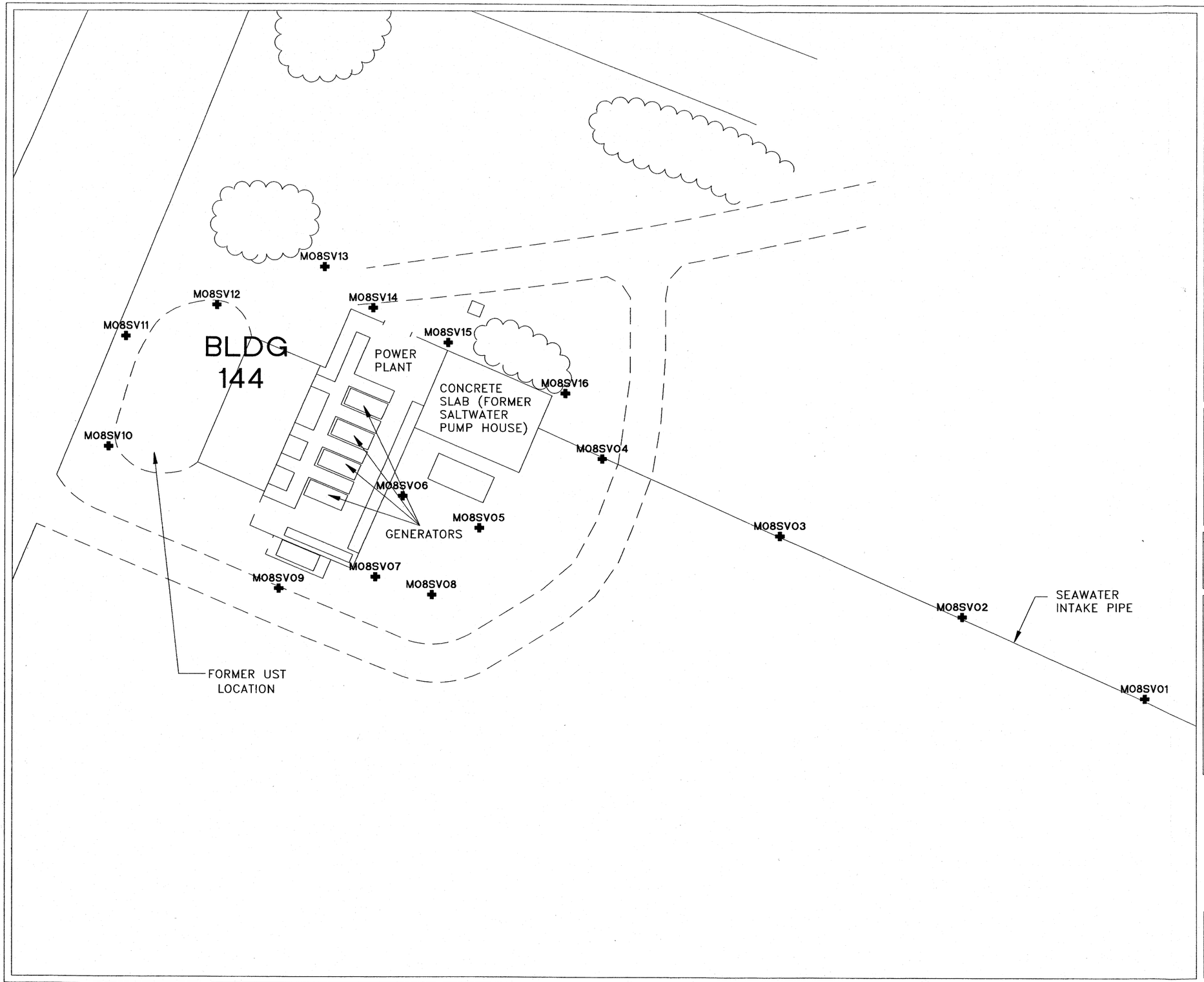
TITLE

ABANDONED POWER PLANT
(SITE 08)
SAND ISLAND

N
FEET
30 0 60 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
13.1-1



LEGEND

M##SV## — SOIL VAPOR SAMPLE LOCATION AND IDENTIFICATION NUMBER

VEGETATION

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING ENGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE08\05169520.DWG DATE: 5-16-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

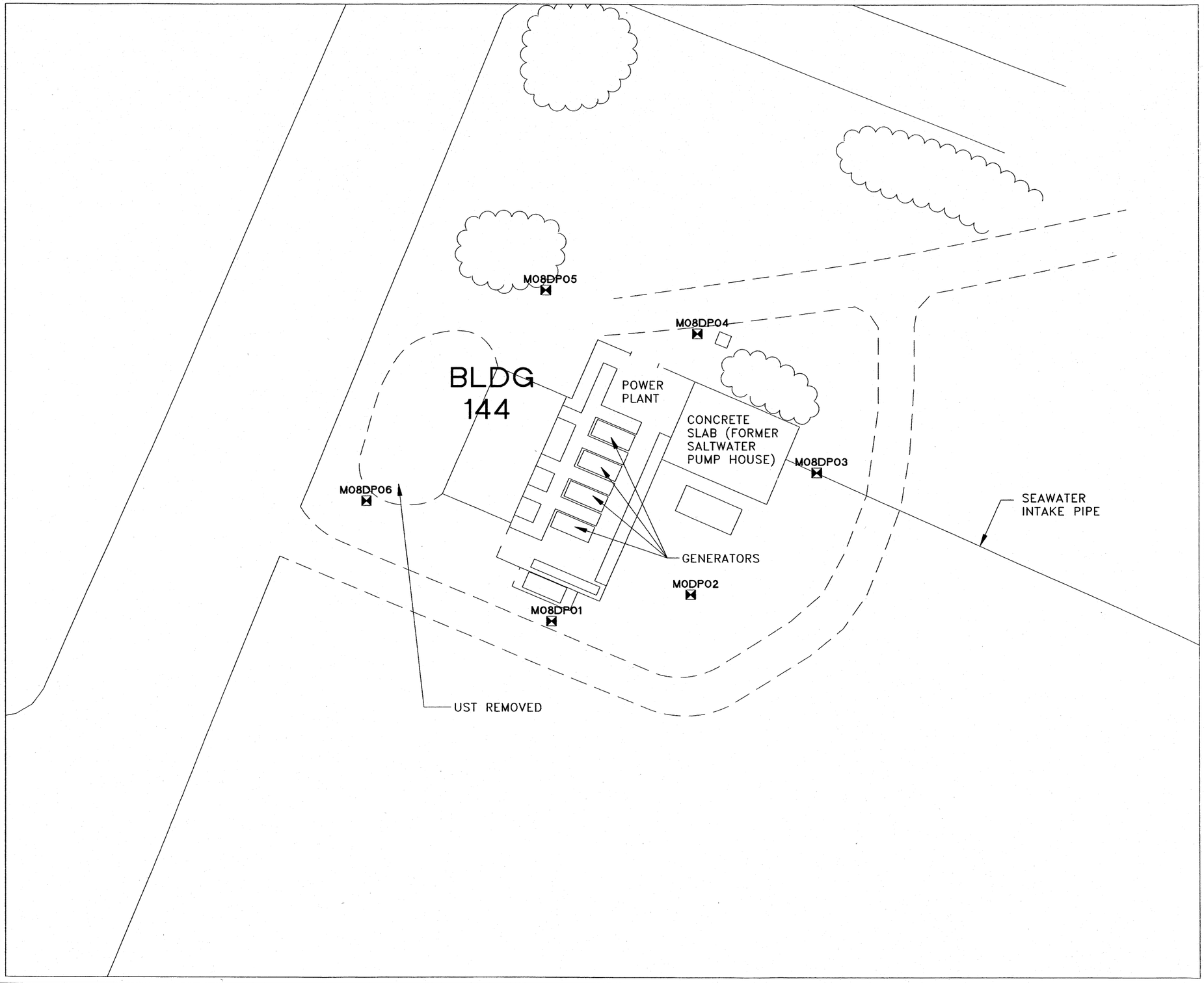
SOIL VAPOR SAMPLE LOCATIONS
(SITE 08)
SAND ISLAND

N

FEET
15 0 30 60

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
13.2-1



LEGEND

M##DP## — DIRECT PUSH SAMPLE LOCATION AND IDENTIFICATION NUMBER

VEGETATION

NOTES

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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE08\05169521.DWG DATE: 5-16-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

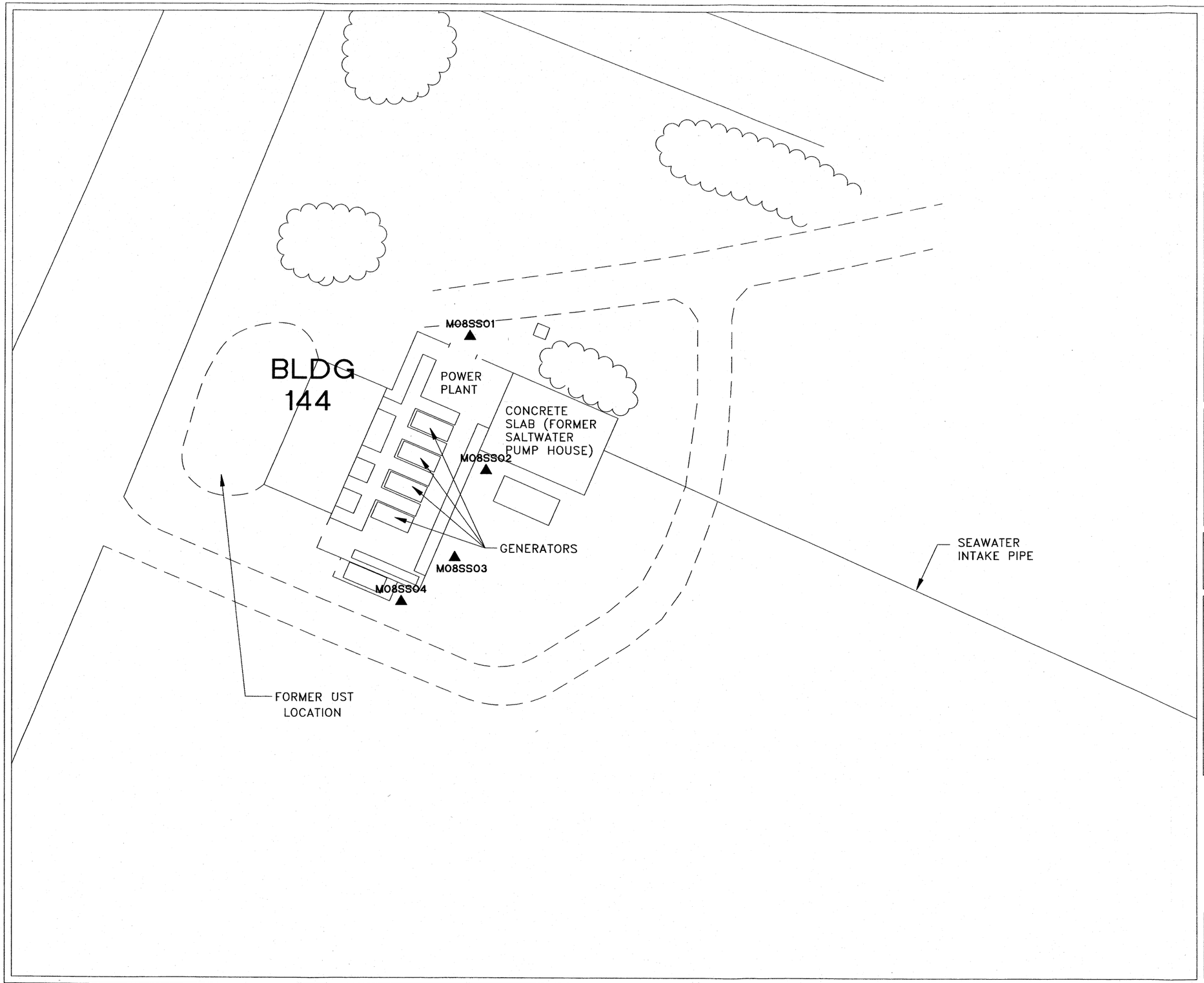
DIRECT PUSH SAMPLE LOCATIONS
(SITE 08)
SAND ISLAND

N

FEET
15 0 30 60

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
13.2-2



LEGEND

M##SS## — SURFACE SOIL SAMPLE LOCATION AND IDENTIFICATION NUMBER

VEGETATION

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING ENGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE08\05169522.DWG DATE: 5-16-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

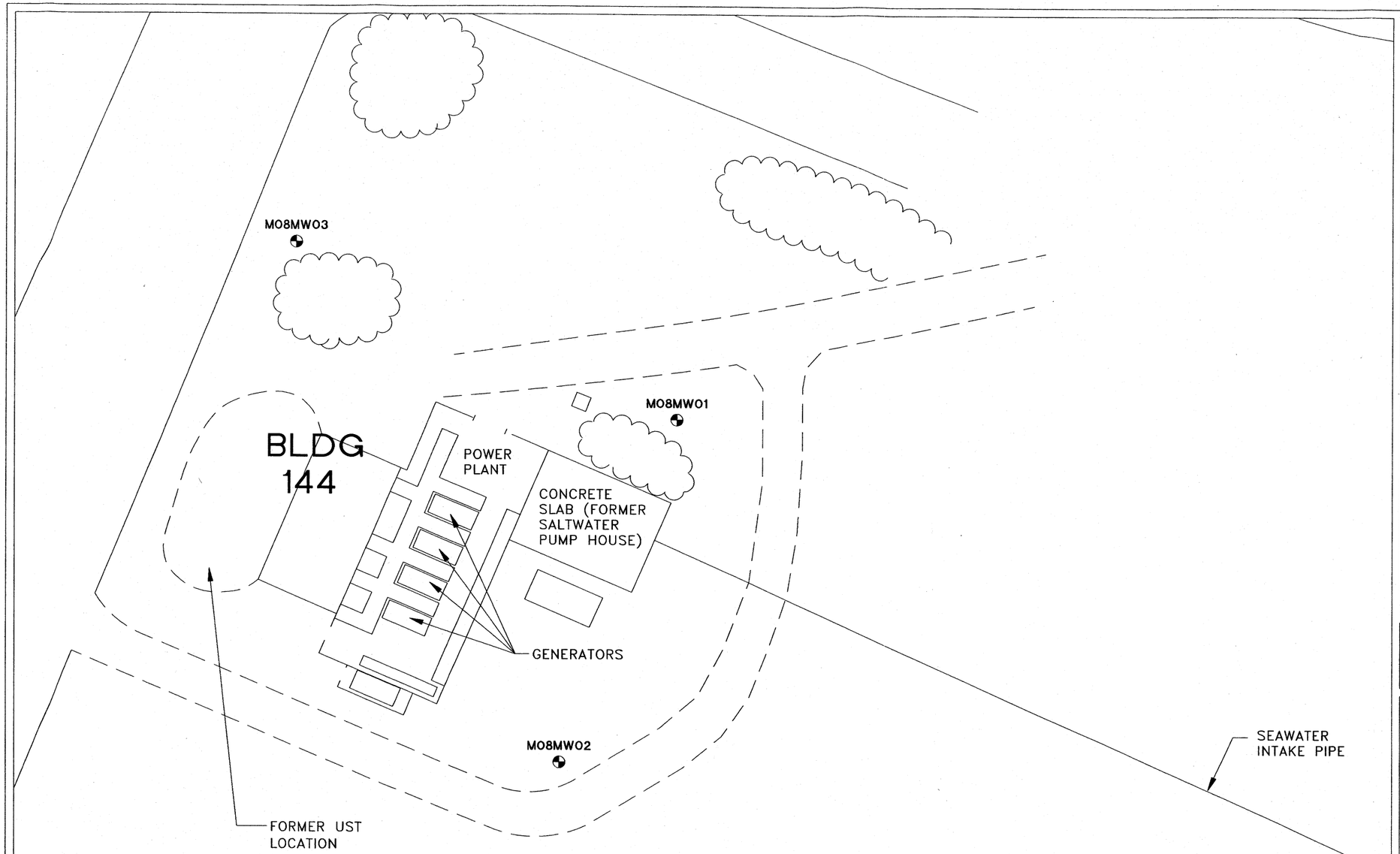
SURFACE SOIL SAMPLE LOCATIONS
(SITE 08)
SAND ISLAND

N

FEET
15 0 30 60

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
13.2-3



LEGEND

M##MW## — MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

VEGETATION

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING ENGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE08\05169523.DWG DATE: 5-16-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

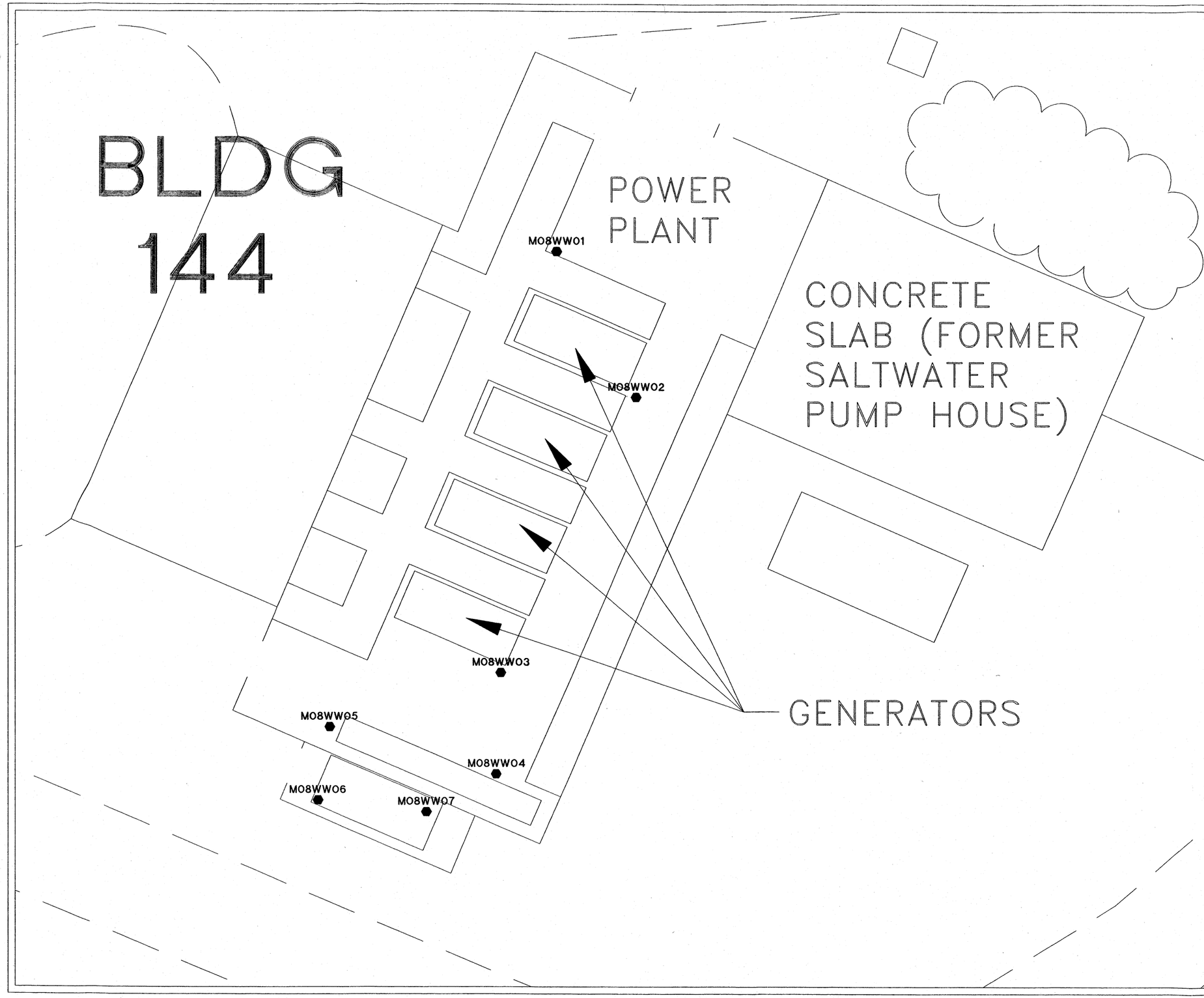
MONITORING WELL LOCATIONS
(SITE 08)
SAND ISLAND

N

FEET
15 0 30 60

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
13.2-4



LEGEND

M##WW## — PCB WIPE SAMPLE LOCATION AND IDENTIFICATION NUMBER

VEGETATION

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING ENGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE08\05229503.DWG DATE: 5-22-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

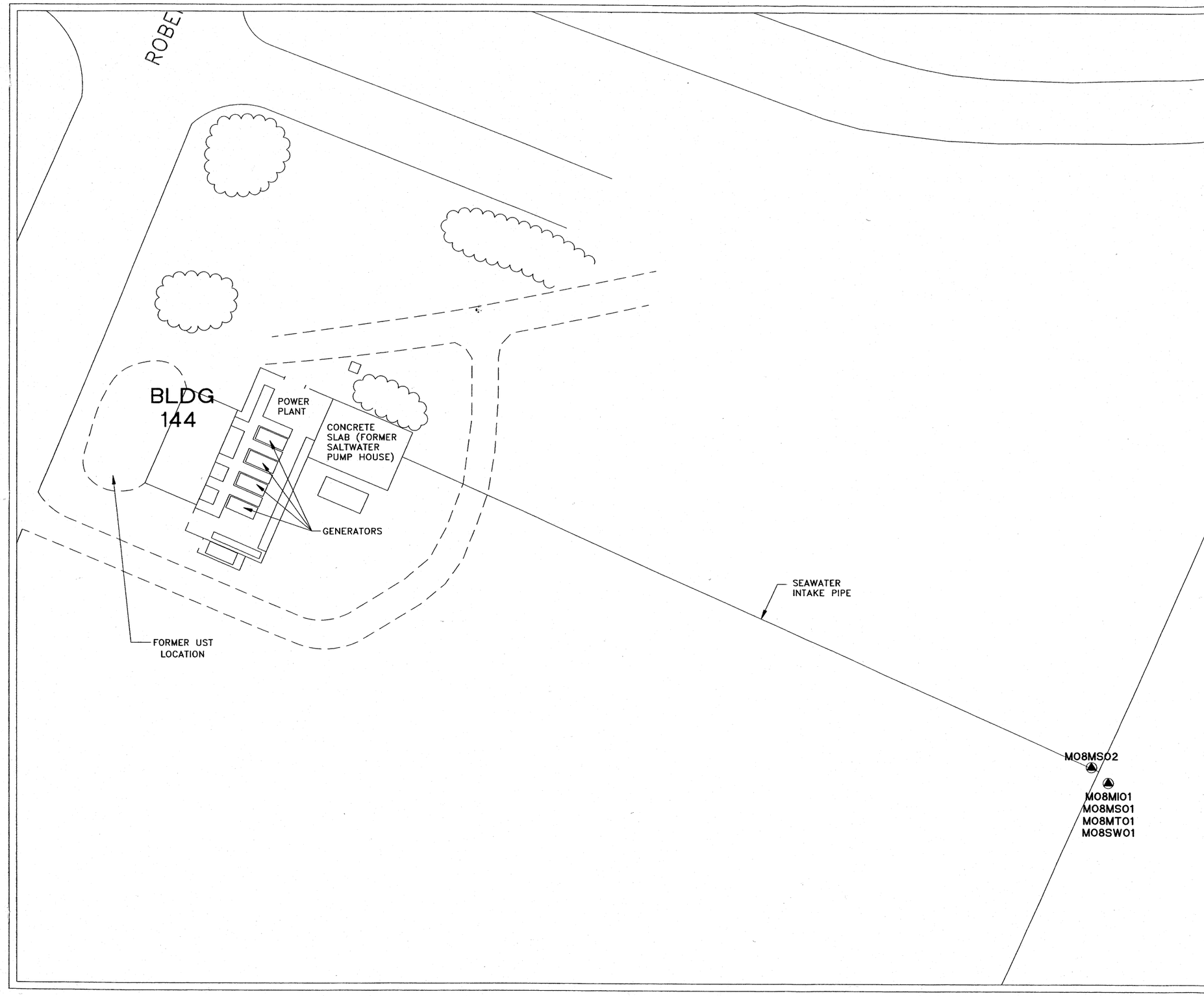
PCB WIPE SAMPLE LOCATIONS
(SITE 08)
SAND ISLAND

N

FEET
5 0 10 20

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
13.2-5



LEGEND

M##MS##	MARINE SAMPLE LOCATION AND IDENTIFICATION NUMBER(S)
M##MI##	MARINE INFAUNA SAMPLE LOCATION AND IDENTIFICATION NUMBER(S)
M##MT##	MARINE TISSUE SAMPLE LOCATION AND IDENTIFICATION NUMBER(S)
M##SW##	MARINE SEA WATER SAMPLE LOCATION AND IDENTIFICATION NUMBER(S)
	VEGETATION

NOTES

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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE08\05229504.DWG DATE: 5-22-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

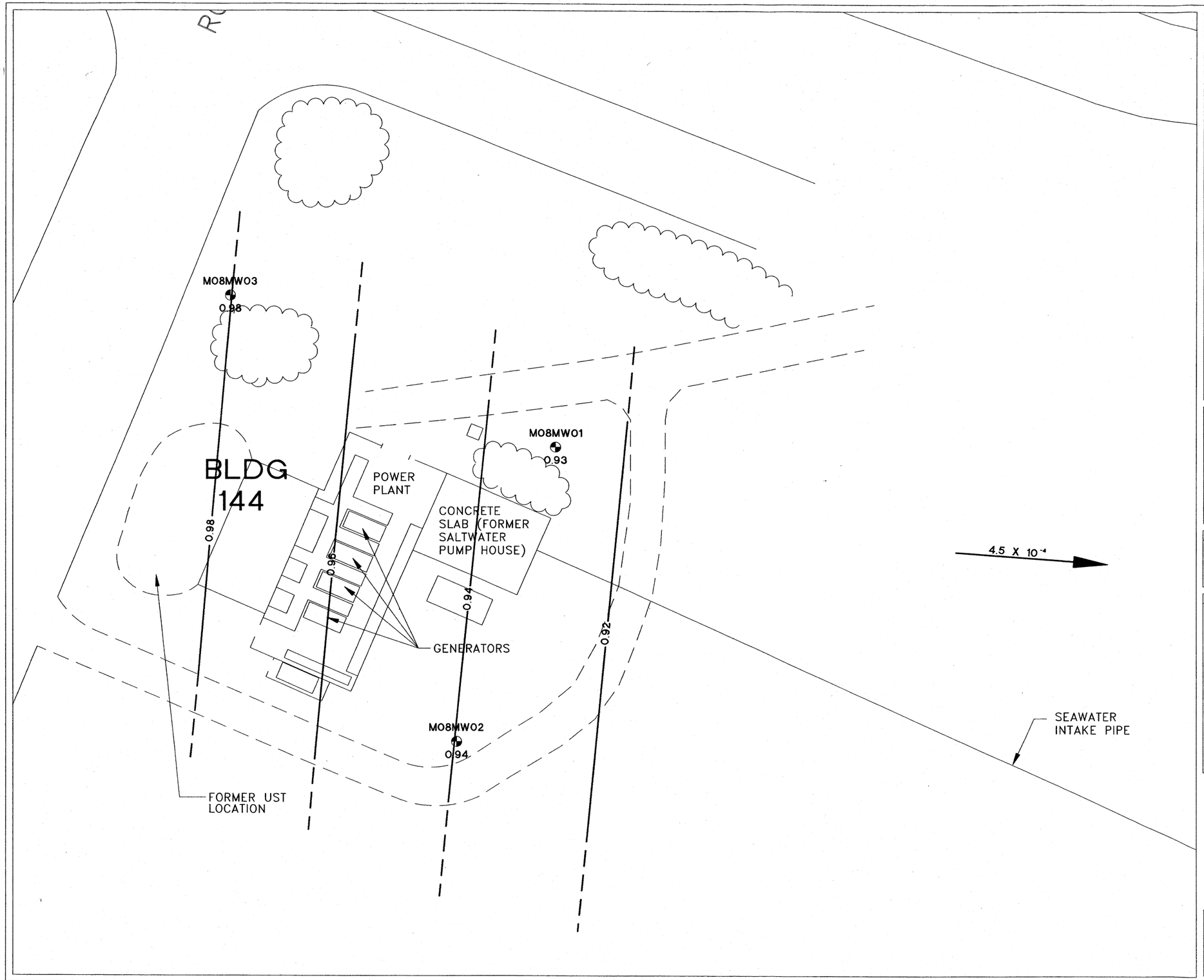
MARINE SAMPLE LOCATIONS
(SITE 08)
SAND ISLAND

N

FEET
20 0 40 80

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
13.2-6



LEGEND

M##MW## 0.98	MONITORING WELL LOCATION, IDENTIFICATION NUMBER, AND WATER LEVEL ELEVATION (11-16-94)
0.98	EQUIPOTENTIAL LINES
	AVERAGE GROUNDWATER GRADIENT (FT/FT)
0.98	ALL VALUES MEASURED IN FEET (MLLW)
	VEGETATION

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING ENGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE08\05169524.DWG DATE: 6-11-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

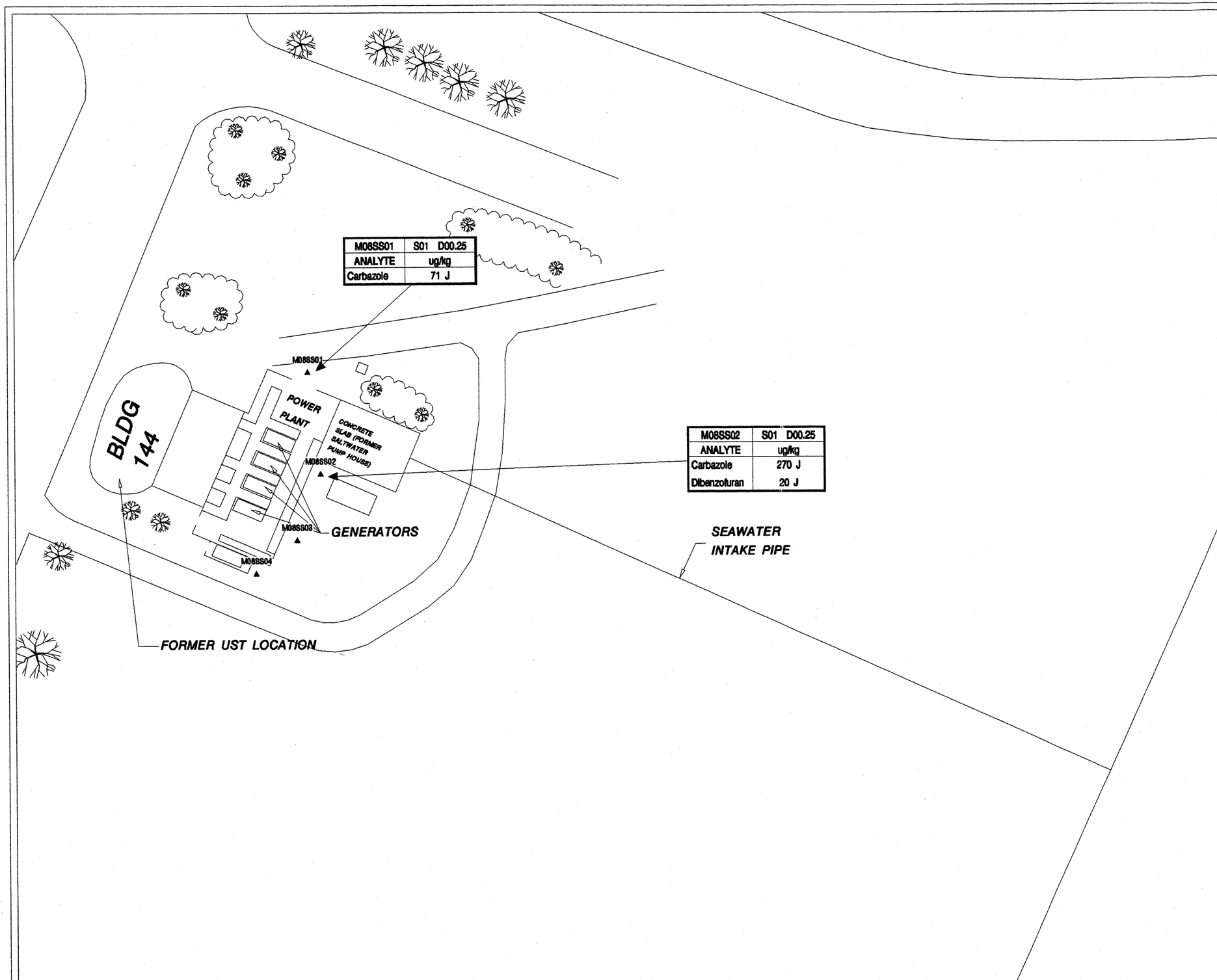
GROUND WATER CONTOUR AND AVERAGE GRADIENT, NOVEMBER 16, 1994, AT 0920 RISING TIDE (SITE 08) SAND ISLAND

N

FEET
15 0 30 60

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
13.4-1



LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M08SS02	OGDEN SAMPLE ID
270	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190186
4. FILE: /appe/hm/cto186/maps/m6169526

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 1038656 & 1038657

TITLE

SEMIVOLATILE ORGANIC COMPOUNDS DETECTED IN SURFACE SOIL SAMPLES (SITE 08) SAND ISLAND

N

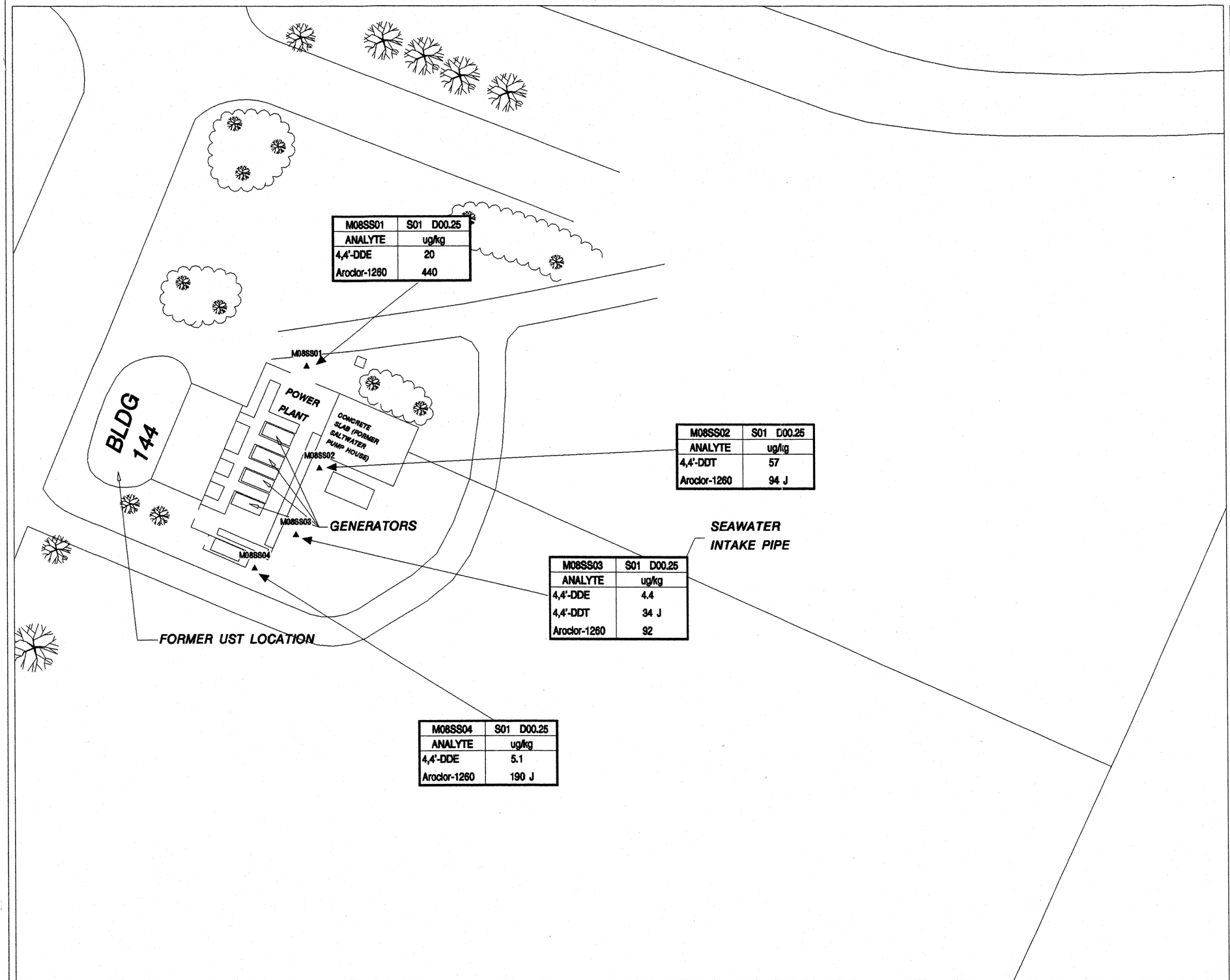
FEET

0 20 40 80 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

13.5-1



M08SS01	S01 D00.25
ANALYTE	ug/kg
4,4'-DDE	20
Aroclor-1260	440

M08SS02	S01 D00.25
ANALYTE	ug/kg
4,4'-DDT	57
Aroclor-1260	94 J

M08SS03	S01 D00.25
ANALYTE	ug/kg
4,4'-DDE	4.4
4,4'-DDT	34 J
Aroclor-1260	92

M08SS04	S01 D00.25
ANALYTE	ug/kg
4,4'-DDE	5.1
Aroclor-1260	190 J

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M08SS02	OGDEN SAMPLE ID
20	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-4, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appe/hm/cto136/mapa/m5169527

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

PESTICIDES AND PCB'S DETECTED IN SURFACE SOIL SAMPLES (SITE 08) SAND ISLAND

N

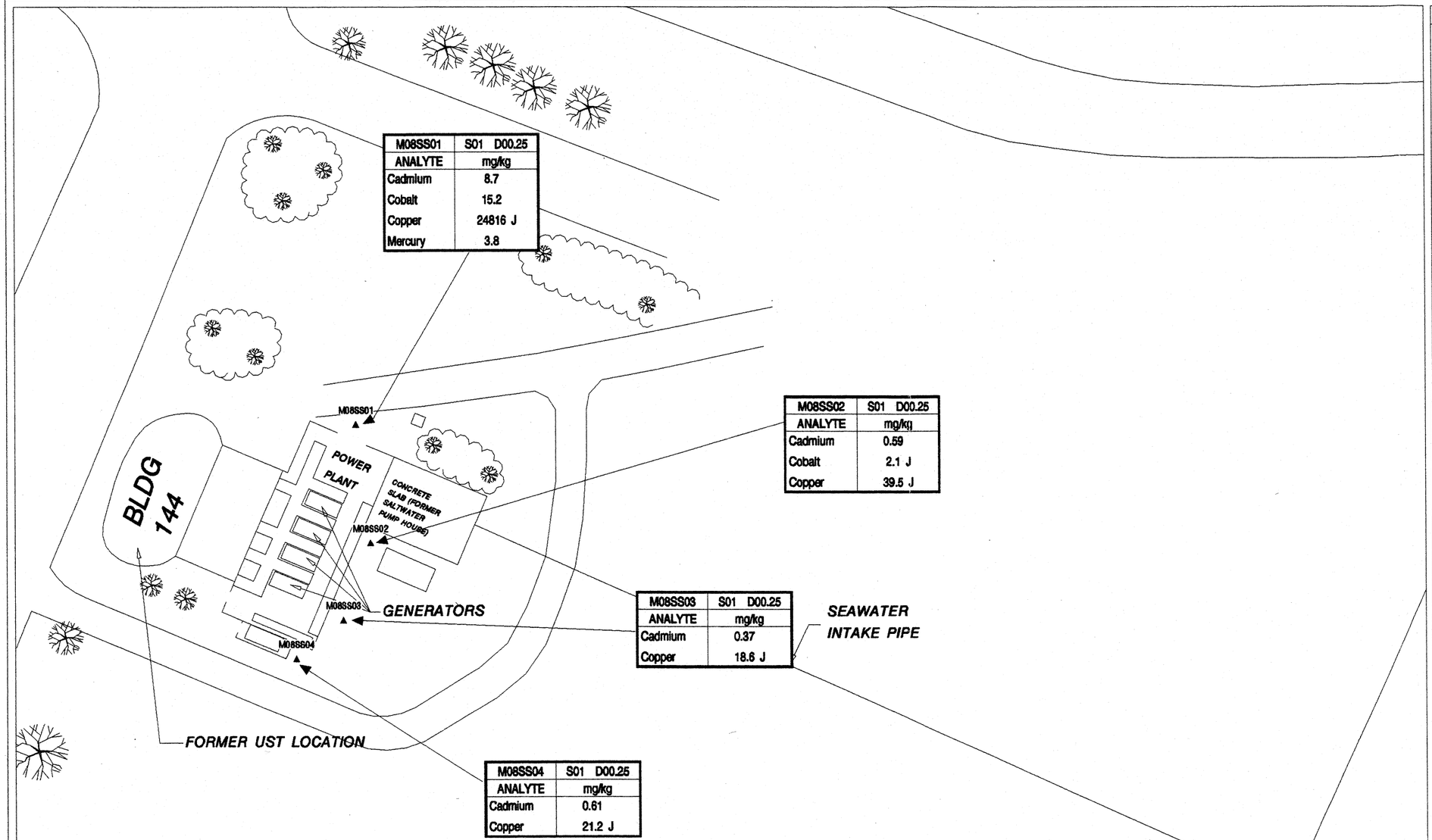
FEET

0 20 40 80 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

13.5-2



M08SS01	S01 D00.25
ANALYTE	mg/kg
Cadmium	8.7
Cobalt	15.2
Copper	24816 J
Mercury	3.8

M08SS02	S01 D00.25
ANALYTE	mg/kg
Cadmium	0.59
Cobalt	2.1 J
Copper	39.5 J

M08SS03	S01 D00.25
ANALYTE	mg/kg
Cadmium	0.37
Copper	18.6 J

M08SS04	S01 D00.25
ANALYTE	mg/kg
Cadmium	0.61
Copper	21.2 J

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M08SS02	OGDEN SAMPLE ID
8.7	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, EB-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appe/hm/cto136/maps/m5169528

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 1038856 & 1038857

TITLE

METAL CONCENTRATIONS DETECTED IN SURFACE SOIL SAMPLES (SITE 08) SAND ISLAND

N

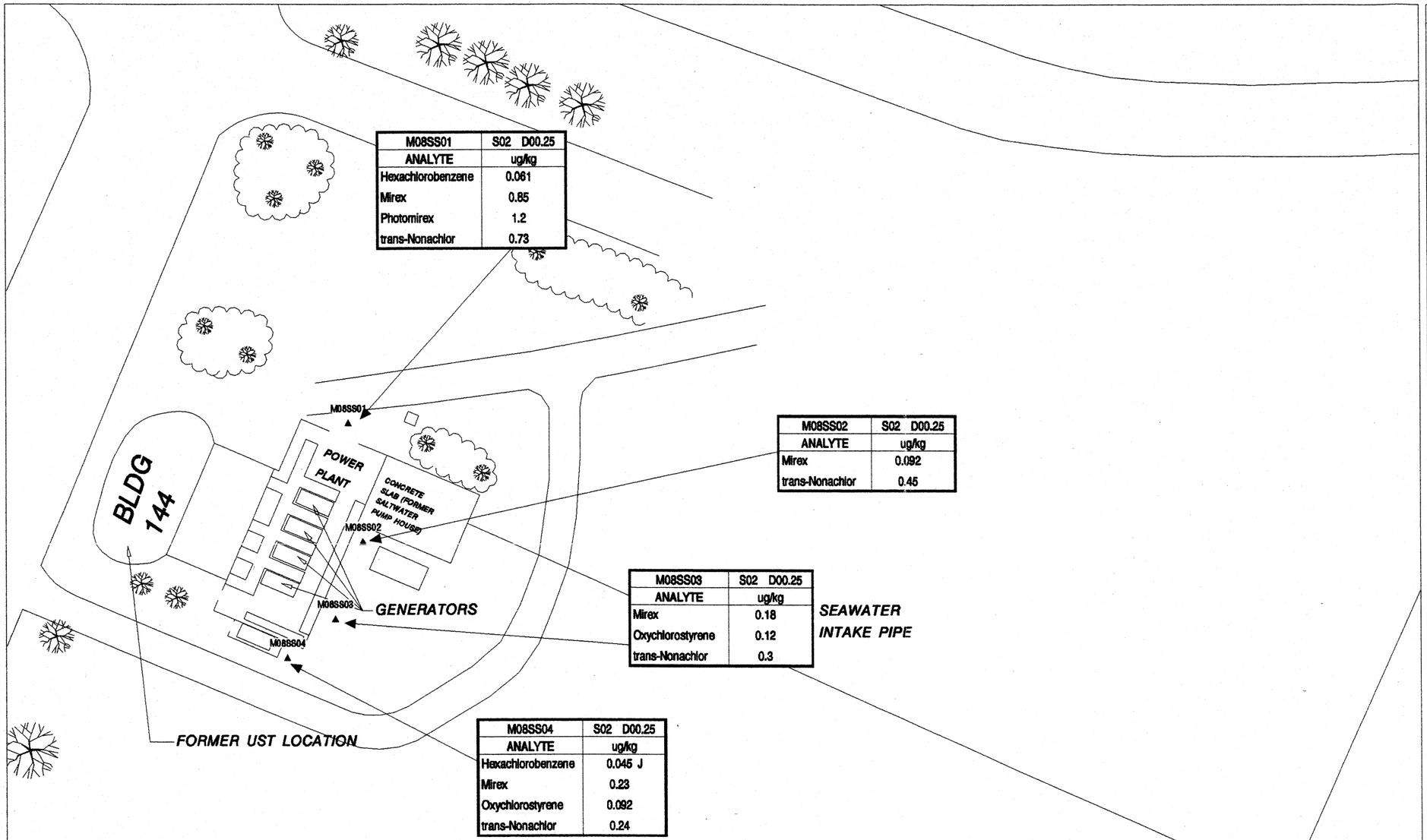
FEET

0 20 40 80 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/11/95	1	CMF		HFP		JMC	

FIGURE

13.5-3



M08SS01	S02 D00.25
ANALYTE	ug/kg
Hexachlorobenzene	0.061
Mirex	0.85
Photomirex	1.2
trans-Nonachlor	0.73

M08SS02	S02 D00.25
ANALYTE	ug/kg
Mirex	0.092
trans-Nonachlor	0.45

M08SS03	S02 D00.25
ANALYTE	ug/kg
Mirex	0.18
Oxychlorostyrene	0.12
trans-Nonachlor	0.3

M08SS04	S02 D00.25
ANALYTE	ug/kg
Hexachlorobenzene	0.045 J
Mirex	0.23
Oxychlorostyrene	0.092
trans-Nonachlor	0.24

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M08SS02	OGDEN SAMPLE ID
0.061	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (M.L.W)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/hm/cto136/maps/m5189580

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 1038856 & 1038857

TITLE

LOW LEVEL PESTICIDES AND PCB'S DETECTED IN SURFACE SOIL SAMPLES (SITE 08) SAND ISLAND

N

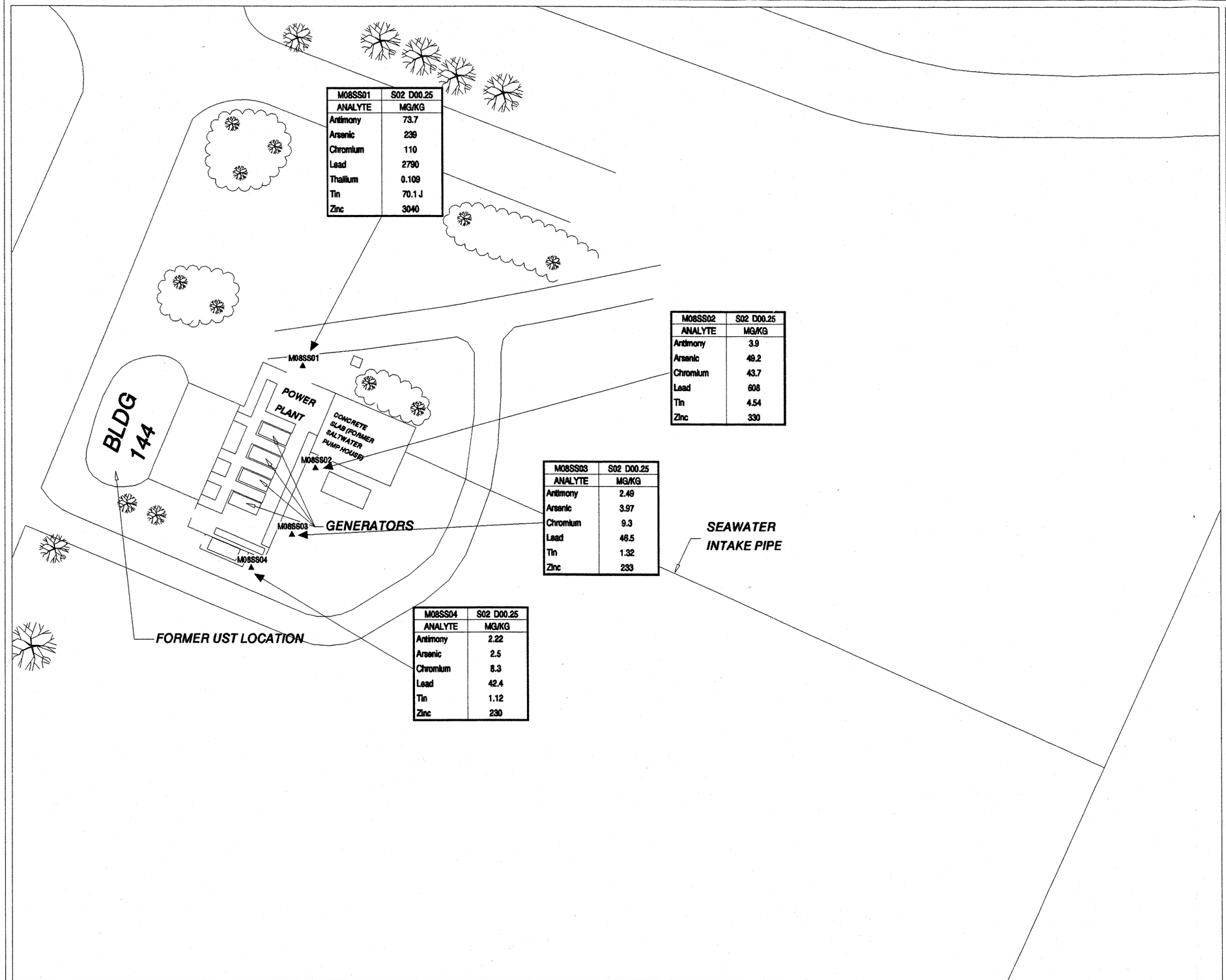
FEET

0 20 40 80 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APP.	INIT.
07/11/95	1	CMF		HFP		JMC	

FIGURE

13.5-4



M08SS01	S02 D00.25
ANALYTE	MG/KG
Antimony	73.7
Arsenic	239
Chromium	110
Lead	2790
Thallium	0.109
Tin	70.1 J
Zinc	3040

M08SS02	S02 D00.25
ANALYTE	MG/KG
Antimony	3.9
Arsenic	49.2
Chromium	43.7
Lead	608
Tin	4.54
Zinc	330

M08SS03	S02 D00.25
ANALYTE	MG/KG
Antimony	2.49
Arsenic	3.97
Chromium	9.3
Lead	46.5
Tin	1.32
Zinc	233

M08SS04	S02 D00.25
ANALYTE	MG/KG
Antimony	2.22
Arsenic	2.5
Chromium	8.3
Lead	42.4
Tin	1.12
Zinc	230

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M08SS02	OGDEN SAMPLE ID
73.7	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190138
4. FILE: /appa/hm/cto138/mapa/m5169531

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

LOW LEVEL METAL CONCENTRATIONS DETECTED IN SURFACE SOIL SAMPLES (SITE 08) SAND ISLAND

N

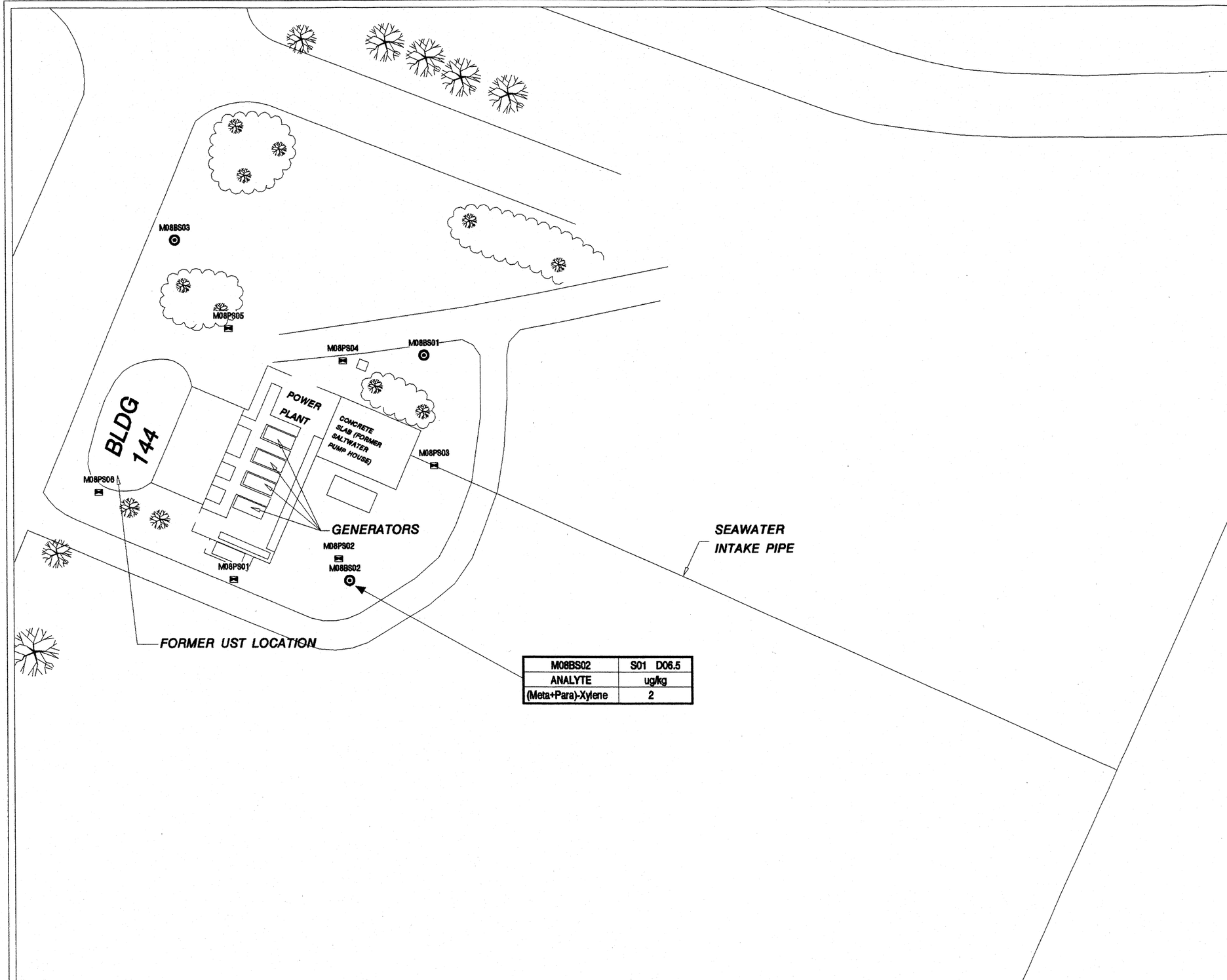
FEET

0 20 40 80 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
12/20/95	1	CMF		HPP		JMC	

FIGURE

13.5-5



M08BS02	S01 D06.5
ANALYTE	ug/kg
(Meta+Para)-Xylene	2

LEGEND

⊙	SOIL BORING SAMPLE LOCATION
⧓	DIRECT PUSH SAMPLE LOCATION
M08BS02	OGDEN SAMPLE ID
2	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET

NOTES

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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, EB-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appe/hm/cto138/maps/m6169583

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

VOLATILE ORGANIC COMPOUNDS DETECTED IN SUBSURFACE SOIL SAMPLES (SITE 08) SAND ISLAND

N

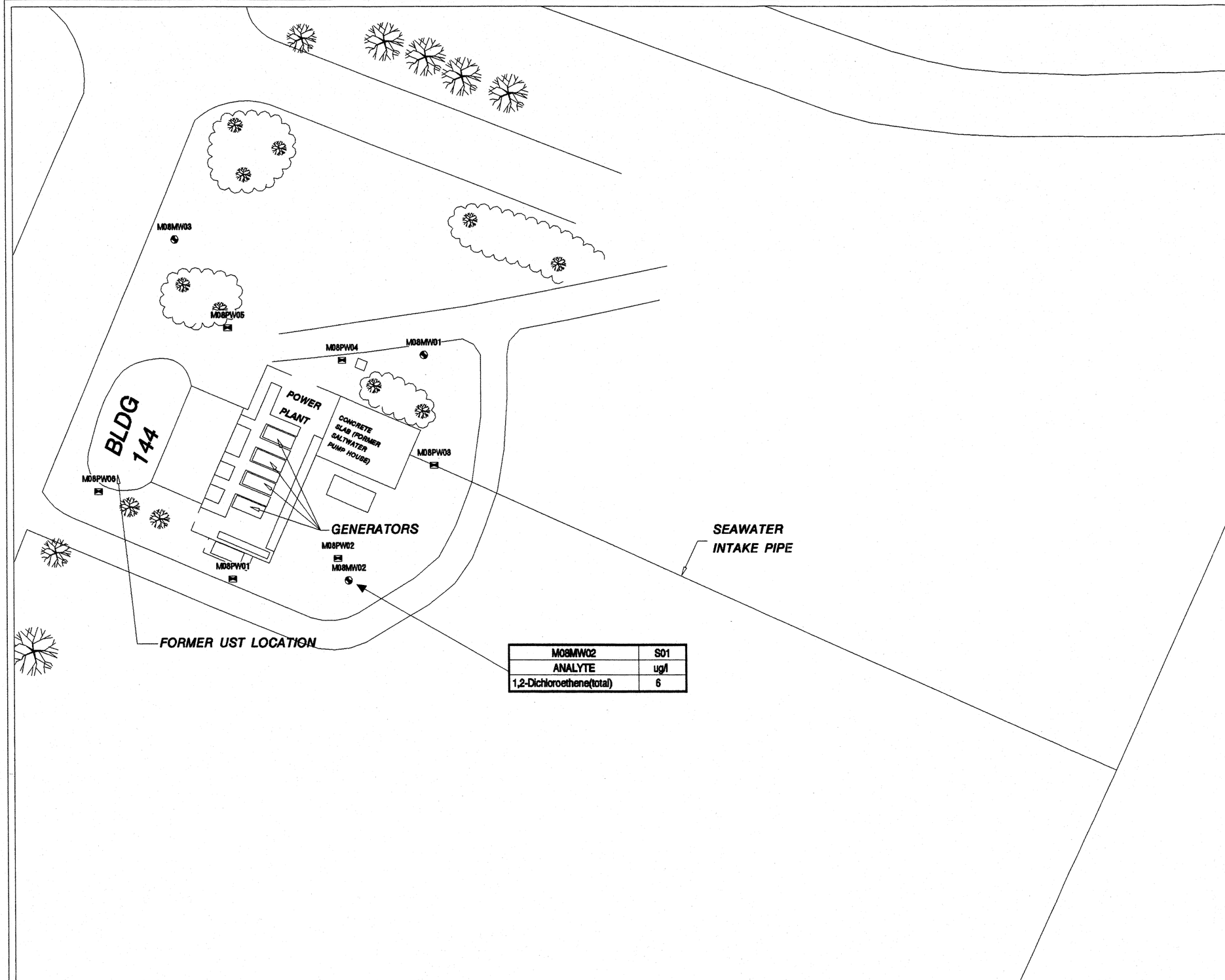
FEET

0 20 40 80 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/11/95	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

13.5-6



M08MW02	S01
ANALYTE	ug/l
1,2-Dichloroethene(total)	6

LEGEND

MONITORING WELL SAMPLE LOCATION

DIRECT PUSH SAMPLE LOCATION

M08MW02 OGDEN SAMPLE ID

6 CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.

S## SAMPLE NUMBER

NOTES

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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appe/hm/dc0185/maps/m5169587

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SAMPLES (SITE 08) SAND ISLAND

N

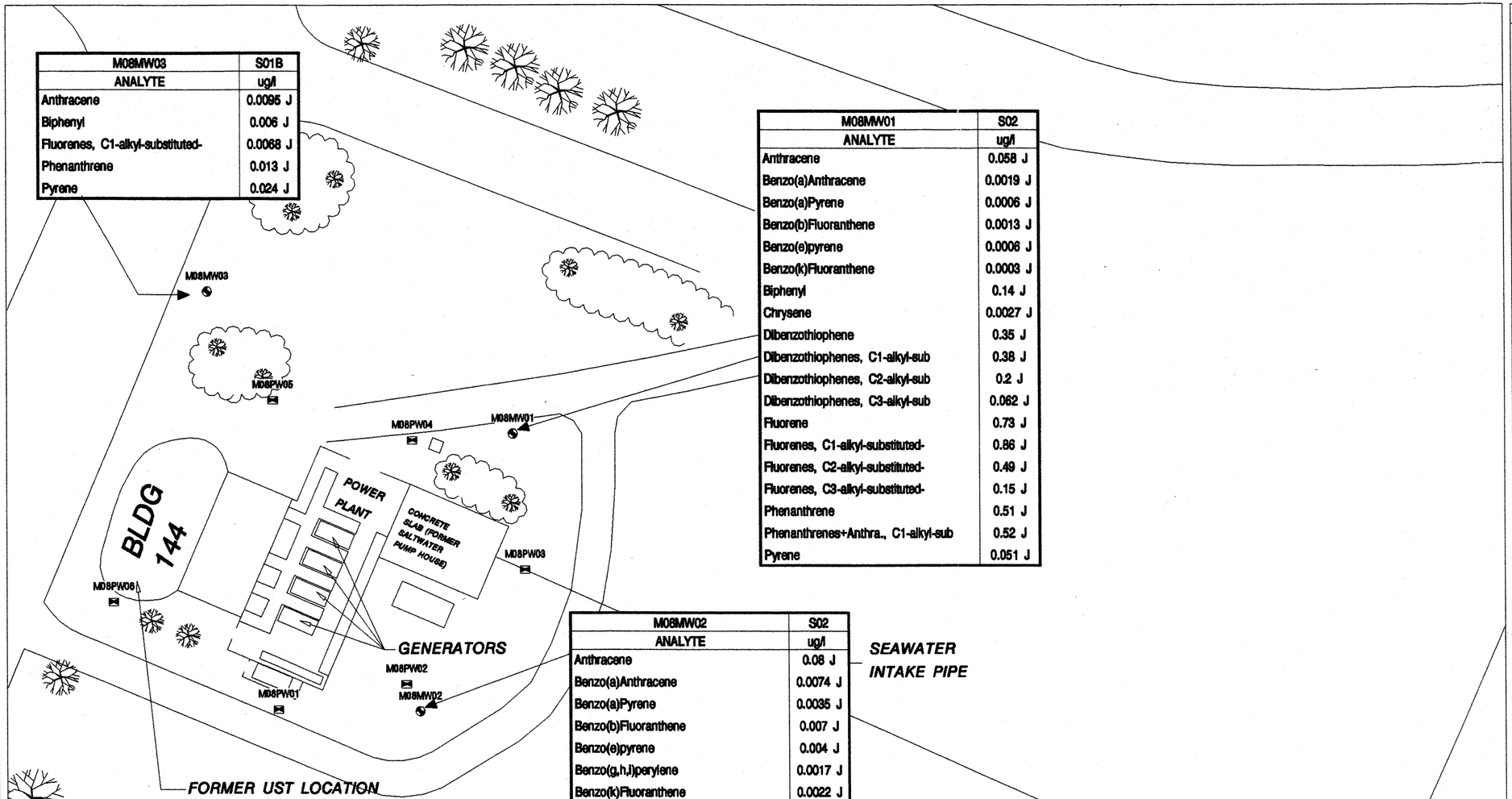
FEET

0 20 40 80 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/93	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

13.5-7



M08MW03	S01B
ANALYTE	ug/l
Anthracene	0.0095 J
Biphenyl	0.006 J
Fluorenes, C1-alkyl-substituted-	0.0068 J
Phenanthrene	0.013 J
Pyrene	0.024 J

M08MW01	S02
ANALYTE	ug/l
Anthracene	0.058 J
Benzo(a)Anthracene	0.0019 J
Benzo(a)Pyrene	0.0006 J
Benzo(b)Fluoranthene	0.0013 J
Benzo(e)pyrene	0.0006 J
Benzo(k)Fluoranthene	0.0003 J
Biphenyl	0.14 J
Chrysene	0.0027 J
Dibenzothiophene	0.35 J
Dibenzothiophenes, C1-alkyl-sub	0.38 J
Dibenzothiophenes, C2-alkyl-sub	0.2 J
Dibenzothiophenes, C3-alkyl-sub	0.062 J
Fluorene	0.73 J
Fluorenes, C1-alkyl-substituted-	0.86 J
Fluorenes, C2-alkyl-substituted-	0.49 J
Fluorenes, C3-alkyl-substituted-	0.15 J
Phenanthrene	0.51 J
Phenanthrenes+Anthra., C1-alkyl-sub	0.52 J
Pyrene	0.051 J

M08MW02	S02
ANALYTE	ug/l
Anthracene	0.08 J
Benzo(a)Anthracene	0.0074 J
Benzo(a)Pyrene	0.0035 J
Benzo(b)Fluoranthene	0.007 J
Benzo(e)pyrene	0.004 J
Benzo(g,h,i)perylene	0.0017 J
Benzo(k)Fluoranthene	0.0022 J
Biphenyl	1.4 J
Chrysene	0.0091 J
Chrysenes, C1-alkyl-substituted-	0.004 J
Chrysenes, C2-alkyl-substituted-	0.0028 J
Dibenzothiophene	0.91 J
Dibenzothiophenes, C1-alkyl-sub	1 J
Dibenzothiophenes, C2-alkyl-sub	0.61 J
Dibenzothiophenes, C3-alkyl-sub	0.25 J
Fluorene	1.8 J
Fluorenes, C1-alkyl-substituted-	1.7 J
Fluorenes, C2-alkyl-substituted-	0.86 J
Fluorenes, C3-alkyl-substituted-	0.28 J
Indeno(1,2,3-cd)pyrene	0.0022 J
Perylene	0.0008 J
Phenanthrene	1.3 J
Phenanthrenes+Anthra., C1-alkyl-sub	0.91 J
Pyrene	0.062 J

LEGEND

MONITORING WELL SAMPLE LOCATION

DIRECT PUSH SAMPLE LOCATION

M08MW02 OGDEN SAMPLE ID

0.08 CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.

S## SAMPLE NUMBER

J ESTIMATED QUANTITY

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING ENGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/hm/cto136/mapa/m5179543

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038657

TITLE

LOW LEVEL SEMIVOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SAMPLES (SITE 08) SAND ISLAND

N

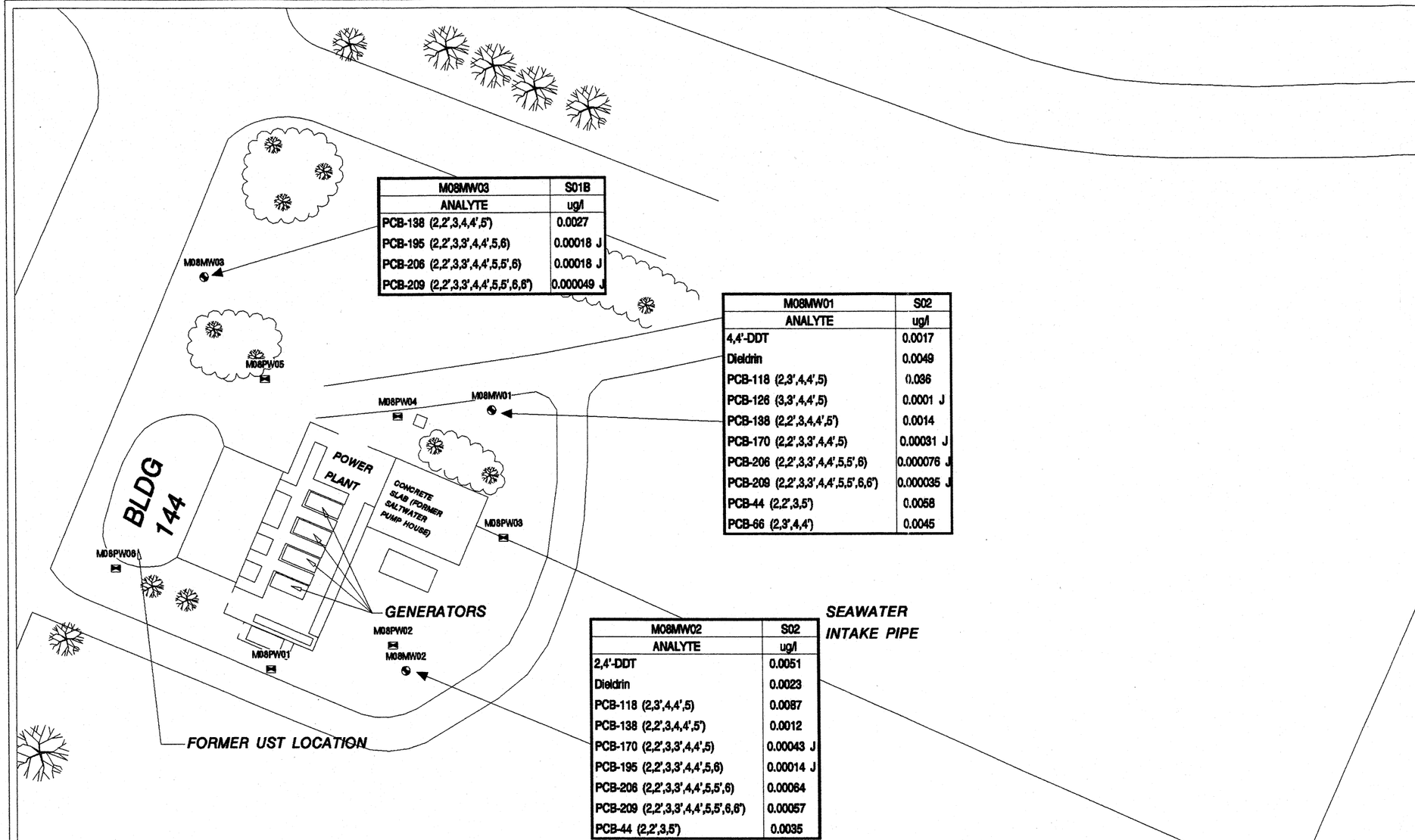
FEET

0 20 40 80 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

13.5-8



M08MW03	S01B
ANALYTE	ug/l
PCB-138 (2,2',3,4,4',5')	0.0027
PCB-195 (2,2',3,3',4,4',5,6)	0.00018 J
PCB-206 (2,2',3,3',4,4',5,5',6)	0.00018 J
PCB-209 (2,2',3,3',4,4',5,5',6,6')	0.000049 J

M08MW01	S02
ANALYTE	ug/l
4,4'-DDT	0.0017
Dieldrin	0.0049
PCB-118 (2,3',4,4',5)	0.036
PCB-126 (3,3',4,4',5)	0.0001 J
PCB-138 (2,2',3,4,4',5')	0.0014
PCB-170 (2,2',3,3',4,4',5)	0.00031 J
PCB-206 (2,2',3,3',4,4',5,5',6)	0.000076 J
PCB-209 (2,2',3,3',4,4',5,5',6,6')	0.000035 J
PCB-44 (2,2',3,5')	0.0058
PCB-66 (2,3',4,4')	0.0045

M08MW02	S02
ANALYTE	ug/l
2,4'-DDT	0.0051
Dieldrin	0.0023
PCB-118 (2,3',4,4',5)	0.0087
PCB-138 (2,2',3,4,4',5')	0.0012
PCB-170 (2,2',3,3',4,4',5)	0.00043 J
PCB-195 (2,2',3,3',4,4',5,6)	0.00014 J
PCB-206 (2,2',3,3',4,4',5,5',6)	0.00064
PCB-209 (2,2',3,3',4,4',5,5',6,6')	0.00057
PCB-44 (2,2',3,5')	0.0035

LEGEND

MONITORING WELL SAMPLE LOCATION

DIRECT PUSH SAMPLE LOCATION

M08MW02 OGDEN SAMPLE ID

0.0051 CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.

S## SAMPLE NUMBER

J ESTIMATED QUANTITY

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appe/hm/cto136/maps/m5179548

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

LOW LEVEL PESTICIDES AND PCB'S DETECTED IN GROUNDWATER SAMPLES (SITE 08) SAND ISLAND

N

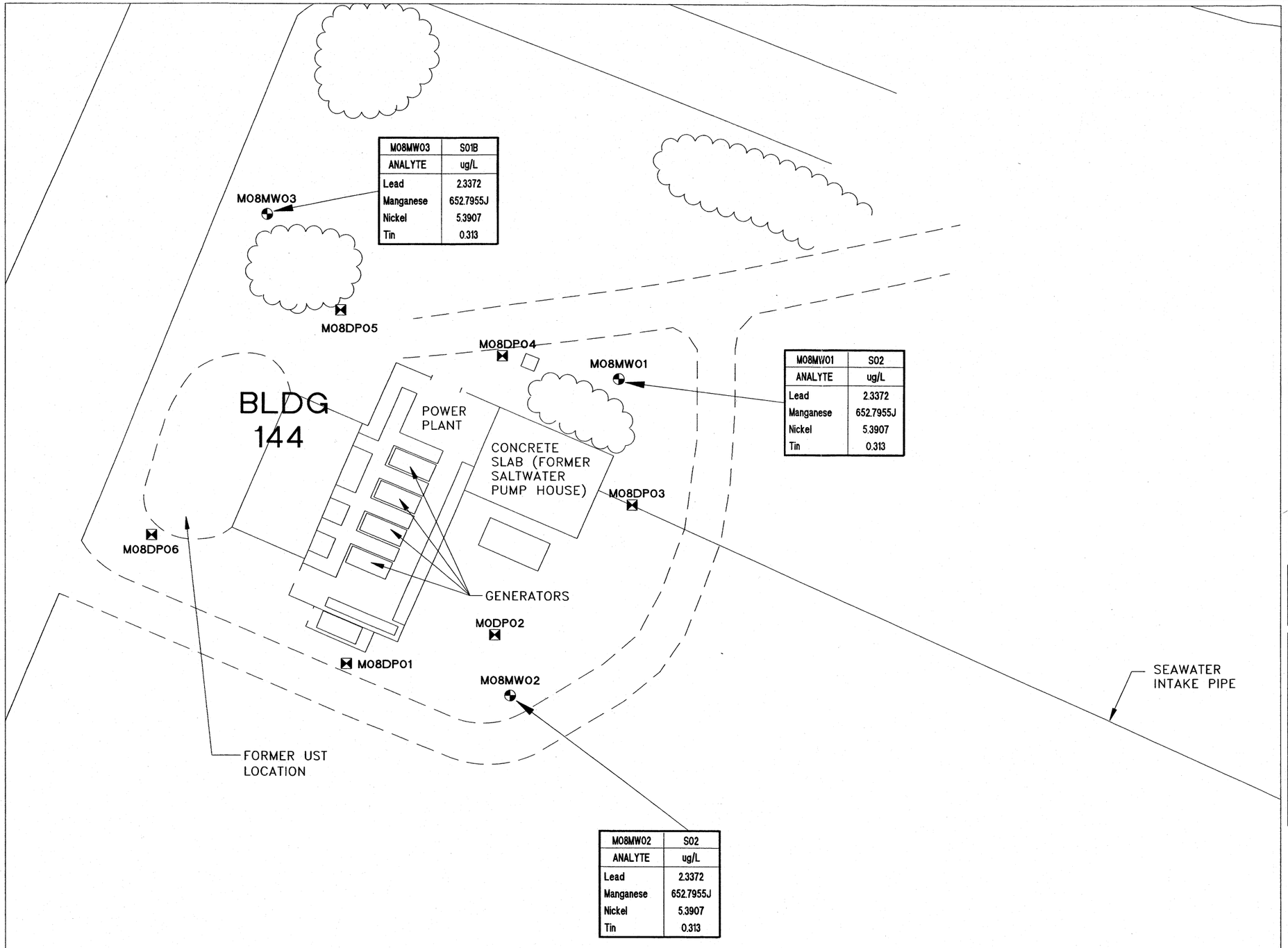
FEET

0 20 40 80 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

13.5-9



M08MW03	S01B
ANALYTE	ug/L
Lead	2.3372
Manganese	652.7955J
Nickel	5.3907
Tin	0.313

M08MW01	S02
ANALYTE	ug/L
Lead	2.3372
Manganese	652.7955J
Nickel	5.3907
Tin	0.313

M08MW02	S02
ANALYTE	ug/L
Lead	2.3372
Manganese	652.7955J
Nickel	5.3907
Tin	0.313

LEGEND

⊠	PUSH WATER LOCATION
◐	MONITORING WELL SAMPLE LOCATION
M08MW02	OGDEN SAMPLE ID
7.8932	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN
S##	SAMPLE NUMBER
J	ESTIMATED QUANTITY

NOTES

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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE08\12219501.DWG DATE: 12-21-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

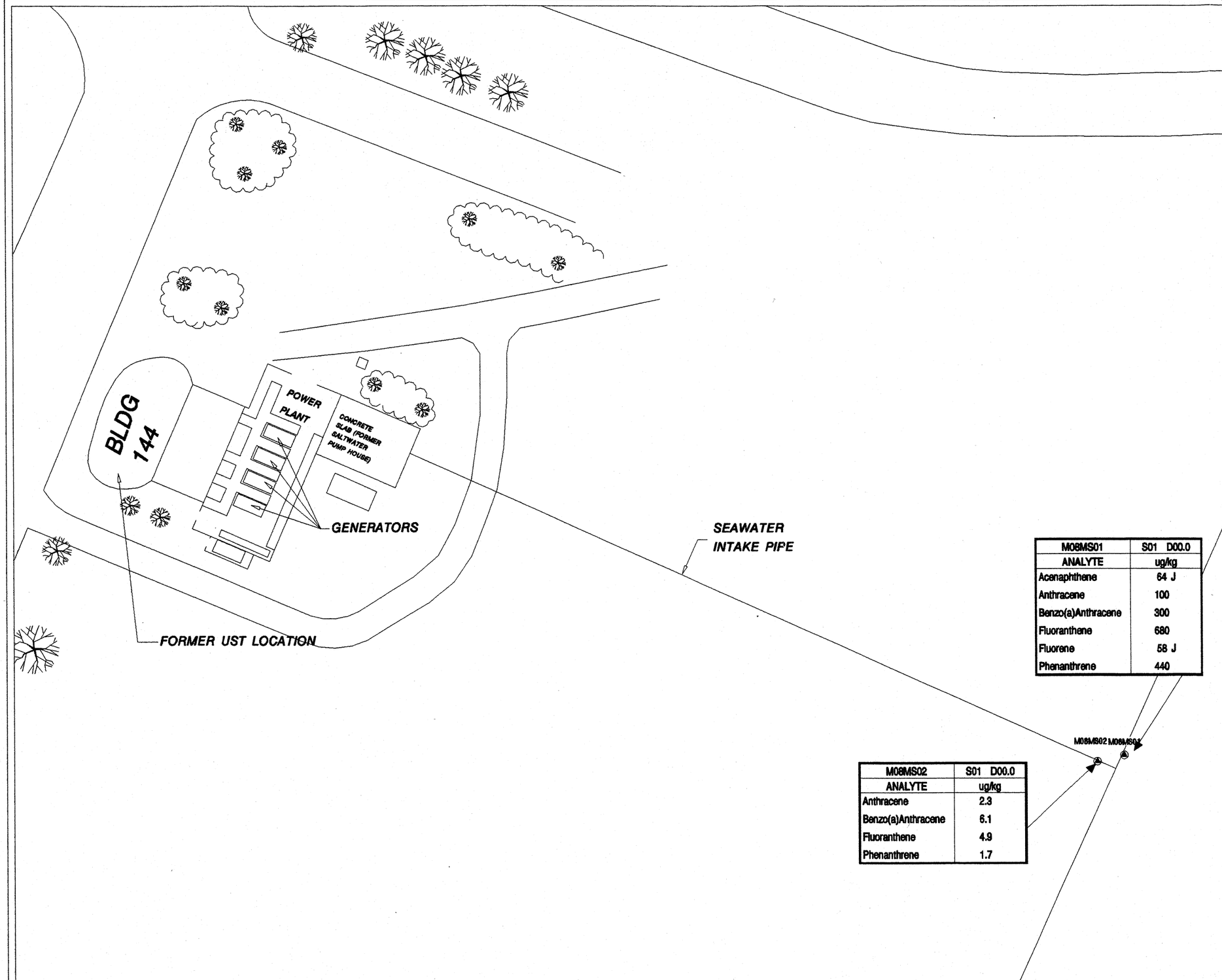
LOW LEVEL METAL CONCENTRATIONS DETECTED IN GROUNDWATER SAMPLES (SITE 08) SAND ISLAND

N

FEET
15 0 30 60

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
13.5-10



M08MS01	S01 D00.0
ANALYTE	ug/kg
Acenaphthene	64 J
Anthracene	100
Benzo(a)Anthracene	300
Fluoranthene	680
Fluorene	58 J
Phenanthrene	440

M08MS02	S01 D00.0
ANALYTE	ug/kg
Anthracene	2.3
Benzo(a)Anthracene	6.1
Fluoranthene	4.9
Phenanthrene	1.7

LEGEND

▲	MARINE SEDIMENT SAMPLE LOCATION
M08MS02	OGDEN SAMPLE ID
64	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190198
4. FILE: /appa/hm/cto130/mapa/m5179551

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

LOW LEVEL SEMIVOLATILE ORGANIC COMPOUNDS DETECTED IN MARINE SEDIMENT SAMPLES (SITE 08) SAND ISLAND

N

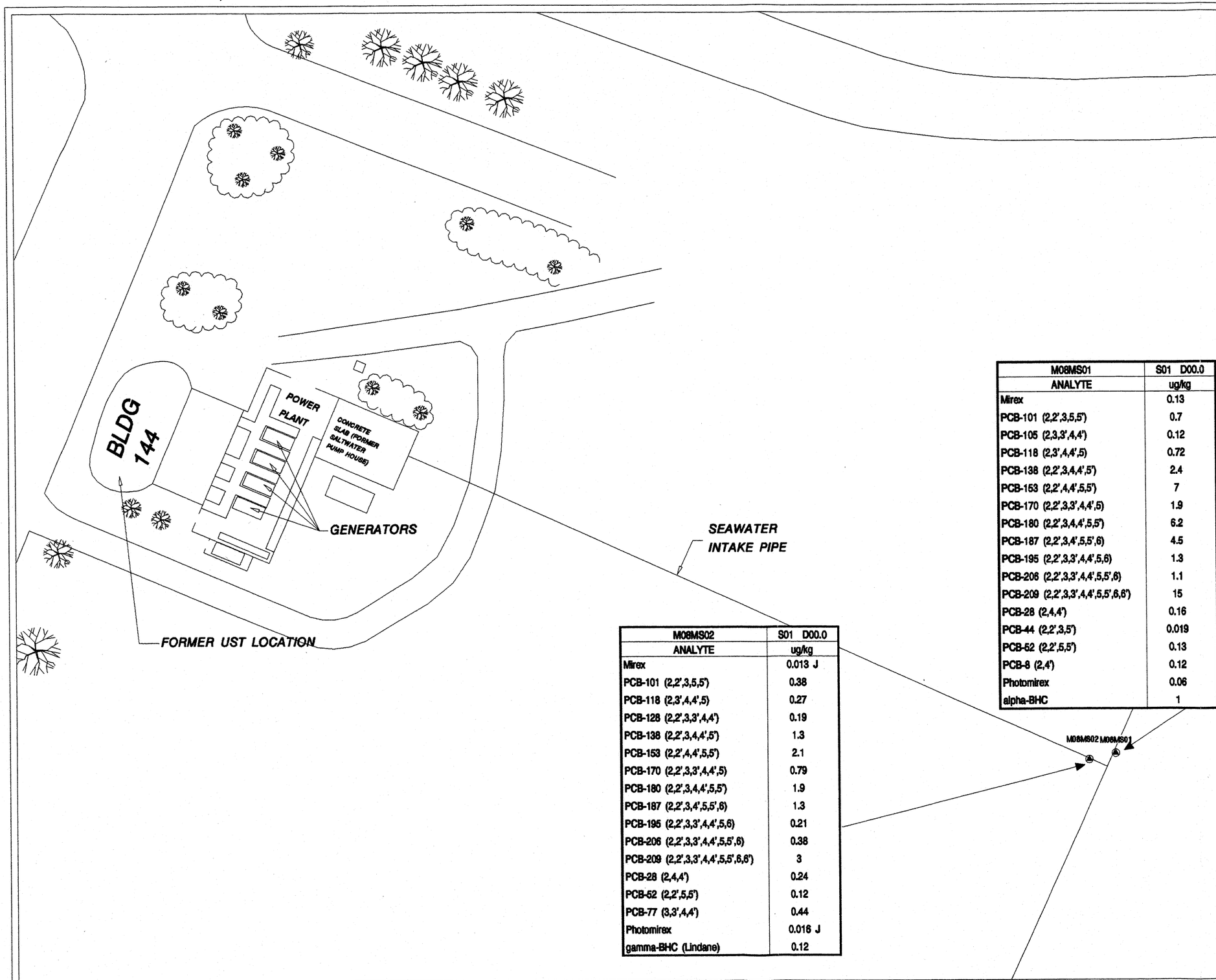
FEET

0 20 40 80 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF.	HFP	HFP	JMC	JMC

FIGURE

13.5-11



M08MS01	S01 D00.0
ANALYTE	ug/kg
Mirex	0.13
PCB-101 (2,2',3,5,5')	0.7
PCB-105 (2,3,3',4,4')	0.12
PCB-118 (2,3',4,4',5)	0.72
PCB-138 (2,2',3,4,4',5')	2.4
PCB-153 (2,2',4,4',5,5')	7
PCB-170 (2,2',3,3',4,4',5)	1.9
PCB-180 (2,2',3,4,4',5,5')	6.2
PCB-187 (2,2',3,4',5,5',6)	4.5
PCB-195 (2,2',3,3',4,4',5,6)	1.3
PCB-206 (2,2',3,3',4,4',5,5',6)	1.1
PCB-209 (2,2',3,3',4,4',5,5',6,6')	15
PCB-28 (2,4,4')	0.16
PCB-44 (2,2',3,5')	0.019
PCB-52 (2,2',5,5')	0.13
PCB-8 (2,4')	0.12
Photomirex	0.06
alpha-BHC	1

M08MS02	S01 D00.0
ANALYTE	ug/kg
Mirex	0.013 J
PCB-101 (2,2',3,5,5')	0.38
PCB-118 (2,3',4,4',5)	0.27
PCB-128 (2,2',3,3',4,4')	0.19
PCB-138 (2,2',3,4,4',5')	1.3
PCB-153 (2,2',4,4',5,5')	2.1
PCB-170 (2,2',3,3',4,4',5)	0.79
PCB-180 (2,2',3,4,4',5,5')	1.9
PCB-187 (2,2',3,4',5,5',6)	1.3
PCB-195 (2,2',3,3',4,4',5,6)	0.21
PCB-206 (2,2',3,3',4,4',5,5',6)	0.38
PCB-209 (2,2',3,3',4,4',5,5',6,6')	3
PCB-28 (2,4,4')	0.24
PCB-52 (2,2',5,5')	0.12
PCB-77 (3,3',4,4')	0.44
Photomirex	0.016 J
gamma-BHC (Lindane)	0.12

LEGEND

▲	MARINE SEDIMENT SAMPLE LOCATION
M08MS02	OGDEN SAMPLE ID
0.13	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/hm/cto138/mapa/m5179555

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 1038856 & 1038857

TITLE

LOW LEVEL PESTICIDES AND PCB'S DETECTED IN MARINE SEDIMENT SAMPLES (SITE 08) SAND ISLAND

N

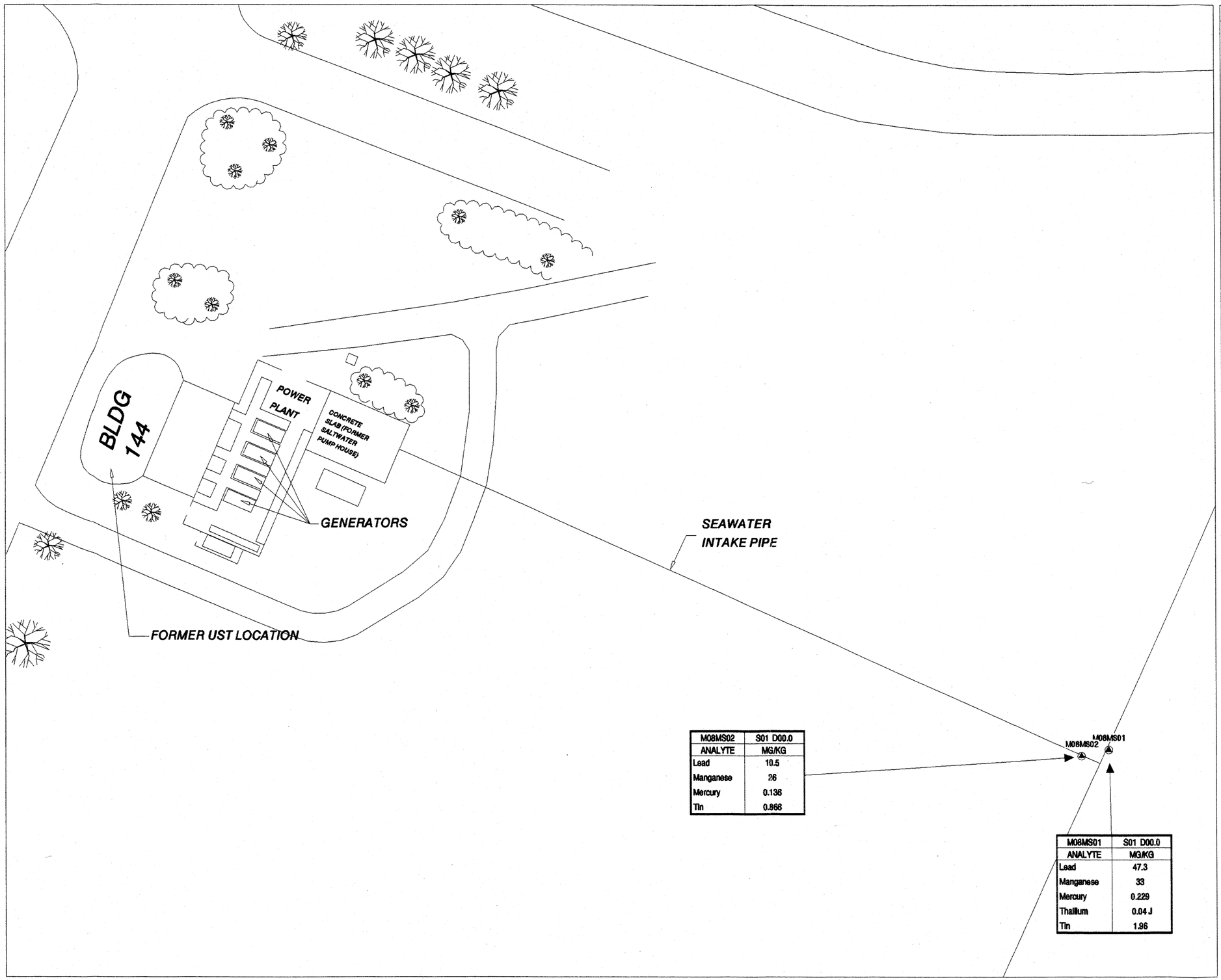
FEET

0 20 40 80 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

13.5-12



M08MS02	S01 D00.0
ANALYTE	MG/KG
Lead	10.5
Manganese	26
Mercury	0.136
Tin	0.866

M08MS01	S01 D00.0
ANALYTE	MG/KG
Lead	47.3
Manganese	33
Mercury	0.229
Thallium	0.04 J
Tin	1.96

LEGEND

▲	MARINE SEDIMENT SAMPLE LOCATION
M08MS02	OGDEN SAMPLE ID
47.3	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-8, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190138
4. FILE: /apps/hm/cto136/maps/m5179550

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 1038856 & 1038857

TITLE

LOW LEVEL METAL CONCENTRATIONS DETECTED IN MARINE SEDIMENT SAMPLES (SITE 08) SAND ISLAND

N

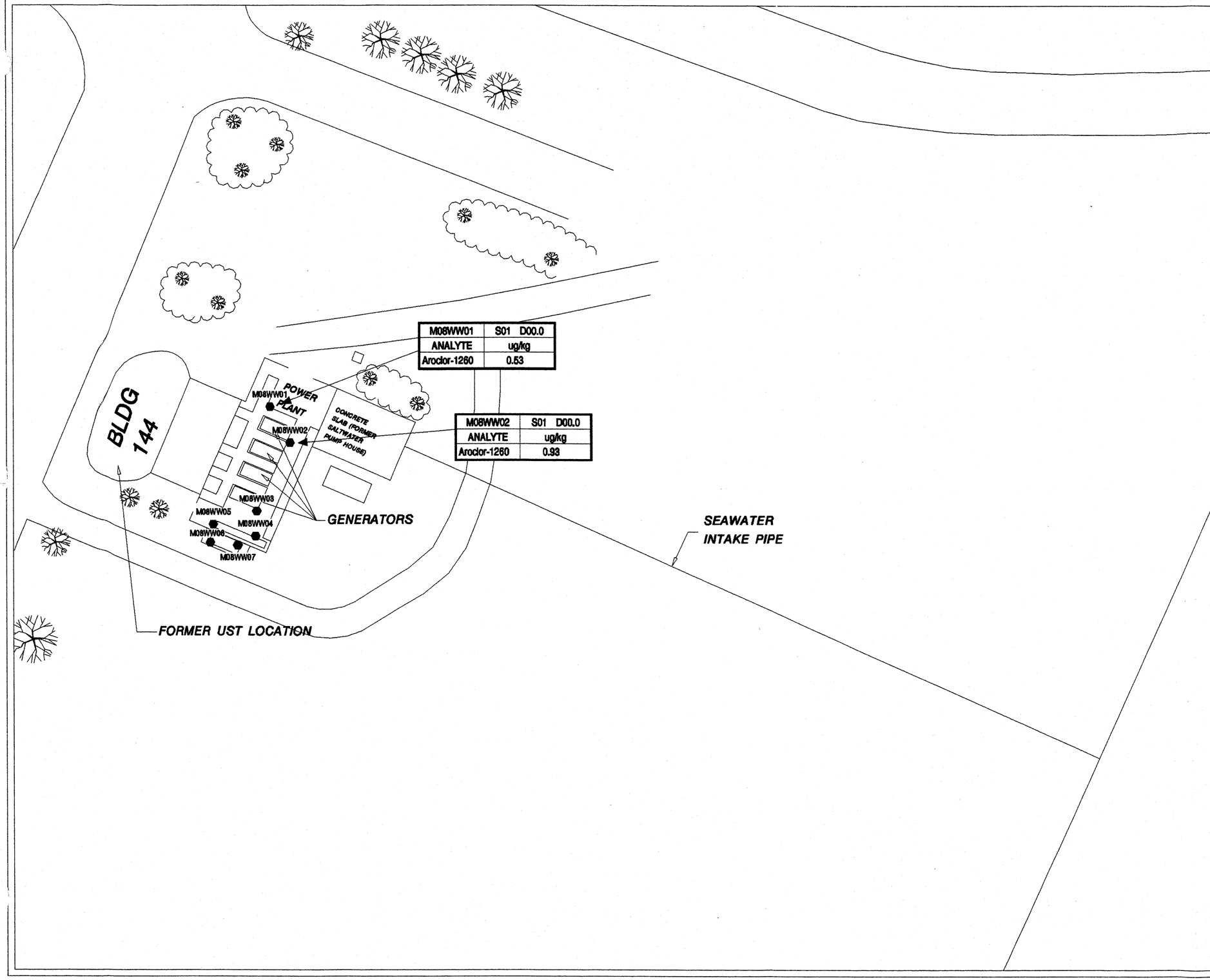
FEET

0 20 40 80 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
12/20/95	1	CMF		HFP		JMC	

FIGURE

13.5-13



LEGEND

⬢	PCB WIPE SAMPLE LOCATION
M08WW02	OGDEN SAMPLE ID
0.93	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING ENGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/hm/cto136/mapa/m6179572

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

PCB CONCENTRATIONS DETECTED FOR PCB WIPE SAMPLES (SITE 08) SAND ISLAND

N

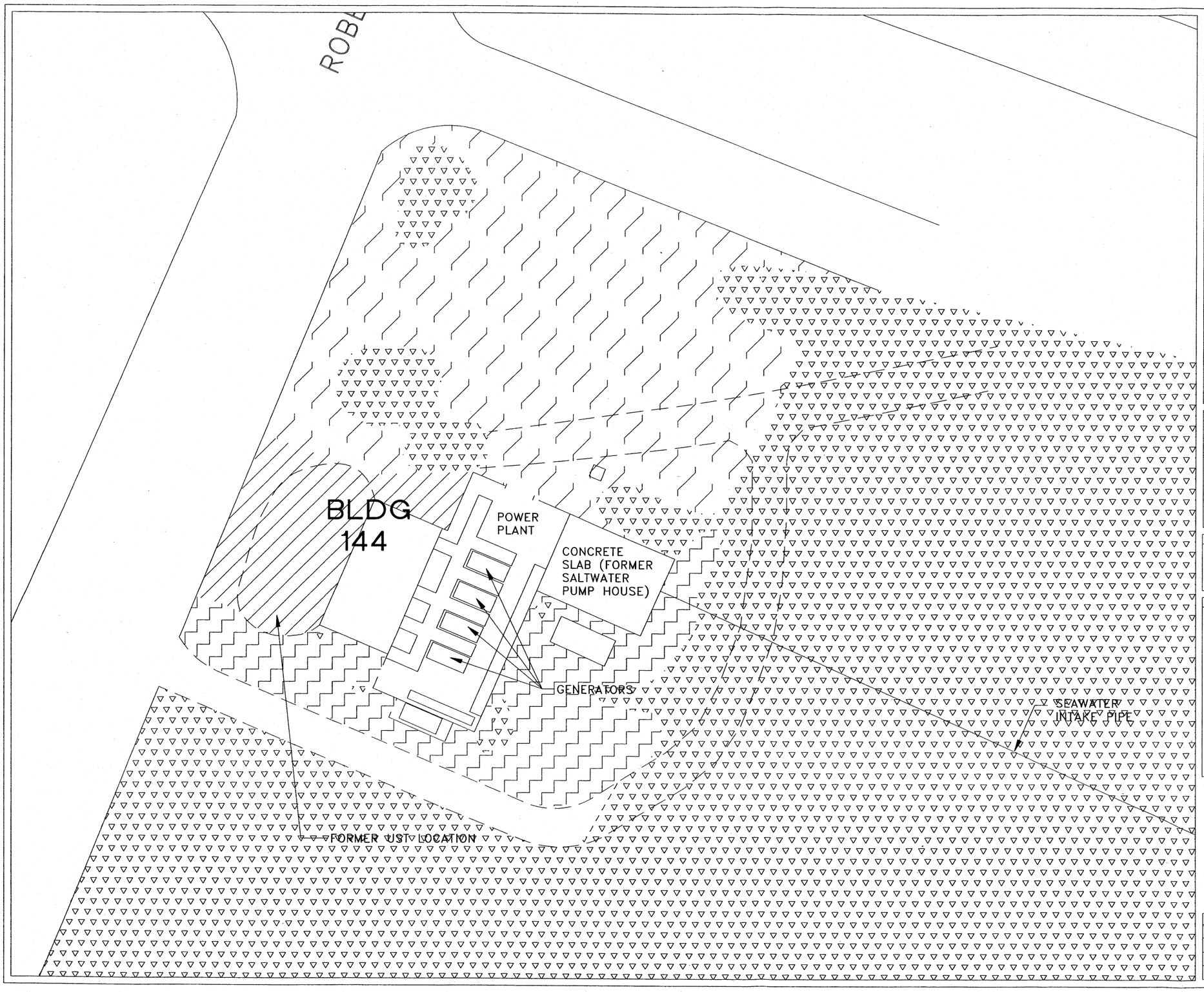
FEET

0 20 40 80 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFF	HFF	JMC	BH

FIGURE

13.5-14



LEGEND

- NON-NATIVE HERB HABITAT
- CASUARINA FOREST (SPARSE)
- DISTURBED HABITAT
- COASTAL STRAND
- SANDY BEACH
- RUDERAL HABITAT
- NON-NATIVE HERB/SMALL CASUARINA TREES
- DEVELOPED

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING ENGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE08\05169538.DWG DATE: 5-16-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

VEGETATION COMMUNITIES
(SITE 08)
SAND ISLAND

N

FEET
15 0 30 60

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
13.6-1

Section 14

SECTION 14
OLD PESTICIDE SHOP, FORMER BUILDING 629 (SITE 09)

This report describes the results of the SI field work conducted intermittently at the Old Pesticide Shop, Former Building 629 (Site 09) from August through November 1994. The purpose of the review was to determine whether Site 09 received hazardous substances, and to assess the likelihood for soil and ground-water contamination at the Site. A discussion of the work conducted during the SI, along with findings, conclusions, and recommendations, is presented below.

This report is organized as follows: Site background information is documented in Section 14.1; a description of SI field sampling activities is presented in Section 14.2; methods used for sample analysis are summarized in Section 14.3; physical characteristics of the Site observed during the investigation activities are discussed in Section 14.4; a summary of the analytical results is presented in Section 14.5; the SERA is described in Section 14.6; and conclusions and recommendations for the Site are presented in Section 14.7.

14.1 BACKGROUND INFORMATION

Building 629 was a pesticide storage building until it was reportedly destroyed by fire several years ago. All that remains of the building is a concrete slab located north of the SK1 Warehouse (Figure 14.1-1). Records of the types of pesticides and the quantities stored in the building were reportedly lost in the fire (Ogden 1994b). During the 1993 EBS Site visit, no evidence of spills or staining was observed, and no evidence was found that drains or other conduits existed in the floor. The potential for pesticide contamination exists at the Site due to past pesticide handling practices and possible pesticide spillage during the fire. Current potential contaminant sources at the Old Pesticide Shop, including residual pesticides and pesticide by-products remaining in soil near the Site, are summarized in Table 14.1-1.

Table 14.1-1

POTENTIAL CHEMICAL CONTAMINANTS, OLD PESTICIDE SHOP, FORMER BLDG. 629, SITE 09

Waste Type	Years of Disposal	Potential Chemical Constituents	Analytical Category
Pesticides and Herbicides	1940s-1980s	Pesticides and Herbicides,	Total Fuel Hydrocarbons, Volatile Organic Compounds Organochlorine Pesticides, Organophosphorus Pesticides, Organochlorine Herbicides, Carbamate and Urea Pesticides, Triazine Pesticides, Metals (As, Cd, Cu, Pb, Hg), Dioxins, Furans

14.2 SAMPLING METHODS AND LOCATIONS

Direct-push

Direct-push soil and ground-water samples were collected by PRC and Ogden personnel at the Site from four locations around the perimeter of the concrete pad on October 4, 1994. (Figure 14.2-1). One duplicate ground-water sample was collected from sample location 03. Depth to water was 4 to 4.5 fbgs.

Surface Soil

Surface soil samples were collected at four locations on October 29, 1994 (Figure 14.2-2). One duplicate surface soil sample was collected from sample location 02.

14.3 Analytical Methods

Direct-push

All direct-push soil samples were analyzed by the field screening laboratory for TPH, pesticides/PCBs, and PAHs. Soil samples from two direct-push locations (locations 01 and 03) were sent offsite for analysis of CLP metals. The sample from location 01 was also analyzed at the offsite laboratory for fuels, CLP pesticides/PCBs, organophosphorous pesticides, chlorinated herbicides, triazine pesticides, carbamate pesticides, and dioxins (Table 14.3-1).

Direct-push ground-water samples were also analyzed by the field screening laboratory for TPH, pesticides/PCBs, and PAHs. The sample collected for field screening analysis from location 03 was duplicated for quality control. Direct-push ground water samples from locations 01 and 03, and one QC duplicate sample (from location 03) were sent offsite for analysis of fuels, CLP pesticides/PCBs, organophosphorous pesticides, chlorinated herbicides, triazine pesticides, carbamate pesticides, dioxins and CLP metals.

Surface Soil

All surface soil samples from this Site were shipped offsite for analysis of fuels, CLP pesticides/PCBs, organophosphorous pesticides, chlorinated herbicides, triazine pesticides, carbamate pesticides, CLP metals, and dioxins.

14.4 Physical Characteristics

14.4.1 Topography

Site 09 is located in a level area, between 5 and 10 feet above MSL, in the center of Sand Island. It is approximately 600 feet east of the southeast corner of the hangar building, and 300 feet west of the Superblock (Figure 14.1-1).

14.4.2 Geology and Soils

The soil at Site 09 appears to consist primarily of coralline sand. No visible evidence of staining, debris, or waste was observed in the surface soils, or in the direct-push soil samples.

14.4.3 Hydrogeology

Ground-water levels measured at the direct-push sampling locations on October 4, 1994 ranged from 4 to 4.5 fbgs. The potentiometric surface could not be determined from the field measurements because elevations of sampling locations were not surveyed at Site 09. Ground-water samples were slightly to moderately turbid. Indicator parameters such as pH, conductivity, and temperature were not measured in these samples.

14.5 Summary of Analytical Results

The sections and tables below summarize the results of laboratory analyses performed on Site 09 samples. Analytical results for organic and inorganic compounds in soil samples are shown in Tables 14.5-1 and 14.5-2, respectively. For ground-water samples, analytical results for the organic and inorganic compounds are presented in Tables 14.5-3 and 14.5-4.

The tables list the analytical methods, the number of detects, the total number of samples, the number of samples rejected during data validation, the minimum undetected concentration, the maximum undetected concentration, the minimum detected concentration, the maximum detected concentration, and the sample with the maximum concentration. In addition, the concentrations of compounds detected at Site 09 are compared to Sand Island background levels. Analytical results for all samples and analytes are contained in Appendix L. Complete CLP and low-level analytical data are available at PACNAVFACENGCOM offices at Pearl Harbor, Hawaii.

14.5.1 Sources

Possible sources of contamination include releases resulting from routine usage and storage of pesticides. Releases also may have resulted from spills during the reported fire.

14.5.2 Surface Soil

Analytical results indicate that detectable concentrations of pesticides, metals, dioxins, furans, and PAHs were found in all Site 09 surface soil samples. Among this group of samples, concentrations of two of the eight analytes that were detected by the CLP pesticide/PCB method, and 20 of the 22 detected CLP metals, were above Sand Island mean background levels. The pesticide with the maximum concentration was 4,4'-DDT (2,600 µg/kg). The only PCB detected among this group of samples was Aroclor-1260 (1,700 mg/kg). Lubricant oil range (C20-C30) hydrocarbons were detected in surface soil samples from all four locations at concentrations ranging from 26 mg/kg in sample M09SS03S01 (sample location 03) to 540 mg/kg in sample M09SS02S01 (location 02). Diesel-range (C14-C20) hydrocarbons were detected in the sample collected at location 02 (15 mg/kg). Low levels of PAHs were detected in surface soil samples; the PAH with the highest concentration was bis(2-ethylhexyl)phthalate (99 µg/kg). The maximum detected lead concentration was 253 mg/kg. Figures 14.5-1, 14.5-2, 14.5-3, and 14.5-4 depict the surface soil sampling locations and selected concentration values.

14.5.3 Subsurface Soil

Among the subsurface samples tested for CLP metals, concentrations of 3 of the 13 analytes detected were greater than mean Sand Island Background levels. In the single sample that was tested by CLP and EPA methods for the full range of analytes, organic constituents concentrations were below detection limits.

14.5.4 Ground Water

The only CLP pesticide/PCB analyte detected among the ground-water samples was 4,4'-DDD at 0.24 µg/L. Among the ground-water samples tested for CLP metals,

concentrations of 6 of the 13 detected analytes were above mean Sand Island background levels. Figures 14.5-5 and 14.5-6 depict the ground-water sampling locations and selected concentration values.

14.6 SCREENING ECOLOGICAL RISK ASSESSMENT

14.6.1 Problem Formulation

Tasks to be accomplished during Problem Formulation include (a) developing a Site description based on current Site investigations, existing literature, any prior preliminary assessments, and Site history; (b) identifying potential stressors, exposure pathways, and ecological receptors (habitats and species); (c) discussing the nature of adverse effects associated with a given stressor; (d) defining ecologically appropriate assessment and measurement endpoints; and (e) making an initial evaluation of risks posed by the Site.

For a Site to present the potential for risk, it must exhibit the following three criteria: contain stressors in abiotic media at detectable and biologically significant concentrations, provide exposure pathways linking stressors to ecological receptors, and have ecological receptors (those associated with assessment endpoints) that either utilize the Site, are present nearby, or are in range of stressors migrating from the Site. If Problem Formulation determines that one or more of these criteria are absent, the Site is recommended for NFA and the risk assessment is concluded at this point. If all criteria are met, then completion of the SERA process is required.

14.6.1.1 Site Description

All that currently remains of Building 629 is a concrete slab, measuring 25 feet by 32 feet, surrounded with a maintained lawn (ruderal habitat) and a few ironwood trees (Figure 14.6-1). Building 629 was a pesticide storage building that was reportedly destroyed by fire several years ago. The Site is located approximately 1,850 feet from the Inner Harbor.

14.6.1.2 Stressor Identification

Chemical data were used to calculate ECs, and CPECs were identified following the methods described in Sections 4.3.1.1.1 and 4.3.1.1.2. Results of the CPEC selection process are presented in Table 14.6-1 for surface soils, in Table 14.6-2 for subsurface soils, in Table 14.6-3 for ground water, and are summarized in Table 14.6-4. The results show that the CPECs are primarily located in surface soils, indicating that contamination of the Site was not of sufficient magnitude or duration to penetrate to the subsurface soil layer. No ground-water CPECs were considered for this Site since it is located away from the marine environment, and it is likely that ground water will not reach the harbor. Principal CPECs at Site 09 include Aroclor-1260, DDT and its breakdown products, eight metals, three dioxins, two furans, and one semi-volatile organic compound.

14.6.1.3 Potential Ecological Effects

CPECs identified onsite that may adversely affect receptors onsite include ΣDDT, PCBs, dioxins, and metals. CPEC physicochemical properties and toxicology, as they relate to potential exposure routes and sensitive ecological receptors, are summarized in Section 4.2.3 and described in detail in Appendix J.

14.6.1.4 Ecological Receptor Identification

There are several potential ecological receptors associated with the Site including Laysan albatross, Bonin petrel, white tern, brown noddy, bristle-thighed curlew, Pacific golden-plover, and ruddy turnstone (Section 4.2.4). Nesting density for the petrel and albatross on the lawn surrounding the concrete pad of the Old Pesticide Shop was observed to be moderate to high. Several white terns were observed nesting in the branches of the ironwood trees onsite. There are a number of petrel burrows around the eastern end of the pad. No marine receptors are associated with this Site because of the large distance of the Old Pesticide Shop from the marine environment.

14.6.1.5 Exposure Pathway Identification

Figure 4.2-2 depicts the CSM for Site 09. Potentially complete terrestrial exposure pathways for Site 09 include direct exposure to CPECs through dermal contact, incidental ingestion of contaminated surface soil, ingestion of contaminated prey items, and the inhalation of volatile compounds associated with pesticide contamination at the Site. Incidental ingestion and dermal contact with contaminated soils are of primary concern for the albatross and noddy. Inhalation of vapors and dermal exposure are principal routes for the burrowing Bonin petrel. Direct ingestion of contaminated prey items (primarily insects) by the curlew, plover, and turnstone is the principle route for these species. There are no complete exposure pathways involving ground water.

14.6.1.6 Endpoints

Assessment endpoint #1 in Section 4.2.6.1 is the only appropriate endpoint for this Site since all ecological receptors associated with the Site are terrestrial species. Congruently, testable hypotheses #1 and #2 in Section 4.2.6.2 are applicable to the transformer pad Site. Measurement endpoints selected for this Site are #1, #2, and #3, which focus on reproductive impairment in seabird and shorebird species, as discussed in Section 4.2.6.3.

14.6.1.7 Summary

After a review of the existing data, it was concluded that this Site possessed the three criteria that indicate the potential for risk. It was determined that completion of the SERA process was required.

14.6.2 Exposure Analysis

The seabird and shorebird species that occur in the vicinity of the Site's concrete pad comprise the target receptors for Site 09. The Laysan albatross was well represented at the Site, and its exposure was estimated via incidental ingestion and dermal absorption of contaminants in surface soils. Bonin petrel or wedge-tailed shearwater burrows were also observed onsite. Exposure to the Bonin petrel was assumed to be representative of exposure for all burrowing bird species. Petrel exposure was estimated for dermal

exposure, incidental ingestion, and inhalation of vapors of contaminants in the subsurface soil. The Pacific golden-plover was used as the representative shorebird. The primary exposure pathway to the plover was via ingestion of invertebrates (insects) that have been exposed to contaminants in the surface soils.

Food chain modeling was used to estimate the level of direct exposure to CPECs in abiotic media and estimate the level of secondary exposure to Site-related CPECs bioaccumulated in prey or forage items (insects). Section 4.3.1.4 presents the equations used for calculating EPVs for each respective target receptor. Table 14.6-5 summarizes the exposures associated with each pathway and each receptor.

14.6.3 Ecological Effects Analysis

The potential for adverse ecological effects was evaluated using literature-derived data on CPEC toxicity with respect to specific target receptors, including the Laysan albatross, Bonin petrel, and golden-plover. Toxicity reference values were calculated, as described in Section 4.3.2.2 and Appendix J, and are presented as part of Table 14.6-6.

14.6.4 Risk Characterization

Risk estimation was performed using a quotient methodology as described in Section 4.3.3.1. Results of these calculations and of the risk description process, including a weight-of-evidence analysis, are discussed below. Results of the weight-of-evidence analysis are summarized in Table 14.6-7.

Since no CPECs were identified in subsurface soil samples, there is negligible onsite risk to burrowing birds. Antimony, 4,4'-DDE, 4,4'-DDT, and Aroclor-1260 had TQs greater than zero for bird species evaluated at Site 09 (Table 14.6-6), which indicates the potential for risk to ground-nesting and shorebirds. The dominant exposure pathways for ground-nesting seabirds is through dermal absorption of contaminants, except in the case of antimony for ground-nesting birds where incidental ingestion of contaminated soil is the most prominent exposure pathway. The dominant exposure route to shorebirds for all CPECs onsite is through incidental ingestion of contaminated prey items.

The TQs for 4,4'-DDE and 4,4'-DDT were 0.47 and 0.09 for ground-nesting birds and 0.15 and 0.38 for shorebirds, respectively. This indicates a low to moderate potential for adverse effects to the bird species from ΣDDT exposure. DDT was first used as an insecticide in the 1940s, and is considerably persistent in the environment. Several studies have shown that DDT affects calcium metabolism in birds. This action results in eggshell thinning and reduced reproductive success (Mearns et al. 1990); therefore, there is a low to moderate risk of reproductive effects to ground-nesting birds and shorebirds onsite from exposure to ΣDDT.

TQs of 0.02 and 0.80 were calculated for Aroclor 1260 for ground-nesting birds and shorebirds, respectively, suggesting a low to moderate potential for adverse effects to these species. Chronic exposure of birds to PCBs has been shown to cause both systematic and reproductive effects. Although the EC for Aroclor-1260 onsite is only 1.7 mg/kg, there is a low risk of potential adverse effects to bird species onsite.

A TQ of 0.12 for antimony indicates a low potential for adverse effects to ground-nesting birds. The metals TQ analysis used an EC value based on total metals concentrations. The actual risk from most metals is likely to be lower than indicated by the TQ analysis, because the bioavailable portion of the metals is the soluble portion, a fraction of the total concentration. Because of the low solubility of antimony, it is unlikely that it will have significant effects on the ground-nesting birds.

14.6.5 Uncertainty Analysis

All uncertainties discussed in Section 4.3.3.3 apply to this Site. Specific to this Site are the uncertainties that arise from using conservative exposure assumptions regarding the dietary and nesting behavior of seabirds onsite. These assumptions may tend to overstate the potential ecological risk associated with contamination at Site 09.

14.6.6 SERA Conclusions

Based on the results of the preceding analysis, the assessment endpoint for special status bird species will not be met at the Site, due to the presence of Aroclor-1260, DDT, and DDE. These are the most important Site-related contaminants that have the highest

potential to cause chronic effects in the bird species onsite. Concentrations of antimony onsite are not considered to pose a significant risk due to its relatively low solubility.

14.7 Conclusions and Recommendations

Elevated levels of pesticides, PCBs, dioxins/furans, semi-volatiles and metals were detected in surface soil. No organic compounds were detected above laboratory detection limits in subsurface soil samples. One ground-water sample was found to contain 0.24 ppb 4,4'-DDD. Based on the results of the SERA, a low to moderate risk exists for terrestrial wildlife due to exposure to PCBs (Aroclor-1260), DDT, and DDE in surface soils at Site 09.

We recommend that onsite surface soils found to contain levels of Aroclors greater than 1.0 ppm and levels of DDT or DDE greater than 1.0 ppm be removed from the Site and disposed of in an appropriate manner. A DDE concentration of 1.0 mg/kg would pose a negligible risk (TQ<0) to migratory shorebirds and seabirds on Midway based on our exposure calculations and the complete exposure pathways. Because only the shorebird species actually ingest prey on-island, and incidental soil ingestion and dermal absorption pathways are so limited for these large organochlorines, a cleanup level of 1.0 mg/kg should be protective of these migratory bird species. Because the toxicological effects of DDD, DDE, and DDT are different, the cleanup will reduce the concentration of each of these compounds, rather than their total concentration, to 1.0 ppm. Following removal of the impacted soils, the Site should be returned to grade with clean soil and revegetated.

TABLE 14.3-1 (Page 1 of 2)
ANALYTICAL METHODS
OLD PESTICIDE SHOP, BUILDING 629 (SITE 09)

		FIELD SCREENING LABORATORY				ROUTINE ANALYTICAL LABORATORY								
	ANALYTICAL METHOD	8021	8015 B	8080	8100	8015 M/OG	OLM01.8V	OLM01.8P	8140 M	8150 M	619 M	632 M	ILM03.OX	8280
EPA ID	OGDEN ID	VOL	TPH	PEST/ PCB	PAH	FUELS	VOC	OC PEST/PCB	OP PEST	CHL HERB	TRI HERB	CARB PEST	METALS	DIOXIN
SURFACE SOIL SAMPLES														
MF520	M09SS01S01D0025	-	-	-	-	X	-	X	X	X	X	X	X	X
MF521	M09SS02S01D0025	-	-	-	-	X	-	X	X	X	X	X	X	X
MF522	M09SS02D01D0025	-	-	-	-	X	-	X	X	X	X	X	X	X
MF523	M09SS03S01D0025	-	-	-	-	X	-	X	X	X	X	X	X	X
MF524	M09SS04S01D0025	-	-	-	-	X	-	X	X	X	X	X	X	X
DIRECT PUSH SOIL SAMPLES														
MF502	M09PS01S01D040	-	X	X	X	-	-	-	-	-	-	-	-	-
MF503	M09PS01S02D040	-	-	-	-	X	-	X	X	X	X	X	X	X
MF506	M09PS02S01D040	-	X	X	X	-	-	-	-	-	-	-	-	-
MF512	M09PS03S01D040	-	X	X	X	-	-	-	-	-	-	-	-	-
MF513	M09PS03S02D040	-	-	-	-	-	-	-	-	-	-	-	X	-
MF516	M09PS04S01D040	-	X	X	X	-	-	-	-	-	-	-	-	-
DIRECT PUSH WATER SAMPLES														
MF500	M09PW01S01D040	-	X	X	X	-	-	-	-	-	-	-	-	-
MF501	M09PW01S02D040	-	-	-	-	X	-	X	X	X	X	X	X	X
MF504	M09PW02S01D044	-	X	X	X	-	-	-	-	-	-	-	-	-
MF508	M09PW03S01D043	-	X	X	X	-	-	-	-	-	-	-	-	-
MF509	M09PW03S02D043	-	-	-	-	X	-	X	X	X	X	X	X	X

"X" = Indicates analytical method performed on sample.

TABLE 14.3-1 (Page 2 of 2)
ANALYTICAL METHODS
OLD PESTICIDE SHOP, BUILDING 629 (SITE 09)

		FIELD SCREENING LABORATORY				ROUTINE ANALYTICAL LABORATORY								
	ANALYTICAL METHOD	8021	8015 B	8080	8100	8015 M/OG	OLM01.8V	OLM01.8P	8140 M	8150 M	619 M	632 M	ILM03.OX	8280
EPA ID	OGDEN ID	VOL	TPH	PEST/ PCB	PAH	FUELS	VOC	OC PEST/PCB	OP PEST	CHL HERB	TRI HERB	CARB PEST	METALS	DIOXIN
MF510	M09PW03D01D043	-	X	X	X	-	-	-	-	-	-	-	-	-
MF511	M09PW03D02D043	-	-	-	-	X	-	X	X	X	X	X	X	X
MF514	M09PW04S01D040	-	X	X	X	-	-	-	-	-	-	-	-	-
EQUIPMENT RINSATE SAMPLES														
MF519	M09XW03E01D000	-	-	-	-	X	-	X	X	X	X	X	X	X
TRIP BLANK SAMPLES														
MF518	M09XW00T00D000	-	-	-	-	-	X	-	-	-	-	-	-	-

"X" = Indicates analytical method performed on sample.

Table 14.5-1
Summary of Soil Results for Organics
Old Pesticide Shop (Bldg 629), Sand Island (Site 9)

			Site 9									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL																			
8015B/OG	C14-C20 (Diesel Range)	MG/KG	1	4	0	5.3	5.5	15	15	M09SS02S01		1	8	0	5.2	5.9	10	10	3.27
8015B/OG	C20-C30 (Lubricant Oil Range)	MG/KG	4	4	0			26	540	M09SS02S01		1	8	0	21	24	44	44	13.3
EPA 8150	Pentachlorophenol	UG/KG	1	4	0	1.1	1.1	27	27	M09SS02S01	J	0	8	0	1	1.2			
EPA 8280	1,2,3,4,6,7,8-HpCDD	NG/G	2	4	0	0.071	0.27	0.13	2.2	M09SS02S01		0	8	0	0.035	0.28			
EPA 8280	HpCDDs (total)	NG/G	2	4	0	0.071	0.27	0.2	3.9	M09SS02S01		0	8	0	0.035	0.28			
EPA 8280	HpCDFs (total)	NG/G	1	4	0	0.062	0.11	1.5	1.5	M09SS02S01		0	8	0	0.13	0.33			
EPA 8280	OCDD	NG/G	3	4	0	0.25	0.25	0.6	26	M09SS02S01		0	8	0	0.058	0.54			
EPA 8280	OCDF	NG/G	1	4	0	0.16	0.37	2.9	2.9	M09SS02S01		0	8	0	0.18	0.62			
OLM01.0B	bis(2-Ethylhexyl)phthalate	UG/KG	3	4	0	360	360	27	99	M09SS01S01	J	1	8	0	350	410	1600	1600	246
OLM01.0B	Chrysene	UG/KG	1	4	0	350	430	44	44	M09SS02S01	J	0	8	0	350	410			
OLM01.0B	Fluoranthene	UG/KG	1	4	0	350	430	47	47	M09SS02S01	J	0	8	0	350	410			
OLM01.0P	4,4'-DDD	UG/KG	2	7	3	7.2	35	5.4	160	M09SS02S01	J	0	10	2	3.4	16			
OLM01.0P	4,4'-DDE	UG/KG	4	7	3			120	1700	M09SS02S01		4	10	2	3.4	4	5.2	1900	13.1
OLM01.0P	4,4'-DDT	UG/KG	4	7	3			70	2600	M09SS02S01		2	10	2	3.4	4	200	320	6.3
OLM01.0P	alpha-Chlordane	UG/KG	1	7	3	3.7	19	9.4	9.4	M09SS03S01		0	10	2	1.8	8.1			
OLM01.0P	Aroclor-1260	UG/KG	3	7	3	72	72	55	1700	M09SS01S01		0	10	2	34	160			
OLM01.0P	Dieldrin	UG/KG	1	7	3	7.2	37	4.3	4.3	M09SS03S01	J	0	10	2	3.4	16			
OLM01.0P	Endosulfan I	UG/KG	1	7	3	1.9	18	21	21	M09SS02S01	J	0	10	2	1.8	8.1			
OLM01.0P	gamma-Chlordane	UG/KG	1	7	3	3.7	19	8.2	8.2	M09SS03S01		0	10	2	1.8	8.1			

Notes:

8015B/OG = Total Fuel Hydrocarbons
EPA 8150 = Chlorinated Herbicides
EPA 8280 = Dioxins & Furans
OLM01.0B = CLP Semi Volatiles
OLM01.0P = CLP Pesticides/PCBs

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 14.5-2
Summary of Soil Results for Inorganics
Old Pesticide Shop (Bldg 629), Sand Island (Site 9)

			Site 9									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL																			
ILM03.0	Aluminum	MG/KG	4	4	0			180	879	M09SS02S01	J	4	8	0	2.9	3.2	127	879	25.2
ILM03.0	Antimony	MG/KG	1	4	0	2.5	2.6	3.6	3.6	M09SS02S01	J	0	8	0	2.5	2.9			
ILM03.0	Arsenic	MG/KG	1	4	0	0.46	0.48	2.2	2.2	M09SS02S01		1	8	0	0.29	0.34	0.46	0.46	0.179
ILM03.0	Barium	MG/KG	4	4	0			6.9	33.9	M09SS02S01		8	8	0			6	15.3	8.68
ILM03.0	Beryllium	MG/KG	4	4	0			0.13	0.18	M09SS02S01	J	8	8	0			0.19	0.45	0.3
ILM03.0	Cadmium	MG/KG	4	4	0			0.25	2.1	M09SS02S01		8	8	0			0.39	0.99	0.617
ILM03.0	Calcium	MG/KG	4	4	0			302000	347000	M09SS04S01		8	8	0			32400	343000	244000
ILM03.0	Chromium	MG/KG	4	4	0			6.5	21.4	M09SS02S01		8	8	0			4.1	8	5.48
ILM03.0	Cobalt	MG/KG	1	4	0	0.98	1	1.6	1.6	M09SS02S01	J	2	8	0	0.97	1.1	1.5	2.2	0.712
ILM03.0	Copper	MG/KG	4	4	0			1.6	45.9	M09SS01S01	J	1	8	0	1	4.3	5.6	5.6	1.57
ILM03.0	Iron	MG/KG	4	4	0			348	13300	M09SS02S01	J	8	8	0			37.4	1240	206
ILM03.0	Lead	MG/KG	4	4	0			7.5	253	M09SS02S01		8	8	0			2.7	10.5	6.28
ILM03.0	Magnesium	MG/KG	4	4	0			17000	19200	M09SS01S01		8	8	0			14000	16800	15700
ILM03.0	Manganese	MG/KG	4	4	0			6.7	65.5	M09SS02S01		8	8	0			4.3	36.7	9.02
ILM03.0	Mercury	MG/KG	1	4	0	0.05	0.06	0.28	0.28	M09SS03S01		3	8	0	0.05	0.06	0.05	0.09	0.039
ILM03.0	Nickel	MG/KG	2	4	0	1.4	1.5	1.5	4.2	M09SS02S01		1	8	0	1.4	1.6	2.3	2.3	0.848
ILM03.0	Potassium	MG/KG	4	4	0			94.2	194	M09SS02S01	J	8	8	0			55.4	143	83.9
ILM03.0	Selenium	MG/KG	4	4	0			1.4	2.1	M09SS01S01		8	8	0			1.6	2.3	1.93
ILM03.0	Silver	MG/KG	2	4	0	1.4	1.4	1.4	1.8	M09SS03S01		1	8	0	1.3	1.6	1.8	1.8	0.814
ILM03.0	Sodium	MG/KG	4	4	0			2200	2780	M09SS03S01	J	8	8	0			2350	2550	2440
ILM03.0	Vanadium	MG/KG	4	4	0			1.6	5.9	M09SS02S01		8	8	0			1.1	3.5	1.71
ILM03.0	Zinc	MG/KG	4	4	0			12.3	573	M09SS02S01		8	8	0			7.5	121	22.1
SUBSURFACE SOIL																			
ILM03.0	Barium	MG/KG	2	2	0			4.8	6	M09PS03S02	J	12	12	0			4.3	92.3	8.19
ILM03.0	Cadmium	MG/KG	2	2	0			0.06	0.07	M09PS01S02		7	12	0	0.04	0.06	0.04	0.35	0.0615
ILM03.0	Calcium	MG/KG	2	2	0			292000	331000	M09PS03S02		12	12	0			34100	350000	276000
ILM03.0	Chromium	MG/KG	2	2	0			4.7	5.1	M09PS03S02	J	12	12	0			4.1	19	6.09
ILM03.0	Iron	MG/KG	2	2	0			3.6	5	M09PS03S02	J	11	12	0	2.7	2.7	2	6910	33.6
ILM03.0	Magnesium	MG/KG	2	2	0			15300	15500	M09PS03S02		12	12	0			14900	20800	17200

Notes:

ILM03.0 = CLP Metals

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 14.5-2
Summary of Soil Results for Inorganics
Old Pesticide Shop (Bldg 629), Sand Island (Site 9)

			Site 9									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SUBSURFACE SOIL - continued																			
ILM03.0	Manganese	MG/KG	2	2	0			2.7	2.8	M09PS03S02		12	12	0			3.2	124	7.21
ILM03.0	Potassium	MG/KG	2	2	0			43.1	60	M09PS03S02	J	12	12	0			44.9	248	65.2
ILM03.0	Barium	MG/KG	2	2	0			4.8	6	M09PS03S02	J	12	12	0			4.3	92.3	8.19
ILM03.0	Cadmium	MG/KG	2	2	0			0.06	0.07	M09PS01S02		7	12	0	0.04	0.06	0.04	0.35	0.0615
ILM03.0	Calcium	MG/KG	2	2	0			292000	331000	M09PS03S02		12	12	0			34100	350000	276000
ILM03.0	Chromium	MG/KG	2	2	0			4.7	5.1	M09PS03S02	J	12	12	0			4.1	19	6.09
ILM03.0	Iron	MG/KG	2	2	0			3.6	5	M09PS03S02	J	11	12	0	2.7	2.7	2	6910	33.6
ILM03.0	Magnesium	MG/KG	2	2	0			15300	15500	M09PS03S02		12	12	0			14900	20800	17200
ILM03.0	Manganese	MG/KG	2	2	0			2.7	2.8	M09PS03S02		12	12	0			3.2	124	7.21
ILM03.0	Potassium	MG/KG	2	2	0			43.1	60	M09PS03S02	J	12	12	0			44.9	248	65.2
ILM03.0	Selenium	MG/KG	2	2	0			1.8	2	M09PS01S02		12	12	0			1.3	2.2	1.83
ILM03.0	Sodium	MG/KG	2	2	0			2280	3000	M09PS03S02	J	12	12	0			2250	4110	2680
ILM03.0	Vanadium	MG/KG	2	2	0			1	1.5	M09PS03S02		11	12	0	0.76	0.76	0.9	12.5	1.58

Notes:

ILM03.0 = CLP Metals

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 14.5-3
Summary of Groundwater Results for Organics
Old Pesticide Shop (Bldg 629), Sand Island (Site 9)
Page 1 of 1

Site 9												Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
OLM01.0P	4,4'-DDD	UG/L	1	2	0	0.11	0.11	0.24	0.24	M09PW03S02		0	4	0	0.1	0.1			

Notes:

OLM01.0P = CLP Pesticides/PCBs

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 14.5-4
Summary of Groundwater Results for Inorganics
Old Pesticide Shop (Bldg 629), Sand Island (Site 9)
Page 1 of 1

			Site 9									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
ILM03.0	Barium	UG/L	1	2	0	2.6	2.6	7.2	7.2	M09PW01S02	J	4	4	0			2.2	16.1	6.01
ILM03.0	Calcium	UG/L	2	2	0			103000	363000	M09PW01S02		4	4	0			150000	351000	208000
ILM03.0	Chromium	UG/L	1	2	0	3.1	3.1	8.1	8.1	M09PW01S02		1	4	0	3.1	3.1	4.6	4.6	2.03
ILM03.0	Hardness	UG/L	2	2	0			524	1100	M09PW01S02		4	4	0			578	3030	1020
ILM03.0	Iron	UG/L	2	2	0			206	375	M09PW03S02	J	4	4	0			298	836	474
ILM03.0	Magnesium	UG/L	2	2	0			47500	64900	M09PW03S02		4	4	0			49300	522000	110000
ILM03.0	Manganese	UG/L	1	2	0	1.7	1.7	5.3	5.3	M09PW01S02		4	4	0			3.8	17.9	5.89
ILM03.0	Potassium	UG/L	2	2	0			3750	13200	M09PW03S02		4	4	0			12000	142000	25000
ILM03.0	Selenium	UG/L	2	2	0			2	2.3	M09PW03S02		1	4	0	1.8	1.8	2.5	2.5	1.16
ILM03.0	Sodium	UG/L	2	2	0			51100	152000	M09PW03S02		3	4	0	15	15	167000	223000	15700
ILM03.0	Vanadium	UG/L	2	2	0			8.5	22.7	M09PW01S02		3	4	0	3.2	3.2	7.2	13.7	6.24

Notes:

ILM03.0 = CLP Metals

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 14.6-1
Surface Soil CPEC Selection - Site 09

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of Detected Concentrations Minimum (mg/kg)	Range of Detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic									
Aluminum	100		1.80E+02	8.79E+02	3.41E+02	8.79E+02	2.23E+02	2.52E+01	No(p)
Antimony	25	2.50E+00	3.60E+00	3.60E+00	1.66E+00	3.42E+00	2.87E-01	5.37E-01	YES
Arsenic	25	4.60E-01	2.20E+00	2.20E+00	4.11E-01	2.03E+00	1.90E+01	1.79E-01	No(6)
Barium	100		6.90E+00	3.39E+01	1.17E+01	3.20E+01	3.85E+01	8.68E+00	No(p)
Beryllium	100		1.30E-01	1.80E-01	1.51E-01	1.80E-01	3.41E+00	3.00E-01	No(5)
Cadmium	100		2.50E-01	2.10E+00	5.05E-01	1.97E+00	5.63E+00	6.17E-01	No(6)
Calcium	100		3.02E+05	3.47E+05	3.32E+05	3.47E+05		2.44E+05	No(4)
Chromium	100		6.50E+00	2.14E+01	9.36E+00	2.05E+01	3.99E+00	5.48E+00	YES
Cobalt	25	9.80E-01	1.60E+00	1.60E+00	6.65E-01	1.52E+00		7.12E-01	YES
Copper	100		1.60E+00	4.59E+01	9.04E+00	4.59E+01	1.00E+02	1.57E+00	No(6)
Iron	100		3.48E+02	1.33E+04	1.50E+03	1.33E+04		2.06E+02	No(p)
Lead	100		7.50E+00	2.53E+02	5.40E+01	2.53E+02	7.28E+00	6.28E+00	YES
Magnesium	100		1.70E+04	1.92E+04	1.77E+04	1.91E+04		1.57E+04	No(5)
Manganese	100		6.70E+00	6.55E+01	1.62E+01	6.55E+01	4.54E+02	9.02E+00	No(6)
Mercury	25	5.00E-02	2.80E-01	2.80E-01	4.79E-02	2.64E-01	2.40E-02	3.90E-02	YES
Nickel	50	1.40E+00	1.50E+00	4.20E+00	1.35E+00	4.13E+00	2.65E+02	8.48E-01	No(6)
Potassium	100		9.42E+01	1.94E+02	1.45E+02	1.94E+02		8.39E+01	No(4)
Selenium	100		1.40E+00	2.10E+00	1.75E+00	2.10E+00	1.85E+00	1.93E+00	No(5)
Silver	50	1.40E+00	1.40E+00	1.80E+00	1.05E+00	1.80E+00		8.14E-01	YES
Sodium	100		2.20E+03	2.78E+03	2.52E+03	2.78E+03		2.44E+03	No(5)
Vanadium	100		1.60E+00	5.90E+00	2.86E+00	5.90E+00	4.44E+01	1.71E+00	No(6)
Zinc	100		1.23E+01	5.73E+02	1.03E+02	5.73E+02	1.11E+01	2.21E+01	YES
Organic									
1,2,3,4,6,7,8-HpCDD	50	7.10E-05	1.30E-04	2.20E-03	1.92E-04	2.02E-03			YES
4,4'-DDD	50	7.20E-03	5.40E-03	1.60E-01	1.53E-02	1.59E-01	1.58E-02		YES
4,4'-DDE	100		1.20E-01	1.70E+00	3.46E-01	1.70E+00	1.58E-02		YES
4,4'-DDT	100		7.00E-02	2.60E+00	3.19E-01	2.60E+00	1.58E-02		YES
alpha-Chlordane	25	3.70E-03	9.40E-03	9.40E-03	6.21E-03	9.40E-03	3.20E+00		No(6)
Aroclor-1260	75	7.20E-02	5.50E-02	1.70E+00	2.10E-01	1.70E+00	1.24E-01		YES
bis(2-Ethylhexyl)phthalate	75	3.60E-01	2.70E-02	9.90E-02	6.26E-02	9.90E-02	2.22E+00		No(1)
Chrysene	25	3.50E-01	4.40E-02	4.40E-02	1.31E-01	4.40E-02	2.30E+00		No(6)

Table 14.6-1
Surface Soil CPEC Selection - Site 09

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of Detected Concentrations Minimum (mg/kg)	Range of Detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Dieldrin	25	7.20E-03	4.30E-03	4.30E-03	8.41E-03	4.30E-03	2.22E-01		No(6)
Endosulfan I	25	1.90E-03	2.10E-02	2.10E-02	4.27E-03	2.10E-02	2.74E+01		No(6)
Fluoranthene	25	3.50E-01	4.70E-02	4.70E-02	1.34E-01	4.70E-02	2.30E+00		No(6)
gamma-Chlordane	25	3.70E-03	8.20E-03	8.20E-03	6.00E-03	8.20E-03	3.20E+00		No(6)
HpCDDs (total)	50	7.10E-05	2.00E-04	3.90E-03	2.47E-04	3.53E-03			YES
HpCDFs (total)	25	6.20E-05	1.50E-03	1.50E-03	1.03E-04	1.38E-03			YES
OCDD	75	2.50E-04	6.00E-04	2.60E-02	1.04E-03	2.22E-02			YES
OCDF	25	1.60E-04	2.90E-03	2.90E-03	2.65E-04	2.64E-03			YES
Pentachlorophenol	25	1.10E-03	2.70E-02	2.70E-02	1.46E-03	2.28E-02			YES

*TBC values are NOAEL dietary concentrations assuming a diet of 100% soil, from Opresko et. al. (1994) ; values for B(a)P were substituted for PAHs without a dose in Opresko, and the value for Arochlor 1248 was substituted for all the PCB congeners.
**Mean value of background surface soil samples taken on Sand Island.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 14.6-2
Subsurface Soil CPEC Selection - Site 09

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of Detected Concentrations Minimum (mg/kg)	Range of Detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic									
Barium	100		4.80E+00	6.00E+00	5.37E+00	6.00E+00	3.85E+01	8.19E+00	No(5)
Cadmium	100		6.00E-02	7.00E-02	6.48E-02	7.00E-02	5.63E+00	6.15E-02	No(5)
Calcium	100		2.92E+05	3.31E+05	3.11E+05	3.31E+05		2.76E+05	No(4)
Chromium	100		4.70E+00	5.10E+00	4.90E+00	5.10E+00	3.99E+00	6.09E+00	No(5)
Iron	100		3.60E+00	5.00E+00	4.24E+00	5.00E+00		3.36E+01	No(5)
Magnesium	100		1.53E+04	1.55E+04	1.54E+04	1.55E+04		1.72E+04	No(5)
Manganese	100		2.70E+00	2.80E+00	2.75E+00	2.80E+00	4.54E+02	7.21E+00	No(5)
Potassium	100		4.31E+01	6.00E+01	5.09E+01	6.00E+01		6.52E+01	No(4)
Selenium	100		1.80E+00	2.00E+00	1.90E+00	2.00E+00	1.85E+00	1.83E+00	No(5)
Sodium	100		2.28E+03	3.00E+03	2.62E+03	3.00E+03		2.68E+03	No(5)
Vanadium	100		1.00E+00	1.50E+00	1.22E+00	1.50E+00	4.44E+01	1.58E+00	No(5)

*TBC values are NOAEL dietary concentrations assuming a diet of 100% soil, from Opresko et. al. (1994) ; values for B(a)P were substituted for PAHs without a dose in Opresko, and the value for Arochlor 1248 was substituted for all the PCB congeners.

**Mean value of background subsurface soil samples taken on Sand Island.

CPEC SELECTION CODE

YES: selected as CPEC

No(1): common laboratory contaminant

No(2): frequency of detection <= 5%

No(3): essential nutrient

No(4): water/soil chemistry

No(5): environmental concentration < 2x background concentration

No(6): EC < ARAR/TBC value

No(7): not persistent, soluble, or mobile

No(p): professional judgement

Table 14.6-3
Groundwater CPEC Selection - Site 09

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (ug/L)	Range of Detected Concentrations Minimum (ug/L)	Range of Detected Concentrations Maximum (ug/L)	Mean Concentration (ug/L)	Environmental Concentration (ug/L)	ARAR Values* (ug/L)	Background Concentration** (ug/L)	CPEC?
Inorganic									
Barium	50	2.6	7.20E+00	7.20E+00	3.06E+00	7.20E+00	1.09E+02	6.01E+00	No(5)
Calcium	100		1.03E+05	3.63E+05	1.93E+05	3.63E+05		2.08E+05	No(5)
Chromium	50	3.10E+00	8.10E+00	8.10E+00	3.54E+00	8.10E+00	5.00E+01	2.03E+00	No(6)
Iron	100		2.06E+02	3.75E+02	2.78E+02	3.75E+02	1.00E+03	4.74E+02	No(5)
Magnesium	100		4.75E+04	6.49E+04	5.55E+04	6.49E+04		1.10E+05	No(5)
Manganese	50	1.70E+00	5.30E+00	5.30E+00	2.12E+00	5.30E+00	1.10E+01	5.89E+00	No(5)
Potassium	100		3.75E+03	1.32E+04	7.04E+03	1.32E+04		2.50E+04	No(5)
Selenium	100		2.00E+00	2.30E+00	2.14E+00	2.30E+00	5.40E+01	1.16E+00	No(5)
Sodium	100		5.11E+04	1.52E+05	8.81E+04	1.52E+05		1.57E+04	No(3)
Vanadium	100		8.50E+00	2.27E+01	1.39E+01	2.27E+01	3.00E+00	6.24E+00	YES
Organic									
4,4'-DDD	50	1.10E-01	2.40E-01	2.40E-01	1.15E-01	2.40E-01	4.20E-04		YES

*The lowest marine chronic value from the NAWQC and HWQC was used when available, then freshwater chronic and freshwater and marine acute values were used if no chronic numbers were listed. For PAHs with no NAWQC or HWQC the value for Fluoranthene (16 ug/L) was used.
**Mean value of background ground water samples taken on Sand Island.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 14.6-4
CPEC Environmental Concentration in all Abiotic Media - Site 09

Analyte	EC (mg/kg) Surface Soil	EC (mg/kg) Subsurface Soil	EC (mg/L) Groundwater
Inorganic			
Antimony	3.42E+00		
Chromium	2.05E+01		
Cobalt	1.52E+00		
Lead	2.53E+02		
Mercury	2.64E-01		
Silver	1.80E+00		
Vanadium			2.27E-02
Zinc	5.73E+02		
Organic			
1,2,3,4,6,7,8-HpCDD	2.02E-03		
4,4'-DDD	1.59E-01		2.40E-04
4,4'-DDE	1.70E+00		
4,4'-DDT	2.60E+00		
Aroclor-1260	1.70E+00		
HpCDDs (total)	3.53E-03		
HpCDFs (total)	1.38E-03		
OCDD	2.22E-02		
OCDF	2.64E-03		
Pentachlorophenol	2.28E-02		

Blanks indicate that the analyte was not chosen as a CPEC for that medium

Table 14.6-5

Target Receptor Exposure Point Values - Site 09

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Ground-nesting Bird (Laysan albatross)			Burrowing Bird (Bonin petrel)				Shorebird (golden-plover)	
	dermal (mg/kg-d)	ingestion (mg/kg-d)	EPV_{gn} (mg/kg-d)	dermal (mg/kg-d)	ingestion (mg/kg-d)	vapor (mg/kg-d)	EPV_{bb} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{sb} (mg/kg-d)
Inorganic									
Antimony	3.54E-03	1.10E-03	4.64E-03	ND	ND	ND	ND	5.34E-09	5.34E-09
Chromium	2.12E-02	6.59E-03	2.78E-02	ND	ND	ND	ND	1.76E-07	1.76E-07
Cobalt	1.57E-03	4.89E-04	2.06E-03	ND	ND	ND	ND	4.74E-08	4.74E-08
Lead	2.62E-01	8.14E-02	3.43E-01	ND	ND	ND	ND	1.18E-07	1.18E-07
Mercury	2.73E-04	8.49E-05	3.58E-04	ND	ND	ND	ND	1.03E-07	1.03E-07
Silver	1.86E-03	5.79E-04	2.44E-03	ND	ND	ND	ND	8.43E-09	8.43E-09
Vanadium	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	5.93E-01	1.84E-01	7.77E-01	ND	ND	ND	ND	8.94E-05	8.94E-05
Organic									
1,2,3,4,6,7,8-HpCDD	1.04E-04	6.50E-07	1.05E-04	ND	ND	ND	ND	1.54E-04	1.54E-04
4,4'-DDD	1.64E-03	5.11E-05	1.70E-03	ND	ND	ND	ND	1.03E-02	1.03E-02
4,4'-DDE	1.76E-02	5.47E-04	1.81E-02	ND	ND	ND	ND	7.26E-02	7.26E-02
4,4'-DDT	2.69E-02	8.36E-04	2.77E-02	ND	ND	ND	ND	1.56E-01	1.56E-01
Aroclor-1260	8.79E-02	5.47E-04	8.84E-02	ND	ND	ND	ND	5.31E-01	5.31E-01
HpCDDs (total)	1.83E-04	1.14E-06	1.84E-04	ND	ND	ND	ND	2.70E-04	2.70E-04
HpCDFs (total)	7.14E-05	4.44E-07	7.18E-05	ND	ND	ND	ND	1.06E-04	1.06E-04
OCDD	1.15E-03	7.14E-06	1.15E-03	ND	ND	ND	ND	1.70E-03	1.70E-03
OCDF	1.37E-04	8.49E-07	1.37E-04	ND	ND	ND	ND	2.02E-04	2.02E-04
Pentachlorophenol	1.18E-03	7.33E-06	1.19E-03	ND	ND	ND	ND	3.40E-04	3.40E-04

ND = not detected/not selected as CPEC

DG = data gap; no parameter available for exposure calculation

Table 14.6-6
Toxicity Quotients for Target Receptors - Site 09

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Ground-nesting Bird (Laysan albatross)			Burrowing Bird (Bonin petrel)			Shorebird (golden-plover)		
	EPV	TRV	TQ*	EPV	TRV	TQ*	EPV	TRV	TQ*
Inorganic									
Antimony	4.64E-03	3.50E-03	0.12	ND	3.50E-03		5.34E-09	3.50E-03	
Chromium	2.78E-02	2.00E-01		ND	2.00E-01		1.76E-07	2.00E-01	
Cobalt	2.06E-03	5.40E-02		ND	5.40E-02		4.74E-08	5.40E-02	
Lead	3.43E-01	8.40E-01		ND	8.40E-01		1.18E-07	8.40E-01	
Mercury	3.58E-04	8.62E+01		ND	8.62E+01		1.03E-07	8.62E+01	
Silver	2.44E-03	1.00E+01		ND	1.00E+01		8.43E-09	1.00E+01	
Vanadium	ND	1.14E+01		ND	1.14E+01		ND	1.14E+01	
Zinc	7.77E-01	1.18E+02		ND	1.18E+02		8.94E-05	1.18E+02	
Organic									
1,2,3,4,6,7,8-HpCDD	1.05E-04	1.26E-02		ND	1.26E-02		1.54E-04	1.26E-02	
4,4'-DDD	1.70E-03	4.10E+00		ND	4.10E+00		1.03E-02	4.10E+00	
4,4'-DDE	1.81E-02	3.00E-02		ND	3.00E-02		7.26E-02	3.00E-02	0.38
4,4'-DDT	2.77E-02	1.10E-01		ND	1.10E-01		1.56E-01	1.10E-01	0.15
Aroclor-1260	8.84E-02	8.40E-02	0.02	ND	8.40E-02		5.31E-01	8.40E-02	0.80
HpCDDs (total)	1.84E-04	1.26E-02		ND	1.26E-02		2.70E-04	1.26E-02	
HpCDFs (total)	7.18E-05	1.26E-02		ND	1.26E-02		1.06E-04	1.26E-02	
OCDD	1.15E-03	2.00E-03		ND	2.00E-03		1.70E-03	2.00E-03	
OCDF	1.37E-04	2.00E-03		ND	2.00E-03		2.02E-04	2.00E-03	
Pentachlorophenol	1.19E-03	7.60E+00		ND	7.60E+00		3.40E-04	7.60E+00	

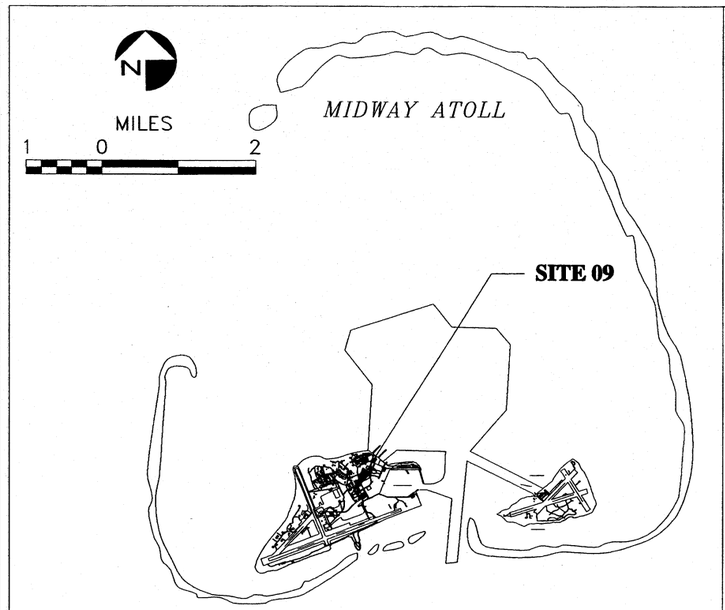
* TQ = log(EPV/TRV); only data gaps (DG) and TQ values greater than or equal to 0 are shown

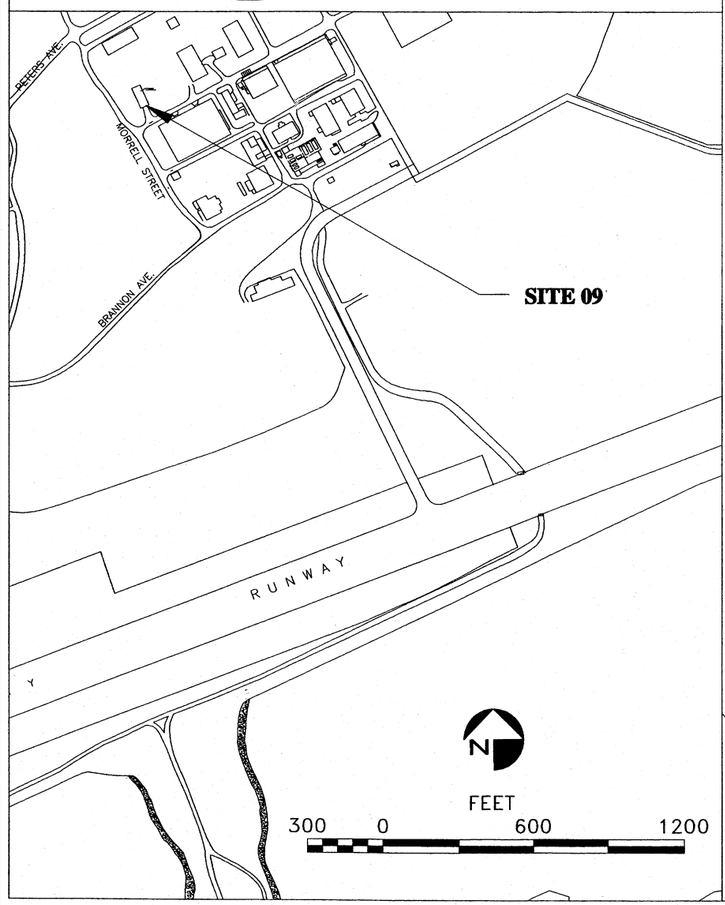
ND = not detected/not selected as CPEC

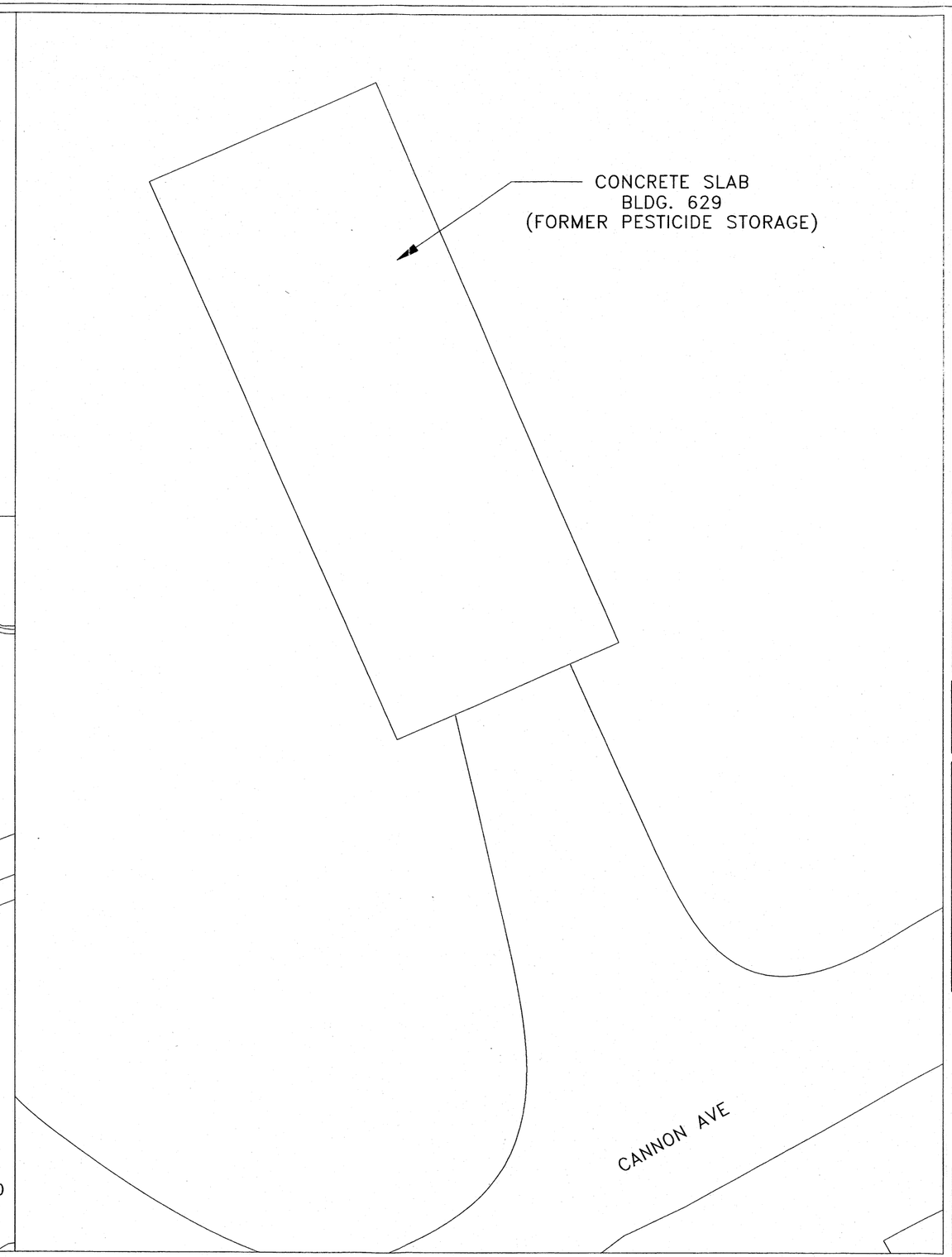
Table 14.6-7
Risk Description (Weight-of-Evidence) Summary - Site 09

ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
• Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
No probability for acute or chronic adverse affects in any individuals of special status bird species from direct and/or secondary exposure to site-related CPEC.							NO
• Impairment of reproduction in ground-nesting birds	CPEC present in surface soils		several TQ > 0				
• Impairment of reproduction in burrowing birds	CPEC present in surface soils		all TQ < 0				
• Impairment of reproduction in shorebirds	CPEC present in surface soils		several TQ > 0				

Figures
Section 14







LEGEND

NOTES

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2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE09\05169540.DWG DATE: 5-16-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

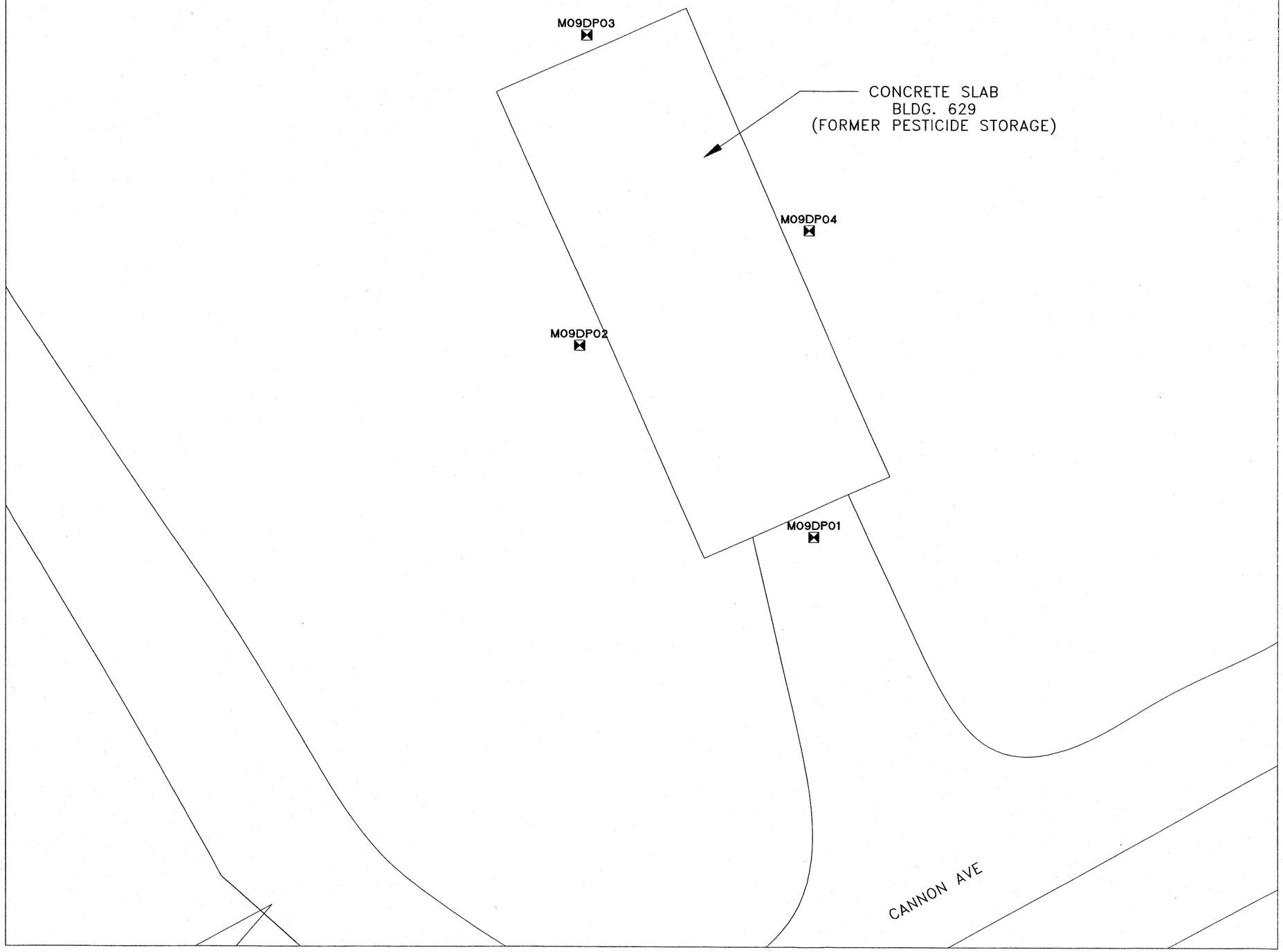
TITLE

OLD PESTICIDE SHOP, FORMER BLDG 629
(SITE 09)
SAND ISLAND

N
FEET
10 0 20 40

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
14.1-1



LEGEND

M##DP## DIRECT PUSH SAMPLE LOCATION AND IDENTIFICATION NUMBER

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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE09\05169542.DWG DATE: 5-16-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

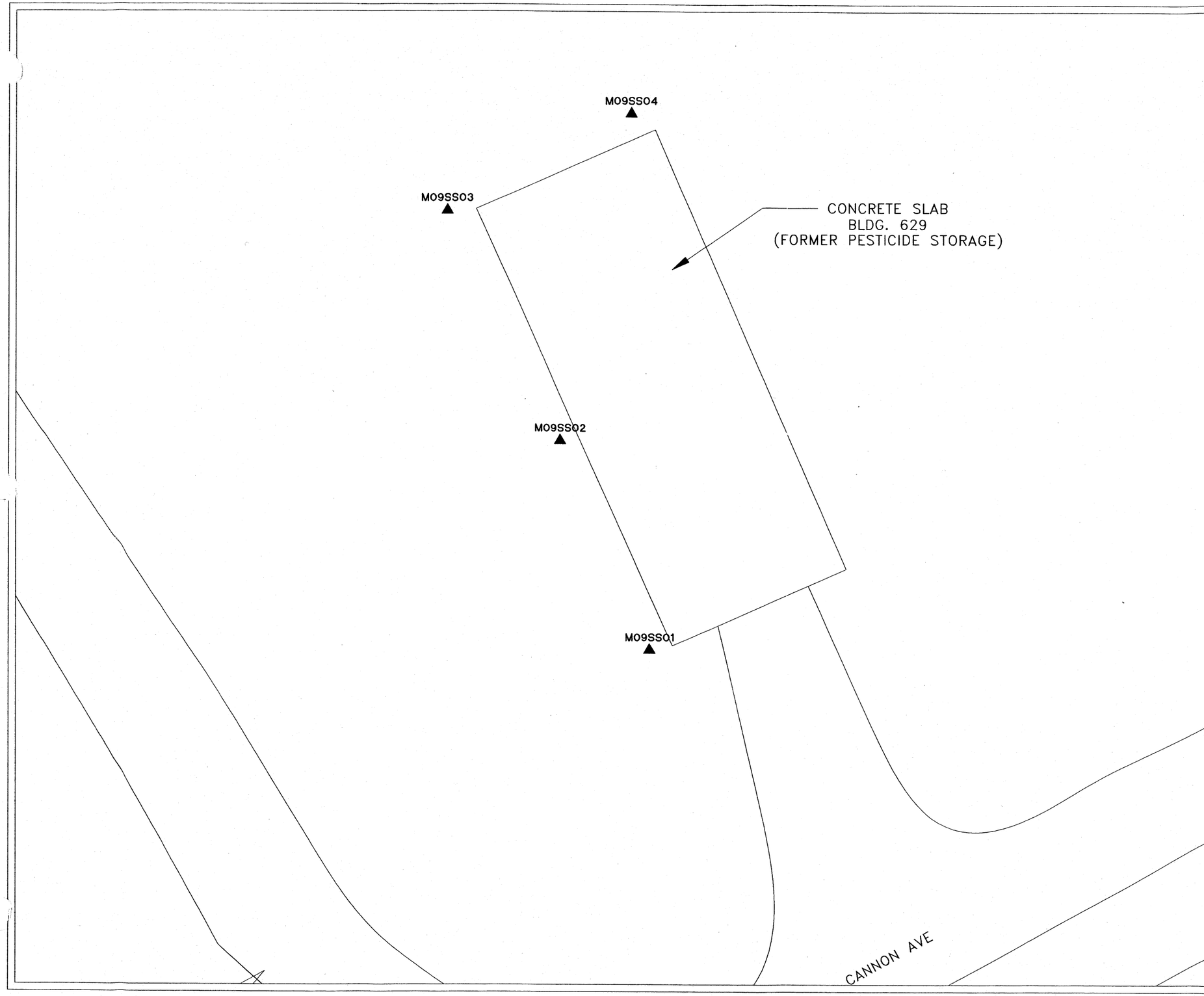
DIRECT PUSH SAMPLE LOCATIONS
(SITE 09)
SAND ISLAND

N

FEET
10 0 20 40

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
14.2-1



LEGEND

M##SS## ▲ SURFACE SOIL SAMPLE LOCATION AND IDENTIFICATION NUMBER

NOTES

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2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE09\05169543.DWG DATE: 5-16-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

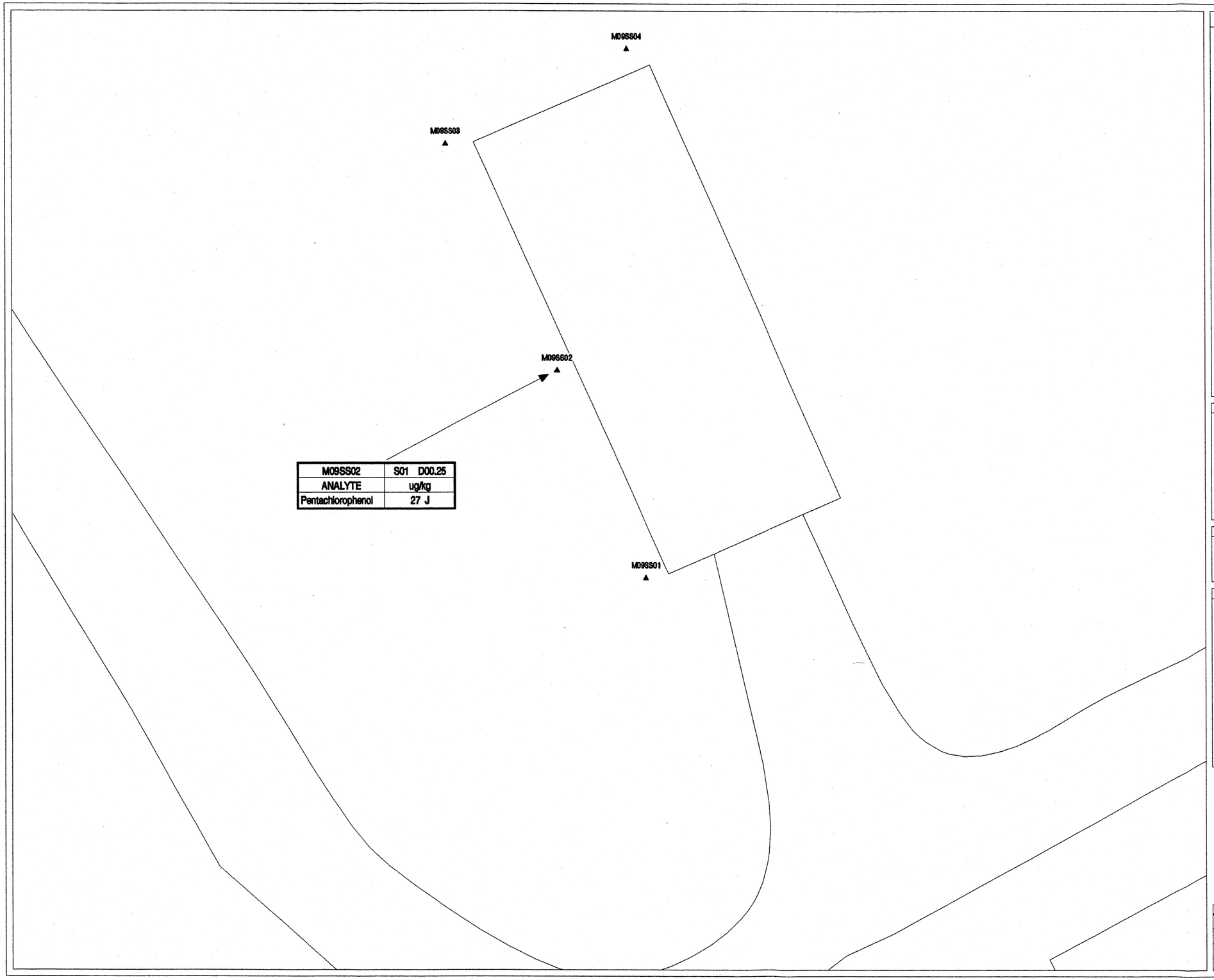
SURFACE SOIL SAMPLE LOCATIONS
(SITE 09)
SAND ISLAND

N

FEET
10 0 20 40

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
14.2-2



M09SS02	S01 D00.25
ANALYTE	ug/kg
Pentachlorophenol	27 J

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M09SS02	OGDEN SAMPLE ID
27	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 1101901196
4. FILE: /appe/hmv/cto130/maps/m5169545

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

HERBICIDES AND PESTICIDES BY EPA METHODS DETECTED IN SURFACE SOIL SAMPLES (SITE 09) SAND ISLAND

N

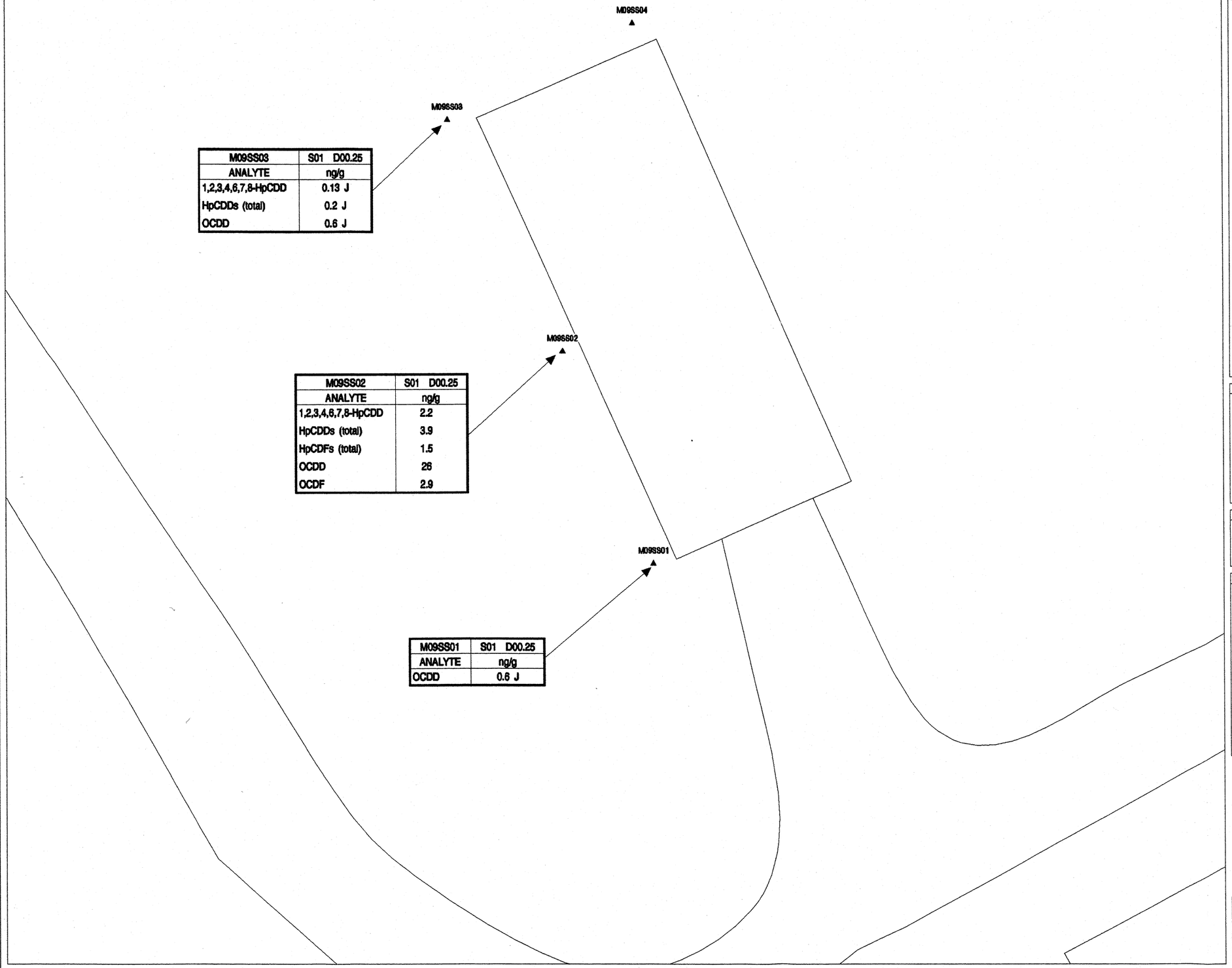
FEET

0 10 20 40 60

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	cmf.	HFP	HFP	JMC	JMC

FIGURE

14.5-1



M09SS03	S01 D00.25
ANALYTE	ng/g
1,2,3,4,6,7,8-HpCDD	0.13 J
HpCDDs (total)	0.2 J
OCDD	0.6 J

M09SS02	S01 D00.25
ANALYTE	ng/g
1,2,3,4,6,7,8-HpCDD	2.2
HpCDDs (total)	3.9
HpCDFs (total)	1.5
OCDD	26
OCDF	2.9

M09SS01	S01 D00.25
ANALYTE	ng/g
OCDD	0.6 J

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M09SS02	OGDEN SAMPLE ID
2.2	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E9-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/hm/cto136/maps/m5169546

SOURCES

PERRY AND ASSOCIATES INC.
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103858 & 1038857

TITLE

DIOXINS DETECTED IN SURFACE SOIL SAMPLES (SITE 09) SAND ISLAND

N

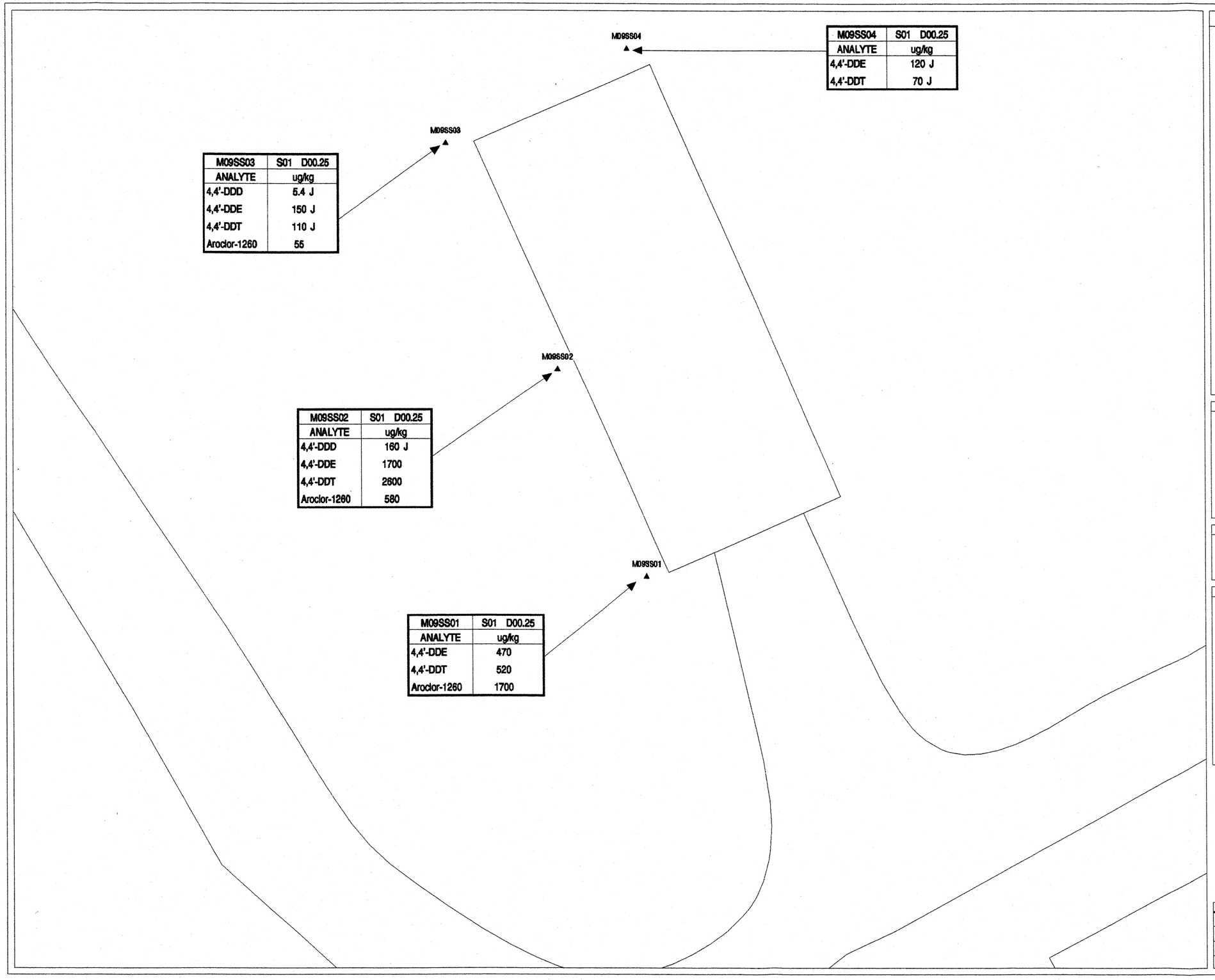
FEET

0 10 20 40 60

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HPP	HPP	JMC	BH

FIGURE

14.5-2



M09SS04	S01 D00.25
ANALYTE	ug/kg
4,4'-DDE	120 J
4,4'-DDT	70 J

M09SS03	S01 D00.25
ANALYTE	ug/kg
4,4'-DDD	5.4 J
4,4'-DDE	150 J
4,4'-DDT	110 J
Aroclor-1260	55

M09SS02	S01 D00.25
ANALYTE	ug/kg
4,4'-DDD	160 J
4,4'-DDE	1700
4,4'-DDT	2600
Aroclor-1260	580

M09SS01	S01 D00.25
ANALYTE	ug/kg
4,4'-DDE	470
4,4'-DDT	520
Aroclor-1260	1700

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M09SS02	OGDEN SAMPLE ID
160	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING ENGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/hm/cto136/maps/m5169548

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

PESTICIDES AND PCB'S DETECTED IN SURFACE SOIL SAMPLES (SITE 09) SAND ISLAND

N

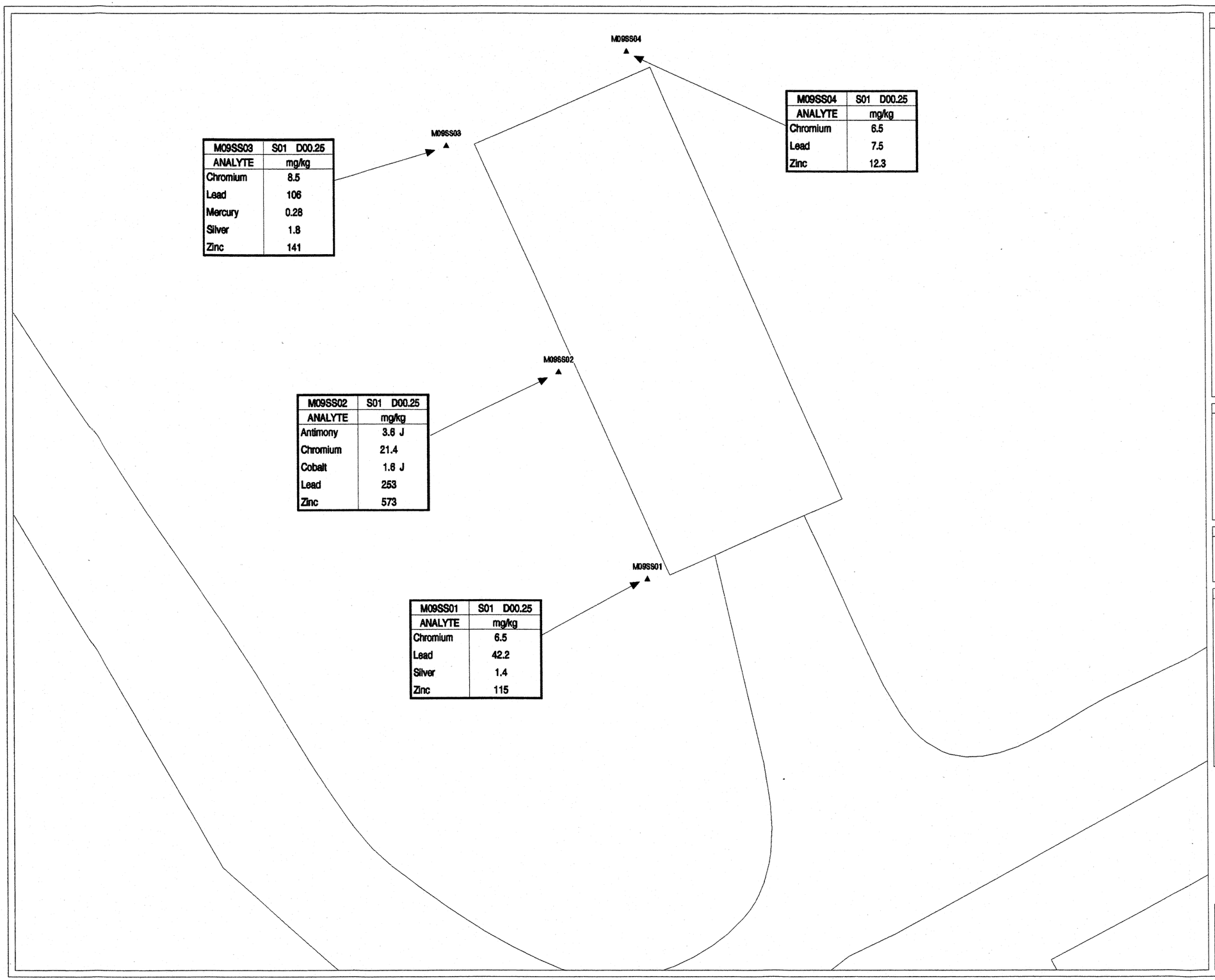
FEET

0 10 20 40 60

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/11/95	1	CMF		HFP	HFP	JMC	BA

FIGURE

14.5-3



M09SS03	S01 D00.25
ANALYTE	mg/kg
Chromium	8.5
Lead	106
Mercury	0.28
Silver	1.8
Zinc	141

M09SS04	S01 D00.25
ANALYTE	mg/kg
Chromium	6.5
Lead	7.5
Zinc	12.3

M09SS02	S01 D00.25
ANALYTE	mg/kg
Antimony	3.6 J
Chromium	21.4
Cobalt	1.6 J
Lead	253
Zinc	573

M09SS01	S01 D00.25
ANALYTE	mg/kg
Chromium	6.5
Lead	42.2
Silver	1.4
Zinc	115

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M09SS02	OGDEN SAMPLE ID
3.6	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190186
4. FILE: /appa/hmr/cto138/maps/m5169549

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

METAL CONCENTRATIONS DETECTED IN SURFACE SOIL SAMPLES (SITE 09) SAND ISLAND

N

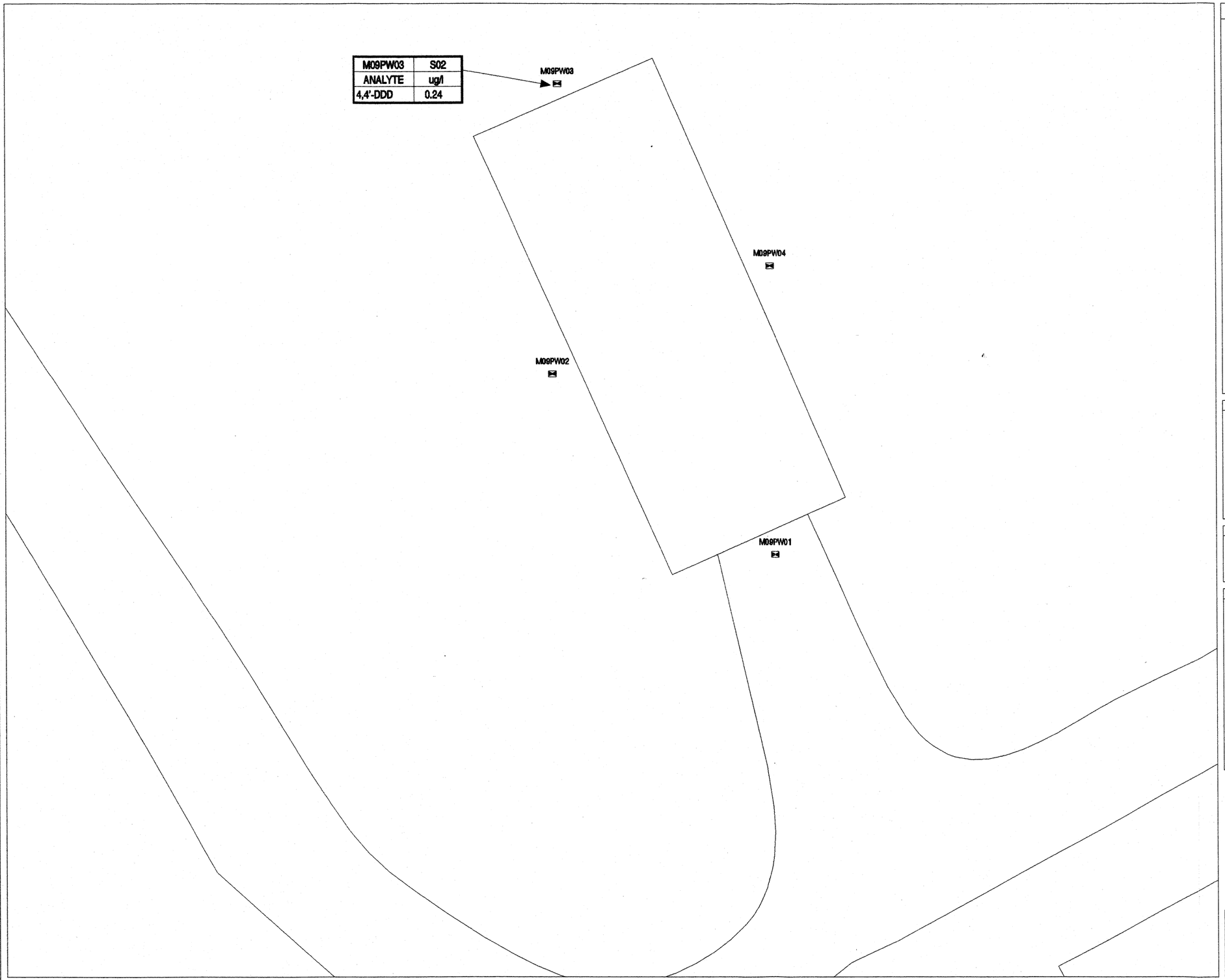
FEET

0 10 20 40 60

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/11/95	1	CMF		HFP		JMC	

FIGURE

14.5-4



LEGEND

⋈	DIRECT PUSH SAMPLE LOCATION
M09PW02	OGDEN SAMPLE ID
0.24	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING ENGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /apps/hmr/dto139/maps/m5179575

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

PESTICIDES AND PCB'S DETECTED IN GROUNDWATER SAMPLES (SITE 09) SAND ISLAND

N

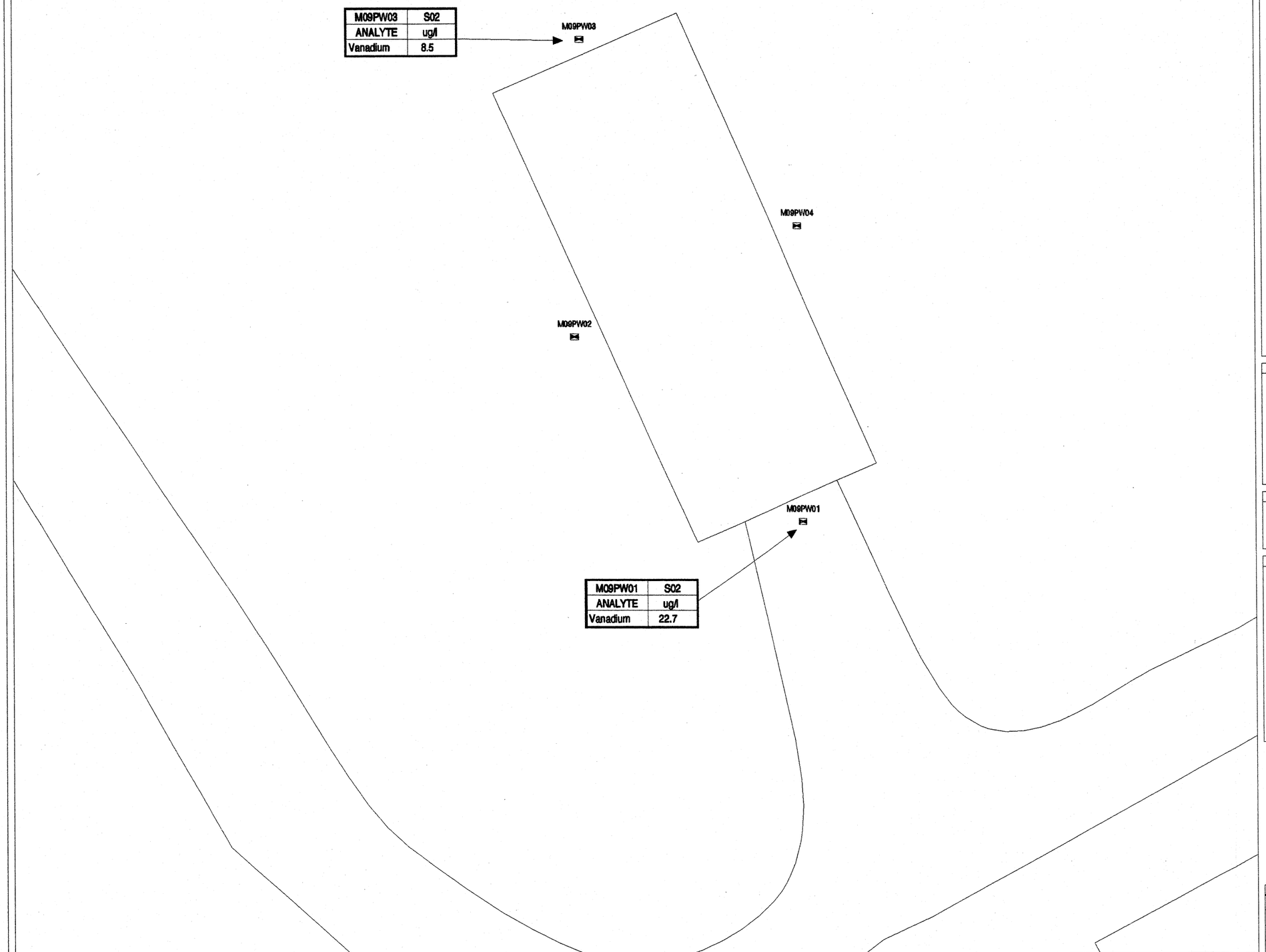
FEET

0 10 20 40 60

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/11/95	1	CMF		HFP	HFP	JMC	BH

FIGURE

14.5-5



LEGEND

⋈	DIRECT PUSH SAMPLE LOCATION
M09PW02	OGDEN SAMPLE ID
22.7	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER

NOTES

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2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER 110190186
6. FILE: /apps/hm/cto136/maps/m5179574

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

METAL CONCENTRATIONS DETECTED IN GROUNDWATER SAMPLES (SITE 09) SAND ISLAND

N

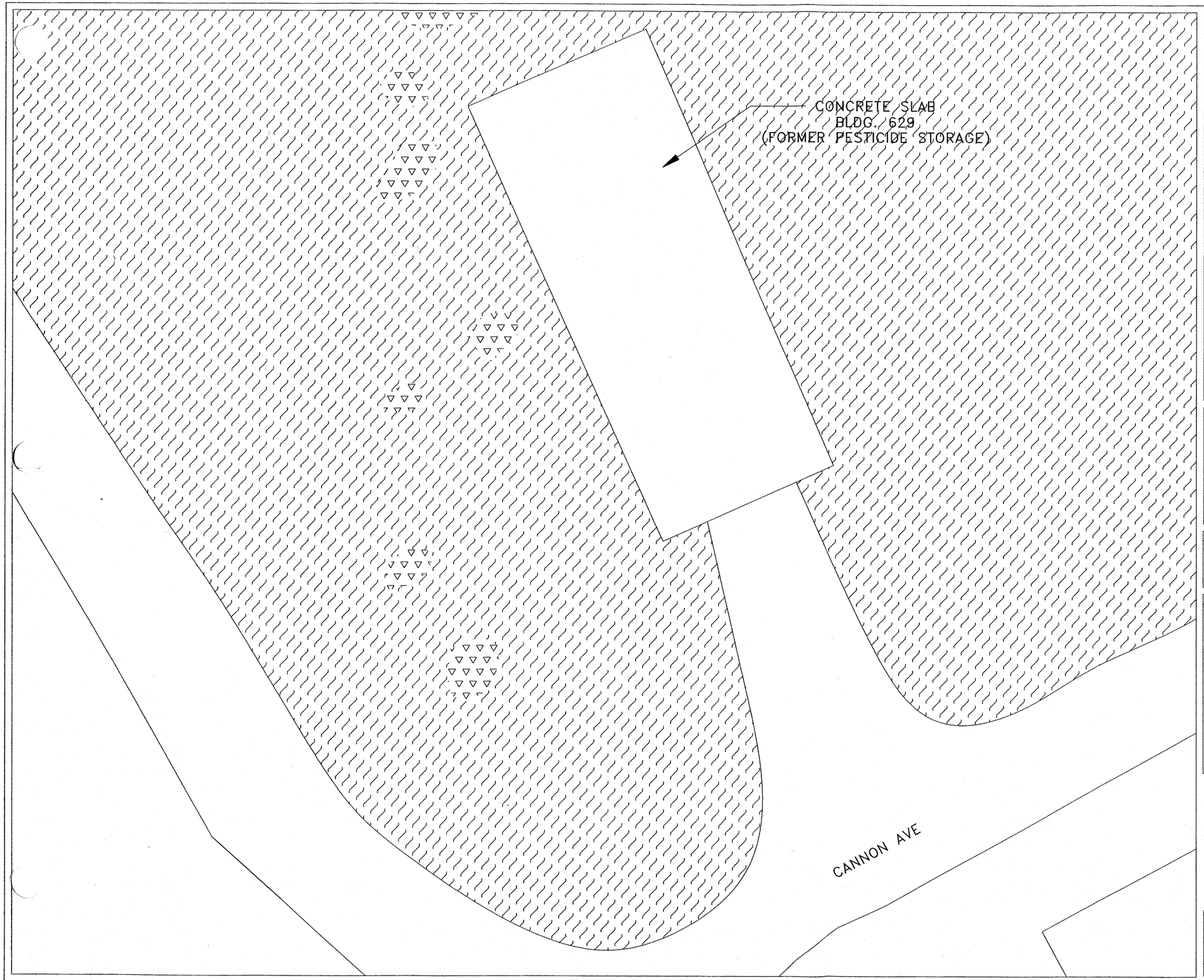
FEET

0 10 20 40 60

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/11/95	1	CMF		HPP	HPP	JMC	BH

FIGURE

14.5-6



LEGEND

- NON-NATIVE HERB HABITAT
- CASUARINA TREES
- DISTURBED HABITAT
- COASTAL STRAND
- SANDY BEACH
- RUDERAL HABITAT
- NON-NATIVE HERB/SMALL CASUARINA TREES
- DEVELOPED

NOTES

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2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE09\05169557.DWG DATE: 5-16-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

VEGETATION COMMUNITIES
(SITE 09)
SAND ISLAND

N

FEET
10 0 20 40

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
14.6-1

Section 15

SECTION 15
SUPERBLOCK AREA (SITES 20, 21, 55, 56, 59, 61, 93, 94)

This report describes the results of the SI field work conducted intermittently at the Superblock Area, Sand Island (Sites 20, 21, 55, 56, 59, 61, 93, 94) from August through November 1994. The purpose of the review was to assess the likelihood for soil and ground-water contamination at the Superblock. A discussion of the work conducted during the SI, along with findings, conclusions, and recommendations, is presented below.

This report is organized as follows: Site background information is documented in Section 15.1; a description of SI field sampling activities is presented in Section 15.2; methods used for sample analysis are summarized in Section 15.3; physical characteristics of the Site observed during the investigation activities are discussed in Section 15.4; a summary of analytical results is presented in Section 15.5; the SERA is described in Section 15.6; and conclusions and recommendations for the Site are presented in Section 15.7.

15.1 BACKGROUND INFORMATION

The Superblock Area, focus of industrial operations on Sand Island, includes eight sites grouped together to facilitate analysis of potentially contaminated ground water in the area. The Superblock Area is bounded by Nimitz, Brannon, Cannon, and Morrell Avenues (Figure 15.1-1).

Old Power Plant, Building 354 (Site 20)

The "Old" Power Plant, Building 354, was the main diesel power plant for Sand Island. Built prior to World War II, it was damaged during the Japanese attack on December 7, 1941. During the 1993 EBS Site visit, the building was observed to be in very poor condition and entry was considered unsafe. The building contains three diesel engines, with evidence of oil leaks and oil-filled sumps; several oil-filled drums, with evidence of leaks; and oil-filled switching equipment, also showing evidence of leaks. In addition, several USTs were associated with this building.

Former Laundry, Building 365 (Site 21)

The abandoned base laundry facility, Building 365, employed a laundry wastewater recovery plant in the 1960s. The plant incorporated a series of acid and caustic storage tanks and sumps. Various sumps and drains were observed in the building during the 1993 EBS Site reconnaissance, but the storage tanks and associated piping had been removed. According to PMC personnel, the facility has been abandoned for approximately one year. For the previous 10 years, only standard washers and dryers were used in the facility. No records of dry cleaning operations at Building 365 are known to exist.

Vehicle Maintenance, Building 356 (Site 55)

Building 356 is the vehicle maintenance and electrical shop for Midway. During the 1993 EBS Site visit the facility contained 10 55-gallon drums of lubricating oil, brake fluid, and automatic transmission fluid. According to the shop foreman, the only cleaning solvent currently used by PMC at NAF Midway Island is Simple Green,® a biodegradable cleaning solution. Several batteries were being charged in a fire-proof battery room. No floor drains were visible inside the shop. Steam cleaning operations are performed outside, on the pavement, adjacent to the building. No oil/water separators were observed. The electrical shop contained three 50-lb cylinders of Freon (dichlorofluoromethane). No evidence of leaks or spills was observed.

Steel/Machine Shop, Building 357 (Site 56)

Building 357 was originally built as an air-powered torpedo overhaul and storage facility. The building currently serves as the steel/machine shop, and provides steel fabrication services for Midway. At the time of the 1993 EBS Site visit, the facility contained several lathes, presses, drill presses, and other machinery. Each had a floor sump for the collection of cutting oil. According to the shop foreman, all used cutting oil is taken to Area 7 for temporary storage prior to being disposed of off-island as hazardous waste. Reportedly, no used cutting oil is burned on the island. No evidence of leaks or spills was observed.

Power Plant, Building 309 (Site 59)

Building 309, the Sand Island power plant, is located next to the "Old" Power Plant. The plant utilizes three generators fueled by JP-5. The fuel is trucked from ASTs at the Fuel

Farm, to generate electrical power. According to the plant foreman, approximately 2,000 gallons of JP-5 is burned each day and each generator contains about 100 gallons of lubricating oil. Oil and blowdown water from the generators drain into a 900-gallon sump. The waste is transferred regularly to an AST near the building. The oil is tested for Toxic Characteristic Leaching Procedure (TCLP) constituents and, if no hazardous constituents are detected, it is then burned at the Burn Tank in the Bulky Waste Landfill. The water is reportedly discharged into the sewer system. No evidence of leaks or spills was observed.

Former Pesticide Storage, Building 3511 (Site 61)

Building 3511, a former pesticide storage building, currently houses an electrical substation. No evidence of contaminant releases (concrete staining, stressed vegetation, etc.) was discovered during the 1993 EBS Site visit.

Former Paint and Oil Warehouse, Building 342 (Site 93)

Building 342 was originally built as a paint and oil warehouse. Reportedly it later served as a plumbing shop. As indicated by signs on the wall, the southeast corner was once used to store batteries. At the time of the 1993 EBS Site visit, the building contained gardening tools. No evidence of leaks or spills was visible.

Power Plant Maintenance, Building 363 (Site 94)

Originally built as a storage and maintenance facility for electrically-powered torpedoes, Building 363 later served as the power plant maintenance facility. During the 1993 EBS Site visit, the building was found to be in poor condition and to contain numerous empty drums, scrap metal, and machinery.

Because the Superblock buildings were put to many different uses over the years, a wide range of contaminants may be present. The nature and extent of contamination may be very complex. The assessment of Site-specific conditions in the Superblock area was based on the potential contaminants and corresponding analytical categories summarized in Table 15.1-1.

Table 15.1-1

POTENTIAL CHEMICAL CONTAMINANTS, SUPERBLOCK AREA, SITES 20, 21, 55, 56, 59, 61, 93, 94

Waste Type	Years of Disposal	Potential Chemical Constituents	Analytical Category
Vehicle Maintenance Waste, Waste Oil, Gasoline, Diesel Fuel	1930s-Present	Heavy-end Hydrocarbons, PCBs, Metals, Solvents, Semi Volatile Organics	Total Fuel Hydrocarbons, Volatile Organic Compounds, Semi Volatile Organic Compounds, PCBs, Metals
Battery Acid	1930s-Present	Metals (Pb, Cd, etc.), Acids	Metals

15.2 SAMPLING METHODS AND LOCATIONS

Soil, soil vapor, ground-water, and PCB wipe sampling programs were undertaken to screen for hazardous substances in soils and ground water in the Superblock area. The following sections and figures summarize the various sampling methods, and illustrate the sampling locations.

Soil Vapor

A soil vapor survey was conducted at the Superblock Area to detect petroleum hydrocarbons and VOCs in subsurface soils and ground water and to delineate the extent of potential contamination. The soil vapor survey utilized 41 sampling locations spaced approximately 100 feet apart in a uniform grid. Sample locations were adjusted to avoid structures (Figure 15.2-1). TEG and Ogden personnel sampled soil vapors at depths of approximately 4 fbgs, on September 13 and 14, 1994.

Direct-push

PRC and Ogden personnel collected 17 direct-push soil and 19 direct-push ground-water samples on October 5-8, 1994 to screen for subsurface contamination (Figure 15.2-2). Direct-push soil and ground-water samples were also taken at two locations to the south

and east of the Superblock Area (locations DP-15 and DP-16). They were included in the sampling program to define the areal extent of potential hydrocarbon contamination surrounding the Old Power Plant, Building 354. The water table was encountered between 4.0 and 5.4 fbgs. Soil samples were taken from just above the capillary fringe zone. Ground-water samples were recovered from between 2 and 3 feet beneath the water table.

Surface Soil

To test for surface soil contamination, four surface soil samples and two duplicate QC samples were collected from points located around the Old Power Plant, Building 354 (Figure 15.2-3). Sampling points were selected outside doorways, in areas where hazardous materials were stored or discarded, and in other areas where spills or disposal of hazardous substances may have occurred.

PCB Wipe Sampling

PCB wipe samples were taken at 10 locations (Figure 15.2-3) within the "Old Power Plant," Building 354, where PCB contaminated oil may have leaked from electrical equipment. One QC duplicate sample was also collected.

Soil Borings

To screen for subsurface contamination and to investigate the lithology of the Superblock, five soil borings were drilled to depths ranging from 14 to 15 fbgs with a 4-inch inside diameter hollow stem auger. Results of the soil vapor survey were used to select soil boring locations. Soil samples were taken continuously down the borehole with a 2.5-inch diameter environmental split-spoon sampler. All, or parts, of the recovered soil were selected for lithologic classification and screening with the OVM. One soil sample was recovered from each boring and submitted for chemical analysis. One duplicate QC sample was also submitted for analysis. Soil samples were typically collected from just above the capillary fringe zone, and from areas that exhibited visible staining or responded to an OVM test. Boring logs (Appendix F) describe Site lithology and materials encountered in the subsurface.

Monitoring Wells

After recovery of soil samples, the soil borings were completed as monitoring wells to test for possible ground-water contamination and to record data for hydrogeologic evaluation (Figure 15.2-4). Each of the five wells was completed to a depth of approximately 14 fbgs, based on the depth to the water table (4.0-5.4 fbgs) and the effect of the tide on ground-water levels. One ground-water sample was collected from each of the wells. One duplicate QC ground-water sample was also collected. Table 15.2-1 summarizes well-completion details. Each well was developed by surging and then by overpumping immediately after the annular space around the casing was filled with filter pack material. During overpumping, ground-water samples were collected at five-gallon flow intervals for chemical analysis and physical characterization. Table 15.4-6 presents well development data (temperature, pH, and specific conductivity) as determined immediately prior to the collection of analytical ground-water samples. Detailed well development logs are presented in Appendix F.

Table 15.2-1

SUMMARY OF MONITORING WELL COMPLETION DETAILS, SUPERBLOCK AREA, SITES 20, 21, 55, 56, 59, 61, 93, 94

Well ID	Ground Surface Elevation (MLLW)	Top of Casing Elevation (MLLW)	Total Depth of Boring (bgs)	Total Depth of Well (bgs)	Well Screen Interval (bgs)	Static Groundwater Level (date of completion) (bgs)
MSBBS01	7.03	8.97	15.0	14.3	4.3-14.3	5.2 (11/10/94)
MSBBS02	7.09	6.66*	15.0	14.4	4.4-14.4	5.2 (11/10/94)
MSBBS03	5.93	7.99	15.0	14.1	4.1-14.1	4.0 (11/11/94)
MSBBS04	6.55	8.46	14.5	14.2	4.2-14.2	4.7 (11/11/94)
MSBBS05	7.11	9.40	14.5	14.3	4.3-14.3	5.4 (11/11/94)

All measurements in feet

*Flush Mount

bgs = below ground surface

Water Level Measurements

After well construction and development and before ground-water sampling, static water level measurements were made in each well. These data, in conjunction with precise top-of-well-casing survey data, were used to evaluate the local hydraulic gradient. To record long-term water level elevation data, an In-Situ mTM3000 pressure transducer water level monitoring device was installed in monitoring well MSBMW03. To evaluate the influence of tidal fluctuations on the water table, water level readings were taken every 15 minutes and downloaded to a laptop computer for analysis. The hydraulic conductivity of the aquifer (K) was then estimated from the response of the water level in the well to tidal variations and the apparent ground-water tidal lag.

Ground Water

Each monitoring well was purged with a Redi-Flo 2 Grundfos pump before ground-water samples were collected for chemical analysis. Water samples were collected at five-gallon flow intervals during the purging procedure to evaluate field parameters (temperature, pH, specific conductivity) and to characterize water quality. One ground-water sample for chemical analysis was collected from each well to test for contamination and to evaluate the impact of disposal activities on the ground water. Detailed ground-water sampling logs are presented in Appendix F.

Aquifer Testing

Three methods were used to estimate K at the Superblock: an *in situ* slug test performed in well MSBMW01, evaluation of tidal damping data from well MSBMW03, and laboratory permeameter tests of four soil cores obtained from boreholes at the Site.

Well MSBMW01 was slug tested to estimate horizontal hydraulic conductivity (K_H) in the immediate vicinity of the well. A fixed-volume slug was rapidly injected into, or withdrawn from, the well. The rate of change of the water level in the well was then recorded via a pressure-transducer linked to an In-Situ Corp. Hermit Data Logger. Slug test data were analyzed using the Bouwer and Rice (1976) and Cooper-Jacob (1946) methods for evaluating partially penetrating wells in an unconfined aquifer. Slug test data are included in Appendix H.

An estimate of K_H at this Site was also derived from tidal fluctuation data and ground-water level measurements taken in well MSBMW03. Tidal data (supplied by NOAA) were acquired at a tidal gauging station located adjacent to the seawall on the north side of Sand Island's Inner Harbor. Parameters required to evaluate K_H by the tidal method include apparent tidal efficiency (TE_{app}), tidal lag time (t_{lag}), specific storage (S_S), and true tidal efficiency (TE_{true}). TE_{app} is defined as the ratio of the amplitude of ground-water level fluctuation to the corresponding tidal amplitude fluctuation. The term t_{lag} is defined as the difference between the time at which the ground water in the well reaches its highest (or lowest) level and the time at which the tide reaches it highest (or lowest) level. TE_{true} was calculated from TE_{app} and t_{lag} using an equation from Jacob (1950). An equation presented in Jacob (1950) and in De Wiest (1965) then allowed S_S to be evaluated using the TE_{true} value. The estimated K_H value was obtained from an equation that expresses K_H as a function of S_S, TE_{true}, and TE_{app} (Jacob, 1950). (Results are discussed in Section 15.4.3.)

Four soil core samples from the Superblock, MSBBS02, MSBBS01, MSBBS04, and MSBBS05, were tested in a constant-head permeameter at the geotechnical laboratory at Ogden Technical Services in Oak Ridge, Tennessee.

Geotechnical Testing

Four relatively undisturbed soil samples were collected from soil borings for geotechnical testing to establish engineering parameters of the overlying soils. Geotechnical parameters are presented in Appendix G.

15.3 ANALYTICAL METHODS

The following sections summarize the methods used for sample analysis. The choice of analytical method was based on the type of disposal activity known to have been conducted at the Site and the type of contaminants suspected to be present. Samples and associated analytical methods are listed in Table 15.3-1.

Soil Vapor

Soil vapor samples were collected at 41 locations and immediately analyzed in the field by portable GC for TPH, VOCs, and the percent CO_2 to percent O_2. ratio. Analytical results are presented in Appendix C.

Direct-push

Direct-push soil and water samples were analyzed at the field screening laboratory for TPH, VOCs, pesticides/PCBs, and PAHs.

Surface Soil

Surface soil samples were analyzed at the laboratory for fuels, CLP SVOCs, CLP pesticides/PCBs, and CLP metals. Surface soil samples were also submitted for quantification of total organic carbon concentrations and for low-detection-level analysis of SVOCs, PCBs, metals, and chlorinated pesticides.

PCB Wipe

Wipe samples were submitted to an offsite laboratory for PCB analysis by EPA Method 8080.

Boring Soil

Representative soil boring samples along with a duplicate sample were submitted to the offsite laboratory for analysis of fuels, CLP VOCs, CLP SVOCs, CLP pesticides/PCBs, and CLP metals.

Monitoring Wells

One ground-water sample from each of the five monitoring wells was submitted to the offsite laboratory for analysis of fuels, CLP VOCs, CLP SVOCs, CLP pesticides/PCBs, and CLP metals. One QC duplicate sample was also analyzed.

Geotechnical

The selected samples were tested by Ogden Technical Services for natural moisture content, unit weight (wet and dry), specific gravity, and permeability. They were classified using the USCS. Samples and geotechnical testing methods are listed in Appendix G of *CTO 0136-Geotechnical Laboratory Analyses*.

15.4 PHYSICAL CHARACTERISTICS

15.4.1 Topography

The majority of the Superblock Area is occupied by buildings and roads (Figure 15.1-1). The area is approximately 500 feet wide, 1,000 feet long, and ranges in elevation between 6 and 7 feet above MLLW.

15.4.2 Geology and Soils

Five boreholes were drilled to depths of approximately 15 fbgs to investigate subsurface conditions, to provide samples for lithologic descriptions, and to test for soil and water contamination. Lithologic descriptions of the subsurface materials encountered in each soil boring are included in the boring logs (Appendix F). Coral sands were encountered in all five borings; grain size and angularity of these sands varied with depth. A very dense (blow counts > 50), dark gray, poorly sorted, gravelly to silty sand was encountered from the surface down to approximately 3 fbgs. Underlying this near-surface material is a pale yellow, dense (blow counts 30 to 50), fine- to coarse-grained coral sand with occasional lenses of medium-dense sand (blow counts 10-30). This layer continues down to a depth of 7 fbgs and is underlain by a very dense, fine- to medium-grained sand, which extends to the bottom of the boreholes. The Superblock is located generally over the area where natural sediments and backfilled materials are found on the island. No attempt was made during the SI to distinguish natural sediments from fill materials. The ground-water levels and uniform subsurface conditions encountered at the Superblock are depicted in cross-section (Figure 15.4-1) from the northeast part of the Site (MSBMW04) and extending toward the southwest (MSBMW02 and MSBMW03).

In MSBBS01, staining was observed between 3 and 6 fbgs. The stained sand was yellowish-brown and emitted a hydrocarbon odor. An oily sheen was also visible on soils collected from this interval. OVM readings for MSBBS01 were 3 ppm at a depth of 3 fbgs, 60 ppm at 3.5 fbgs, 264 ppm at 4.5 fbgs, 35 ppm at 6 fbgs, and 184 ppm at 7.5 fbgs. Soil from the upper 1 foot of borings MSBBS02 and MSBBS03 was discolored (slight

gray staining). The results of geotechnical soil sample testing are summarized in Table 15.4-1.

Table 15.4-1

GEOTECHNICAL LABORATORY TEST RESULTS

Sample Location	Depth of Sample (fbgs)	Natural Moisture Content (%)	Unit Weight Bulk Density Wet (lbs/ft^3)	Unit Weight Bulk Density Dry (lbs/ft^3)	Specific Gravity	Hydraulic Conductivity (cm/sec)	USCS	TOC WB (%)
MSBBS02	4.0	10.0	91.5	83.2	2.78	2.3E-05	SP	0.86
MSBBS01	4.0	11.3	98.3	88.3	2.76	1.2E-04	SP	0.94
MSBBS04	2.5	9.5	83.1	75.9	2.73	3.4E-05	SP	0.78
MSBBS05	3.5	10.1	94.9	86.2	2.73	4.0E-05	SP	0.44

USCS = Unified Soil Classification System SP = Sand Poorly Sorted
TOC = Total Organic Carbon

15.4.3 Hydrogeology

After sample recovery, the five soil borings were completed as monitoring wells to evaluate the hydrogeologic characteristics and ground-water quality of the Site. Water table levels, well production, and aquifer characteristics including hydraulic gradient, hydraulic conductivity (K_H), specific storage (S_S), transmissivity (T), and storativity (S), are discussed in this section.

Ground water within the Superblock Area exists within a calcareous sand formation. Field observations suggest that the aquifer is unconfined; hydraulic head is therefore directly related to the elevation of the water table. Water levels in the five monitoring wells ranged between 1.58 and 1.70 feet above MLLW. Depths-to-water below the top of casing (BTOC) are listed in Table 15.4-2.

Table 15.4-2

GROUND WATER ELEVATION

WELL ID	Top of Casing elevation (MLLW)	Date	Time	Depth to Water (BTOC)	Water Level Elevation (MLLW)
MSBMW01	8.97	11/16/94	1100	7.39	1.58
MSBMW02	6.66*	11/16/94	1107	4.98	1.68
MSBMW03	7.99	11/16/94	1114	6.29	1.70
MSBMW04	8.46	11/16/94	1055	6.88	1.58
MSBMW05	9.40	11/16/94	1111	7.70	1.70

All measurements in feet
BTOC = Below Top of Casing
*Flush Mount
MLLW = Mean Lower Low Water

At the time of measurement, ground-water elevations indicated a local hydraulic gradient of approximately 2.1E-04 ft/ft to the east. Because the gradient is low and the water table is shallow, the hydraulic gradient is significantly influenced by tidal fluctuations. Figure 15.4-2 illustrates water table contours and the average gradient direction and magnitude as determined from the data in Table 15.4-2. Table 15.4-3 lists the estimated K_H value obtained from tidal and monitoring well data (as discussed in Section 15.2), and the parameters used in the calculations.

Table 15.4-3

TIDAL EFFICIENCY AND ESTIMATED HYDRAULIC CONDUCTIVITY (K_H) SUPERBLOCK

Apparent Tidal Efficiency TE_{app}	Time Lag (hours)	Distance to Ocean (ft)	True Tidal Efficiency TE_{true}	Specific Storage S_S (ft^{-1})	K_H (ft/min)	K_H (ft/day)
0.18	1	2,000	0.29	5.55E-07	2.30	3,308

Slug test data were used to generate two regression curves: one curve to model hydraulic conductivity (K), and one for both transmissivity (T) and storativity (S). These graphs are shown in Appendix H. K_H was estimated at 3,200 ft/day (Table 15.4-4). T and S values were 3.88E05 ft^2/day and 1.0E-08, respectively.

For further review of this coefficient, K values estimated from slug testing at four other sites on Sand Island were compared to the slug test K value obtained at the Superblock (Table 15.4-5). Slug test data from five Sand Island sites yielded K values ranging from 349 ft/day to 3,200 ft/day, with a mean K of 1,462 ft/day.

Permeameter testing yielded comparatively low K values for the four samples: 0.07 ft/day, 0.34 ft/day, 0.10 ft/day, and 0.11 ft/day, respectively. These values are probably not representative of actual field conditions because the small sample used in the permeameter test, which may have been compacted or disturbed in transport, can not simulate the true characteristics of *in situ* aquifer materials. In addition, core sample permeameter testing yields an estimate of the vertical component of hydraulic conductivity (K_V), which is generally much lower than K_H.

Along with the K values estimated from slug testing, tidal damping, and permeameter testing, published average K values for clean and silty sands (Freeze and Cherry, 1979) were used for comparison and to aid in estimating a representative K value for the Superblock (Table 15.4-4).

K was also calculated by averaging the values obtained by all methods employed at the Site. The resulting mean K value was 817 ft/day (the range was 0.07 ft/day to 3,308 ft/day); however, the K_H value estimated from tide statistics and water level data from well MSBMW03 (3,308 ft/day) is very close to the K value obtained from the slug test data (3,200 ft/day). At the Superblock Site, K of the fine- to coarse-grained coral sands appears to be quite high (in excess of 3,000 ft/day); however, this value corresponds to the upper limits of the K-test results reported in this investigation.

Water from all five monitoring wells contained little or no suspended sediment, and in the wells in which marine silts were encountered, a slight turbidity was exhibited. Specific conductivities (measured during well development and purging) ranged from 380 µS/cm in

well MSBMW04 to 1,470 µS/cm in well MSBMW01. Table 15.4-6 presents field parameters (temperature, pH, and specific conductivity), and the volume of water purged, as determined immediately prior to sampling for laboratory analysis

Table 15.4-6

FINAL MEASUREMENTS OF FIELD PARAMETERS AND VOLUME WITHDRAWN DURING WELL PURGING

Well ID	Date	Time	Temperature (°C)	pH	Specific Conductivity (µS/cm)	Total Purged Volume (Gal)	Total Purged Volume (well volumes)
MSBMW01	11/14/94	1320	29.3	8.53	1470	25	4.3
MSBMW02	11/14/94	1416	27.3	8.63	1120	30	3.9
MSBMW03	11/14/94	1520	28.1	9	800	25	3.8
MSBMW04	11/15/94	755	26.9	9.12	380	20	3.3
MSBMW05	11/15/94	850	28.1	8.51	820	22	3.7

15.5 Summary Of Analytical Data

The sections and tables below summarize the results of laboratory analyses performed on the Superblock samples. For soil samples, analytical results for organic and inorganic compounds are shown in Tables 15.5-1 and 15.5-2, respectively. For ground-water samples, analytical results for the organic and inorganic compounds are presented in Tables 15.5-3 and 15.5-4. PCB wipe sampling results are presented in Table 15.5-5.

The tables list the analytical methods, the number of detects, the total number of samples, the number of samples rejected during data validation, the minimum undetected concentration, the maximum undetected concentration, the minimum detected concentration, the maximum detected concentration, and the sample with the maximum concentration. In addition, the concentrations of compounds detected at the Superblock are compared to Sand Island background levels. Analytical results for all samples and analytes are contained in Appendix L. Complete CLP and low-level analytical data are available at PACNAVFACENGCOM offices at Pearl Harbor, Hawaii.

15.5.1 Soil Vapor

TFH vapors were detected at three locations. The maximum TFH concentration, 888 ppmv, was detected at location SV-20 (Figure 15.2-1). Methane was detected at two locations. The maximum methane concentration, 1,120 ppmv was found at location SV-19. PCE was also detected at two locations. The maximum PCE level was 0.263 ppmv at SV-1. All other soil vapor samples were non-detects. The complete TEG soil vapor survey report is included in Appendix C.

15.5.2 Surface soil

Among the Superblock surface soil samples (tested by both CLP and low level methods), concentrations of 15 of 21 detected pesticide analytes, and 32 of the 38 detected metal analytes, were above mean Sand Island background levels. The maximum detected CLP PCB concentration was 8,000 µg/kg of Aroclor-1260. The maximum concentration of a CLP pesticide analyte was 37 µg/kg of 4,4'-DDT. Low level methods detected 17 PCB congeners and five pesticides. The maximum pesticide concentration detected by low level methods was also 37 µg/kg of 4,4'-DDT. Low level analytical results indicated that PCB-180 was the PCB congener with the maximum concentration (710 µg/kg).. Concentrations of all pesticides and PCB congeners, for which background levels have been established, were in excess of mean Sand Island background levels. Many semi-volatile compounds were detected in surface soils at concentrations exceeding established background levels. The constituents detected at the highest concentrations were pyrene at 2,800 µg/kg and fluoranthene at 2,600 µg/kg. The maximum lead concentration detected among the surface soil samples was 443 µg/kg. Figures 15.5-1, 15.5-2, 15.5-3, 15.5-4, and 15.5-5 depict the surface soil sampling locations and selected concentration values.

15.5.3 Subsurface soil

Among the Superblock subsurface soil samples, CLP pesticide/PCBs were not detected, whereas concentrations of 11 of the 18 detected CLP metals were above mean Sand Island background levels. Semi-volatile and volatile compounds were detected in subsurface soils at concentrations exceeding established background levels. The semi-volatile, 2-methylnaphtalene, and acetone, a volatile, were detected at 32,000 µg/kg and

280 µg/kg, respectively. The maximum lead concentration detected among the subsurface soil samples was 2.4 µg/kg. Figure 15.5-6 depicts the subsurface soil sampling locations and VOC concentrations.

15.5.4 Ground water

Among the Superblock ground-water samples, CLP pesticide/PCB concentrations were below detection limits. Seven of the 17 CLP metals detected in this group of samples were above mean Sand Island background levels. Volatile and semi-volatile constituents were detected in ground-water samples at concentrations exceeding established background levels. Chlorobenzene was detected at a maximum concentration of 1,500 µg/L and 1, 4 dichlorobenzene was detected at 370 µg/L. The maximum lead concentration detected among the ground-water samples was 29.4 µg/L. Figures 15.5-7, 15.5-8, and 15.5-9 depict the ground-water sampling locations and selected concentration values.

15.5.5 PCB Wipe Samples

The maximum PCB concentration detected among the wipe samples was 92 µg/100 cm^2 (Figure 15.5-10).

15.6 Screening Ecological Risk Assessment

15.6.1 Problem Formulation

Tasks to be accomplished during Problem Formulation include (a) developing a Site description based on current Site investigations, existing literature, any prior preliminary assessments, and Site history; (b) identifying potential stressors, exposure pathways, and ecological receptors (habitats and species); (c) discussing the nature of adverse effects associated with a given stressor; (d) defining ecologically appropriate assessment and measurement endpoints; and (e) making an initial evaluation of risks posed by the Site.

For a Site to present the potential for risk, it must exhibit the following three criteria: (a) contain stressors in abiotic media at detectable and biologically significant concentrations,

(b) provide exposure pathways linking stressors to ecological receptors, and (c) have ecological receptors (those associated with assessment endpoints) that either utilize the Site, are present nearby, or are in range of stressors migrating from the Site. If Problem Formulation determines that one or more of these criteria are absent, the Site is recommended for NFA and the risk assessment is concluded at this point. If all criteria are met, then completion of the SERA process is required.

15.6.1.1 Site Description

The Superblock, an industrial/operational area on Sand Island, is roughly bounded by Nimitz, Brannon, Cannon, and Morrell Avenues (Figure 15.1-1). Eight sites (Sites 20, 21, 55, 56, 59, 61, 93, and 94) were grouped together for a general ground-water investigation. The eight sites border each other and are located within the developed Superblock area. Areas of well-maintained lawn and ironwood trees are near the buildings and around the perimeter of the area.

15.6.1.2 Stressor Identification

Because of the early availability of chemical analysis data, ECs were computed and CPECs were identified at this point in the SERA process using methods previously described in Sections 4.3.1.1.1 and 4.3.1.1.2. Detailed results of CPEC selection for surface soils (<6 inches bgs) are shown in Table 15.6-1; for subsurface soils (>3.0 feet) in Table 15.6-2, and for ground water in Table 15.6-3. Results of the CPEC selections are summarized in Table 15.6-4. Metals, pesticides, and PCBs were the primary CPECs identified in surface soils. Metals, BTEX compounds, and PAHs were the principal CPECs identified in subsurface soils and ground water.

15.6.1.3 Potential Ecological Effects

CPECs identified onsite that may adversely affect receptors onsite include ΣDDT, PCBs, PAHs, metals, and BTEX compounds. CPEC physicochemical properties and toxicology, as they relate to potential exposure routes and sensitive ecological receptors, are summarized in Section 4.2.3 and described in detail in Appendix J.

15.6.1.4 Ecological Receptor Identification

There are several potential terrestrial ecological receptors associated with the Superblock Area including the Laysan albatross, Bonin petrel and/or wedge-tailed shearwater, red-tailed tropicbird, white tern, brown noddy, Pacific golden-plover, and ruddy turnstone (Section 4.2.4). The nesting density of petrels and shearwaters is expected to be low to moderate because only a few burrows were observed scattered throughout grassy areas onsite. Tropicbirds and white terns were also observed in moderate numbers onsite. Moderate levels of nesting by the albatross were observed throughout the unpaved portions of the Superblock and the adjacent undeveloped habitat.

15.6.1.5 Exposure Pathway Identification

The CSM appropriate to this Site is shown in Figure 4.2-2. Potentially complete terrestrial exposure routes for the Superblock include direct exposure to contaminated soil through dermal contact, incidental ingestion of contaminated surface soil, ingestion of contaminated prey items, and inhalation of volatile emissions. Incidental ingestion and dermal contact with contaminated surface soils are of primary concern for the albatross, noddy, and tropicbird onsite. Inhalation of volatile emissions and dermal exposure are principal routes for the burrowing Bonin petrel and wedge-tailed shearwater. Direct ingestion of contaminated prey items (primarily insects) by the curlew, plover, and turnstone would be the principle exposure routes for these species.

15.6.1.6 Endpoints

The assessment endpoints and testable hypotheses appropriate for this Site are the protection of special status bird species listed in Sections 4.2.6.1 and 4.2.6.2. Measurement endpoints selected for this Site include those for terrestrial species listed in Section 4.2.6.3.

15.6.1.7 Summary

Based on the preceding information it was concluded that this Site met the three criteria that indicate the potential for risk and that completion of the SERA process was required.

15.6.2 Exposure Analysis

Terrestrial target receptors for this Site include the Bonin petrel and/or wedge-tailed shearwater, Laysan albatross, red-tailed tropicbird, Pacific golden-plover, and ruddy turnstone. Exposure pathway models (c.f., Section 4.3.1.3) applicable to burrowing birds (#1), ground-nesting birds (#2), and shorebirds (#3) were used for the various species that occur onsite. Bonin petrels and/or wedge-tailed shearwaters identified onsite by the presence of burrows were evaluated for exposure to contaminants in subsurface soils through dermal exposure, incidental ingestion of soil, and inhalation of vapors. The Laysan albatross was evaluated for dermal absorption and incidental ingestion of contaminants in surface soils. Shorebirds were evaluated for ingestion of invertebrates (insects) that have been exposed to contaminants in surface soils. Equations for calculating EPVs are described in Section 4.3.1.4. Exposures via each pathway for each target receptor are listed in Table 15.6-5.

15.6.3 Ecological Effects Analysis

The potential for adverse ecological effects to bird species was evaluated using literature-derived data on CPEC toxicity with respect to specific target receptor species or to appropriate surrogate test species when specific data were not available. Toxicity reference values are shown in Table 15.6-6 and toxicity profiles for each CPEC are provided in Appendix J.

15.6.4 Risk Characterization

Risk estimation was performed using a quotient methodology described in Section 4.3.3.1. Results of these calculations are shown in Table 15.6-6. Results of the risk description weight-of-evidence analyses are summarized in Table 15.6-7 and are discussed below.

Toxicity quotient analysis suggests that antimony and Aroclor-1260 have the potential to adversely affect ground-nesting birds and shorebirds. None of the TQs for burrowing birds were greater than zero; which suggests that the risk to these birds is negligible. It is unlikely that antimony will have significant effects on the ground-nesting birds or

shorebirds because it is relatively insoluble and thus not readily bioavailable. In addition, antimony is not known to cause severe chronic effects, such as reproductive failure, in avian receptors.

The TQs for Aroclor-1260 for ground-nesting birds and shorebirds are 0.70 and 0.63, respectively, indicating a moderate potential for adverse effects. Because PCBs are known bioaccumulators and can cause reproductive effects in birds at low concentrations, the risk to these birds from Aroclor-1260 could be significant.

15.6.5 Uncertainty Analysis

All uncertainties discussed in Section 4.3.3.3 apply to this Site.

15.6.6 SERA Conclusions

The assessment endpoint for special status birds species is not expected to be met because of the potential for adverse effects from Aroclor-1260 to ground-nesting birds and shorebirds onsite. PCBs have been shown to have reproductive effects on birds. The detected Aroclor-1260 maximum surface soil concentration of 8 ppm is considered to present a risk to ground-nesting birds and shorebirds onsite.

15.7 CONCLUSIONS AND RECOMMENDATIONS

Low levels of PAHs, pesticides, and PCBs were detected in surface soil samples collected in the vicinity of Bldg. 354, within the Superblock. Organic compounds detected in subsurface soils consisted of PAHs, volatiles, and TFH. Ground-water samples were found to contain volatile organic compounds and TFH. Metals were detected in surface soil, subsurface soil, and ground-water samples collected at the Site.

Moderately high levels of fuel hydrocarbons and fuels constituents detected in subsurface soils and ground water are believed to be related to releases of fuels from removed USTs in the vicinity of Bldg. 354 (Old Power Plant). Evaluation and cleanup of these constituents in soils and ground water is currently being implemented as part of the

Midway closure process. No further investigation or action is recommended for fuel hydrocarbons and related constituents.

Aroclor-1260 was detected at a maximum concentration of 92 ppb in wipe samples collected from interior surfaces of Bldg. 354. The detected levels of PCBs in wipe samples are not considered to be high enough to warrant special handling or disposal considerations for building demolition debris. No further action is recommended regarding the presence of PCBs on the interior surfaces of Bldg. 354.

Based on the results of the SERA, the detected concentrations of Aroclor-1260 (maximum 8 ppm) in surface soils near Bldg. 354 pose a risk to terrestrial wildlife and seabirds. We recommend that surface soils in the vicinity found to contain levels of Aroclors greater than 1.0 ppm be removed and disposed of properly. Following removal of contaminated soil the Site should be backfilled to original grade with clean fill soil. Removal of PCB-impacted soils should be coordinated with the remediation of fuel impacted soils and ground water currently scheduled for this area. Although lead did not have a TQ greater than zero, some elevated concentrations of lead will be cleaned up during the excavation of soil with lead-based paint chips around the buildings.

Tables
Section 15

TABLE 15.3-1 (Page 1 of 5)
ANALYTICAL METHODS
SUPERBLOCK

		FIELD SCREENING LABORATORY				ROUTINE ANALYTICAL LABORATORY					SPECIAL ANALYTICAL LABORATORY				
	ANALYTICAL METHOD	8021	8015 B	8080	8100	8015 M/OG	OLM01.8V	OLM01.8B	OLM01.8P	ILM03.OX	STIV141A	STIV141C	STIII213	STIV141E	9060 M
EPA ID	OGDEN ID	VOL	TPH	PEST/ PCB	PAH	FUELS	VOC	SVOC	OC PEST/PCB	METALS	LL SVOC	LL PCB	LL METALS	LL PEST	TOC
SURFACE SOIL SAMPLES															
MG039	MSBSS01S01D0025	-	-	-	-	X	-	X	X	X	-	-	-	-	-
MG040	MSBSS01S02D0025	-	-	-	-	-	-	-	-	-	X	X	X	X	X
MG041	MSBSS02S01D0025	-	-	-	-	X	-	X	X	X	-	-	-	-	-
MG042	MSBSS02D01D0025	-	-	-	-	X	-	X	X	X	-	-	-	-	-
MG043	MSBSS02S02D0025	-	-	-	-	-	-	-	-	-	X	X	X	X	X
MG044	MSBSS03S01D0025	-	-	-	-	X	-	X	X	X	-	-	-	-	-
MG045	MSBSS03S02D0025	-	-	-	-	-	-	-	-	-	X	X	X	X	X
MG046	MSBSS03D02D0025	-	-	-	-	-	-	-	-	-	X	X	X	X	X
MG047	MSBSS04S01D0025	-	-	-	-	X	-	X	X	X	-	-	-	-	-
MG048	MSBSS04S02D0025	-	-	-	-	-	-	-	-	-	X	X	X	X	X
DIRECT PUSH SOIL SAMPLES															
MG002	MSBPS01S01D056	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG005	MSBPS02S01D057	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG007	MSBPS03S01D040	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG009	MSBPS04S01D048	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG011	MSBPS05S01D040	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG013	MSBPS06S01D040	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG015	MSBPS07S01D040	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG018	MSBPS08S01D040	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG019	MSBPS08D01D040	X	X	X	X	-	-	-	-	-	-	-	-	-	-

"X" = Indicates analytical method performed on sample.

TABLE 15.3-1 (Page 2 of 5)
ANALYTICAL METHODS
SUPERBLOCK

		FIELD SCREENING LABORATORY				ROUTINE ANALYTICAL LABORATORY						SPECIAL ANALYTICAL LABORATORY			
	ANALYTICAL METHOD	8021	8015 B	8080	8100	8015 M/OG	OLM01.8V	OLM01.8B	OLM01.8P	ILM03.OX	STIV141A	STIV141C	STIII213	STIV141E	9060 M
EPA ID	OGDEN ID	VOL	TPH	PEST/ PCB	PAH	FUELS	VOC	SVOC	OC PEST/PCB	METALS	LL SVOC	LL PCB	LL METALS	LL PEST	TOC
MG021	MSBPS09S01D047	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG024	MSBPS10S10D045	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG026	MSBPS11S01D040	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG028	MSBPS12S01D040	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG030	MSBPS13S01D040	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG032	MSBPS14S01D040	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG034	MSBPS15S01D040	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG036	MSBPS16S01D040	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG038	MSBPS17S01D040	X	X	X	X	-	-	-	-	-	-	-	-	-	-
DIRECT PUSH WATER SAMPLES															
MG001	MSBPW01S01D063	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG003	MSBPW02S01D062	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG004	MSBPW02S02D250	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG006	MSBPW03S01D080	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG008	MSBPW04S01D053	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG010	MSBPW05S01D037	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG012	MSBPW06S01D044	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG014	MSBPW07S01D040	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG016	MSBPW08S01D044	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG017	MSBPW08D01D044	X	X	X	X	-	-	-	-	-	-	-	-	-	-

"X" = Indicates analytical method performed on sample.

TABLE 15.3-1 (Page 3 of 5)
ANALYTICAL METHODS
SUPERBLOCK

		FIELD SCREENING LABORATORY				ROUTINE ANALYTICAL LABORATORY					SPECIAL ANALYTICAL LABORATORY				
	ANALYTICAL METHOD	8021	8015 B	8080	8100	8015 M/OG	OLM01.8V	OLM01.8B	OLM01.8P	ILM03.OX	STIV141A	STIV141C	STIII213	STIV141E	9060 M
EPA ID	OGDEN ID	VOL	TPH	PEST/ PCB	PAH	FUELS	VOC	SVOC	OC PEST/PCB	METALS	LL SVOC	LL PCB	LL METALS	LL PEST	TOC
MG020	MSBPW09S01D052	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG022	MSBPW09S02D250	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG023	MSBPW10S01D052	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG025	MSBPW11S01D046	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG027	MSBPW12S01D040	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG029	MSBPW13S01D040	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG031	MSBPW14S01D042	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG033	MSBPW15S01D039	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG035	MSBPW16S01D042	X	X	X	X	-	-	-	-	-	-	-	-	-	-
MG037	MSBPW17S01D049	X	X	X	X	-	-	-	-	-	-	-	-	-	-
PCB WIPES															
MG049	MSBWW01S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-
MG050	MSBWW02S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-
MG051	MSBWW03S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-
MG052	MSBWW04S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-
MG053	MSBWW05S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-
MG054	MSBWW05D01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-
MG055	MSBWW06S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-
MG056	MSBWW07S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-
MG057	MSBWW08S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-
MG058	MSBWW09S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-

"X" = Indicates analytical method performed on sample.

TABLE 15.3-1 (Page 4 of 5)
ANALYTICAL METHODS
SUPERBLOCK

		FIELD SCREENING LABORATORY				ROUTINE ANALYTICAL LABORATORY					SPECIAL ANALYTICAL LABORATORY				
	ANALYTICAL METHOD	8021	8015 B	8080	8100	8015 M/OG	OLM01.8V	OLM01.8B	OLM01.8P	ILM03.OX	STIV141A	STIV141C	STIII213	STIV141E	9060 M
EPA ID	OGDEN ID	VOL	TPH	PEST/ PCB	PAH	FUELS	VOC	SVOC	OC PEST/PCB	METALS	LL SVOC	LL PCB	LL METALS	LL PEST	TOC
MG059	MSBWW10S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-
BORING SOIL SAMPLES															
MG060	MSBBS01S01D045	-	-	-	-	X	X	X	X	X	-	-	-	-	-
MG061	MSBBS02S01D045	-	-	-	-	X	X	X	X	X	-	-	-	-	-
MG062	MSBBS03S01D045	-	-	-	-	X	X	X	X	X	-	-	-	-	-
MG063	MSBBS03D01D040	-	-	-	-	X	X	X	X	X	-	-	-	-	-
MG064	MSBBS04S01D030	-	-	-	-	X	X	X	X	X	-	-	-	-	-
MG065	MSBBS05S01D0040	-	-	-	-	X	X	X	X	X	-	-	-	-	-
MONITORING WELL SAMPLES															
MG066	MSBMW01S01D150	-	-	-	-	X	X	X	X	X	-	-	-	-	-
MG067	MSBMW02S01D150	-	-	-	-	X	X	X	X	X	-	-	-	-	-
MG068	MSBMW03S01D140	-	-	-	-	X	X	X	X	X	-	-	-	-	-
MG069	MSBMS04S01D140	-	-	-	-	X	X	X	X	X	-	-	-	-	-
MG070	MSBMW05S01D140	-	-	-	-	X	X	X	X	X	-	-	-	-	-
MG071	MSBMW05D01D140	-	-	-	-	X	X	X	X	X	-	-	-	-	-
EQUIPMENT RINSATE															
MG072	MSBXW02E01D000	-	-	-	-	X	X	X	X	X	-	-	-	-	-
TRIP BLANKS															

"X" = Indicates analytical method performed on sample.

TABLE 15.3-1 (Page 5 of 5)
ANALYTICAL METHODS
SUPERBLOCK

		FIELD SCREENING LABORATORY				ROUTINE ANALYTICAL LABORATORY					SPECIAL ANALYTICAL LABORATORY				
	ANALYTICAL METHOD	8021	8015 B	8080	8100	8015 M/OG	OLM01.8V	OLM01.8B	OLM01.8P	ILM03.OX	STIV141A	STIV141C	STIII213	STIV141E	9060 M
EPA ID	OGDEN ID	VOL	TPH	PEST/ PCB	PAH	FUELS	VOC	SVOC	OC PEST/PCB	METALS	LL SVOC	LL PCB	LL METALS	LL PEST	TOC
MG073	MSBXW00T00D000	-	-	-	-	-	X	-	-	-	-	-	-	-	-
MG074	MSBXW00T00D000	-	-	-	-	-	X	-	-	-	-	-	-	-	-
MG075	MSBXW00T00D000	-	-	-	-	-	X	-	-	-	-	-	-	-	-
MG076	MSBXW00T00D000	-	-	-	-	-	X	-	-	-	-	-	-	-	-

"X" = Indicates analytical method performed on sample.

Table 15.4-4

HYDRAULIC CONDUCTIVITY ESTIMATES BASED ON TIDAL FLUCTUATIONS, SLUG TESTING, PERMEAMETER TESTING AND PUBLISHED DATA. SUPERBLOCK, NOVEMBER, 1994 - JANUARY, 1995

SOURCE	WELL OR SAMPLE #	WATER TABLE ELEVATION (feet above MLLW)	DEPTH SAMPLED (fbgs)	HYDRAULIC CONDUCTIVITY (K)	
				(cm/sec)	(ft/day)
TIDAL FLUCTUATIONS	MSBMW03	1.70		1.17E+00	3,308
SLUG TEST	MSBMW01	1.58		1.13E+00	3,200
PERMEAMETER TEST	MSBBS02		4.0	2.30E-05	0.1
PERMEAMETER TEST	MSBBS01		4.0	1.20E-04	0.3
PERMEAMETER TEST	MSBBS04		2.5	3.4E-05	0.1
PERMEAMETER TEST	MSBBS05		3.5	4.00E-05	0.1
PUBLISHED AVERAGE	CLEAN SANDS			1.0E-02	28.3
PUBLISHED AVERAGE	SILTY SANDS			1.0E-03	2.8
			MAXIMUM	1.17E+00	3,308
			MINIMUM	2.30E-05	0.1
			AVERAGE	2.89E-01	817

Table 15.4-5

HYDRAULIC CONDUCTIVITY ESTIMATES BASED ON SLUG TESTING DATA SAND ISLAND 14 NOV. 94 - 16 NOV. 94

SITE	WELL	WATER TABLE ELEVATION (MLLW)	HYDRAULIC CONDUCTIVITY (cm/sec)	HYDRAULIC CONDUCTIVITY (ft/day)
Abandoned Power Plant, Site 08	M08MW03	0.93	0.48	1,372
Runway Landfill, Site 02	M02MW03	0.85	0.12	349
Superblock, Site SB	MSBMW03	1.58	1.13	3,200
Bulky Waste Landfill, Site 01	M01MW01	1.09	0.25	718
Area 401, Site 05	M05MW01	1.40	0.60	1,637
		MAXIMUM	1.13	3,200
		MINIMUM	0.12	349
		AVERAGE	0.52	1,462

Table 15.5-1
Summary of Soil Results for Organics
Superblock, Sand Island (Site SB)

			Site SB									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL																			
8015B/OG	C06-C11 (Gasoline Range)	MG/KG	2	4	0	5.7	5.8	15	16	MSBSS02S01		0	8	0	5.2	6.1			
8015B/OG	C11-C14 (Kerosene Range)	MG/KG	2	4	0	5.7	5.8	11	11	MSBSS01S01		0	8	0	5.2	6.1			
8015B/OG	C14-C20 (Diesel Range)	MG/KG	4	4	0			11	71	MSBSS01S01		1	8	0	5.2	5.9	10	10	3.27
8015B/OG	C20-C30 (Lubricant Oil Range)	MG/KG	4	4	0			220	1400	MSBSS01S01		1	8	0	21	24	44	44	13.3
9060M	Total Organic Carbon	UG/G	4	4	0			16600	66800	MSBSS02S02	J								
OLM01.0B	Anthracene	UG/KG	1	4	0	380	1800	440	440	MSBSS01S01	J	0	8	0	350	410			
OLM01.0B	Benzo(a)Anthracene	UG/KG	2	4	0	390	1800	73	1300	MSBSS01S01	J	0	8	0	350	410			
OLM01.0B	Benzo(a)Pyrene	UG/KG	3	4	0	1800	1800	52	840	MSBSS01S01	J	0	8	0	350	410			
OLM01.0B	Benzo(b)Fluoranthene	UG/KG	4	4	0			120	1500	MSBSS01S01	J	0	8	0	350	410			
OLM01.0B	Benzo(k)Fluoranthene	UG/KG	2	4	0	1800	1900	46	69	MSBSS03S01	J	0	8	0	350	410			
OLM01.0B	bis(2-Ethylhexyl)phthalate	UG/KG	3	4	0	1900	1900	29	410	MSBSS02S01	J	1	8	0	350	410	1600	1600	246
OLM01.0B	Carbazole	UG/KG	2	4	0	390	1800	61	690	MSBSS01S01	J	0	8	0	350	410			
OLM01.0B	Chrysene	UG/KG	4	4	0			55	1600	MSBSS01S01	J	0	8	0	350	410			
OLM01.0B	Di-n-Butylphthalate	UG/KG	1	4	0	390	1900	58	58	MSBSS03S01	J	0	8	0	350	410			
OLM01.0B	Dimethylphthalate	UG/KG	1	4	0	390	1900	360	360	MSBSS03S01	J	0	8	0	350	410			
OLM01.0B	Fluoranthene	UG/KG	4	4	0			26	2600	MSBSS01S01		0	8	0	350	410			
OLM01.0B	Indeno(1,2,3-cd)pyrene	UG/KG	1	4	0	380	1800	340	340	MSBSS01S01	J	0	8	0	350	410			
OLM01.0B	Phenanthrene	UG/KG	1	4	0	380	1800	2400	2400	MSBSS01S01		0	8	0	350	410			
OLM01.0B	Pyrene	UG/KG	4	4	0			34	2800	MSBSS01S01		0	8	0	350	410			
OLM01.0P	4,4'-DDD	UG/KG	1	8	4	3.9	19	17	17	MSBSS02S01	NJ	0	10	2	3.4	16			
OLM01.0P	4,4'-DDE	UG/KG	1	8	4	3.9	19	33	33	MSBSS02S01		4	10	2	3.4	4	5.2	1900	13.1
OLM01.0P	4,4'-DDT	UG/KG	2	8	4	3.9	26	22	37	MSBSS02S01	N	2	10	2	3.4	4	200	320	6.3
OLM01.0P	Aldrin	UG/KG	2	8	4	1.9	1.9	2	4.5	MSBSS03S01	N	0	10	2	1.8	8.1			
OLM01.0P	alpha-BHC	UG/KG	1	8	4	1.9	1.9	7.3	7.3	MSBSS03S01	NJ	0	10	2	1.8	8.1			
OLM01.0P	Aroclor-1260	UG/KG	4	8	4			360	8000	MSBSS04S01	J	0	10	2	34	160			
STIV141A	Acenaphthene	UG/KG	3	4	0	4.1	4.1	2.3	52	MSBSS01S02		3	9	1	0.17	0.18	0.072	5.2	0.154
STIV141A	Acenaphthylene	UG/KG	4	4	0			1.4	15	MSBSS03S02		4	9	1	0.16	0.17	0.35	3.1	0.267
STIV141A	Anthracene	UG/KG	4	4	0			4.2	130	MSBSS01S02		8	9	1			0.086	24	0.531
STIV141A	Benzo(a)Anthracene	UG/KG	4	4	0			9.8	600	MSBSS01S02		8	9	1			1	260	4.1

Notes:

8015B/OG = Total Fuel Hydrocarbons
OLM01.0B = CLP Semi Volatiles
OLM01.0P = CLP Pesticides/PCBs
STIV141A = NOAA Status and Trends Semi Volatiles

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 15.5-1
Summary of Soil Results for Organics
Superblock, Sand Island (Site SB)

			Site SB									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL - continued																			
STIV141A	Benzo(a)Pyrene	UG/KG	4	4	0			10	410	MSBSS01S02		8	9	1			0.84	270	3.89
STIV141A	Benzo(b)Fluoranthene	UG/KG	4	4	0			19	660	MSBSS01S02		8	9	1			0.94	300	6.13
STIV141A	Benzo(e)pyrene	UG/KG	4	4	0			14	330	MSBSS01S02		8	9	1			0.83	160	3.97
STIV141A	Benzo(g,h,i)perylene	UG/KG	4	4	0			25	380	MSBSS01S02		8	9	1			0.79	55	3.27
STIV141A	Benzo(k)Fluoranthene	UG/KG	4	4	0			6.3	220	MSBSS01S02		8	9	1			0.55	130	2.75
STIV141A	Biphenyl	UG/KG	3	4	0	4.3	4.3	1.4	3.4	MSBSS01S02	J	0	8	0	0.049	0.2			
STIV141A	Chrysene	UG/KG	4	4	0			13	600	MSBSS01S02		8	9	1			1.6	300	6.46
STIV141A	Chrysenes, C1-alkyl-substitute	UG/KG	4	4	0			8.5	440	MSBSS01S02		8	9	1			0.57	180	2.97
STIV141A	Chrysenes, C2-alkyl-substitute	UG/KG	4	4	0			10	180	MSBSS01S02		6	9	1	0.26	0.26	0.84	59	1.58
STIV141A	Chrysenes, C3-alkyl-substitute	UG/KG	4	4	0			13	130	MSBSS01S02		3	9	1	0.26	0.28	7.1	22	0.731
STIV141A	Chrysenes, C4-alkyl-substitute	UG/KG	4	4	0			12	120	MSBSS01S02		3	9	1	0.26	0.28	5	11	0.608
STIV141A	Dibenzo(a,h)Anthracene	UG/KG	4	4	0			2.6	71	MSBSS01S02		8	9	1			0.15	20	0.676
STIV141A	Dibenzothiophene	UG/KG	4	4	0			0.72	41	MSBSS01S02		4	9	1	0.16	0.17	0.097	4	0.149
STIV141A	Dibenzothiophenes, C1-alkyl-s	UG/KG	2	4	0	4	4.2	9.9	80	MSBSS01S02		4	9	1	0.16	0.17	0.08	3.5	0.147
STIV141A	Dibenzothiophenes, C2-alkyl-s	UG/KG	2	4	0	4	4.2	17	130	MSBSS01S02		4	9	1	0.16	0.17	0.2	6.5	0.243
STIV141A	Dibenzothiophenes, C3-alkyl-s	UG/KG	2	4	0	4	4.2	18	120	MSBSS01S02		3	9	1	0.16	0.18	0.29	5.2	0.225
STIV141A	Fluoranthene	UG/KG	4	4	0			18	1100	MSBSS01S02		8	9	1			2	370	8.68
STIV141A	Fluoranthenes+Pyrenes, C1-alk	UG/KG	4	4	0			12	570	MSBSS01S02		8	9	1			1.1	200	3.98
STIV141A	Fluoranthenes+Pyrenes, C2-alk	UG/KG	4	4	0			15	600	MSBSS01S02		7	9	1	0.2	0.2	0.97	140	3
STIV141A	Fluoranthenes+Pyrenes, C3-alk	UG/KG	4	4	0			8.5	200	MSBSS01S02		5	9	1	0.2	0.2	0.71	38	0.976
STIV141A	Fluorene	UG/KG	3	4	0	5.4	5.4	1.7	30	MSBSS01S02		4	9	1	0.22	0.22	0.064	3	0.146
STIV141A	Fluorenes, C1-alkyl-substitute	UG/KG	1	4	0	5.4	5.7	16	16	MSBSS01S02		1	9	1	0.22	0.25	2	2	0.164
STIV141A	Fluorenes, C2-alkyl-substitute	UG/KG	1	4	0	5.4	5.7	39	39	MSBSS01S02		1	8	0	0.22	0.25	3	3	0.173
STIV141A	Fluorenes, C3-alkyl-substitute	UG/KG	1	4	0	5.4	5.7	150	150	MSBSS01S02		0	8	0	0.22	0.25			
STIV141A	Indeno(1,2,3-cd)pyrene	UG/KG	4	4	0			14	310	MSBSS01S02		8	9	1			0.67	180	3.2
STIV141A	Naphthalenes, C1-alkyl-substit	UG/KG	4	4	0			4.1	23	MSBSS01S02		1	8	0	0.23	0.26	0.29	0.29	0.133
STIV141A	Naphthalenes, C2-alkyl-substit	UG/KG	2	4	0	5.6	5.9	20	49	MSBSS01S02		1	8	0	0.23	0.26	0.58	0.58	0.146
STIV141A	Naphthalenes, C3-alkyl-substit	UG/KG	2	4	0	5.6	5.9	11	48	MSBSS01S02		1	8	0	0.23	0.26	1.1	1.1	0.158
STIV141A	Naphthalenes, C4-alkyl-substit	UG/KG	1	4	0	5.6	6	46	46	MSBSS01S02		1	8	0	0.23	0.26	1.6	1.6	0.166

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles
STIV141C = NOAA Status and Trends PCBs

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 15.5-1
Summary of Soil Results for Organics
Superblock, Sand Island (Site SB)

			Site SB									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL - continued																			
STIV141A	Perylene	UG/KG	4	4	0			4.1	110	MSBSS01S02		8	9	1			0.22	51	1.38
STIV141A	Phenanthrene	UG/KG	4	4	0			9.7	730	MSBSS01S02		8	9	1			0.33	89	1.78
STIV141A	Phenanthrenes+Anthra., C1-alk	UG/KG	4	4	0			8.2	470	MSBSS01S02		8	9	1			0.44	59	1.46
STIV141A	Phenanthrenes+Anthra., C2-alk	UG/KG	4	4	0			9.2	380	MSBSS01S02		7	9	1	0.28	0.28	0.5	43	1.16
STIV141A	Phenanthrenes+Anthra., C3-alk	UG/KG	3	4	0	6.7	6.7	26	190	MSBSS01S02		4	9	1	0.27	0.29	0.43	21	0.54
STIV141A	Phenanthrenes+Anthra., C4-alk	UG/KG	3	4	0	6.7	6.7	89	350	MSBSS01S02		5	8	0	0.27	0.29	1.4	75	1.19
STIV141A	Pyrene	UG/KG	4	4	0			18	1100	MSBSS01S02		8	9	1			2.1	390	8.67
STIV141C	PCB-101 (2,2',3,5,5')	UG/KG	2	4	0	0.028	0.03	2	16	MSBSS04S02		4	8	0	0.011	0.012	0.1	1.7	0.054
STIV141C	PCB-118 (2,3',4,4',5)	UG/KG	3	4	0	2	2	2.4	8.7	MSBSS02S02		8	8	0			0.085	2.8	0.506
STIV141C	PCB-128 (2,2',3,3',4,4')	UG/KG	3	5	1	0.04	0.04	3.5	47	MSBSS04S02		7	8	0	0.014	0.014	0.048	1.2	0.16
STIV141C	PCB-138 (2,2',3,4,4',5')	UG/KG	4	8	4			21	620	MSBSS04S02		8	8	0			0.27	5.5	1.24
STIV141C	PCB-153 (2,2',4,4',5,5')	UG/KG	4	8	4			11	460	MSBSS04S02		8	9	1			0.46	5.9	1.64
STIV141C	PCB-170 (2,2',3,3',4,4',5)	UG/KG	4	8	4			18	410	MSBSS04S02		7	8	0	0.059	0.059	0.14	1.4	0.293
STIV141C	PCB-18 (2,2',5)	UG/KG	1	4	0	0.099	4.7	7.5	7.5	MSBSS02S02		0	8	0	0.038	0.043			
STIV141C	PCB-180 (2,2',3,4,4',5,5')	UG/KG	4	8	4			40	710	MSBSS04S02		8	8	0			0.23	2	0.846
STIV141C	PCB-187 (2,2',3,4',5,5',6)	UG/KG	4	8	4			32	400	MSBSS04S02		6	8	0	0.027	0.027	0.14	1.4	0.238
STIV141C	PCB-195 (2,2',3,3',4,4',5,6)	UG/KG	4	5	1			7.7	71	MSBSS04S02		8	8	0			0.032	0.38	0.127
STIV141C	PCB-206 (2,2',3,3',4,4',5,5',6	UG/KG	4	4	0			3.9	29	MSBSS04S02		7	8	0	0.011	0.011	0.036	0.76	0.0866
STIV141C	PCB-209 (2,2',3,3',4,4',5,5',6	UG/KG	4	4	0			0.29	7.4	MSBSS04S02		7	8	0	0.013	0.013	0.037	0.94	0.0931
STIV141C	PCB-28 (2,4,4')	UG/KG	1	4	0	0.067	3.2	0.47	0.47	MSBSS02S02		0	8	0	0.026	0.029			
STIV141C	PCB-44 (2,2',3,5')	UG/KG	2	4	0	0.033	1.6	0.1	0.4	MSBSS02S02		1	8	0	0.013	0.014	0.27	0.27	0.0106
STIV141C	PCB-52 (2,2',5,5')	UG/KG	2	4	0	0.029	1.4	1.3	1.5	MSBSS01S02		1	8	0	0.011	0.013	0.41	0.41	0.00984
STIV141C	PCB-77 (3,3',4,4')	UG/KG	2	5	1	0.054	2.6	3.6	11	MSBSS01S02		0	8	0	0.021	0.024			
STIV141C	PCB-8 (2,4')	UG/KG	2	4	0	0.048	2.3	0.28	0.62	MSBSS01S02		5	8	0	0.019	0.021	0.029	0.13	0.0303
STIV141E	2,4'-DDD	UG/KG	1	4	0	0.039	1.8	7	7	MSBSS02S02		6	8	0	0.015	0.016	0.045	8.7	0.21
STIV141E	2,4'-DDT	UG/KG	3	5	1	2.9	2.9	2.7	15	MSBSS02S02		7	10	2	0.024	0.024	0.19	62	0.931
STIV141E	4,4'-DDD	UG/KG	2	4	0	0.071	3.1	1.2	4.4	MSBSS02S02		5	8	0	0.026	0.029	0.063	8.3	0.169
STIV141E	4,4'-DDE	UG/KG	2	5	1	0.04	1.7	4.7	17	MSBSS02S02		8	12	4			0.6	1300	13.2
STIV141E	4,4'-DDT	UG/KG	3	6	2	2.5	2.5	3.2	37	MSBSS02S02		8	10	2			0.091	260	3.57
STIV141E	alpha-Chlordane	UG/KG	4	5	1			2.2	13	MSBSS02S02		6	8	0	0.014	0.015	0.03	4.1	0.107

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles
STIV141C = NOAA Status and Trends PCBs
STIV141E = NOAA Status and Trends Pesticides

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 15.5-1
Summary of Soil Results for Organics
Superblock, Sand Island (Site SB)

			Site SB									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
			FL = Data Validation Qualifier (Flag)																
SURFACE SOIL - continued																			
STIV141E	beta-BHC	UG/KG	1	4	0	0.055	0.059	1.9	1.9	MSBSS04S02	J	3	8	0	0.022	0.024	0.015	0.065	0.0175
STIV141E	delta-BHC	UG/KG	1	4	0	0.032	0.034	1.6	1.6	MSBSS04S02		0	8	0	0.012	0.014			
STIV141E	Dieldrin	UG/KG	3	4	0	2.4	2.4	0.75	1.9	MSBSS03S02		2	8	0	0.019	0.022	0.059	0.15	0.0177
STIV141E	gamma-BHC (Lindane)	UG/KG	2	4	0	0.039	1.9	0.16	0.18	MSBSS02S02		2	8	0	0.015	0.017	0.073	0.11	0.0145
STIV141E	gamma-Chlordane	UG/KG	3	5	1	1.9	1.9	3.3	15	MSBSS02S02		4	8	0	0.016	0.018	0.029	1.8	0.0345
STIV141E	Hexachlorobenzene	UG/KG	4	4	0			0.071	0.69	MSBSS04S02	J	6	8	0	0.018	0.019	0.0089	0.027	0.0121
STIV141E	Methoxychlor	UG/KG	4	4	0			0.18	2.9	MSBSS04S02	J	0	8	0	0.076	0.086			
STIV141E	Mirex	UG/KG	3	4	0	2.2	2.2	0.32	1.9	MSBSS03S02		8	8	0			0.13	2.8	0.609
STIV141E	trans-Nonachlor	UG/KG	3	5	1	1.1	1.1	2.5	12	MSBSS02S02		8	9	1			0.043	18	0.699
SUBSURFACE SOIL																			
8015B/OG	C06-C11 (Gasoline Range)	MG/KG	1	5	0	5.5	5.6	5100	5100	MSBBS01S01		0	12	0	5.5	6.7			
8015B/OG	C11-C14 (Kerosene Range)	MG/KG	1	5	0	5.5	5.6	13000	13000	MSBBS01S01		0	12	0	5.5	6.7			
8015B/OG	C14-C20 (Diesel Range)	MG/KG	1	5	0	5.5	5.6	2900	2900	MSBBS01S01		0	12	0	5.5	6.7			
8015B/OG	C20-C30 (Lubricant Oil Range)	MG/KG	2	5	0	22	22	200	3700	MSBBS01S01		0	12	0	22	27			
OLM01.0B	2-Methylnaphthalene	UG/KG	1	6	1	360	370	32000	32000	MSBBS01S01	J	0	12	0	370	580			
OLM01.0B	Phenanthrene	UG/KG	1	6	1	360	370	1600	1600	MSBBS01S01	J	0	12	0	370	580			
OLM01.0B	Pyrene	UG/KG	1	6	1	360	370	1200	1200	MSBBS01S01	J	0	12	0	370	580			
OLM01.0V	(Meta+Para)-Xylene	UG/KG	1	5	0	1	1	26	26	MSBBS01S01	J	1	12	0	1	1	2	2	0.561
OLM01.0V	Acetone	UG/KG	4	5	0	100	100	51	280	MSBBS01S01	J	12	12	0			16	200	39.1
OLM01.0V	Chlorobenzene	UG/KG	1	5	0	1	1	170	170	MSBBS01S01	J	0	12	0	1	1			
OLM01.0V	Ethylbenzene	UG/KG	1	5	0	1	1	21	21	MSBBS01S01	J	0	12	0	1	1			
OLM01.0V	Methylene Chloride	UG/KG	3	5	0	6	28	10	12	MSBBS03S01		2	12	0	5	7	1	2	2.6

Notes:

STIV141E = NOAA Status and Trends Pesticides
8015B/OG = Total Fuel Hydrocarbons
OLM01.0B = CLP Semi Volatiles
OLM01.0V = CLP Volatiles

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 15.5-2
Summary of Soil Results for Inorganics
Superblock, Sand Island (Site SB)

			Site SB									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL																			
ILM03.0	Aluminum	MG/KG	4	4	0			298	3080	MSBSS01S01		4	8	0	2.9	3.2	127	879	25.2
ILM03.0	Antimony	MG/KG	3	4	0	2.8	2.8	3.5	11.2	MSBSS03S01	J	0	8	0	2.5	2.9			
ILM03.0	Arsenic	MG/KG	3	4	0	0.5	0.5	3.2	46.5	MSBSS03S01		1	8	0	0.29	0.34	0.46	0.46	0.179
ILM03.0	Barium	MG/KG	4	4	0			22	150	MSBSS03S01		8	8	0			6	15.3	8.68
ILM03.0	Beryllium	MG/KG	3	4	0	0.14	0.14	0.23	0.28	MSBSS01S01		8	8	0			0.19	0.45	0.3
ILM03.0	Cadmium	MG/KG	4	4	0			0.66	1.9	MSBSS02S01		8	8	0			0.39	0.99	0.617
ILM03.0	Calcium	MG/KG	4	4	0			26700	281000	MSBSS04S01		8	8	0			32400	343000	244000
ILM03.0	Chromium	MG/KG	4	4	0			10.9	64.9	MSBSS03S01		8	8	0			4.1	8	5.48
ILM03.0	Cobalt	MG/KG	3	4	0	1.1	1.1	4.1	5.2	MSBSS02S01	J	2	8	0	0.97	1.1	1.5	2.2	0.712
ILM03.0	Copper	MG/KG	4	4	0			32.5	166	MSBSS02S01	J	1	8	0	1	4.3	5.6	5.6	1.57
ILM03.0	Iron	MG/KG	4	4	0			1470	19700	MSBSS03S01	J	8	8	0			37.4	1240	206
ILM03.0	Lead	MG/KG	4	4	0			149	443	MSBSS02S01		8	8	0			2.7	10.5	6.28
ILM03.0	Magnesium	MG/KG	4	4	0			12100	16800	MSBSS01S01		8	8	0			14000	16800	15700
ILM03.0	Manganese	MG/KG	4	4	0			19.4	142	MSBSS02S01	J	8	8	0			4.3	36.7	9.02
ILM03.0	Mercury	MG/KG	3	4	0	0.06	0.06	0.08	0.23	MSBSS02S01		3	8	0	0.05	0.06	0.05	0.09	0.039
ILM03.0	Nickel	MG/KG	3	4	0	1.5	1.5	15.1	49.4	MSBSS02S01		1	8	0	1.4	1.6	2.3	2.3	0.848
ILM03.0	Potassium	MG/KG	4	4	0			120	591	MSBSS01S01	J	8	8	0			55.4	143	83.9
ILM03.0	Silver	MG/KG	1	4	0	1.4	1.5	1.7	1.7	MSBSS03S01	J	1	8	0	1.3	1.6	1.8	1.8	0.814
ILM03.0	Sodium	MG/KG	4	4	0			2080	2270	MSBSS01S01	J	8	8	0			2350	2550	2440
ILM03.0	Vanadium	MG/KG	4	4	0			3.3	32.4	MSBSS03S01		8	8	0			1.1	3.5	1.71
ILM03.0	Zinc	MG/KG	4	4	0			121	501	MSBSS03S01	J	8	8	0			7.5	121	22.1
STIII213	Aluminum	MG/KG	3	4	0	11000	11000	9200	15000	MSBSS02S02		0	8	0	5500	8400			
STIII213	Antimony	MG/KG	4	4	0			7.87	23.8	MSBSS03S02		8	8	0			0.288	1.06	0.537
STIII213	Arsenic	MG/KG	4	4	0			4.9	65.2	MSBSS03S02		3	8	0	1.6	1.6	1.62	2	1.09
STIII213	Cadmium	MG/KG	4	4	0			0.793	2.83	MSBSS02S02		8	8	0			0.53	1.44	0.946
STIII213	Chromium	MG/KG	4	4	0			12	111	MSBSS01S02		1	8	0	7.3	10	12.4	12.4	4.71
STIII213	Copper	MG/KG	4	4	0			20	153	MSBSS02S02		5	8	0	2.8	3	5.6	7.8	3.64
STIII213	Iron	MG/KG	4	4	0			2550	23900	MSBSS03S02		8	8	0			64.2	2060	334
STIII213	Lead	MG/KG	4	4	0			37.6	587	MSBSS01S02		7	8	0	3	3	3.3	9.7	4.92

Notes:

STIII213 = NOAA Status and Trends Low Level Metals
ILM03.0 = CLP Metals

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 15.5-2
Summary of Soil Results for Inorganics
Superblock, Sand Island (Site SB)

			Site SB									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL - continued																			
STIII213	Manganese	MG/KG	4	4	0			34	270	MSBSS02S02		3	8	0	14	17	21	37.6	12.6
STIII213	Mercury	MG/KG	3	4	0	0.025	0.025	0.144	0.249	MSBSS02S02		3	8	0	0.025	0.025	0.029	0.062	0.0203
STIII213	Nickel	MG/KG	3	4	0	5.2	5.2	13.2	87.2	MSBSS02S02		2	8	0	5.7	7.3	5.9	9.8	3.84
STIII213	Silver	MG/KG	4	4	0			0.054	0.308	MSBSS02S02		7	8	0	0.04	0.04	0.0448	0.09	0.0571
STIII213	Thallium	MG/KG	1	4	0	0.032	0.032	0.065	0.065	MSBSS02S02		8	8	0			0.021	0.036	0.0266
STIII213	Tin	MG/KG	4	4	0			1.08	7.62	MSBSS03S02		8	8	0			0.072	6.06	0.314
STIII213	Zinc	MG/KG	4	4	0			126	592	MSBSS02S02		8	8	0			7.8	75.8	19.6
SUBSURFACE SOIL																			
ILM03.0	Aluminum	MG/KG	1	5	0	5.1	5.1	8.1	8.1	MSBBS04S01	J	3	12	0	2.9	4.4	781	5440	9.29
ILM03.0	Barium	MG/KG	5	5	0			5.1	12.4	MSBBS04S01		12	12	0			4.3	92.3	8.19
ILM03.0	Beryllium	MG/KG	5	5	0			0.25	0.47	MSBBS05S01	J	8	12	0	0.33	0.5	0.21	0.57	0.264
ILM03.0	Cadmium	MG/KG	4	5	0	0.07	0.07	0.09	0.22	MSBBS02S01		7	12	0	0.04	0.06	0.04	0.35	0.0615
ILM03.0	Calcium	MG/KG	5	5	0			316000	387000	MSBBS05S01		12	12	0			34100	350000	276000
ILM03.0	Chromium	MG/KG	5	5	0			4.7	6.2	MSBBS02S01		12	12	0			4.1	19	6.09
ILM03.0	Copper	MG/KG	3	5	0	0.65	1.2	0.5	3.2	MSBBS04S01		1	12	0	0.56	6.2	26.8	26.8	0.767
ILM03.0	Iron	MG/KG	4	5	0	8.5	8.5	9.4	57.8	MSBBS04S01		11	12	0	2.7	2.7	2	6910	33.6
ILM03.0	Lead	MG/KG	1	5	0	0.29	0.29	2.4	2.4	MSBBS04S01		5	12	0	0.19	0.28	0.29	171	0.402
ILM03.0	Magnesium	MG/KG	5	5	0			12000	16500	MSBBS03S01		12	12	0			14900	20800	17200
ILM03.0	Manganese	MG/KG	5	5	0			3.2	4.3	MSBBS04S01		12	12	0			3.2	124	7.21
ILM03.0	Selenium	MG/KG	5	5	0			1.2	2	MSBBS02S01		12	12	0			1.3	2.2	1.83
ILM03.0	Silver	MG/KG	1	5	0	1.3	1.3	1.5	1.5	MSBBS03S01		2	12	0	1.4	2	1.4	2.2	0.861
ILM03.0	Sodium	MG/KG	5	5	0			2310	2700	MSBBS01S01	J	12	12	0			2250	4110	2680
ILM03.0	Vanadium	MG/KG	5	5	0			0.83	1.8	MSBBS04S01		11	12	0	0.76	0.76	0.9	12.5	1.58
ILM03.0	Zinc	MG/KG	2	5	0	0.88	3.3	1.1	2.7	MSBBS04S01		4	12	0	0.5	3.2	1.6	134	2.08

Notes:

STIII213 = NOAA Status and Trends Low Level Metals
ILM03.0 = CLP Metals

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 15.5-3
Summary of Groundwater Results for Organics
Superblock, Sand Island (Site SB)
Page 1 of 1

			Site SB									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
8015B/OG	C06-C11 (Gasoline Range)	MG/L	1	5	0	0.5	0.5	2.6	2.6	MSBMW01S01		0	4	0	0.5	0.5			
8015B/OG	C11-C14 (Kerosene Range)	MG/L	1	5	0	0.5	0.5	6.2	6.2	MSBMW01S01		0	4	0	0.5	0.5			
8015B/OG	C14-C20 (Diesel Range)	MG/L	1	5	0	0.5	0.5	8.4	8.4	MSBMW01S01		0	4	0	0.5	0.5			
8015B/OG	C20-C30 (Lubricant Oil Range	MG/L	2	5	0	2	2	2.9	8.5	MSBMW01S01		0	4	0	2	2			
OLM01.0B	1,4-Dichlorobenzene	UG/L	1	6	1	9	48	370	370	MSBMW01S01		0	4	0	9	10			
OLM01.0B	2-Methylnaphthalene	UG/L	1	6	1	9	48	120	120	MSBMW01S01		0	4	0	9	10			
OLM01.0B	bis(2-Ethylhexyl)phthalate	UG/L	2	6	1	9	48	1	1	MSBMW02S01	J	0	4	0	9	10			
OLM01.0B	Butylbenzylphthalate	UG/L	1	6	1	9	48	1	1	MSBMW02S01	J	0	4	0	9	10			
OLM01.0B	Carbazole	UG/L	1	6	1	9	48	45	45	MSBMW01S01	J	0	4	0	9	10			
OLM01.0B	Naphthalene	UG/L	1	6	1	9	48	200	200	MSBMW01S01		0	4	0	9	10			
OLM01.0V	Benzene	UG/L	1	6	1	1	1	2	2	MSBMW01S01		0	4	0	1	1			
OLM01.0V	Chlorobenzene	UG/L	1	6	1	1	1	1500	1500	MSBMW01S01		0	4	0	1	1			
OLM01.0V	Chloroform	UG/L	1	6	1	1	1	4	4	MSBMW03S01		0	4	0	1	1			
OLM01.0V	Ethylbenzene	UG/L	1	6	1	1	1	20	20	MSBMW01S01		0	4	0	1	1			
OLM01.0V	Ortho-Xylene	UG/L	1	6	1	1	1	2	2	MSBMW01S01		0	4	0	1	1			
pH	pH	MG/L	2	2	0			7.9	8.3	MSBMW04S01	J								

Notes:

8015B/OG = Total Fuel Hydrocarbons
OLM01.0B = CLP Semi Volatiles
OLM01.0V = CLP Volatiles

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 15.5-4
Summary of Groundwater Results for Inorganics
Superblock, Sand Island (Site SB)

			Site SB									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
ILM03.0	Aluminum	UG/L	2	5	0	23	23	111	118	MSBMW05S01		0	4	0	14	14			
ILM03.0	Arsenic	UG/L	3	5	0	2.2	2.2	5.6	9.1	MSBMW01S01		2	4	0	1.5	2.2	14.7	19	3.9
ILM03.0	Barium	UG/L	5	5	0			7.3	25.6	MSBMW01S01		4	4	0			2.2	16.1	6.01
ILM03.0	Beryllium	UG/L	3	5	0	0.6	0.6	2.1	2.6	MSBMW02S01		0	4	0	0.6	0.79			
ILM03.0	Calcium	UG/L	5	5	0			45100	125000	MSBMW01S01		4	4	0			150000	351000	208000
ILM03.0	Chromium	UG/L	2	5	0	4	4	4.1	4.3	MSBMW05S01		1	4	0	3.1	3.1	4.6	4.6	2.03
ILM03.0	Copper	UG/L	2	5	0	2	2	2.1	9.4	MSBMW05S01	J	0	4	0	2.7	2.7			
ILM03.0	Iron	UG/L	1	5	0	8.4	151	220	220	MSBMW01S01		4	4	0			298	836	474
ILM03.0	Lead	UG/L	2	5	0	1.3	1.3	2.6	29.4	MSBMW02S01		0	4	0	0.9	0.9			
ILM03.0	Magnesium	UG/L	5	5	0			13000	68300	MSBMW01S01		4	4	0			49300	522000	110000
ILM03.0	Manganese	UG/L	4	5	0	2.5	2.5	10.4	349	MSBMW01S01		4	4	0			3.8	17.9	5.89
ILM03.0	Mercury	UG/L	1	5	0	0.1	0.1	0.16	0.16	MSBMW01S01		0	4	0	0.1	0.1			
ILM03.0	Potassium	UG/L	5	5	0			3240	8360	MSBMW01S01		4	4	0			12000	142000	25000
ILM03.0	Sodium	UG/L	5	5	0			13400	61600	MSBMW02S01		3	4	0	15	15	167000	223000	15700
ILM03.0	Vanadium	UG/L	3	5	0	3	3	3.4	10.1	MSBMW03S01		3	4	0	3.2	3.2	7.2	13.7	6.24
ILM03.0	Zinc	UG/L	3	5	0	4	4	6.8	82.6	MSBMW05S01	J	1	4	0	18.8	23.3	51.7	51.7	15.8

Notes:

ILM03.0 = CLP Metals

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
Mean = Geometric Mean

Table 15.6-1
Surface Soil CPEC Selection - Site Superblock

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Aldrin	50	1.90E-03	2.00E-03	4.50E-03	1.69E-03	4.50E-03	1.03E+00		No(6)
alpha-BHC	25	1.90E-03	7.30E-03	7.30E-03	1.58E-03	6.65E-03	1.12E+00		No(6)
alpha-Chlordane	100		2.20E-03	1.30E-02	3.54E-03	1.19E-02	3.20E+00		No(6)
Anthracene	100		4.20E-03	1.30E-01	2.90E-02	1.30E-01	2.30E+00		No(6)
Aroclor-1260	100		3.60E-01	8.00E+00	1.17E+00	8.00E+00	1.24E-01		YES
Benzo(a)anthracene	100		9.80E-03	6.00E-01	1.12E-01	6.00E-01	2.30E+00		No(6)
Benzo(a)pyrene	100		1.00E-02	4.10E-01	9.61E-02	4.10E-01	2.30E+00		No(6)
Benzo(b)fluoranthene	100		1.90E-02	6.60E-01	2.02E-01	6.60E-01	2.30E+00		No(6)
Benzo(e)pyrene	100		1.40E-02	3.30E-01	1.11E-01	3.30E-01	2.30E+00		No(6)
Benzo(g,h,i)perylene	100		2.50E-02	3.80E-01	1.19E-01	3.80E-01	2.30E+00		No(6)
Benzo(k)fluoranthene	100		6.30E-03	2.20E-01	6.10E-02	2.20E-01	2.30E+00		No(6)
beta-BHC	25	5.50E-05	1.90E-03	1.90E-03	8.07E-05	1.74E-03	2.07E+00		No(6)
Biphenyl	75	4.30E-03	1.40E-03	3.40E-03	2.15E-03	3.40E-03	2.30E+00		No(6)
bis(2-Ethylhexyl)phthalate	75	1.90E+00	2.90E-02	4.10E-01	1.96E-02	4.10E-01	2.22E+00		No(1)
Carbazole	50	3.90E-01	6.10E-02	6.90E-01	2.93E-01	6.90E-01			YES
Chrysene	100		1.30E-02	6.00E-01	1.65E-01	6.00E-01	2.30E+00		No(6)
Chrysenes, C1-alky	100		8.50E-03	4.40E-01	8.65E-02	4.40E-01	2.30E+00		No(6)
Chrysenes, C2-alky	100		1.00E-02	1.80E-01	5.57E-02	1.80E-01	2.30E+00		No(6)
Chrysenes, C3-alky	100		1.30E-02	1.30E-01	5.90E-02	1.30E-01	2.30E+00		No(6)
Chrysenes, C4-alky	100		1.20E-02	1.20E-01	4.96E-02	1.20E-01	2.30E+00		No(6)
delta-BHC	25	3.20E-05	1.60E-03	1.60E-03	5.14E-05	1.47E-03	1.12E+00		No(6)
Di-n-Butylphthalate	25	3.90E-01	5.80E-02	5.80E-02	3.14E-01	5.80E-02	2.22E-01		No(6)
Dibenzo(a,h)anthracene	100		2.60E-03	7.10E-02	1.97E-02	7.10E-02	2.30E+00		No(6)
Dibenzothiophene	100		7.20E-04	4.10E-02	5.26E-03	4.10E-02	2.30E+00		No(6)
Dibenzothiophenes, C1-alky	50	4.00E-03	9.90E-03	8.00E-02	7.59E-03	8.00E-02	2.30E+00		No(6)
Dibenzothiophenes, C2-alky	50	4.00E-03	1.70E-02	1.30E-01	9.82E-03	1.30E-01	2.30E+00		No(6)
Dibenzothiophenes, C3-alky	50	4.00E-03	1.80E-02	1.20E-01	9.76E-03	1.20E-01	2.30E+00		No(6)
Dieldrin	75	2.40E-03	7.50E-04	1.90E-03	1.31E-03	1.90E-03	2.22E-01		No(6)
Dimethylphthalate	25	3.90E-01	3.60E-01	3.60E-01	4.95E-01	3.60E-01			No(1)
Fluoranthene	100		1.80E-02	1.10E+00	2.82E-01	1.10E+00	2.30E+00		No(6)
Fluoranth+Pyr, C1-alky	100		1.20E-02	5.70E-01	1.16E-01	5.70E-01	2.30E+00		No(6)
Fluoranth+Pyr, C2-alky	100		1.50E-02	6.00E-01	1.48E-01	6.00E-01	2.30E+00		No(6)
Fluoranth+Pyr, C3-alky	100		8.50E-03	2.00E-01	5.12E-02	2.00E-01	2.30E+00		No(6)

Table 15.6-1
Surface Soil CPEC Selection - Site Superblock

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Fluorene	75	5.40E-03	1.70E-03	3.00E-02	6.01E-03	3.00E-02	2.30E+00		No(6)
Fluorenes, C1-alky	25	5.40E-03	1.60E-02	1.60E-02	4.33E-03	1.46E-02	2.30E+00		No(6)
Fluorenes, C2-alky	25	5.40E-03	3.90E-02	3.90E-02	5.41E-03	3.41E-02	2.30E+00		No(6)
Fluorenes, C3-alky	25	5.40E-03	1.50E-01	1.50E-01	7.57E-03	1.22E-01	2.30E+00		No(6)
gamma-BHC (Lindane)	50	3.90E-05	1.60E-04	1.80E-04	1.52E-04	1.80E-04	7.41E+00		No(6)
gamma-Chlordane	75	1.90E-03	3.30E-03	1.50E-02	3.58E-03	1.50E-02	3.20E+00		No(6)
Hexachlorobenzene	100		7.10E-05	6.90E-04	1.92E-04	6.65E-04			YES
Indeno(1,2,3-cd)pyrene	100		1.40E-02	3.10E-01	9.40E-02	3.10E-01	2.30E+00		No(6)
Methoxychlor	100		1.80E-04	2.90E-03	5.58E-04	2.86E-03	2.06E+01		No(6)
Mirex	75	2.20E-03	3.20E-04	1.90E-03	7.00E-04	1.90E-03			YES
Naphthalenes, C1-alky	100		4.10E-03	2.30E-02	8.26E-03	2.30E-02	2.30E+00		No(6)
Naphthalenes, C2-alky	50	5.60E-03	2.00E-02	4.90E-02	9.49E-03	4.90E-02	2.30E+00		No(6)
Naphthalenes, C3-alky	50	5.60E-03	1.10E-02	4.80E-02	8.13E-03	4.80E-02	2.30E+00		No(6)
Naphthalenes, C4-alky	25	5.60E-03	4.60E-02	4.60E-02	5.81E-03	3.99E-02	2.30E+00		No(6)
PCB-8	50	4.80E-05	2.80E-04	6.20E-04	2.63E-04	6.20E-04	1.24E-01		No(6)
PCB-18	25	9.90E-05	7.50E-03	7.50E-03	4.68E-04	7.50E-03	1.24E-01		No(6)
PCB-28	25	6.70E-05	4.70E-04	4.70E-04	1.74E-04	4.70E-04	1.24E-01		No(6)
PCB-44	50	3.30E-05	1.00E-04	4.00E-04	1.52E-04	4.00E-04	1.24E-01		No(6)
PCB-52	50	2.90E-05	1.30E-03	1.50E-03	3.75E-04	1.50E-03	1.24E-01		No(6)
PCB-77	50	5.40E-05	3.60E-03	1.10E-02	1.09E-03	1.10E-02	1.24E-01		No(6)
PCB-101	50	2.80E-05	2.00E-03	1.60E-02	2.86E-04	1.60E-02	1.24E-01		No(6)
PCB-118	75	2.00E-03	2.40E-03	8.70E-03	2.66E-03	8.70E-03	1.24E-01		No(6)
PCB-128	75	4.00E-05	3.50E-03	4.70E-02	2.69E-03	4.70E-02	1.24E-01		No(6)
PCB-138	100		2.10E-02	6.20E-01	8.58E-02	6.20E-01	1.24E-01		YES
PCB-153	100		1.10E-02	4.60E-01	6.27E-02	4.60E-01	1.24E-01		YES
PCB-170	100		1.80E-02	4.10E-01	7.51E-02	4.10E-01	1.24E-01		YES
PCB-180	100		4.00E-02	7.10E-01	1.34E-01	7.10E-01	1.24E-01		YES
PCB-187	100		3.20E-02	4.00E-01	9.63E-02	4.00E-01	1.24E-01		YES
PCB-195	100		7.70E-03	7.10E-02	7.26E-02	7.10E-02	1.24E-01		No(6)
PCB-206	100		3.90E-03	2.90E-02	9.06E-03	2.90E-02	1.24E-01		No(6)
PCB-209	100		2.90E-04	7.40E-03	1.82E-03	7.40E-03	1.24E-01		No(6)
Perylene	100		4.10E-03	1.10E-01	3.31E-02	1.10E-01	2.30E+00		No(6)
Phenanthrene	100		9.70E-03	7.30E-01	1.13E-01	7.30E-01	2.30E+00		No(6)

Table 15.6-1
Surface Soil CPEC Selection - Site Superblock

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Phenanth+Anthra., C1-alky	100		8.20E-03	4.70E-01	6.81E-02	4.70E-01	2.30E+00		No(6)
Phenanth+Anthra., C2-alky	100		9.20E-03	3.80E-01	5.90E-02	3.80E-01	2.30E+00		No(6)
Phenanth+Anthra., C3-alky	75	6.70E-03	2.60E-02	1.90E-01	3.21E-02	1.90E-01	2.30E+00		No(6)
Phenanth+Anthra., C4-alky	75	6.70E-03	8.90E-02	3.50E-01	6.07E-02	3.50E-01	2.30E+00		No(6)
Pyrene	100		1.80E-02	1.10E+00	2.54E-01	1.10E+00	2.30E+00		No(6)
trans-Nonachlor	75	1.10E-03	2.50E-03	1.20E-02	2.72E-03	1.20E-02			YES

*TBC values are NOAEL dietary concentrations assuming a diet of 100% soil, from Opresko et. al. (1994) ; values for B(a)P were substituted for PAHs without a dose in Opresko, and the value for Arochlor 1248 was substituted for all the PCB congeners.
**Mean value of background surface soil samples taken on Sand Island.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 15.6-2
Subsurface Soil CPEC Selection - Site Superblock

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic									
Aluminum	20	5.10E+00	8.10E+00	8.10E+00	3.21E+00	5.95E+00	2.23E+02	9.29E+00	No(p)
Barium	100		5.10E+00	1.24E+01	6.44E+00	9.91E+00	3.85E+01	8.19E+00	No(p)
Beryllium	100		2.50E-01	4.70E-01	3.49E-01	4.70E-01	3.41E+00	2.64E-01	No(p)
Cadmium	80	7.00E-02	9.00E-02	2.20E-01	1.04E-01	2.05E-01	5.63E+00	6.15E-02	No(6)
Calcium	100		3.15E+05	3.87E+05	3.55E+05	3.87E+05		2.76E+05	No(3)
Chromium	100		4.70E+00	6.20E+00	5.44E+00	6.11E+00	3.99E+00	6.09E+00	No(5)
Copper	60	6.50E-01	5.00E-01	3.20E+00	8.07E-01	2.31E+00	1.00E+02	7.67E-01	No(6)
Iron	80	8.50E+00	9.40E+00	5.78E+01	1.41E+01	4.44E+01		3.36E+01	No(p)
Lead	20	2.90E-01	2.40E+00	2.40E+00	2.54E-01	1.49E+00	7.28E+00	4.02E-01	No(6)
Magnesium	100		1.20E+04	1.65E+04	1.37E+04	1.57E+04		1.72E+04	No(3)
Manganese	100		3.20E+00	4.30E+00	3.50E+00	4.03E+00	4.54E+02	7.21E+00	No(5)
Selenium	100		1.20E+00	2.00E+00	1.57E+00	1.98E+00	1.85E+00	1.83E+00	No(5)
Silver	20	1.30E+00	1.50E+00	1.50E+00	7.68E-01	1.22E+00		8.61E-01	No(5)
Sodium	100		2.31E+03	2.70E+03	2.57E+03	2.70E+03		2.68E+03	No(3)
Vanadium	100		8.30E-01	1.80E+00	1.26E+00	1.75E+00	4.44E+01	1.58E+00	No(5)
Zinc	40	8.80E-01	1.10E+00	2.70E+00	1.25E+00	2.49E+00	1.11E+01	2.08E+00	No(5)
Organic									
(Meta+Para)-Xylene	20	1.00E-03	2.60E-02	2.60E-02	1.10E-03	1.08E-02			YES
2-Methylnaphthalene	20	3.60E-01	3.20E+01	3.20E+01	5.16E-01	7.33E+00			No(1)
Acetone	80	1.00E-01	5.10E-02	2.80E-01	7.56E-02	1.77E-01	5.16E+01		No(1)
Chlorobenzene	20	1.00E-03	1.70E-01	1.70E-01	1.60E-03	4.32E-02			YES
Ethylbenzene	20	1.00E-03	2.10E-02	2.10E-02	1.06E-03	9.21E-03			YES
Methylene Chloride	60	6.00E-03	1.00E-02	1.20E-02	9.04E-03	1.20E-02	3.02E+01		No(1)
Phenanthrene	20	3.60E-01	1.60E+00	1.60E+00	2.83E-01	8.63E-01	2.30E+00		No(6)
Pyrene	20	3.60E-01	1.20E+00	1.20E+00	2.67E-01	7.02E-01	2.30E+00		No(6)

*TBC values are NOAEL dietary concentrations assuming a diet of 100% soil, from Opresko et. al. (1994) ; values for B(a)P were substituted for PAHs without a dose in Opresko, and the value for Arochlor 1248 was substituted for all the PCB congeners.
**Mean value of background subsurface soil samples taken on Sand Island.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 15.6-3
Groundwater CPEC Selection - Site Superblock

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (ug/l)	Range of detected Concentrations Minimum (ug/l)	Range of detected Concentrations Maximum (ug/l)	Mean Concentration (ug/l)	Environmental Concentration (EC) (ug/l)	ARAR Values* (ug/l)	Background Concentration** (ug/l)	CPEC?
Inorganic									
Aluminum	40	2.30E+01	1.11E+02	1.18E+02	2.88E+01	1.18E+02	2.60E+02	3.89E+00	No(p)
Arsenic	60	2.20E+00	5.60E+00	9.10E+00	3.31E+00	9.10E+00	3.60E+01	3.90E+00	No(5)
Barium	100		7.30E+00	2.56E+01	1.24E+01	2.19E+01	1.09E+02	6.01E+00	No(p)
Beryllium	60	6.00E-01	2.10E+00	2.60E+00	1.05E+00	2.60E+00	5.30E+00		No(p)
Calcium	100		4.51E+04	1.25E+05	6.49E+04	1.03E+05		2.08E+05	No(3)
Chromium	40	4.00E+00	4.10E+00	4.30E+00	2.69E+00	4.29E+00	5.00E+01	2.03E+00	No(6)
Copper	40	2.00E+00	2.10E+00	9.40E+00	1.82E+00	5.90E+00	2.90E+00	1.22E+00	YES
Iron	20	8.40E+00	2.20E+02	2.20E+02	3.88E+01	1.98E+02	1.00E+03	4.74E+02	No(p)
Lead	40	1.30E+00	2.60E+00	2.94E+01	1.84E+00	1.37E+01	5.60E+00	8.66E-02	YES
Magnesium	100		1.30E+04	6.83E+04	3.36E+04	6.83E+04		1.10E+05	No(3)
Manganese	80	2.50E+00	1.04E-01	3.49E+02	3.82E+01	3.49E+02	1.10E+01	5.89E+00	YES
Mercury	20	1.00E-01	1.60E-01	1.60E-01	6.31E-02	1.27E-01	3.00E-02	1.02E-03	YES
Potassium	100		3.24E+03	8.36E+03	5.52E+03	8.32E+03		2.50E+04	No(3)
Sodium	100		1.34E+04	6.16E+04	4.22E+04	6.16E+04		1.57E+04	No(3)
Vanadium	60	3.00E+00	3.40E+00	1.01E+01	3.30E+00	8.33E+00	3.00E+00	6.24E+00	No(5)
Zinc	60	4.00E+00	6.80E+00	8.26E+01	8.25E+00	4.94E+01	8.60E+01	1.58E+01	No(5)
Organic									
1,4-Dichlorobenzene	20	9.00E+00	3.70E+02	3.70E+02	1.58E+01	1.42E+02			YES
2-Methylnaphthalene	20	9.00E+00	1.20E+02	1.20E+02	1.27E+01	6.66E+01			YES
Benzene	20	1.00E+00	2.00E+00	2.00E+00	6.60E-01	1.46E+00	7.00E+02		No(6)
bis(2-Ethylhexyl)phthalate	40	9.00E+00	1.00E+00	1.00E+00	4.82E+00	1.00E+00	3.00E+00		No(1)
Butylbenzylphthalate	20	9.00E+00	1.00E+00	1.00E+00	6.65E+00	1.00E+00	3.00E+00		No(1)
Carbazole	20	9.00E+00	4.50E+01	4.50E+01	1.04E+01	3.58E+01			YES
Chlorobenzene	20	1.00E+00	1.50E+03	1.50E+03	2.48E+00	2.07E+02			YES
Chloroform	20	1.00E+00	4.00E+00	4.00E+00	7.58E-01	2.54E+00	1.24E+03		No(6)
Ethylbenzene	20	1.00E+00	2.00E+01	2.00E+01	1.05E+00	8.88E+00			YES
Naphthalene	20	9.00E+00	2.00E+02	2.00E+02	1.40E+01	9.36E+01	6.20E+02		No(6)
Ortho-Xylene	20	1.00E+00	2.00E+00	2.00E+00	6.60E-01	1.46E+00			YES

*The lowest marine chronic value from the NAWQC and HWQC was used when available, then freshwater chronic and freshwater and marine acute values were used if no chronic numbers were listed. For PAHs with no NAWQC or HWQC the value for Fluoranthene (16 ug/L) was used.
**Mean value of background ground water samples taken on Sand Island.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 15.6-4
CPEC Environmental Concentrations in all Abiotic Media - Site Superblock

Analyte	EC (mg/kg) Surface Soil	EC (mg/kg) Subsurface Soil	EC (mg/L) Groundwater
Inorganic			
Antimony	2.38E+01		
Arsenic	6.52E+01		
Chromium	1.11E+02		
Cobalt	5.20E+00		
Copper	1.66E+02		5.90E-03
Lead	5.87E+02		1.37E-02
Manganese			3.49E-01
Mercury	2.49E-01		1.27E-04
Silver	1.64E+00		
Thallium	6.22E-02		
Tin	7.62E+00		
Zinc	5.92E+02		
Organic			
(Meta+Para)-Xylene		1.08E-02	
1,4-Dichlorobenzene			1.42E-01
2-Methylnaphthalene			6.66E-02
4,4'-DDE	1.70E-02		
4,4'-DDT	3.70E-02		
Aroclor-1260	8.00E+00		
Carbazole	6.90E-01		3.58E-02
Chlorobenzene		4.32E-02	2.07E-01
Ethylbenzene		9.21E-03	8.88E-03
Hexachlorobenzene	6.65E-04		
Mirex	1.90E-03		
Ortho-Xylene			1.46E-03
PCB-138	6.20E-01		
PCB-153	4.60E-01		
PCB-170	4.10E-01		
PCB-180	7.10E-01		
PCB-187	4.00E-01		
trans-Nonachlor	1.20E-02		

Blanks indicate that the analyte was not chosen as a CPEC for that medium

Table 15.6-5
Target Receptor Exposure Point Values - Site Superblock

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Ground-nesting Bird (Laysan albatross)			Burrowing Bird (Bonin petrel)				Shorebird (golden-plover)	
	dermal (mg/kg-d)	ingestion (mg/kg-d)	EPV_{gn} (mg/kg-d)	dermal (mg/kg-d)	ingestion (mg/kg-d)	vapor (mg/kg-d)	EPV_{bb} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{sb} (mg/kg-d)
Inorganic									
Antimony	2.46E-02	7.65E-03	3.23E-02	ND	ND	ND	ND	2.79E-08	2.79E-08
Arsenic	6.74E-02	2.10E-02	8.84E-02	ND	ND	ND	ND	1.53E-07	1.53E-07
Chromium	1.15E-01	3.57E-02	1.50E-01	ND	ND	ND	ND	7.15E-07	7.15E-07
Cobalt	5.38E-03	1.67E-03	7.05E-03	ND	ND	ND	ND	1.22E-07	1.22E-07
Copper	1.72E-01	5.34E-02	2.25E-01	ND	ND	ND	ND	1.94E-06	1.94E-06
Lead	6.07E-01	1.89E-01	7.96E-01	ND	ND	ND	ND	2.06E-07	2.06E-07
Mercury	2.57E-04	8.01E-05	3.38E-04	ND	ND	ND	ND	7.29E-08	7.29E-08
Silver	1.70E-03	5.27E-04	2.22E-03	ND	ND	ND	ND	5.76E-09	5.76E-09
Thallium	6.43E-05	2.00E-05	8.43E-05	ND	ND	ND	ND	2.91E-09	2.91E-09
Tin	7.88E-03	2.45E-03	1.03E-02	ND	ND	ND	ND	7.13E-07	7.13E-07
Zinc	6.12E-01	1.90E-01	8.03E-01	ND	ND	ND	ND	6.93E-05	6.93E-05
Organic									
(Meta+Para)-Xylene	ND	ND	ND	1.56E-03	1.01E-05	4.04E-05	1.61E-03	ND	ND
4,4'-DDE	1.76E-04	5.47E-06	1.81E-04	ND	ND	ND	ND	8.22E-04	8.22E-04
4,4'-DDT	3.83E-04	1.19E-05	3.95E-04	ND	ND	ND	ND	1.19E-03	1.19E-03
Aroclor-1260	4.14E-01	2.57E-03	4.16E-01	ND	ND	ND	ND	3.60E-01	3.60E-01
Carbazole	3.57E-02	2.22E-04	3.59E-02	ND	ND	ND	ND	3.39E-02	3.39E-02
Chlorobenzene	ND	ND	ND	6.26E-03	4.06E-05	1.62E-04	6.46E-03	ND	ND
Ethylbenzene	ND	ND	ND	1.33E-03	8.65E-06	2.84E-05	1.37E-03	ND	ND
Hexachlorobenzene	3.44E-05	2.14E-07	3.46E-05	ND	ND	ND	ND	5.76E-05	5.76E-05
Mirex	9.82E-05	6.11E-07	9.89E-05	ND	ND	ND	ND	5.05E-04	5.05E-04
PCB-138	3.21E-02	1.99E-04	3.23E-02	ND	ND	ND	ND	9.48E-02	9.48E-02
PCB-153	2.38E-02	1.48E-04	2.39E-02	ND	ND	ND	ND	3.77E-04	3.77E-04
PCB-170	2.12E-02	1.32E-04	2.13E-02	ND	ND	ND	ND	4.59E-03	4.59E-03
PCB-180	3.67E-02	2.28E-04	3.69E-02	ND	ND	ND	ND	3.02E-02	3.02E-02
PCB-187	2.07E-02	1.29E-04	2.08E-02	ND	ND	ND	ND	1.70E-02	1.70E-02
trans-Nonachlor	6.20E-04	3.86E-06	6.24E-04	ND	ND	ND	ND	5.11E-04	5.11E-04

ND = not detected/not selected as CPEC
DG = data gap; no parameter available for exposure calculation

Table 15.6-6
Toxicity Quotients for Target Receptors - Site Superblock

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Ground-nesting Bird (Laysan albatross)			Burrowing Bird (Bonin petrel)			Shorebird (golden-plover)		
	EPV	TRV	TQ*	EPV	TRV	TQ*	EPV	TRV	TQ*
Inorganic									
Antimony	3.23E-02	3.50E-03	0.96	ND	3.50E-03		2.79E-08	3.50E-03	
Arsenic	8.84E-02	1.02E+00		ND	1.02E+00		1.53E-07	1.02E+00	
Chromium	1.50E-01	2.00E-01		ND	2.00E-01		7.15E-07	2.00E-01	
Cobalt	7.05E-03	5.40E-02		ND	5.40E-02		1.22E-07	5.40E-02	
Copper	2.25E-01	8.40E+00		ND	8.40E+00		1.94E-06	8.40E+00	
Lead	7.96E-01	8.40E-01		ND	8.40E-01		2.06E-07	8.40E-01	
Mercury	3.38E-04	8.62E+01		ND	8.62E+01		7.29E-08	8.62E+01	
Silver	2.22E-03	1.00E+01		ND	1.00E+01		5.76E-09	1.00E+01	
Thallium	8.43E-05	2.40E+00		ND	2.40E+00		2.91E-09	2.40E+00	
Tin	1.03E-02	5.00E-01		ND	5.00E-01		7.13E-07	5.00E-01	
Zinc	8.03E-01	1.18E+02		ND	1.18E+02		6.93E-05	1.18E+02	
Organic									
(Meta+Para)-Xylene	ND	2.06E-01		1.61E-03	2.06E-01		ND	2.06E-01	
4,4'-DDE	1.81E-04	3.00E-02		ND	3.00E-02		8.22E-04	3.00E-02	
4,4'-DDT	3.95E-04	1.10E-01		ND	1.10E-01		1.19E-03	1.10E-01	
Aroclor-1260	4.16E-01	8.40E-02	0.70	ND	8.40E-02		3.60E-01	8.40E-02	0.63
Carbazole	3.59E-02	5.00E+00		ND	5.00E+00		3.39E-02	5.00E+00	
Chlorobenzene	ND	2.73E+00		6.46E-03	2.73E+00		ND	2.73E+00	
Ethylbenzene	ND	1.36E+01		1.37E-03	1.36E+01		ND	1.36E+01	
Hexachlorobenzene	3.46E-05	1.00E+00		ND	1.00E+00		5.76E-05	1.00E+00	
Mirex	9.89E-05	5.10E-01		ND	5.10E-01		5.05E-04	5.10E-01	
PCB-138	3.23E-02	1.47E+02		ND	1.47E+02		9.48E-02	1.47E+02	
PCB-153	2.39E-02	1.93E+02		ND	1.93E+02		3.77E-04	1.93E+02	
PCB-170	2.13E-02	2.60E-01		ND	2.60E-01		4.59E-03	2.60E-01	
PCB-180	3.69E-02	9.50E+01		ND	9.50E+01		3.02E-02	9.50E+01	
PCB-187	2.08E-02	1.90E-01		ND	1.90E-01		1.70E-02	1.90E-01	
trans-Nonachlor	6.24E-04	1.20E+00		ND	1.20E+00		5.11E-04	1.20E+00	

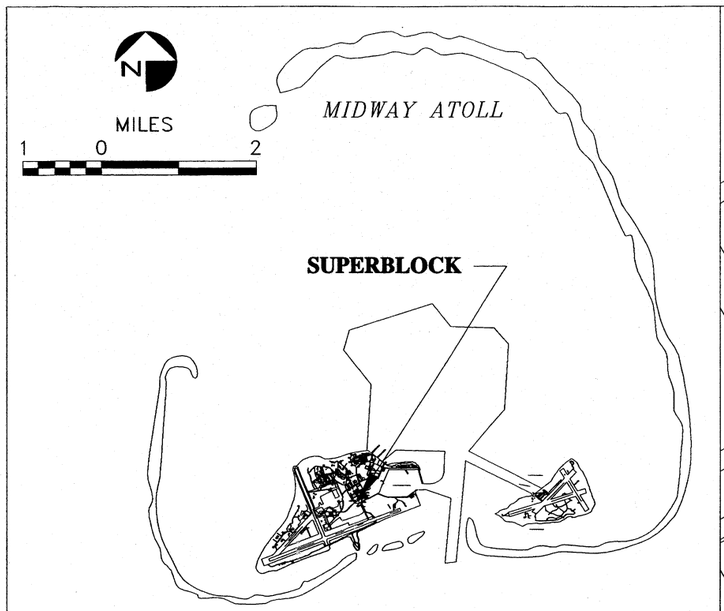
* TQ = log(EPV/TRV); only data gaps (DG) and TQ values greater than or equal to 0 are shown
ND = not detected/not selected as CPEC
DG = data gap; no parameter available for exposure calculation

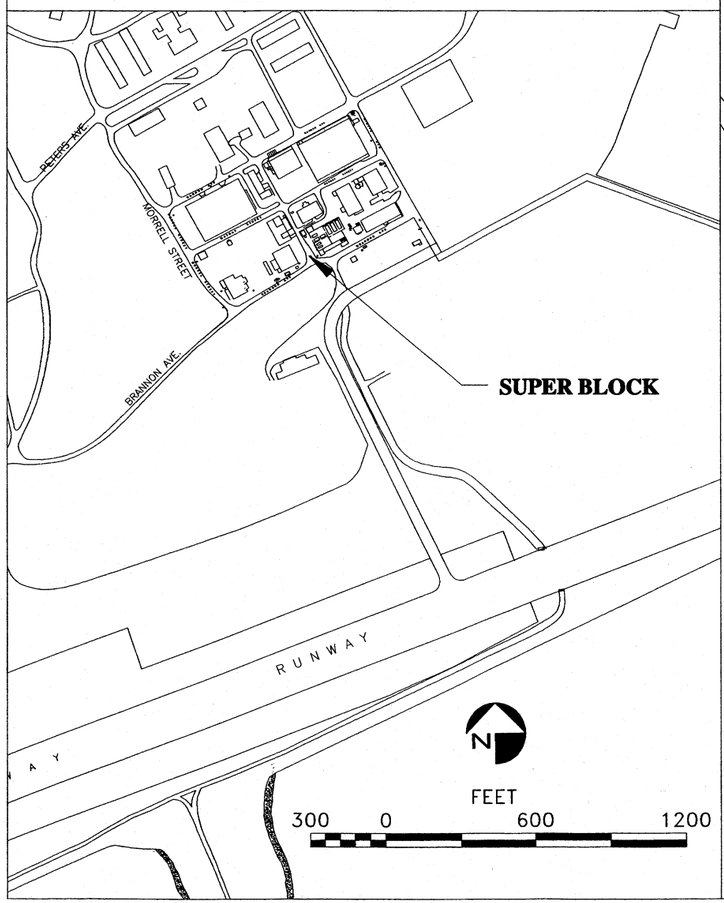
Table 15.6-7
Risk Description (Weight-of-Evidence) Summary - Superblock

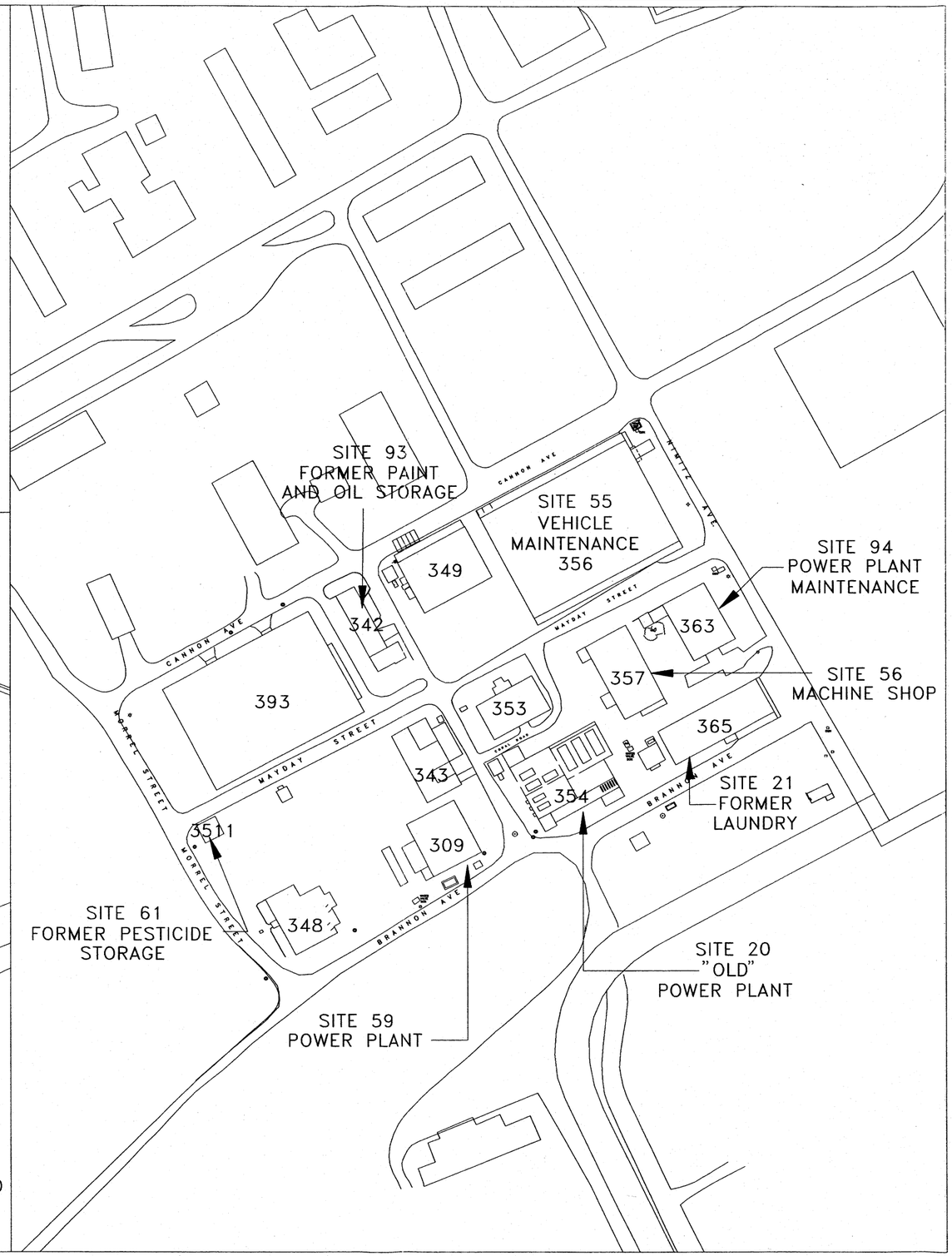
ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
• Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
No probability for acute or chronic adverse affects in any individuals of special status bird species from direct and/or secondary exposure to site-related CPEC.							NO
• Impairment of reproduction in ground-nesting birds	CPEC present in several abiotic media		TQ s for antimony = 0.96 and for Aroclor 1260 = 0.7				
• Impairment of reproduction in burrowing birds	CPEC present in several abiotic media		all TQ < 0				
• Impairment of reproduction in shorebirds	CPEC present in several abiotic media		TQ s for Aroclor 1260 = 0.63				

DG = data gap precludes possibility of analysis

Figures
Section 15







LEGEND

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITESB\05169558.DWG DATE: 5-16-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

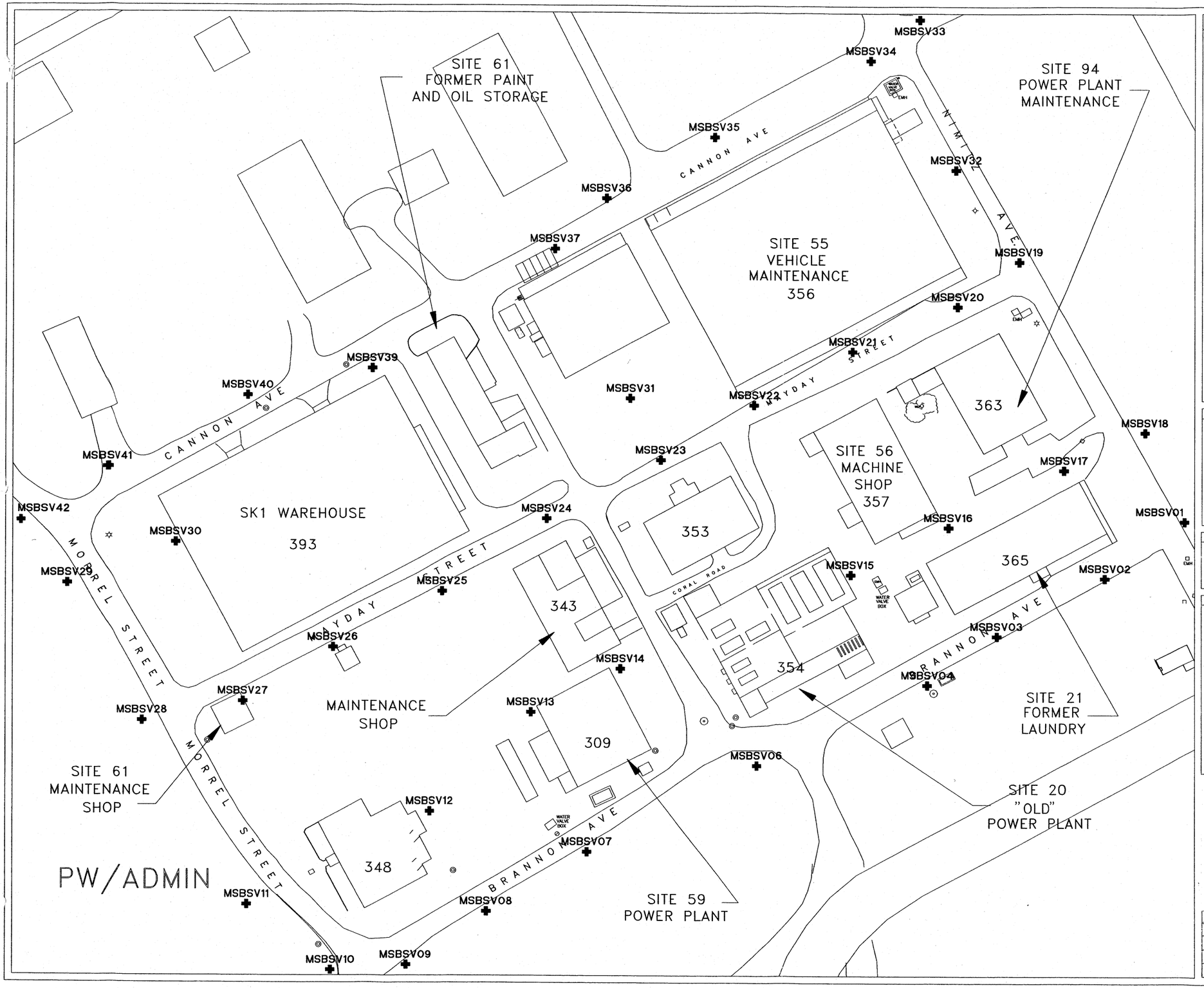
TITLE

SUPER BLOCK
(SITES 20, 21, 55, 56, 59, 61, 93, 94)
SAND ISLAND

FEET
100 0 200 400

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
15.1-1



LEGEND

M##SV## — SOIL VAPOR SAMPLE LOCATION AND IDENTIFICATION NUMBER

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5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITESB\05169559.DWG DATE: 5-16-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

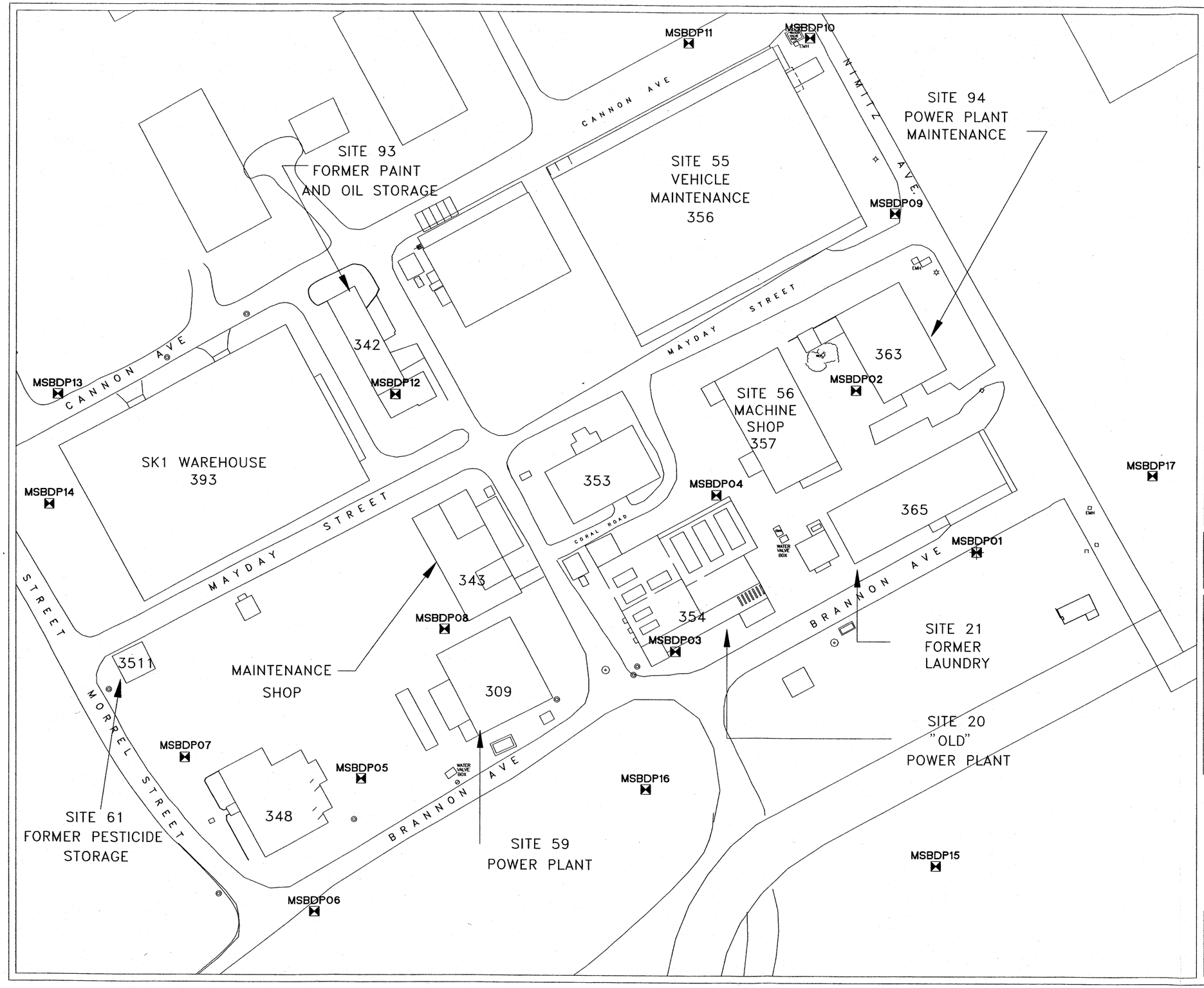
SOIL VAPOR SAMPLE LOCATIONS
SUPER BLOCK
SAND ISLAND

N

FEET
50 0 100 200

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
15.2-1



LEGEND

M##DP## — DIRECT PUSH SAMPLE LOCATION AND IDENTIFICATION NUMBER

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217,
DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITESB\05169561.DWG DATE: 5-16-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

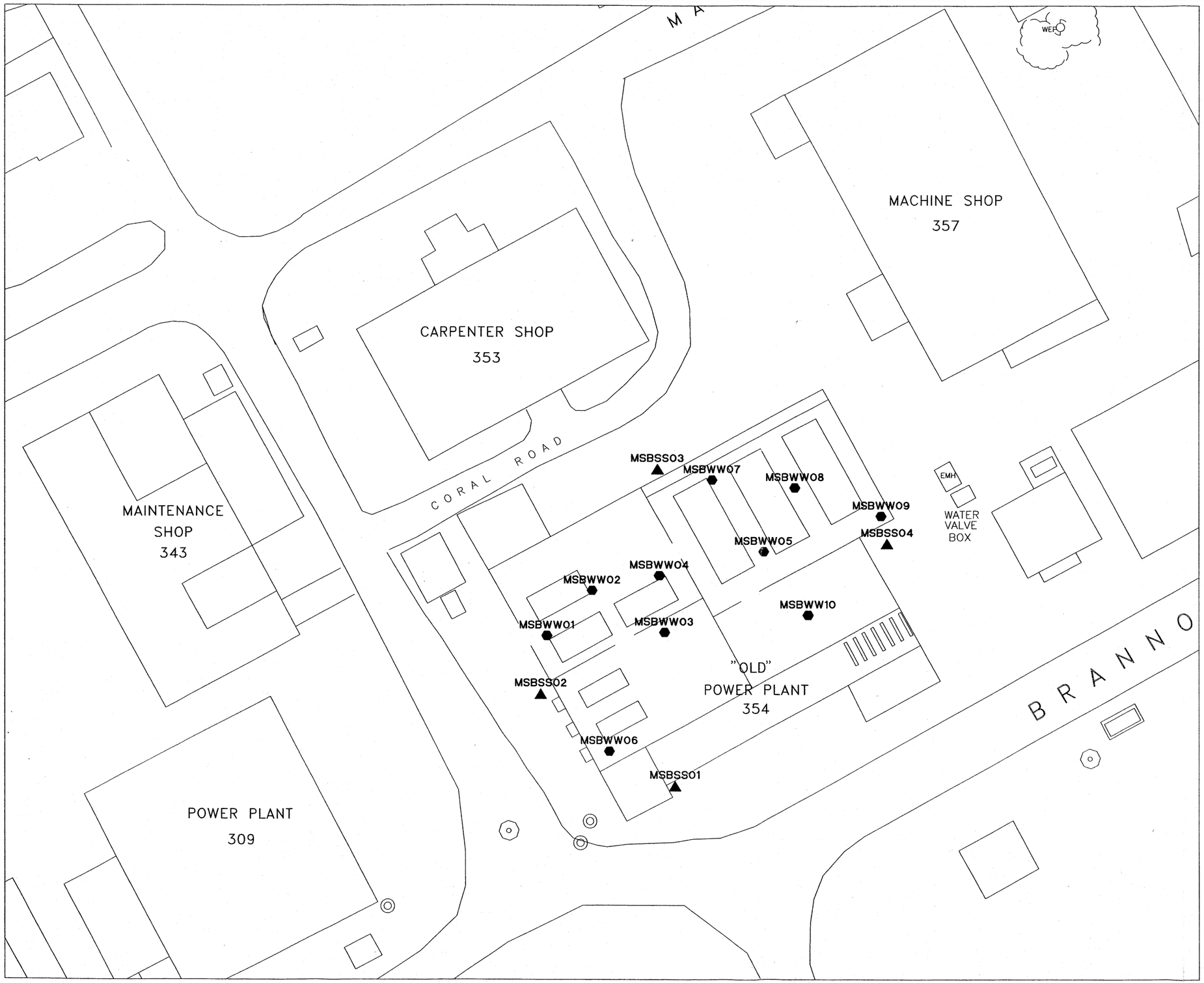
DIRECT PUSH SAMPLE LOCATIONS
SUPER BLOCK
SAND ISLAND

N

FEET
50 0 100 200

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
15.2-2



LEGEND

M##SS## ▲ SURFACE SOIL SAMPLE LOCATION AND IDENTIFICATION NUMBER

M##WW## ⬢ PCB WIPE SAMPLE LOCATION AND IDENTIFICATION NUMBER

NOTES

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5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITESB\05169562.DWG DATE: 5-16-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

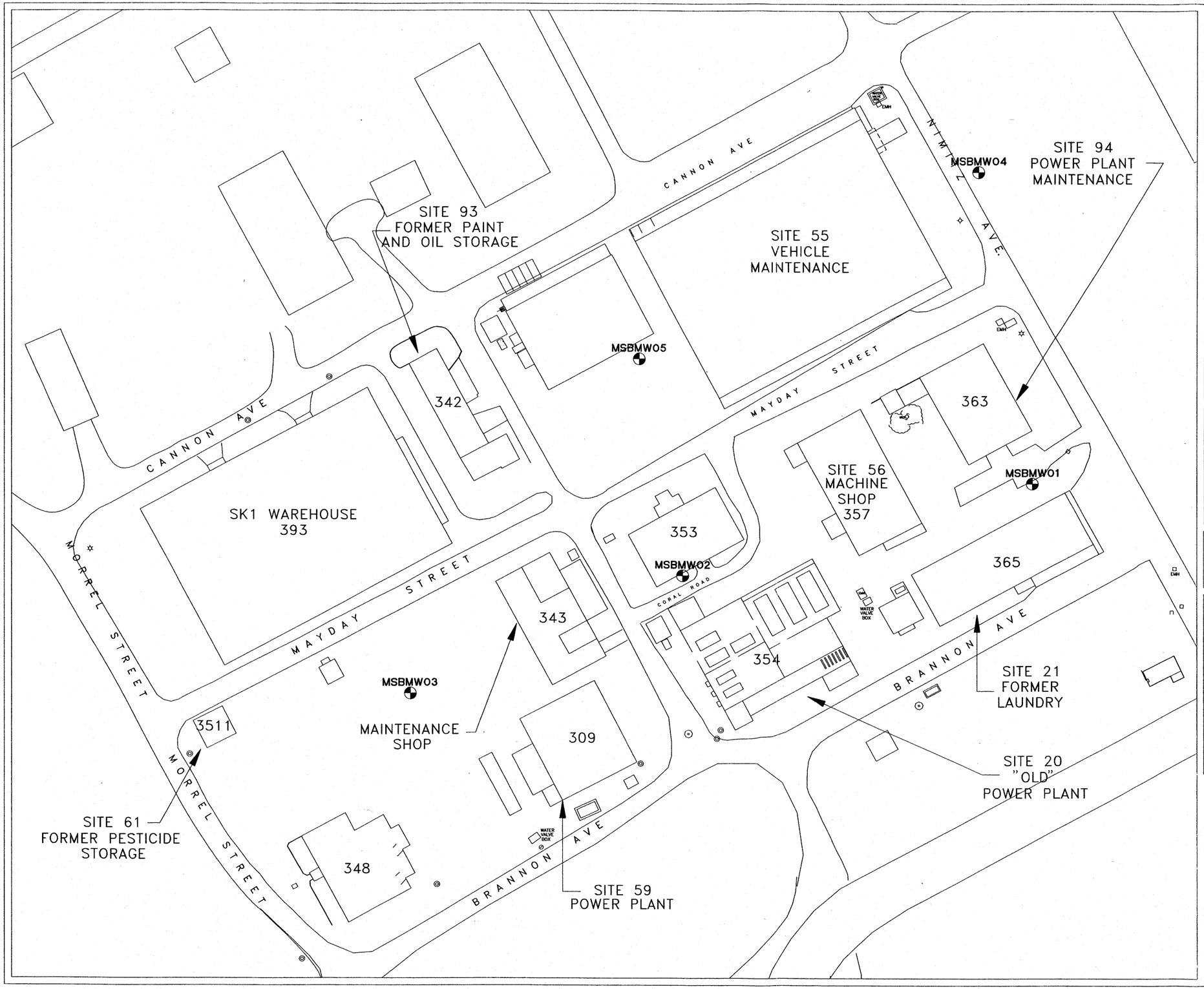
SURFACE SOIL AND PCB WIPE SAMPLE LOCATIONS SUPER BLOCK SAND ISLAND

N

FEET
20 0 40 80

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
15.2-3



LEGEND

M##MW## — MONITORING WELL LOCATION AND IDENTIFICATION NUMBER

NOTES

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5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITESB\05169563.DWG DATE: 5-16-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

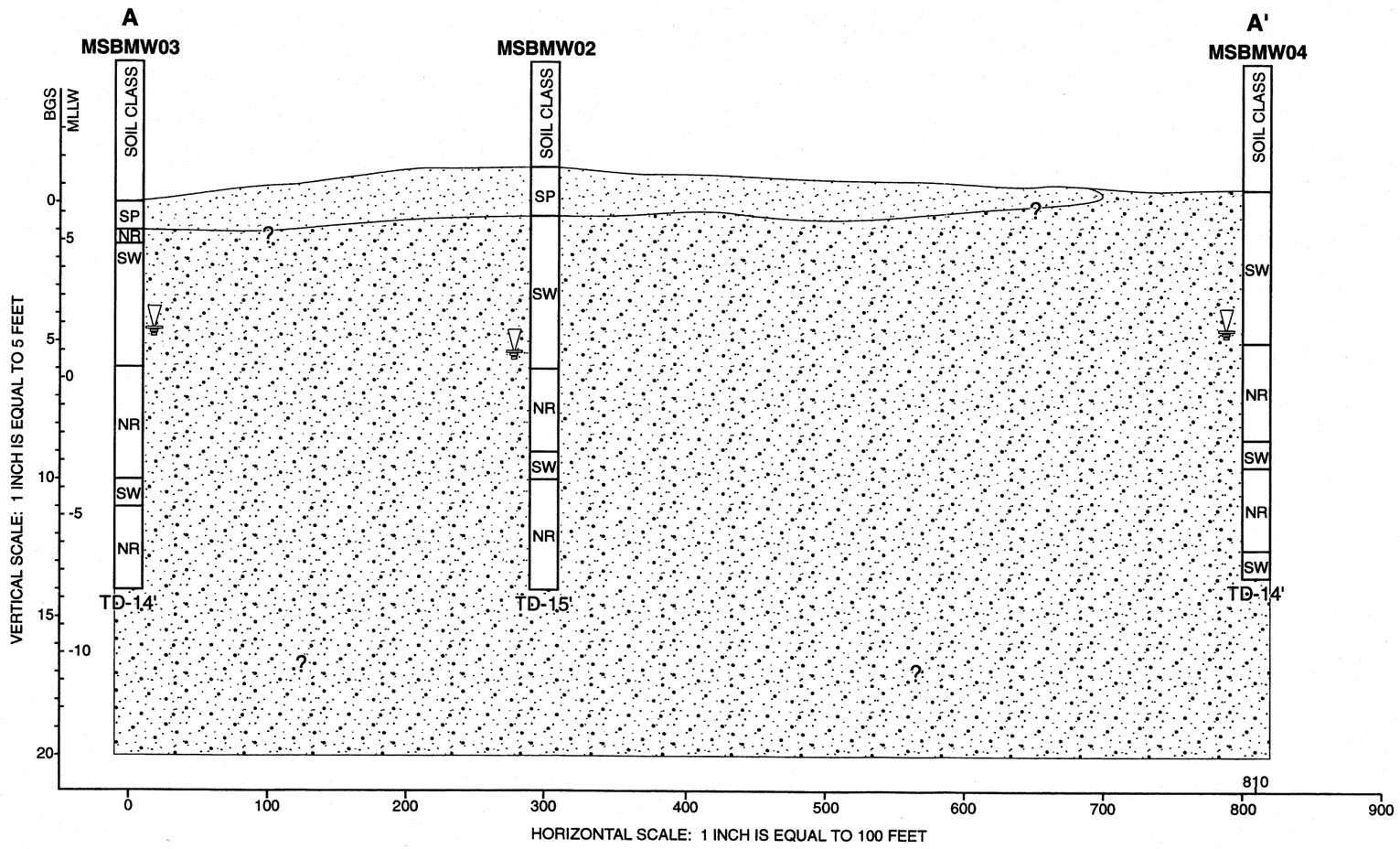
MONITORING WELL LOCATIONS
SUPER BLOCK
SAND ISLAND

N

FEET
50 0 100 200

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
15.2-4



LEGEND

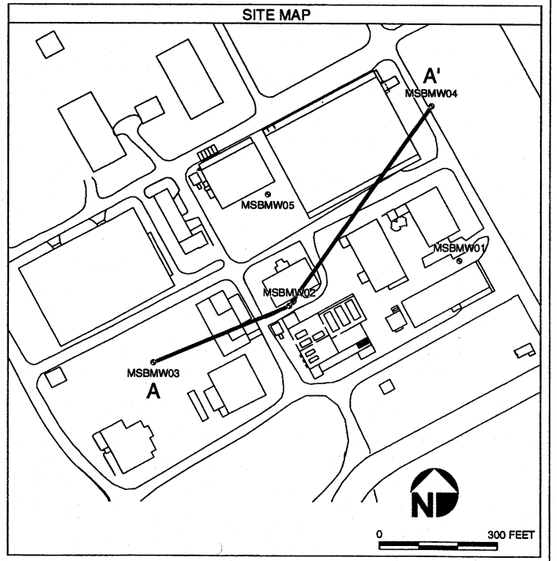
SP	SILTY CORAL SAND, FINE- TO COURSE-GRAINED, PALE YELLOW, POORLY SORTED WITH SOME CORAL GRAVEL
SW	CORAL SAND, FINE GRAINED, PALE YELLOW, WELL SORTED
NR	NO RECOVERY
	BORE HOLE
	STATIC GROUNDWATER LEVEL
BGS	BELOW GROUND SURFACE
MLLW	MEAN LOW LOW WATER
TD	TOTAL DEPTH

VERTICAL EXAGERATION = 20X

TITLE

GEOLOGIC CROSS SECTION A-A'
SUPER BLOCK
SAND ISLAND

SITE MAP



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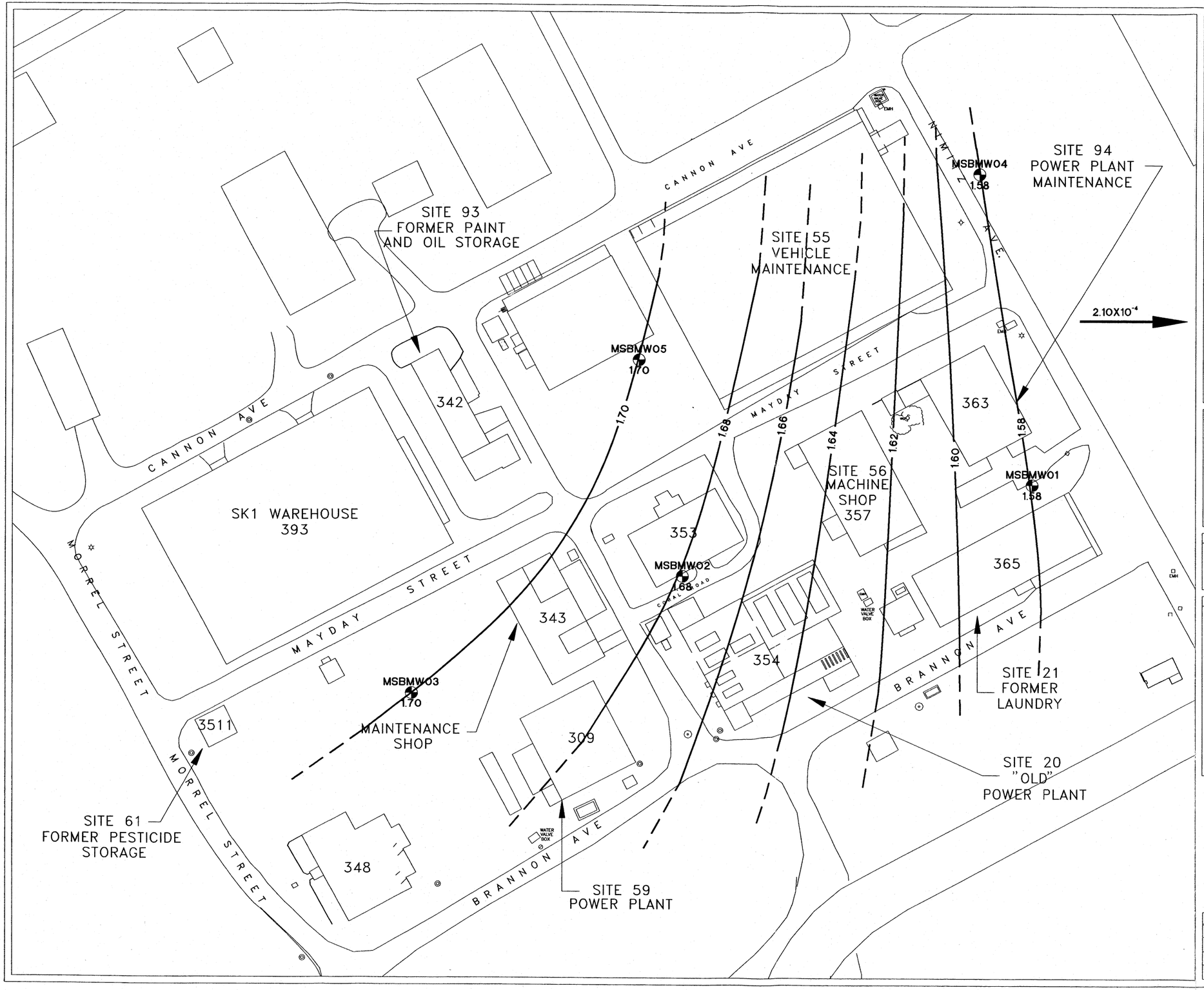
5. PROJECT NUMBER: 110190136
6. FILE: ..\MIDWAY\SITEINVS\CORELDRW\05269505.CDR

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
6\02\95		JCS		HFP		BDH	

FIGURE

15.4-1



LEGEND

M##MW## 1.70	MONITORING WELL LOCATION, IDENTIFICATION NUMBER, AND WATER LEVEL ELEVATION (11-16-94)
1.70	EQUIPOTENTIAL LINES
	AVERAGE GROUNDWATER GRADIENT (FT/FT)
1.70	ALL VALUES MEASURED IN FEET (MLLW)

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITESB\05169565.DWG DATE: 6-13-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

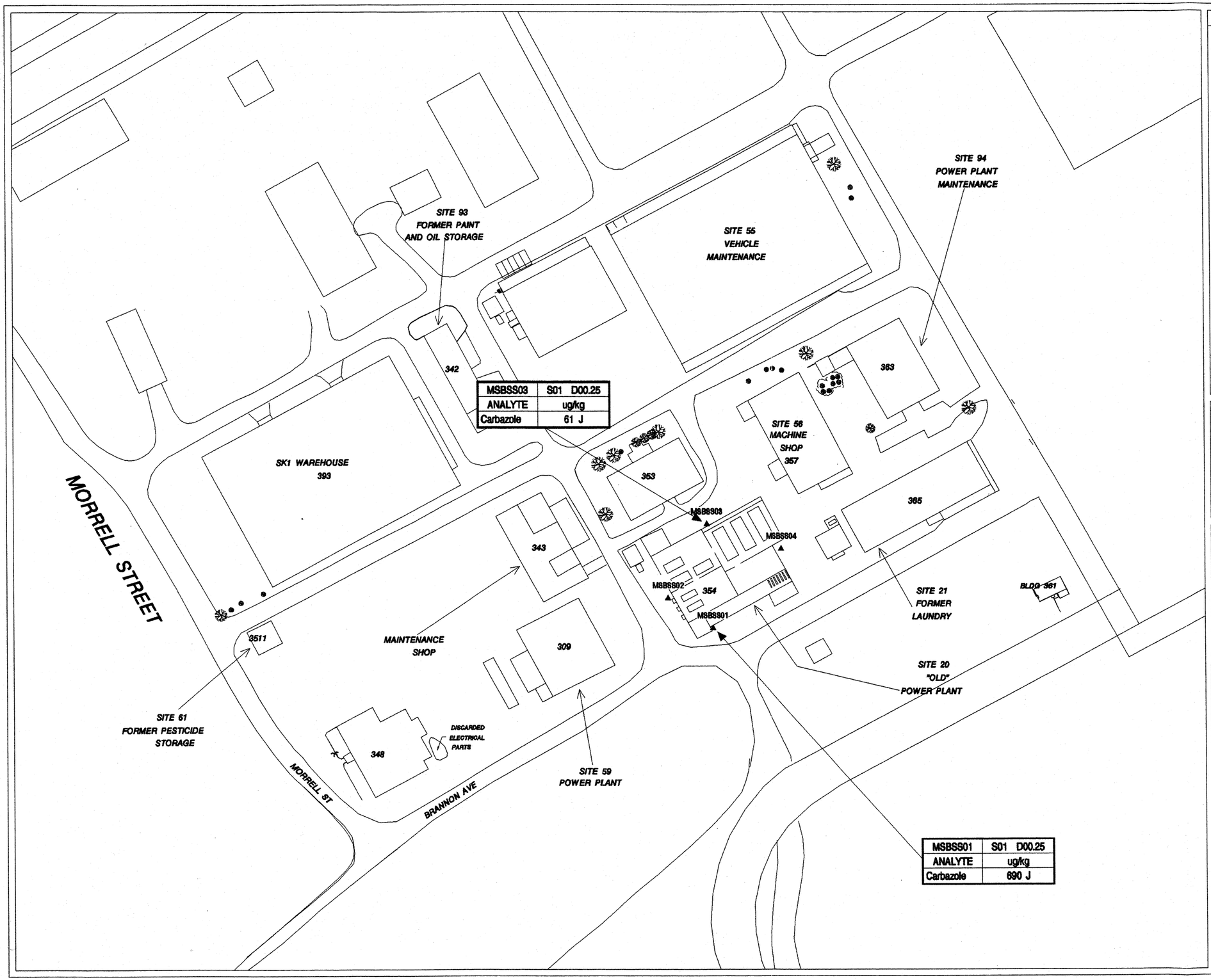
GROUNDWATER CONTOURS AND AVERAGE GRADIENT NOVEMBER 16 1994 AT 1100 RISING TIDE SUPER BLOCK SAND ISLAND

N

FEET
50 0 100 200

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
15.4-2



MSBSS03	S01 D00.25
ANALYTE	ug/kg
Carbazole	61 J

MSBSS01	S01 D00.25
ANALYTE	ug/kg
Carbazole	690 J

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
MSBSS02	OGDEN SAMPLE ID
690	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (M.L.W)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-8, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appe/hm/cto136/maps/m51699588

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 1038856 & 1038857

TITLE

SEMIVOLATILE ORGANIC COMPOUNDS DETECTED IN SURFACE SOIL SAMPLES (SITE SB) SAND ISLAND

N

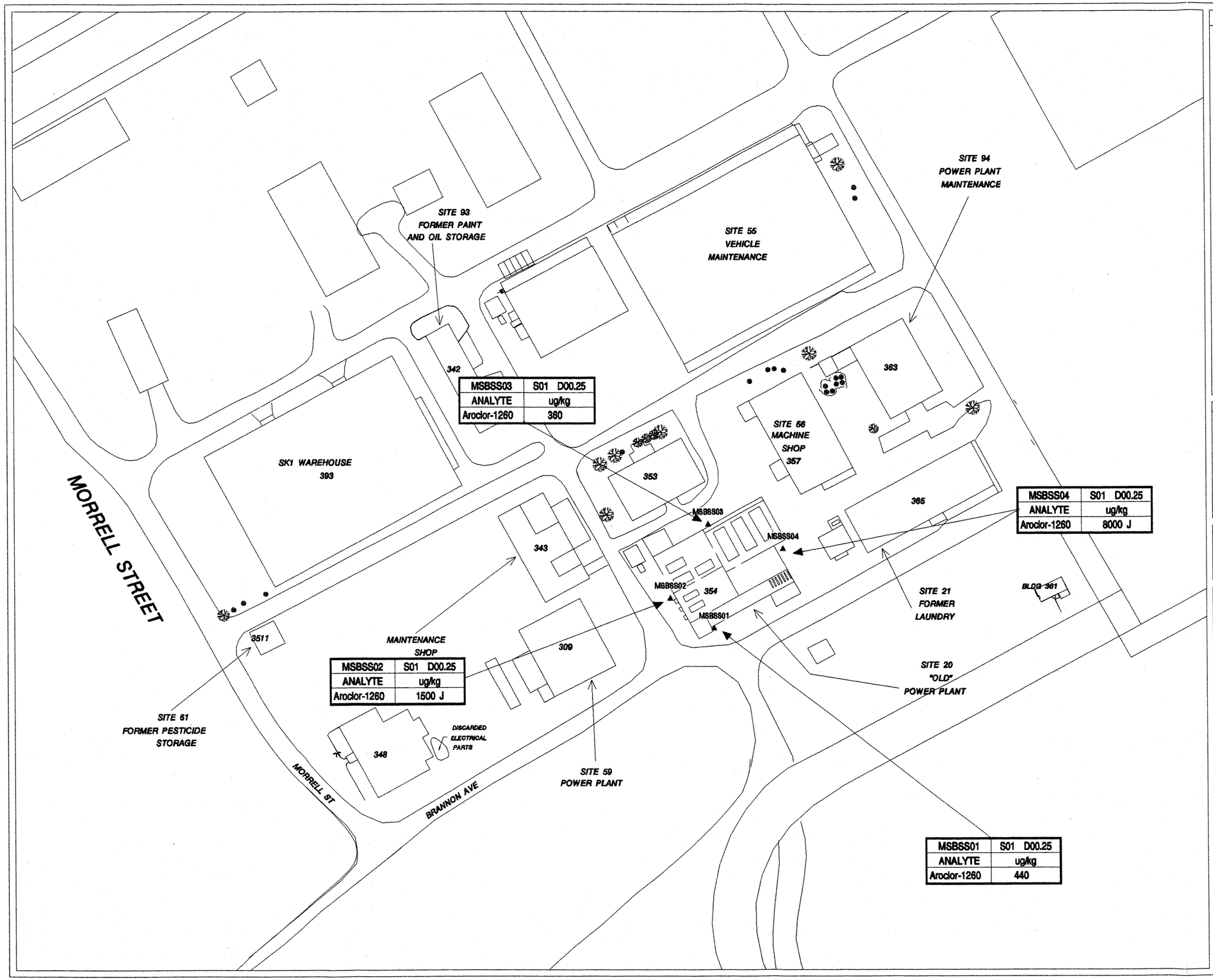
FEET

0 60 120 240 360

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	cmf	HPP	HPP	JMC	JMC

FIGURE

15.5-1



MSBSS03	S01 D00.25
ANALYTE	ug/kg
Aroclor-1260	360

MSBSS04	S01 D00.25
ANALYTE	ug/kg
Aroclor-1260	8000 J

MSBSS02	S01 D00.25
ANALYTE	ug/kg
Aroclor-1260	1500 J

MSBSS01	S01 D00.25
ANALYTE	ug/kg
Aroclor-1260	440

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
MSBSS02	OGDEN SAMPLE ID
8000	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appe/hm/cto138/mape/m5169569

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 1038856 & 1038857

TITLE

PESTICIDES AND PCB'S DETECTED IN SURFACE SOIL SAMPLES (SITE SB) SAND ISLAND

N

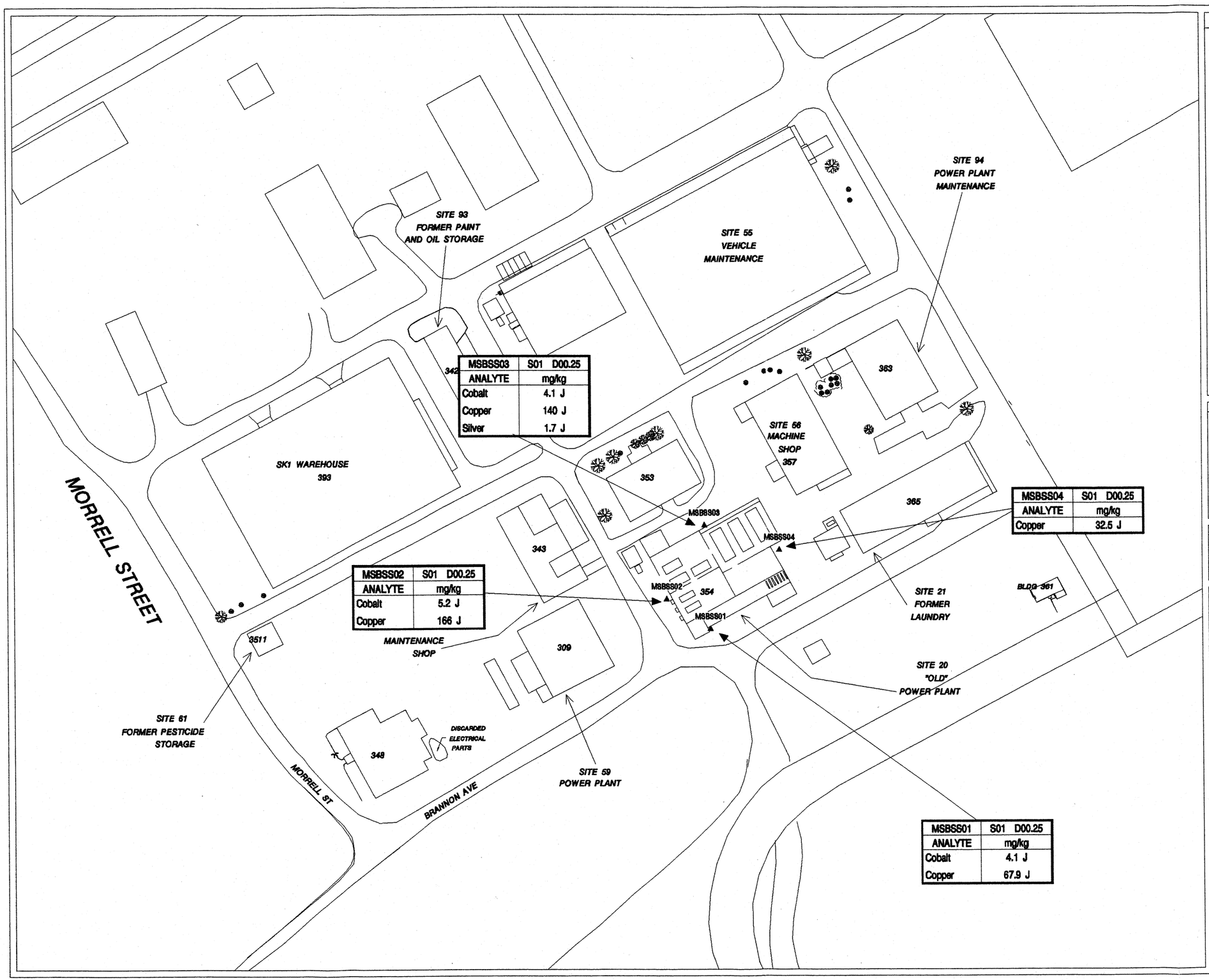
FEET

0 60 120 240 360

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HW	JMC	BH

FIGURE

15.5-2



MSBSS03	S01 D00.25
ANALYTE	mg/kg
Cobalt	4.1 J
Copper	140 J
Silver	1.7 J

MSBSS04	S01 D00.25
ANALYTE	mg/kg
Copper	32.5 J

MSBSS02	S01 D00.25
ANALYTE	mg/kg
Cobalt	5.2 J
Copper	166 J

MSBSS01	S01 D00.25
ANALYTE	mg/kg
Cobalt	4.1 J
Copper	67.9 J

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
MSBSS02	OGDEN SAMPLE ID
5.2	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

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3. PROJECT NUMBER 110190136
4. FILE: /appa/hm/cto136/mapa/m5169570

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

METAL CONCENTRATIONS DETECTED IN SURFACE SOIL SAMPLES (SITE SB) SAND ISLAND

N

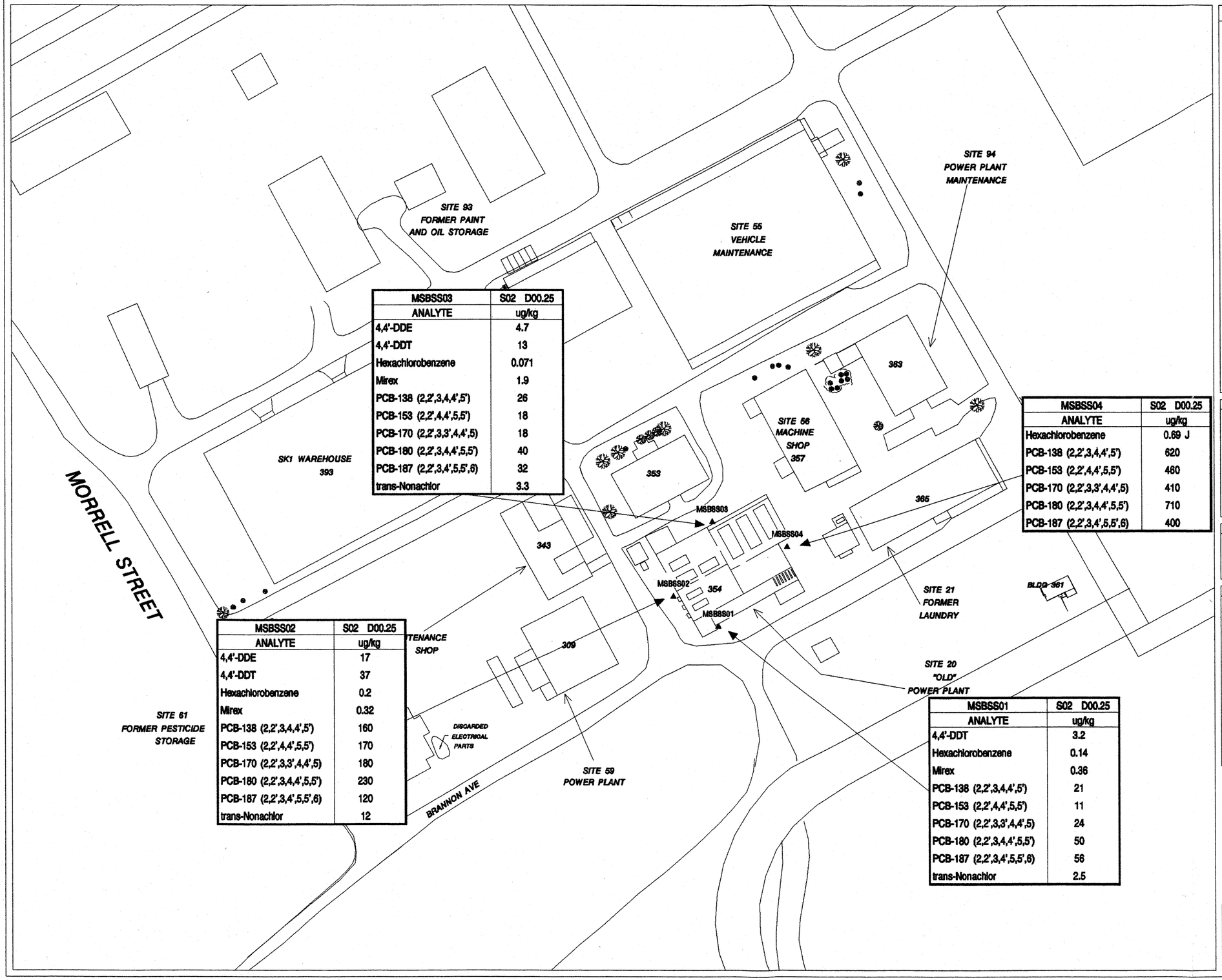
FEET

0 60 120 240 360

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	BH

FIGURE

15.5-3



MSBSS03	S02 D00.25
ANALYTE	ug/kg
4,4'-DDE	4.7
4,4'-DDT	13
Hexachlorobenzene	0.071
Mirex	1.9
PCB-138 (2,2',3,4,4',5')	26
PCB-153 (2,2',4,4',5,5')	18
PCB-170 (2,2',3,3',4,4',5)	18
PCB-180 (2,2',3,4,4',5,5')	40
PCB-187 (2,2',3,4',5,5',6)	32
trans-Nonachlor	3.3

MSBSS04	S02 D00.25
ANALYTE	ug/kg
Hexachlorobenzene	0.69 J
PCB-138 (2,2',3,4,4',5')	620
PCB-153 (2,2',4,4',5,5')	460
PCB-170 (2,2',3,3',4,4',5)	410
PCB-180 (2,2',3,4,4',5,5')	710
PCB-187 (2,2',3,4',5,5',6)	400

MSBSS02	S02 D00.25
ANALYTE	ug/kg
4,4'-DDE	17
4,4'-DDT	37
Hexachlorobenzene	0.2
Mirex	0.32
PCB-138 (2,2',3,4,4',5')	160
PCB-153 (2,2',4,4',5,5')	170
PCB-170 (2,2',3,3',4,4',5)	180
PCB-180 (2,2',3,4,4',5,5')	230
PCB-187 (2,2',3,4',5,5',6)	120
trans-Nonachlor	12

MSBSS01	S02 D00.25
ANALYTE	ug/kg
4,4'-DDT	3.2
Hexachlorobenzene	0.14
Mirex	0.36
PCB-138 (2,2',3,4,4',5')	21
PCB-153 (2,2',4,4',5,5')	11
PCB-170 (2,2',3,3',4,4',5)	24
PCB-180 (2,2',3,4,4',5,5')	50
PCB-187 (2,2',3,4',5,5',6)	56
trans-Nonachlor	2.5

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
MSBSS02	OGDEN SAMPLE ID
17	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (M.L.W)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, EB-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/hm/cto136/maps/m5169572

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

LOW LEVEL PESTICIDES AND PCB'S DETECTED IN SURFACE SOIL SAMPLES (SITE SB) SAND ISLAND

N

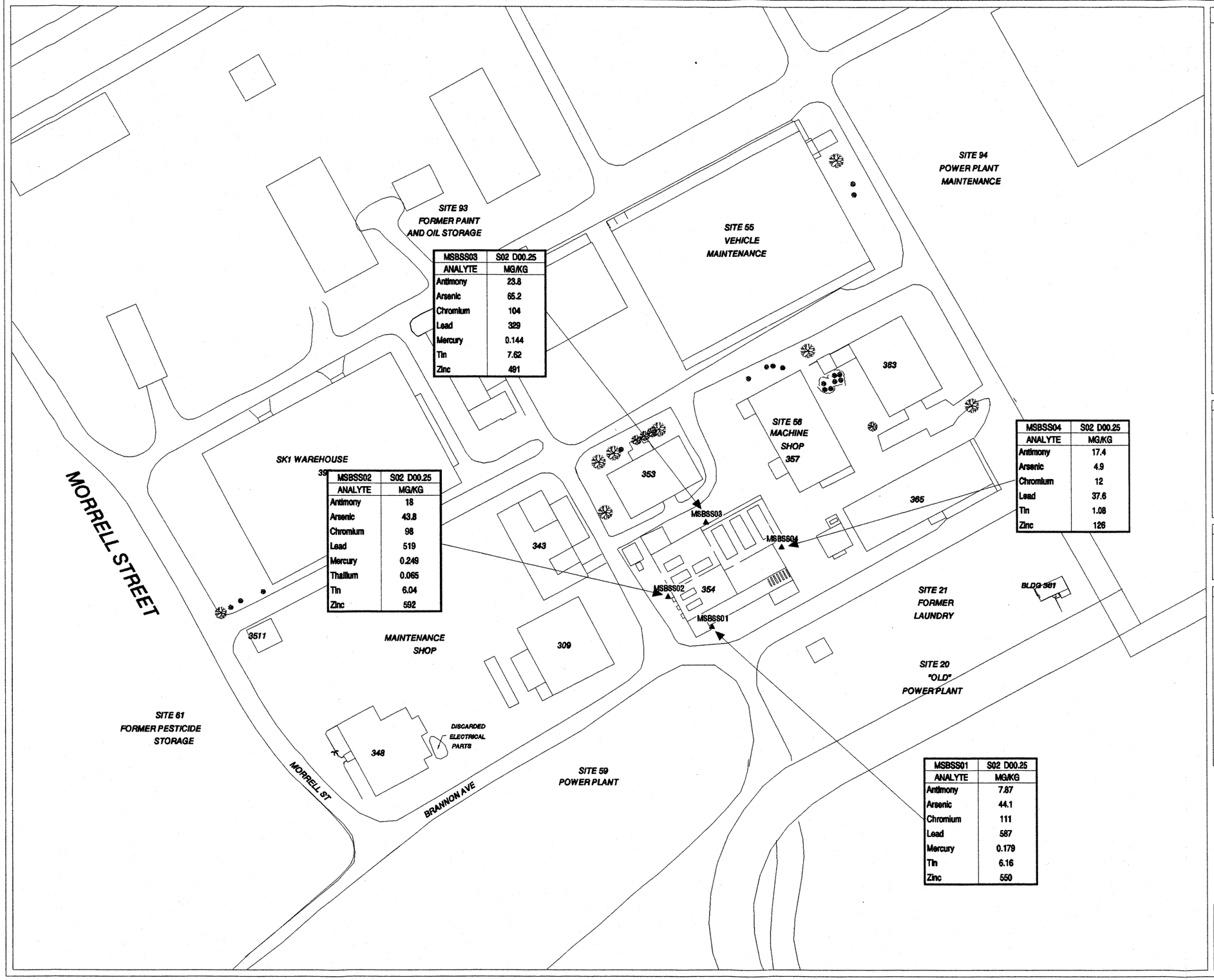
FEET

0 60 120 240 360

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

15.5-4



MSBSS03	S02 D00.25
ANALYTE	MG/KG
Antimony	23.8
Arsenic	65.2
Chromium	104
Lead	329
Mercury	0.144
Tin	7.62
Zinc	491

MSBSS02	S02 D00.25
ANALYTE	MG/KG
Antimony	18
Arsenic	43.8
Chromium	98
Lead	519
Mercury	0.249
Thallium	0.065
Tin	6.04
Zinc	592

MSBSS04	S02 D00.25
ANALYTE	MG/KG
Antimony	17.4
Arsenic	4.9
Chromium	12
Lead	37.6
Tin	1.08
Zinc	126

MSBSS01	S02 D00.25
ANALYTE	MG/KG
Antimony	7.87
Arsenic	44.1
Chromium	111
Lead	587
Mercury	0.179
Tin	6.16
Zinc	550

LEGEND

▲ SURFACE SOIL SAMPLE LOCATION

MSBSS02 OGDEN SAMPLE ID

23.8 CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.

S## SAMPLE NUMBER

D##.# DEPTH IN FEET

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190186
4. FILE: /appe/hmvcto18/maps/m5169573

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

LOW LEVEL METAL CONCENTRATIONS DETECTED IN SURFACE SOIL SAMPLES (SITE SB) SAND ISLAND

N

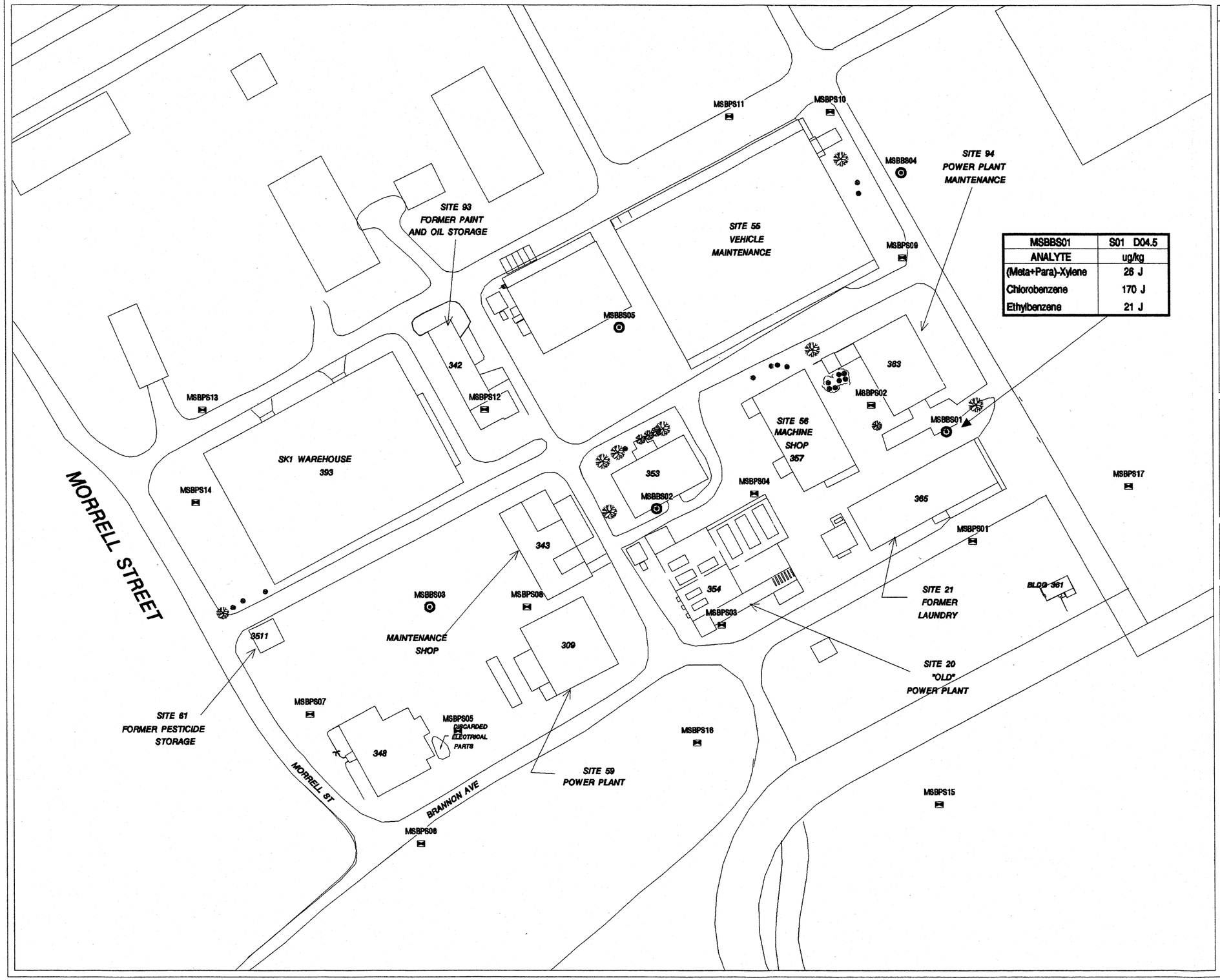
FEET

0 60 120 240 360

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
12/20/95	1	CMF		HPP		JMC	

FIGURE

15.5-5



MSBBS01	S01 D04.5
ANALYTE	ug/kg
(Meta+Para)-Xylene	26 J
Chlorobenzene	170 J
Ethylbenzene	21 J

LEGEND

⊙	SOIL BORING SAMPLE LOCATION
⊠	DIRECT PUSH SAMPLE LOCATION
MSBBS02	OGDEN SAMPLE ID
26	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/hm/cto136/maps/m5169675

SOURCES

PERRY AND ASSOCIATES INC.
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

VOLATILE ORGANIC COMPOUNDS DETECTED IN SUBSURFACE SOIL SAMPLES (SITE SB) SAND ISLAND

N

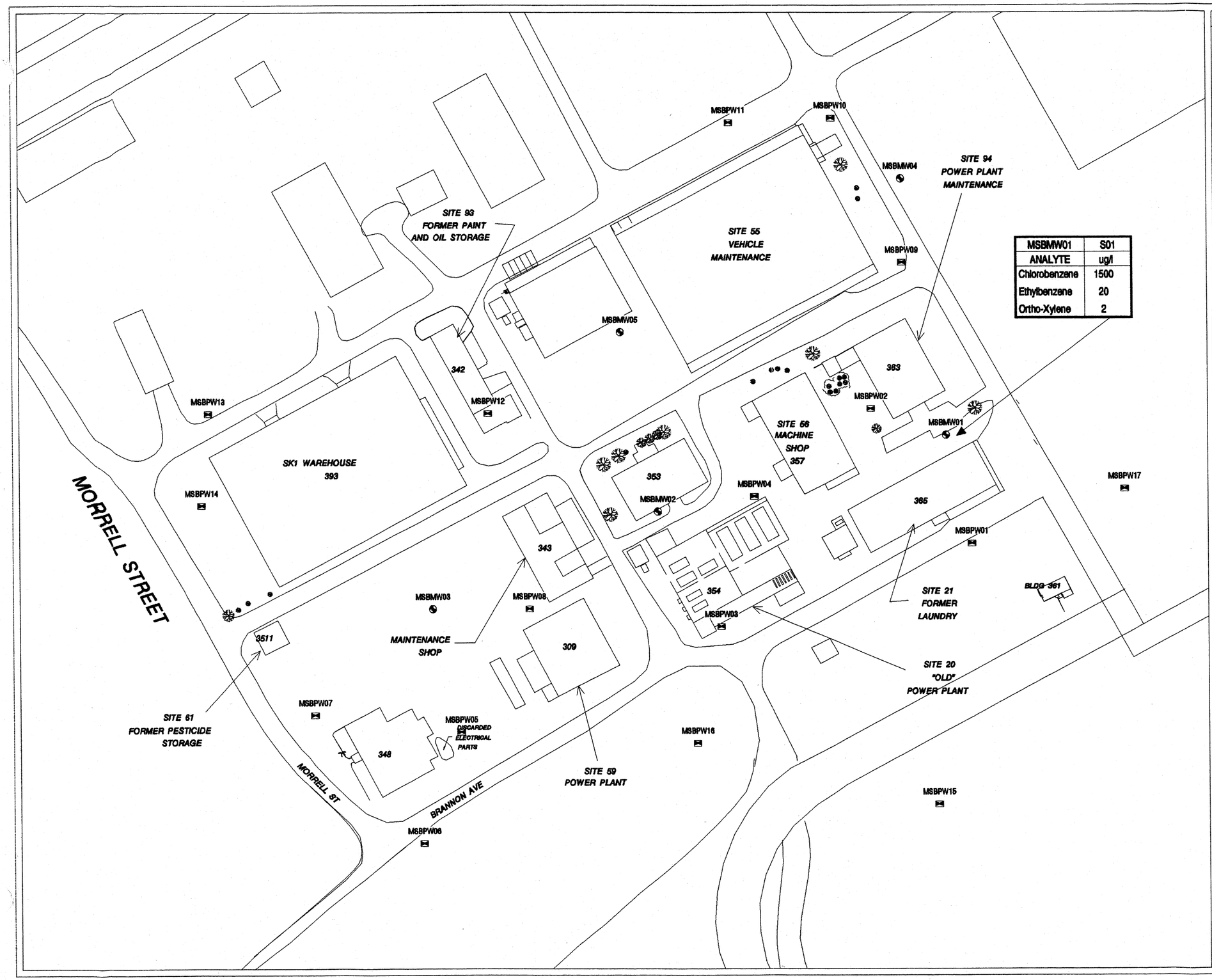
FEET

0 60 120 240 360

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JH

FIGURE

15.5-6



MSBMW01	S01
ANALYTE	ug/l
Chlorobenzene	1500
Ethylbenzene	20
Ortho-Xylene	2

LEGEND

MONITORING WELL SAMPLE LOCATION

DIRECT PUSH SAMPLE LOCATION

MSBMW02 OGDEN SAMPLE ID

1500 CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.

S## SAMPLE NUMBER

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appe/hm/cto138/mape/m6149628

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 1038856 & 1038857

TITLE

VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SAMPLES (SITE SB) SAND ISLAND

N

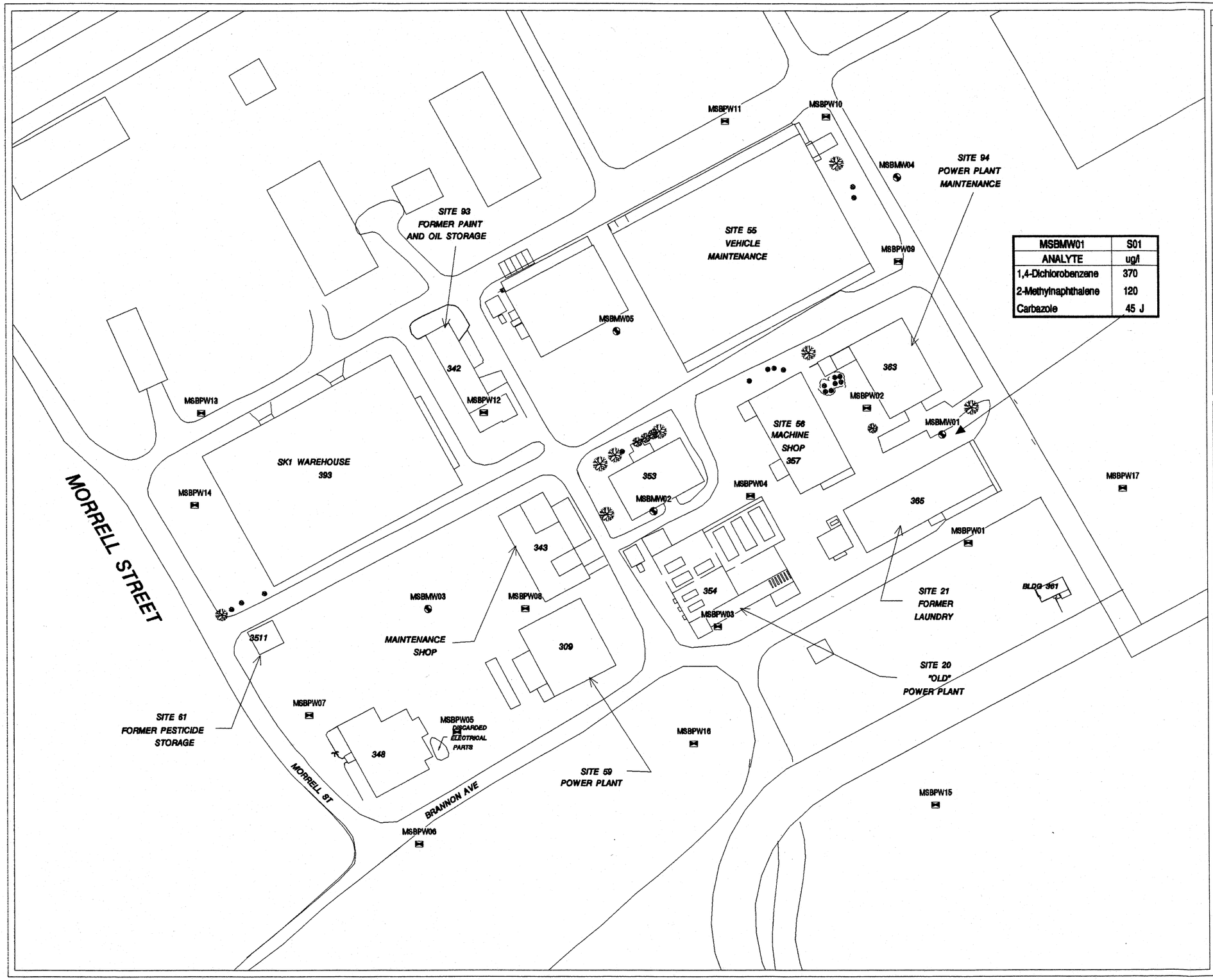
FEET

0 60 120 240 360

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

15.5-7



MSBMW01	S01
ANALYTE	ug/l
1,4-Dichlorobenzene	370
2-Methylnaphthalene	120
Carbazole	45 J

LEGEND

MONITORING WELL SAMPLE LOCATION

DIRECT PUSH SAMPLE LOCATION

MSBMW02 OGDEN SAMPLE ID

370 CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.

S## SAMPLE NUMBER

J ESTIMATED QUANTITY

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190138
4. FILE: /appe/hm/cto138/maps/m6149529

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 1038856 & 1038857

TITLE

SEMIVOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SAMPLES (SITE SB) SAND ISLAND

N

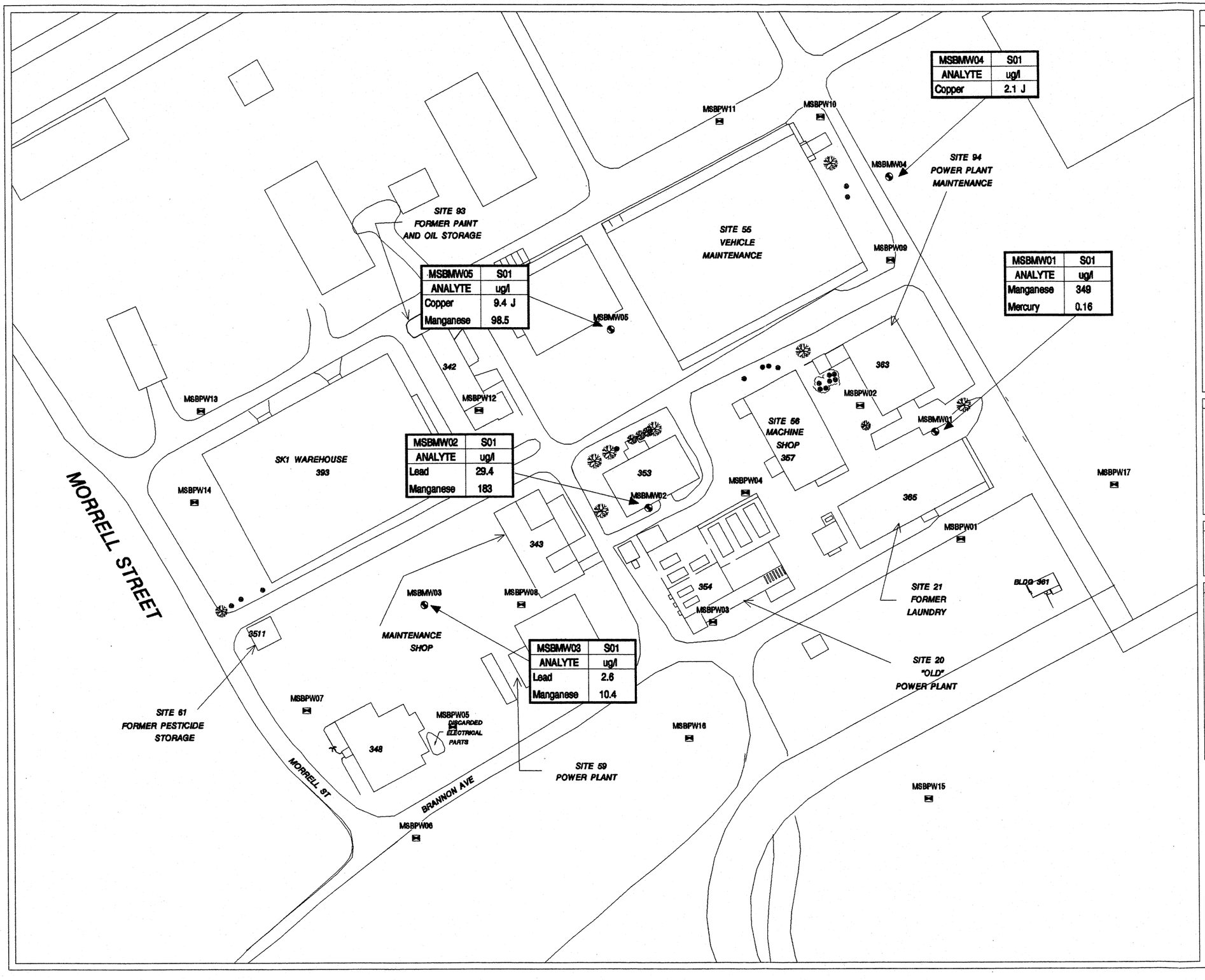
FEET

0 60 120 240 360

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

15.5-8



LEGEND

◉	MONITORING WELL SAMPLE LOCATION
⋈	DIRECT PUSH SAMPLE LOCATION
MSBMW02	OGDEN SAMPLE ID
9.4	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
J	ESTIMATED QUANTITY

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3. PROJECT NUMBER 110190136
4. FILE: /appe/hm/cto136/mapa/m6179596

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038657

TITLE

METAL CONCENTRATIONS DETECTED IN GROUNDWATER SAMPLES (SITE SB) SAND ISLAND

N

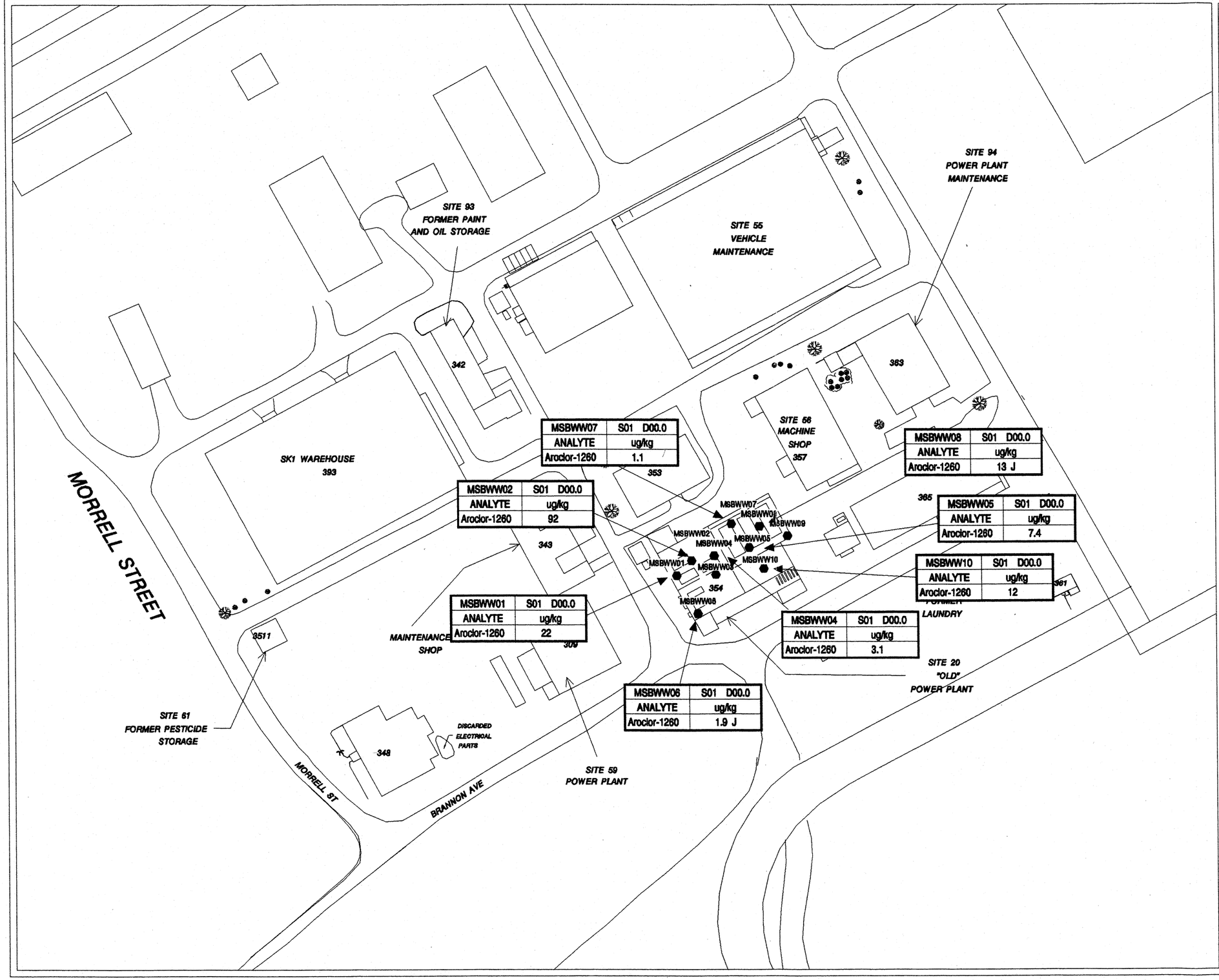
FEET

0 60 120 240 360

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	BH

FIGURE

15.5-9



MSBWW07	S01 D00.0
ANALYTE	ug/kg
Aroclor-1260	1.1

MSBWW08	S01 D00.0
ANALYTE	ug/kg
Aroclor-1260	13 J

MSBWW02	S01 D00.0
ANALYTE	ug/kg
Aroclor-1260	92

MSBWW05	S01 D00.0
ANALYTE	ug/kg
Aroclor-1260	7.4

MSBWW10	S01 D00.0
ANALYTE	ug/kg
Aroclor-1260	12

MSBWW01	S01 D00.0
ANALYTE	ug/kg
Aroclor-1260	22

MSBWW04	S01 D00.0
ANALYTE	ug/kg
Aroclor-1260	3.1

MSBWW06	S01 D00.0
ANALYTE	ug/kg
Aroclor-1260	1.9 J

LEGEND

⬢	PCB WIPE SAMPLE LOCATION
MSBWW02	OGDEN SAMPLE ID
92	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/hm/cto130/mapa/m5170597

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

PCB CONCENTRATIONS DETECTED FOR PCB WIPE SAMPLES (SITE SB) SAND ISLAND

N

FEET

0 60 120 240 360

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFF	HFF	JMC	JMC

FIGURE

15.5-10

SECTION 16
FORMER COMMISSARY DRY CLEANING PLANT, BUILDING 2403 (SITE 22)

This report describes the results of the SI field work conducted intermittently at the Former Commissary Dry Cleaning Plant, Building 2403, Sand Island (Site 22) from August through November 1994. The purpose of the review was to determine whether Site 22 received hazardous substances, and to assess the likelihood for soil and groundwater contamination at the Site. A discussion of the work conducted during the SI, along with findings, conclusions, and recommendations, is presented below.

This report is organized as follows: Site background information is documented in Section 16.1; a description of SI field sampling activities is presented in Section 16.2; methods used for sample analysis are summarized in Section 16.3; physical characteristics of the Site observed during the investigation activities are discussed in Section 16.4; a summary of the analytical data is presented in Section 16.5; the SERA is described in Section 16.6; and conclusions and recommendations for the Site are presented in Section 16.7.

16.1 Background Information

The Former Commissary Dry Cleaning Plant (Site 22) is a single story building constructed of concrete blocks and wood, with a concrete floor. It is currently used by the BOS contractor to store furniture. All dry cleaning equipment has been removed from the building. Older Site plans for the commissary complex, Bldg. 2403 (Drawing No. 07582, dated 1957), indicate the dry cleaning plant was co-located with the commissary (Figure 16.1-1). The plans do not indicate any USTs onsite for storage of dry cleaning solvents. No contaminant release is known to have occurred at Building 2403 and no records of operations at the Site are known to exist; however, visible evidence (e.g., water lines and equipment outlines on the floor) suggests that the building was used for dry cleaning. Table 16.1-1 lists the contaminants that may have been released at the Site (dry cleaning solvents) and the associated analytical categories.

Table 16.1-1

POTENTIAL CHEMICAL CONTAMINANTS, FORMER COMMISSARY DRY CLEANING PLANT, BUILDING 2403, SITE 22

Waste Type	Years of Disposal	Potential Chemical Constituents	Analytical Category
Dry Cleaning Solvents	1950s-1980?	Stoddard Solvent, PCE	Volatile Organic Compounds, Semi Volatile Organic Compounds

16.2 Sampling Methods and Locations

Soil Vapor

To detect and delineate petroleum hydrocarbons and VOCs possibly present in subsurface soils and ground water, TEG and Ogden personnel conducted a soil vapor survey at Site 22 on September 10, 1994. Samples were collected at 10 locations around the perimeter of Building 2403 (Figure 16.2-1) at depths between 2 and 3 fbgs.

Direct-push

To screen for subsurface soil and ground-water contamination, PRC and Ogden personnel collected soil and ground-water samples by direct-push methods. Samples were taken at four locations around the perimeter of Building 2403 on October 8, 1994 (Figure 16.2-2). Depth to water was 4.6 fbgs. Because PCE was detected at the northeast corner of Building 2403 during the soil vapor survey, both shallow (4.7 fbgs) and deep (25.0 fbgs) ground-water samples were collected at this location (DP-1).

16.3 Analytical Methods

Soil Vapor

Ten soil vapor samples, one equipment blank, and one duplicate sample collected at the Site were immediately analyzed in the field by portable GC for TPH, VOCs, methane, and to determine the percent CO_2/percent O_2 ratio (Table 16.3-1). Analytical results are listed in Appendix C.

Direct-push

Soil and ground-water samples from Site 22 were analyzed at the field screening laboratory for VOCs, TPH, and PAHs. Samples were also submitted to the offsite laboratory for analysis of fuels, CLP VOCs, CLP SVOCs, and CLP metals (Table 16.3-1).

16.4 PHYSICAL CHARACTERISTICS

Site 22 is located on Nimitz Avenue, immediately north of Midway Mall and approximately 600 feet south of POL Tank Farm No. 3. Building 2403 is situated on a grassed lot and is surrounded by several ironwood trees. The structure is currently being used to store furniture. Access is usually gained through the loading dock doors located behind the building.

16.4.1 Topography

The grade at Site 22 is generally level. A detailed survey is not available for this Site and the direction of surface runoff flow could not be determined. Based on ground surveys conducted at adjacent sites, the elevation of Site 22 appears to be between 6 and 10 feet above MSL. The shore of the lagoon is approximately 1,500 ft north of the commissary building.

16.4.2 Geology and Soils

Soils at Site 22 are predominantly beige and white coralline and silty sands. No shell or coral fragments were encountered during the investigation, and no hard layers were present at depths of less than 6 fbgs. Because soil samples were taken only at depths of 4 fbgs, soil profiles were not constructed; however, the soil's resistance to penetration by the direct-push probe did not vary significantly across the Site. The probe was driven to a depth of 25 fbgs to obtain a ground-water sample. No visible evidence of soil staining, debris, or waste was encountered in any of the direct-push samples.

16.4.3 Hydrogeology

During the direct-push survey, ground water was encountered at a depth of approximately 5 fbgs. The depth to ground water was generally consistent at all direct-push and soil vapor sample locations. No evidence of confining units, such as hard layers or changes in the rate of advance of the direct-push probes, was observed.

Ground-water samples collected from the direct-push sampler were turbid. This may be due to the presence of silts and clays in the subgrade. No chemical odors, which might indicate the presence of contamination, were detected. A sulfur odor was noted by the direct-push sampling crew in sample M22PW02S01D250. Indicator parameters such as pH, conductivity, and temperature were not measured in the direct-push samples.

16.5 Summary of Analytical Results

The sections and tables below summarize the results of the laboratory analyses performed on Site 22 samples. For soil samples, analytical results for organic and inorganic compounds are summarized in Tables 16.5-1 and 16.5-2, respectively. Results for inorganic compounds in ground-water samples are presented in Table 16.5-3.

The tables list the analytical methods, the number of detects, the total number of samples, the number of samples rejected during data validation, the minimum undetected concentration, the maximum undetected concentration, the minimum detected concentration, the maximum detected concentration, and the sample with the maximum concentration. In addition, the concentrations of compounds detected at Site 22 are compared to Sand Island background levels. Analytical results for all samples and analytes are contained in Appendix L. Complete CLP and low-level analytical data are available at PACNAVFACENGCOM offices at Pearl Harbor, Hawaii.

16.5.1 Sources

The potential contaminants of concern at this Site are dry cleaning solvents stored in metal 55- gallon drums and smaller containers. Solvent spills and releases may have impacted soil and ground water. Vapors from the dry cleaning process were typically

discharged through vents into the atmosphere. Chlorinated solvents are water soluble at low concentrations (generally less than 1,500 mg/L). Vapors may have dissolved in rain water and migrated into soils near air vents.

16.5.2 Soil Vapor

All soil vapor samples collected at Site 22 (Figure 16.2-1) were taken between 2 and 4 fbgs. TFH and benzene were detected in the sample from location SV-1 at concentrations of 1.7 ppmv and 0.342 ppmv, respectively. PCE was detected in the sample from location SV-4 at 0.120 ppmv. Target compounds were not detected in any of the other soil vapor samples from the Site. The percent CO_2/percent O_2 ratio was 0.02 in samples from locations SV-4 and SV-5. The percent CO_2/percent O_2 ratio in samples from all other locations at the Site was approximately 0.01. The complete TEG soil vapor survey report is included in Appendix C.

16.5.3 Subsurface Soil

Field examination of soil samples collected from the vadose zone did not reveal evidence of contamination. A sulfur odor and a 5.2 ppm PID headspace reading were detected in the ground-water sample from 25 fbgs. Other soil and ground-water sample headspace readings were 1.0 ppm or less. No visible product was observed in any of the samples. Among the subsurface soil samples (tested offsite by CLP methods for metals), concentrations of 11 of the 18 metal analytes detected exceeded mean Sand Island background levels. The maximum detected lead concentration was 29.3 mg/kg.

Constituents associated with dry cleaning activities were not detected in any of the soil samples from this Site. The offsite laboratory detected phenol (by the CLP method) at a maximum concentration of 1,400 µg/kg; however, phenols are not associated with any known former activity conducted at this Site. Figures 16.5-1 and 16.5-2 depict subsurface soil sampling locations and selected concentration values.

16.5.4 Ground Water

The field screening laboratory did not detect TPH, PAHs or any compounds associated with dry cleaning activities in ground-water samples. Dichlorodifluoromethane was detected in three samples: PW02S01, PW03S01, and PW04S01. The maximum concentration detected was 6.8 µg/L in sample PW02S01. Dichlorodifluoromethane was detected at very similar levels in the other two samples. This compound, found in refrigerants, is suspected to be a laboratory artifact. Among the ground-water samples tested at an offsite laboratory for CLP metals. Concentrations of 13 of the 16 metal analytes detected were above mean Sand Island background levels.

16.6 SCREENING ECOLOGICAL RISK ASSESSMENT

16.6.1 Problem Formulation

Tasks to be accomplished during Problem Formulation include (a) developing a Site description based on current Site investigations, existing literature, any prior preliminary assessments, and Site history; (b) identifying potential stressors, exposure pathways, and ecological receptors (habitats and species); (c) discussing the nature of adverse effects associated with a given stressor; (d) defining ecologically appropriate assessment and measurement endpoints; and (e) making an initial evaluation of risks posed by the Site.

For a Site to present the potential for risk, it must exhibit the following three criteria: contain stressors in abiotic media at detectable and biologically significant concentrations, provide exposure pathways linking stressors to ecological receptors, and have ecological receptors (those associated with assessment endpoints) that either utilize the Site, are present nearby, or are in range of stressors migrating from the Site. If Problem Formulation determines that one or more of these criteria are absent, the Site is recommended for NFA and the risk assessment is concluded at this point. If all criteria are met, then completion of the SERA process is required.

16.6.1.1 Site Description

Site 22 is developed and has some ruderal habitat adjacent to the north, west, and south sides of Building 2403, reportedly used as a dry cleaning shop and as a commissary.

16.6.1.2 Stressor Identification

Because of the early availability of chemical analysis data, ECs were computed and CPECs were identified at this point in the SERA process, using the methods previously described in Sections 4.3.1.1.1 and 4.3.1.1.2. CPECs for Site 22 are confined to lead (29.3 mg/kg), zinc (32.2 mg/kg), and phenol (1.4 mg/kg) in subsurface soils; manganese (0.0152 mg/L), and vanadium (0.0129 mg/L) in ground water.

16.6.1.3 Potential Ecological Effects

CPECs onsite that may have effects on ecological receptors include lead, manganese, vanadium, zinc, and phenol. Section 4.2.3 and Appendix J discuss the physicochemical and toxicological properties of these CPECs.

16.6.1.4 Ecological Receptor Identification

There are several potential ecological receptors at and near Building 2403 including the Laysan albatross, white tern, and the Pacific golden-plover (Section 4.2.4). Individuals of these species were observed solely on the lawn outside the building. It appears that nesting densities are low to moderate onsite.

16.6.1.5 Exposure Pathway Identification

No complete terrestrial exposure pathways exist for this Site. Contamination associated with the dry cleaning facility is considered to be subsurface in nature. There are no transport mechanisms available to bring either subsurface soil or ground-water contamination within reach of surface receptors. None of the ecological receptors onsite are burrowing organisms.

16.6.1.6 Endpoints

The potential receptors onsite are comprised solely of terrestrial seabird and shorebird species; therefore, assessment endpoint #1 in Section 4.2.6.1 and testable hypotheses #1 and #2 in Section 4.2.6.2 are appropriate for this Site. Measurement endpoints #2 and #3 in Section 4.2.6.3 were selected for this Site.

16.6.1.7 Summary

Several bird species associated with assessment endpoints were identified as potential onsite receptors and contaminants were identified onsite; no potentially complete exposure pathways exist between these two elements. The probability of ecological risk is negligible for Site 22.

16.7 Conclusions and Recommendations

No compounds related to dry cleaning activities were found in environmental media at this Site. Lead, zinc and phenol were detected in subsurface soils, and low levels of metals, manganese and vanadium were detected in ground water. Based on the results of the SERA, potentially complete exposure pathways do not exist between the shorebirds and seabirds that nest and feed in the area and the impacted subsurface soils and ground water. No further investigation or action is recommended.

Tables
Section 16

TABLE 16.3-1 (Page 1 of 2)
ANALYTICAL METHODS
FORMER COMMISSARY/DRY CLEANING PLANT, BUILDING 2403 (SITE 22)

			FIELD SCREENING LABORATORY			ROUTINE ANALYTICAL LABORATORY			
	ANALYTICAL METHOD	8021	8015 B	8080	8100	8015 M/OG	OLM01.8V	OLM01.8B	ILM03.OX
EPA ID	OGDEN ID	VOL	TPH	PEST/ PCB	PAH	FUELS	VOC	SVOC	METALS
DIRECT PUSH SOIL SAMPLES									
MH004	M22PS01S01D040	X	X	-	X	-	-	-	-
MH005	M22PS01S02D040	-	-	-	-	X	X	X	X
MH008	M22PS02S01D040	X	X	-	X	-	-	-	-
MH009	M22PS02D01D040	X	X	-	X	-	-	-	-
MH010	M22PS02S02D040	-	-	-	-	X	X	X	X
MH014	M22PS03S01D040	X	X	-	X	-	-	-	-
MH015	M22PS03S02D040	-	-	-	-	-	-	-	X
MH018	M22PS04S01D040	X	X	-	X	-	-	-	-
MH019	M22PS04S02D040	-	-	-	-	X	X	X	X
DIRECT PUSH WATER SAMPLES									
MH001	M22PW01S01D047	X	X	-	X	-	-	-	-
MH002	M22PW01S02D250	-	-	-	-	X	X	X	X

"X" = Indicates analytical method performed on sample.

TABLE 16.3-1 (Page 2 of 2)
ANALYTICAL METHODS
FORMER COMMISSARY/DRY CLEANING PLANT, BUILDING 2403 (SITE 22)

			FIELD SCREENING LABORATORY			ROUTINE ANALYTICAL LABORATORY			
	ANALYTICAL METHOD	8021	8015 B	8080	8100	8015 M/OG	OLM01.8V	OLM01.8B	ILM03.OX
EPA ID	OGDEN ID	VOL	TPH	PEST/ PCB	PAH	FUELS	VOC	SVOC	METALS
DIRECT PUSH WATER SAMPLES									
MH003	M22PWO1S03D250	X	X	-	X	-	-	-	-
MH006	M22PW02S01D048	X	X	-	X	-	-	-	-
MH007	M22PW02S02D048	-	-	-	-	-	-	-	X
MH011	M22PW03S01D046	X	X	-	X	-	-	-	-
MH012	M22PW03D01D046	X	X	-	X	-	-	-	-
MH013	M22PW03S02D046	-	-	-	-	X	X	X	X
MH016	M22PW04S01D047	X	X	-	X	-	-	-	-
MH017	M22PW04S02D047	-	-	-	-	-	-	-	X
EQUIPMENT RINSATE									
MH020	M22XW04E01D000	-	-	-	-	X	X	X	X
TRIP BLANKS									
MH021	M22XW00T00D000	-	-	-	-	-	X	-	-
MH022	M22XW00T00D000	-	-	-	-	-	X	-	-

"X" = Indicates analytical method performed on sample.

Table 16.5-1
Summary of Soil Results for Organics
Former Commissary Dry Cleaning Plant, Sand Island (Site 22)

Site 22												Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SUBSURFACE SOIL																			
OLM01.0B	Phenol	UG/KG	2	2	0			1100	1400	M22PS02S02		1	12	0	370	580	500	500	223
OLM01.0V	Methylene Chloride	UG/KG	1	3	0	6	6	2	2	M22PS02S02	J	2	12	0	5	7	1	2	2.6

Notes:

OLM01.0B = CLP Semi Volatiles
OLM01.0V = CLP Volatiles

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 16.5-2
Summary of Soil Results for Inorganics
Former Commissary Dry Cleaning Plant, Sand Island (Site 22)

			Site 22									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SUBSURFACE SOIL																			
ILM03.0	Aluminum	MG/KG	1	4	0	3.1	3.4	64	64	M22PS03S02		3	12	0	2.9	4.4	781	5440	9.29
ILM03.0	Barium	MG/KG	4	4	0			5.8	7.8	M22PS03S02		12	12	0			4.3	92.3	8.19
ILM03.0	Beryllium	MG/KG	2	4	0	0.13	0.16	0.17	0.21	M22PS03S02		8	12	0	0.33	0.5	0.21	0.57	0.264
ILM03.0	Cadmium	MG/KG	4	4	0			0.09	0.6	M22PS03S02		7	12	0	0.04	0.06	0.04	0.35	0.0615
ILM03.0	Calcium	MG/KG	4	4	0			65000	350000	M22PS01S02		12	12	0			34100	350000	276000
ILM03.0	Chromium	MG/KG	4	4	0			4.4	5.4	M22PS02S02		12	12	0			4.1	19	6.09
ILM03.0	Copper	MG/KG	2	4	0	0.61	0.96	3.5	6	M22PS02S02	J	1	12	0	0.56	6.2	26.8	26.8	0.767
ILM03.0	Iron	MG/KG	4	4	0			10.3	226	M22PS03S02		11	12	0	2.7	2.7	2	6910	33.6
ILM03.0	Lead	MG/KG	2	4	0	0.22	0.3	4.7	29.3	M22PS03S02		5	12	0	0.19	0.28	0.29	171	0.402
ILM03.0	Magnesium	MG/KG	4	4	0			16500	17400	M22PS03S02		12	12	0			14900	20800	17200
ILM03.0	Manganese	MG/KG	4	4	0			3.3	8.4	M22PS03S02		12	12	0			3.2	124	7.21
ILM03.0	Potassium	MG/KG	4	4	0			43	66.8	M22PS03S02	J	12	12	0			44.9	248	65.2
ILM03.0	Selenium	MG/KG	4	4	0			1.6	1.7	M22PS01S02		12	12	0			1.3	2.2	1.83
ILM03.0	Silver	MG/KG	2	4	0	1.4	1.5	1.7	1.8	M22PS02S02		2	12	0	1.4	2	1.4	2.2	0.861
ILM03.0	Sodium	MG/KG	4	4	0			2680	2970	M22PS02S02	J	12	12	0			2250	4110	2680
ILM03.0	Vanadium	MG/KG	3	4	0	0.72	0.72	0.84	1.4	M22PS03S02		11	12	0	0.76	0.76	0.9	12.5	1.58
ILM03.0	Zinc	MG/KG	1	4	0	2.5	3.1	37.8	37.8	M22PS03S02	J	4	12	0	0.5	3.2	1.6	134	2.08

Notes:

ILM03.0 = CLP Metals

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
Mean = Geometric Mean

Table 16.5-3
Summary of Groundwater Results for Inorganics
Former Commissary Dry Cleaning Plant, Sand Island (Site 22)

			Site 22									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
ILM03.0	Aluminum	UG/L	1	4	0	14	14	204	204	M22PW02S02		0	4	0	14	14			
ILM03.0	Arsenic	UG/L	3	4	0	1.4	1.4	3.5	11.6	M22PW01S02		2	4	0	1.5	2.2	14.7	19	3.9
ILM03.0	Barium	UG/L	4	4	0			5	9.5	M22PW02S02	J	4	4	0			2.2	16.1	6.01
ILM03.0	Cadmium	UG/L	1	4	0	0.2	0.2	0.28	0.28	M22PW02S02		0	4	0	0.2	0.2			
ILM03.0	Calcium	UG/L	4	4	0			183000	492000	M22PW02S02		4	4	0			150000	351000	208000
ILM03.0	Chromium	UG/L	1	4	0	3.1	3.1	15.3	15.3	M22PW02S02		1	4	0	3.1	3.1	4.6	4.6	2.03
ILM03.0	Iron	UG/L	4	4	0			566	1630	M22PW04S02		4	4	0			298	836	474
ILM03.0	Magnesium	UG/L	4	4	0			44300	460000	M22PW01S02		4	4	0			49300	522000	110000
ILM03.0	Manganese	UG/L	4	4	0			2.5	15.2	M22PW01S02		4	4	0			3.8	17.9	5.89
ILM03.0	Potassium	UG/L	4	4	0			2900	150000	M22PW01S02		4	4	0			12000	142000	25000
ILM03.0	Selenium	UG/L	3	4	0	1.8	1.8	2.3	3.4	M22PW02S02		1	4	0	1.8	1.8	2.5	2.5	1.16
ILM03.0	Sodium	UG/L	3	4	0	15	15	23400	196000	M22PW04S02		3	4	0	15	15	167000	223000	15700
ILM03.0	Vanadium	UG/L	3	4	0	3.2	3.2	10.8	12.9	M22PW02S02		3	4	0	3.2	3.2	7.2	13.7	6.24
ILM03.0	Zinc	UG/L	2	4	0	2.3	2.3	5.3	17.4	M22PW02S02	J	1	4	0	18.8	23.3	51.7	51.7	15.8

Notes:

ILM03.0 = CLP Metals

#D = No. of Detects

#S = Total No. of Samples

#R = No. of Samples Rejected During Data Validation

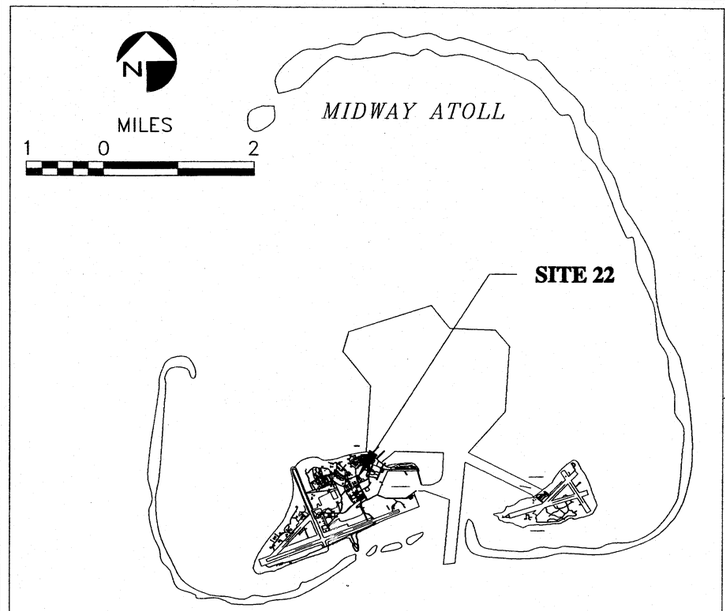
FL = Data Validation Qualifier (Flag)

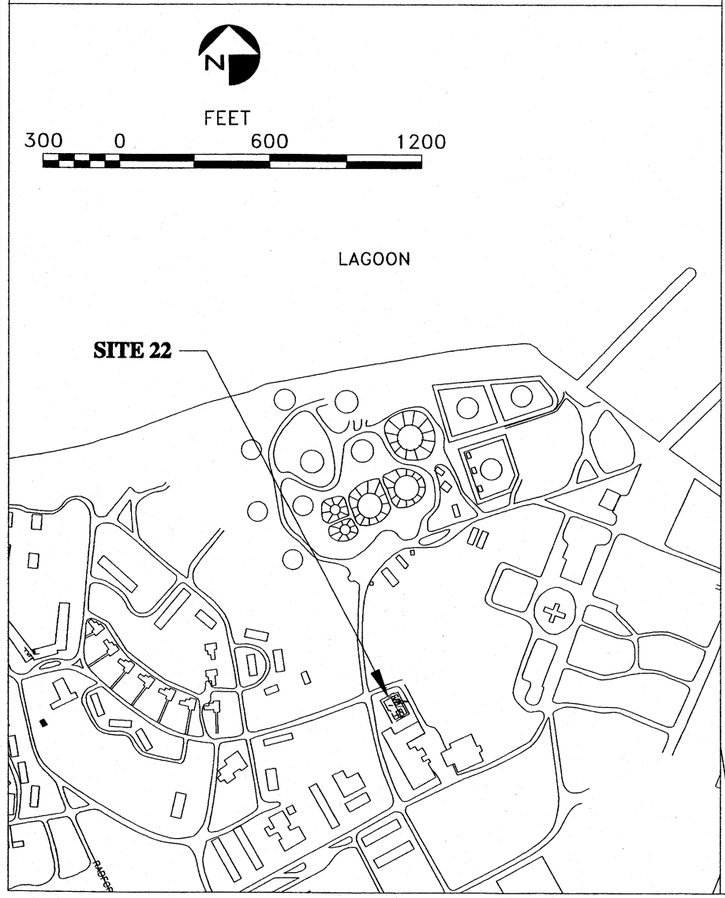
J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)

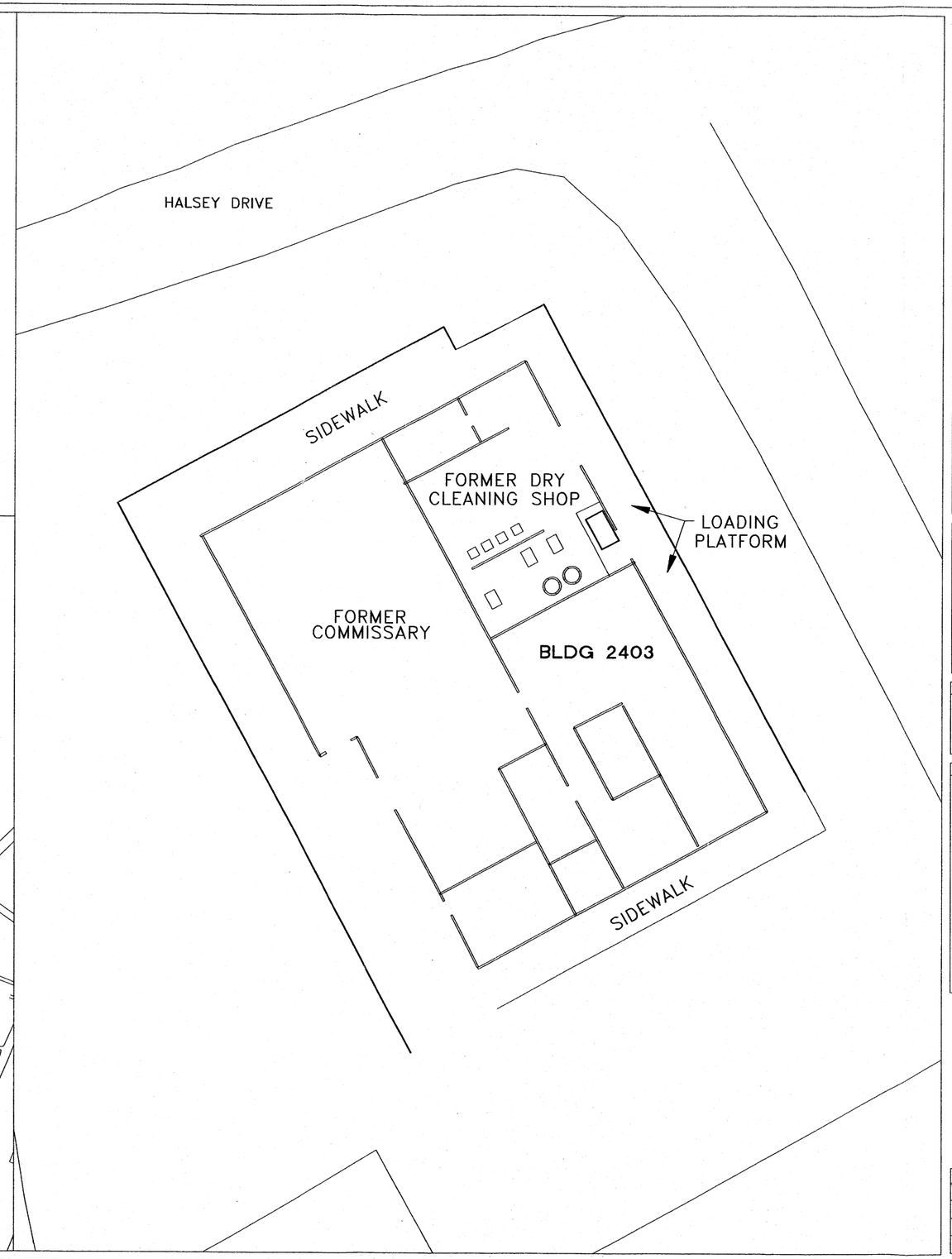
Mean = Geometric Mean

SI22WA.XLS

Figures
Section 16







LEGEND

NOTES

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2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITES\SITE22\05169579.DWG DATE: 5-16-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

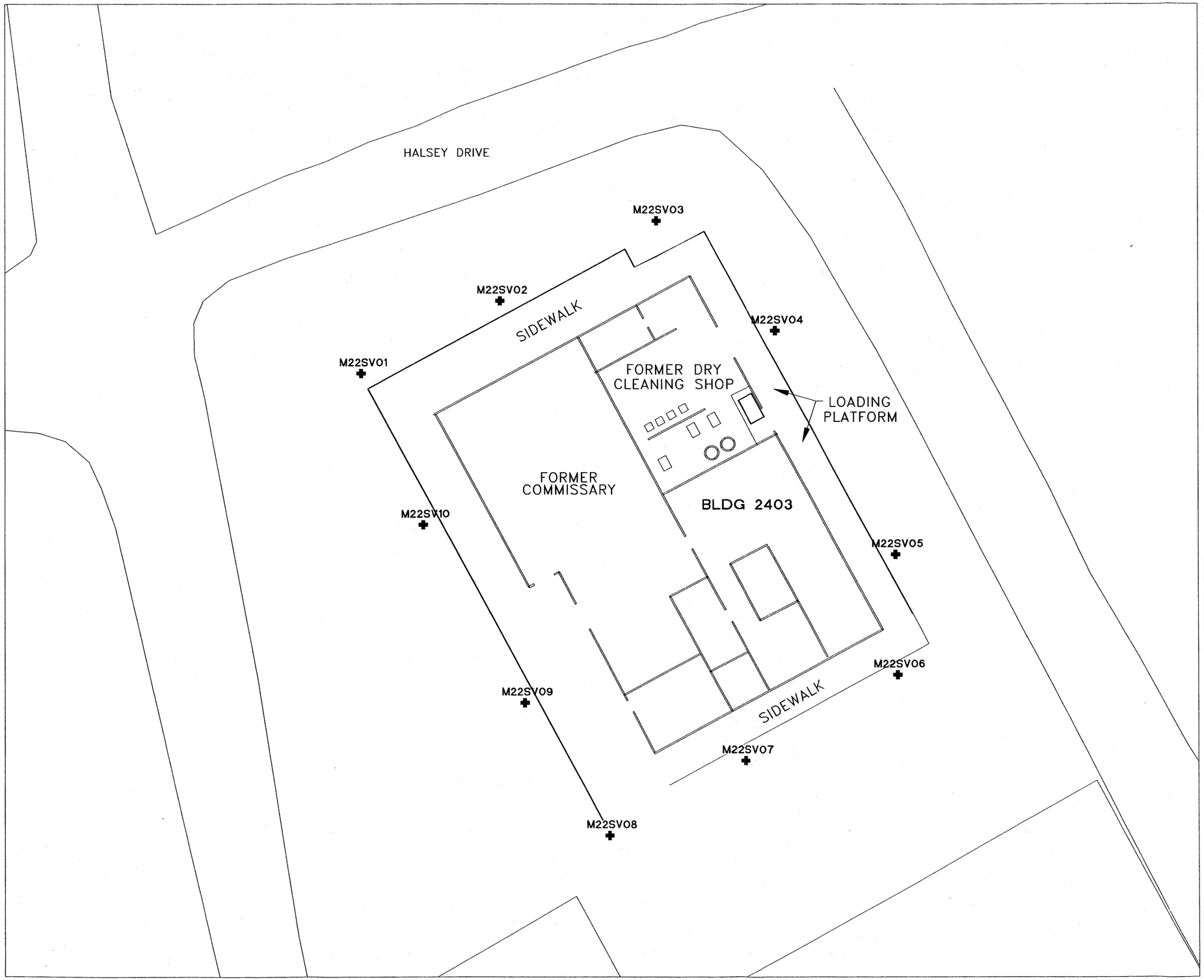
TITLE

FORMER COMMISSARY
DRY CLEANING PLANT, BLDG 2403
(SITE 22)
SAND ISLAND

N
FEET
12.5 0 25 50

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
16.1-1



LEGEND

M##SV## SOIL VAPOR SAMPLE LOCATION AND IDENTIFICATION NUMBER

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITES\SITE22\05169580.DWG DATE: 5-16-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

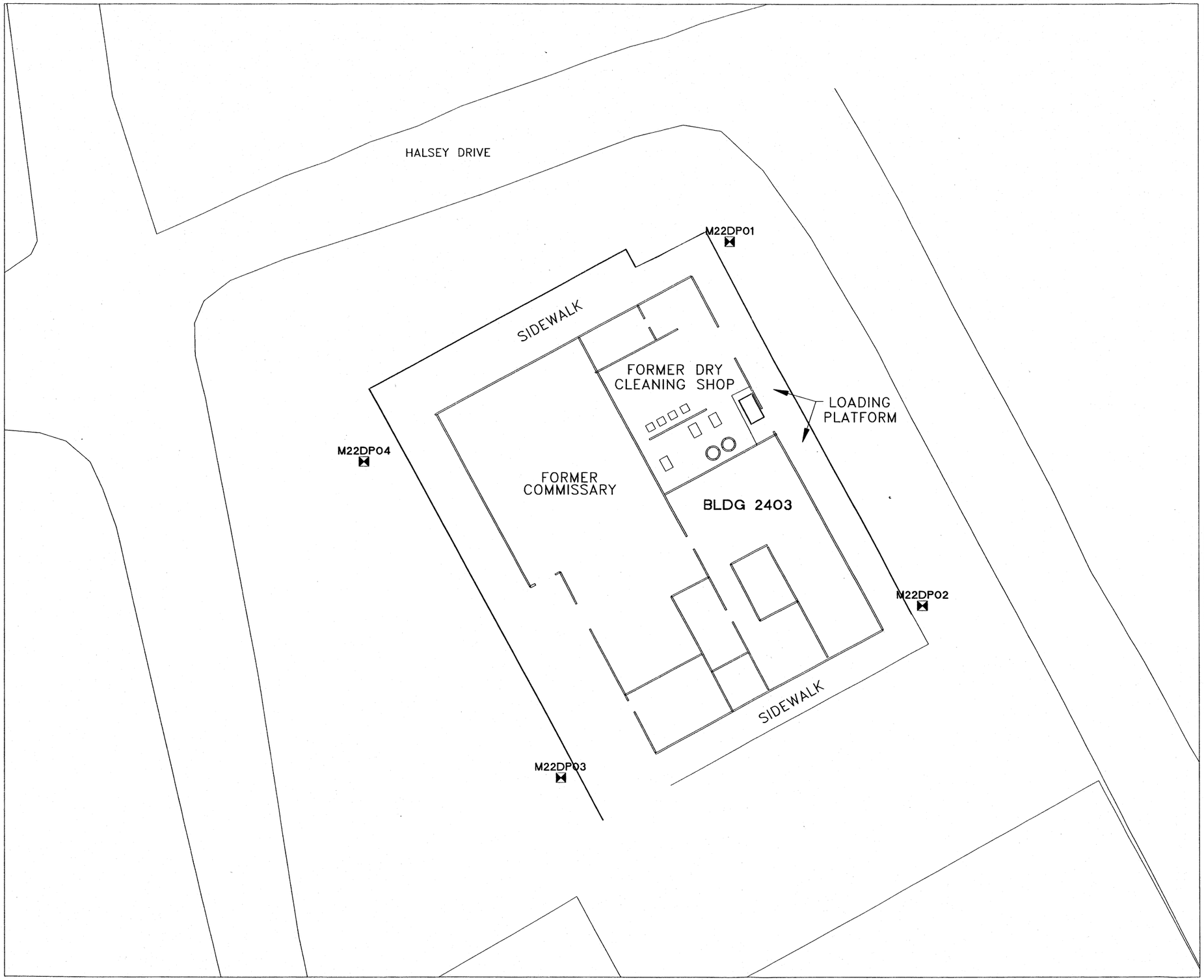
SOIL VAPOR SAMPLE LOCATIONS
(SITE 22)
SAND ISLAND

N

FEET
12.5 0 25 50

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
16.2-1



LEGEND

M##DP## DIRECT PUSH SAMPLE LOCATION AND IDENTIFICATION NUMBER

NOTES

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2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITES\SITE22\05169581.DWG DATE: 5-16-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

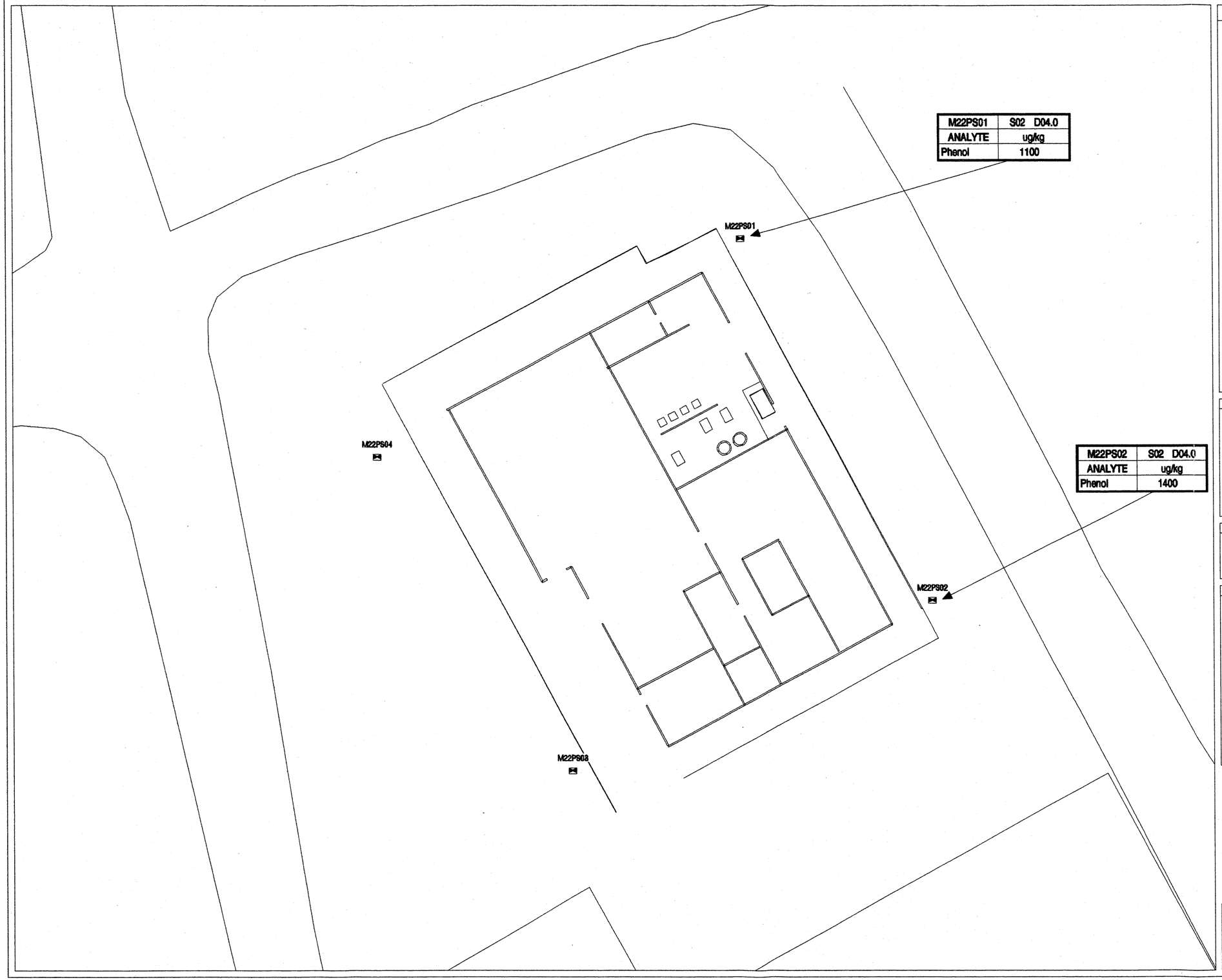
DIRECT PUSH SAMPLE LOCATIONS
(SITE 22)
SAND ISLAND

N

FEET
12.5 0 25 50

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
16.2-2



M22PS01	S02 D04.0
ANALYTE	ug/kg
Phenol	1100

M22PS02	S02 D04.0
ANALYTE	ug/kg
Phenol	1400

LEGEND

⋈	DIRECT PUSH SAMPLE LOCATION
M22PS02	OGDEN SAMPLE ID
1400	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET

NOTES

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2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BMF11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-5, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190186
4. FILE: /appa/hmr/cto186/maps/m5169583

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

SEMIVOLATILE ORGANIC COMPOUNDS DETECTED IN SUBSURFACE SOIL SAMPLES (SITE 22) SAND ISLAND

N

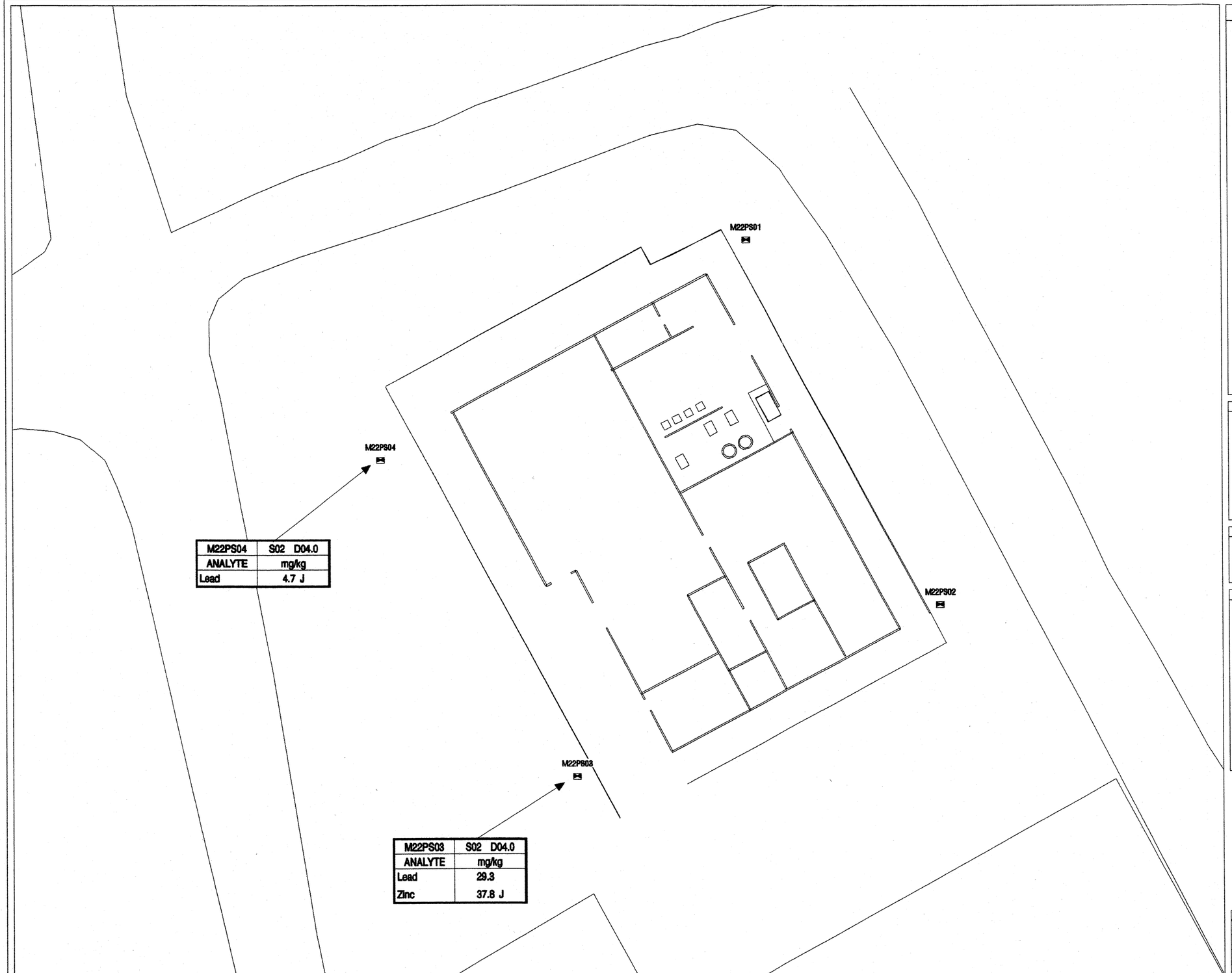
FEET

0 12.5 25 50 75

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	cmf.	HFP	HFP	JMC	JMC

FIGURE

16.5-1



M22PS04	S02 D04.0
ANALYTE	mg/kg
Lead	4.7 J

M22PS03	S02 D04.0
ANALYTE	mg/kg
Lead	29.3
Zinc	37.8 J

LEGEND

⊠	DIRECT PUSH SAMPLE LOCATION
M22PS02	OGDEN SAMPLE ID
29.3	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-5, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appe/hm/cto136/maps/m5160584

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

METAL CONCENTRATIONS DETECTED IN SUBSURFACE SOIL SAMPLES (SITE 22) SAND ISLAND

N

FEET

0 12.5 25 50 75

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	cmf.	HFP	HFP	JMC	BH

FIGURE

16.5-2

Section 17

SECTION 17
SEWER OUTFALLS, SAND AND EASTERN ISLANDS (SITE 25)

This report describes the results of the SI field work conducted intermittently from August through November 1994 at the Sewer Outfalls on Sand and Eastern Islands (Site 25). The purpose of the review was to determine whether hazardous substances were released and to assess the likelihood of seawater and marine sediment contamination. A discussion of the work conducted during the SI, along with findings, conclusions, and recommendations, is presented below.

This report is organized as follows: Site background information is documented in Section 17.1; a description of SI field sampling activities is presented in Section 17.2; methods used for sample analysis are summarized in Section 17.3; physical characteristics of the Site observed during the investigation activities are discussed in Section 17.4; a summary of analytical results, is presented in Section 17.5; the SERA is described in Section 17.6; and conclusions and recommendations for the Site are presented in Section 17.7.

17.1 BACKGROUND INFORMATION

Nine sewer outfalls, from both active and inactive sewer lines on Sand and Eastern Islands have been identified, grouped together, and designated as Site 25 (Figure 17.1-1). The outfalls, which range in diameter from 4 to 24 inches, are all located in a near-shore environment in shallow water. Two inactive outfalls have been found on Eastern Island. Five inactive or abandoned outfalls and two active outfalls have been identified on Sand Island.

Midway currently discharges untreated sewage and waste water into the lagoon on the northwest side of Sand Island through a 16-inch sewer line (Outfall 02). Although the line extends approximately 1,600 feet out into the lagoon, most of the effluent appears to issue from a breach in the pipe located approximately 1,000 feet offshore. During the 1993 EBS Site visit, Ogden personnel observed an unidentified effluent rising from the vicinity of a 24-inch outfall located in the southwest corner of Sand Island's Inner Harbor (Outfall 06).

Potential contaminants at the sewer outfalls include hazardous materials that may have been disposed of through drainage systems. Contaminants may exist within sediment accumulations near, or just beyond the end of each pipe. Currents, waves, and tides tend to disperse and dilute effluent discharged into the sea; therefore, the near-shore environment may not have been impacted. Table 17.1-1 lists the potential contaminants and the analyses implemented to characterize the nature and extent of any contamination that may exist.

Table 17.1-1

POTENTIAL CHEMICAL CONTAMINANTS, SEWER OUTFALLS, SAND AND EASTERN ISLANDS, SITE 25

Waste Type	Years of Disposal	Potential Chemical Constituents	Analytical Category
Various Organic and Inorganic Wastes	1940s-Present (Active Outfalls), Unknown (Inactive Outfalls)	Organic and Inorganic Compounds	Semi Volatile Organic Compounds, Organochlorine Pesticides, PCBs, Metals

17.2 SAMPLING METHODS AND LOCATIONS

To screen for possible contaminants at the outfall locations, sediment core, seawater, tissue, and infauna samples were collected. A marine reconnaissance of each outfall was completed to identify habitats and species occurring in the Site vicinity. Paired transects parallel to the outfalls were completed to estimate numbers and coverage of species. Lists of species observed at each Site are included in Appendix N. Both horizontal and vertical marine sediment samples were collected at this Site. If the sampling tool was unable to penetrate the sediment to a depth sufficient for vertical core sampling (10-12 inches), horizontal sediment core samples were collected instead. At outfalls that appeared to have been inactive for a long period of time, sediment samples were recovered for chemical analysis and toxicity testing; seawater, tissue and infauna samples were not collected at these outfalls. Each of the nine outfalls is discussed separately.

17.2.1 Sand Island

Outfall 01 - Old Sewer Outfall

Two sediment core samples were collected at Outfall 01; sample 01 was located at the terminus of the outfall and sample 02 was located 30 feet offshore of the terminus (Figure 17.2-1). One horizontal and one vertical sediment core were taken at Location 01. One vertical sediment core was taken at Location 02. The horizontal sediment core at Location 01 and the vertical sediment core at Location 02 were tested to evaluate toxicity. The vertical sediment core from Location 02 was also analyzed for chemical contaminants. Three cores for infaunal analyses were taken at each location.

Outfall 02 - Active Sewer Outfall

The area near Outfall 02 was divided into nine locations for the sampling program (Figure 17.2-1): six locations were positioned at the end of the outfall (Locations 01 and 02 were 15 feet southwest of the end of the pipe, Locations 03 and 04 were at or within the end of the pipe, and Locations 05 and 06 were 15 feet northeast of the end of the pipe), and three locations were sited at the breach in the pipeline (Locations 07 and 08 were approximately 6 feet from the southwest side of the pipe, and Location 09 was approximately 6 feet northeast of the pipe). Horizontal sediment samples for chemical and toxicity analysis were taken at Locations 01, 03, 05, 07, and 09. A QC duplicate sample was taken at Location 03. The samples at Location 03 were collected within the outfall pipe. Vertical sediment samples were taken at Locations 02, 04, 06, and 08. Samples were not taken at Location 10 because the hammer driver core would not penetrate to the depth required for sampling. Seawater samples were taken at Location 03, near the end of the pipe (a QC duplicate sample was also taken at this location) and in the effluent plume emanating from the breach in the pipe at Location 09. Whole organisms were collected for tissue analysis in the vicinity of the end of the pipe (Location 03) and the breach in the pipe (Location 09). Organisms collected at the end of the pipe represented herbivores (the damselfish *Stegastes fasciolatus* and the sea urchin *Echinometra mathaei*), detritus feeders (the sea cucumber *Holothuria* sp.), and carnivores (the wrasse *Thalassoma ballieui*). The same species of herbivore (the sea urchin *Echinometra mathaei*) and detritivore (the sea cucumber *Holothuria* sp.) were collected at the leak area.

Outfall 03 - West NAVFAC Outfall

Four locations were sampled at the west NAVFAC outfall located approximately 1,300 feet to the east-northeast of the NAVFAC Buildings (Figure 17.2-1). The 8-inch diameter pipe is broken into four disjointed sections. The section nearest the shore is located at the beach-water interface and extends 10 to 15 feet into the channel on the surface of the sediment. Location 04 was established in the surf zone where the pipe emerged from the beach and became exposed in the water of the inner reef flat. The next section of pipe is about 6 feet farther offshore; this section is approximately 15 feet long and is also resting on the coral sand/coral rubble substrate. The next section, approximately 15 feet long and 60 feet offshore, was found to be still mounted on concrete pillars that hold it at the water line. This indicates that when the outfall was active, the pipeline was positioned just below the surface of the water. Location 03 was established inshore of the pipe section on the pillar formation. The pipe section farthest offshore is exposed on the surface of the sediment for approximately 15 feet before it disappears into a large pocket of sand. Location 01 was established 30 feet offshore from where the pipe disappeared, and Location 02 was established toward the near shore end of the final pipe section.

Vertical sediment cores were taken at Locations 01, 02, and 03, and a horizontal sediment core was taken at Location 04. Sediment samples from all locations were analyzed for chemical contaminants. The sample collected at Location 01 was also tested to evaluate toxicity. Three cores for infaunal analysis were collected at Location 01.

Outfall 04 - East NAVFAC Outfall

Two locations were sampled at the East NAVFAC outfall which is located 130 feet east of the west NAVFAC outfall (Figure 17.2-1). Location 01 was established at the offshore terminus of the outfall. Location 02 was established in the surf zone where the pipe emerged from the sand and became exposed in the water of the inner reef flats.

Horizontal and vertical sediment cores were taken at Location 01, and a vertical sediment core was taken at Location 02. All sediment samples were analyzed for chemical contaminants. The horizontal sample at Location 01, was also tested to evaluate toxicity. Three cores for infaunal analysis were collected at Location 01.

Outfall 05 - Runway Storm Drain Outfall

The runway storm drain is located on the southern side of the active runway and approximately 500 feet west of the Bulky Waste Landfill (Figure 17.2-1). Two types of discharges exist at this Site. A horizontal sediment sample, a toxicity sample, and infaunal samples were collected at this Site. The horizontal sediment sample was taken directly in front of the drains, approximately 6 feet from the quay wall; this was the closest area to the drains where adequate sand was available. The three infaunal cores were taken slightly farther away from the quay wall.

Outfall 06 - Inner Harbor Outfall

Two locations were sampled at the Inner Harbor Outfall (Figure 17.2-1). The mouth of the pipe was designated Location 01 and an area 10 feet north of the pipe was designated Location 02.

Horizontal sediment samples were collected from inside the pipe for toxicity testing and chemical analyses at Locations 01 and 02. A seawater sample was collected only at Location 01. For tissue analysis, whole organisms were collected as close as possible to the pipe. Organisms collected represented primary producers (the algae *Dictyota acutiloba*), herbivores (the convict tang *Acanthurus triostegus* and the sea urchin *Echinometra mathaei*), and filter feeders (the bivalve *Chama iostoma*).

Outfall 07 - Rocky Point Outfall

Sediment samples from the Rocky Point Site were subjected to chemical analysis, toxicity testing, and infaunal analysis (Figure 17.2-1). Horizontal sediment cores were taken near the pipeline break (Location 02). A vertical sediment core was taken offshore, near the location at which the pipeline enters the sand (Location 01). Only horizontal samples were collected at the nearshore location because the coral rubble resisted penetration. Infaunal and toxicity samples were taken at both locations.

17.2.2 Eastern Island

Outfall 08 - Southwest Outfall

A limited amount of sediment existed at this location; therefore, a composite horizontal sediment core, derived from several different sand pockets, was recovered (Figure 17.2-2). The sample was analyzed for possible contaminants and evaluated for toxicity.

Outfall 09 - Southeast Outfall

Two locations were sampled at the Southeast Outfall on Eastern Island (Figure 17.2-2). Location 01 was at established at the offshore terminus of the outfall. Location 02 was established in the surf zone where the pipe exited the sand. One horizontal sediment core was taken at Location 01, and one vertical sediment core was taken at Location 02. Sediment samples were analyzed for chemical contaminants and toxicity.

17.3 ANALYTICAL METHODS

17.3.1 Marine Sediment

Marine sediment samples were analyzed by low-level methods for SVOCs, PCBs, metals, and pesticides. Total organic carbon concentrations, grain size, and toxicity were also quantified. Table 17.3-1 lists the samples and analytical methods.

17.3.2 Seawater

Seawater samples were analyzed by low-level methods for SVOCs, PCBs, metals, and pesticides.

17.3.3 Marine Tissue

Marine tissue samples were also analyzed by low-level methods for SVOCs, PCBs, metals, and pesticides.

17.4 PHYSICAL CHARACTERISTICS

The nine sewer outfalls are located in shallow water near the shores of Sand and Eastern Islands (Figure 17.1-1). Outfall 01, located approximately 750 feet off the northwest shore of Sand Island, is inactive and consists of two 12-inch diameter pipes. Outfall 02 is active and consists of one 16-inch diameter pipe, the end of which is located 1,625 feet off the northwest shore of Sand Island. Effluent also issues from a break in this pipe, located approximately 1,000 feet offshore. The west and east NAVFAC Outfalls (Outfalls 03 and 04) are located about 300 feet off the south shore of Sand Island. These two outfalls are 8 and 12 inches in diameter respectively and are both abandoned. The Runway Storm Drain, Outfall 05, is 24 inches in diameter and is located about 200 feet off the south shore of Sand Island. The Inner Harbor Outfall (Outfall 06) is inactive, and consists of a 24-inch diameter pipe that emerges from the quay wall in the southwestern corner of Sand Island's Inner Harbor. The Rocky Point Outfall (Outfall 07) is 12 inches in diameter and is located approximately 500 feet off Rocky Point at the eastern end of Sand Island. Two inactive outfalls (Outfalls 08 and 09) are located approximately 1200 feet apart off the southern shore of Eastern Island. Outfall 08 is 8 inches in diameter and is located approximately 250 feet offshore. Outfall 09 consists of two pipes, one 4 inches in diameter and one 6 inches in diameter, and is also located about 250 feet offshore.

17.5 SUMMARY OF ANALYTICAL RESULTS

The sections and tables below summarize the results of laboratory analyses performed on Site 25 samples. For marine sediment samples, analytical results for organic and inorganic compounds are shown in Tables 17.5-1 and 17.5-2 respectively. Analytical results for seawater samples are presented in Tables 17.5-3 and 17.5-4. Marine tissue sampling results are discussed in Section 17.6.2.

The tables list the analytical methods, the number of detects, the total number of samples, the number of samples rejected during data validation, the minimum undetected concentration, the maximum undetected concentration, the minimum detected concentration, the maximum detected concentration, and the sample with the maximum concentration. In addition, the concentrations of compounds detected at the Site are compared to Sand Island background levels. Analytical results for all samples and

analytes are included in Appendix L. Complete CLP and low-level analytical data are available at PACNAVFACENGCOM offices at Pearl Harbor, Hawaii.

17.5.1 Marine Sediment

Low-level analytical methods detected 15 pesticides among the marine sediment samples. The highest pesticide concentration was 4.2 µg/kg of 4,4' DDD. Forty-two SVOCs were detected. The maximum SVOC concentration detected was 310 µg/kg of a dibenzothiophene compound. Nineteen PCB congeners were detected; the maximum was 4.3 µg/kg of PCB-170. Fifteen metals were detected in this group of samples. The maximum lead concentration was 9.7 mg/kg. The highest detected concentration of mercury was 0.038 mg/kg. Figures 17.5-1, 17.5-2, 17.5-3, 17.5-4, 17.5-5, and 17.5-6 depict the sampling locations and selected concentration values.

17.5.2 Seawater

Among the seawater samples tested by low-level methods, two pesticides, endrin ketone and hexachlorobenzene, were detected; maximum concentrations of both were low (0.0035 and 0.0036 µg/L). Only one PCB congener was detected: PCB-180 at a maximum concentration of 0.0012 µg/L. Thirty five SVOCs were detected; the maximum concentration was 0.7 µg/L of a napthalene-group compound. Sixteen metals were detected; the highest lead concentration was 0.863 µg/L, and the highest mercury concentration was 0.0018 µg/L.

17.6 Screening Ecological Risk Assessment

17.6.1 Problem Formulation

Tasks to be accomplished during Problem Formulation include (a) developing a Site description based on current Site investigations, existing literature, any prior preliminary assessments, and Site history; (b) identifying potential stressors, exposure pathways, and ecological receptors (habitats and species); (c) discussing the nature of adverse effects associated with a given stressor; (d) defining ecologically appropriate assessment and measurement endpoints; and (e) making an initial evaluation of risks posed by the Site.

For a Site to present the potential for risk, it must exhibit the following three criteria: (a) contain stressors in abiotic media at detectable and biologically significant concentrations, (b) provide exposure pathways linking stressors to ecological receptors, and (c) have ecological receptors (those associated with assessment endpoints) that either utilize the Site, are present nearby, or are in range of stressors migrating from the Site. If Problem Formulation determines that one or more of these criteria are absent, the Site is recommended for NFA and the risk assessment is concluded at this point. If all criteria are met, then completion of the SERA process is required.

17.6.1.1 Site Description

This "Site" covers all outfalls to the marine environment on both Sand and Eastern Islands. These outfalls include two known sewer outfalls (Old Sewer Outfall [01] and Active Sewer Outfall [02] on Sand Island), a power plant discharge (Rocky Point Outfall [07] for the Abandoned Power Plant), a storm drain for the airport runway (Runway Storm Drain [05]), and five outfalls for unknown discharges (Inner Harbor [06] and NAVFAC East [04] and West [03] on Sand Island, and Southeast [09] and Southwest [08] Outfalls on Eastern Island).

Outfall 01 - Old Sewer Outfall

Outfall 01 is located fairly close to the beach on the northwest side of Sand Island well inside the fringing reef in a zone of sand with occasional rubble reefs.

Outfall 02 - Active Sewer Outfall

Outfall 02 is located on the northwest side of Sand Island well inside the fringing reef. The pipeline extends approximately 1,625 feet offshore northwest from the beach and generally lays on top of the sand. The pipeline crosses an area composed primarily of sand with occasional rubble reefs and an area with coral heads interspersed with sand. No discharge was observed flowing from the terminus of the active sewer pipeline. Brown, discolored water, approximately 975 feet from the beach, was identified flowing from an obvious rupture in the pipeline.

Outfall 03 - West NAVFAC Outfall

The West NAVFAC Outfall is located on the beach approximately 1,300 feet east-northeast of the NAVFAC Buildings on the southwest side of Sand Island. The beach, approximately 800 feet inshore of the fringing reef, is exposed to large swells, strong currents, and substantial wind chop. A longshore current from the east was fairly strong on relatively calm days, and extremely pronounced during storm activity. The abandoned West and East NAVFAC Outfalls are perpendicular to the shoreline, midway between the abandoned NAVFAC facility and the Bulky Waste Landfill. These outfalls are located approximately 130 feet apart.

The West NAVFAC pipeline is no longer intact. The remains comprise four disjointed sections of 8-inch diameter pipe. The section nearest the shore is located at the beach-water interface and extends 10-15 feet into the channel on the surface of the sediment. The next section of pipe is approximately 15 feet long, and rests on a coral sand/coral rubble substrate about 6 feet farther offshore. The next section, approximately 15 feet long and 60 feet offshore, is still mounted on concrete pillars that hold it at the water line. This implies when the outfall was active, the pipeline ran just below the surface of the water. Water depth in this area ranges from 0 to 6.5 feet. The pipe section farthest offshore is exposed on the surface of the sediment for approximately 15 feet before disappearing into a large pocket of sand.

Other hard structures in the area include an eastern outcrop on pillars 6.5 by 16 feet that provides habitat for a variety of organisms, and to the west of the offshore pipe section, a large tabletop reef (approximately 10 by 50 feet) about 3 to 6.5 feet below the water surface. Water depth at the base of the reef is approximately 10 to 13 feet. The reef is surrounded by coral sand.

Outfall 04 - East NAVFAC Outfall

The East NAVFAC Outfall is located 130 feet from the West NAVFAC Outfall. The conditions and habitats are the same as at the West Outfall.

The eastern pipeline is no longer intact. The remains comprise a continuous section of 12-inch diameter pipe extending from the surf zone to approximately 100 feet offshore. This section of pipe rests on top of the sea floor which is composed of a mixture of coral sand

and coral rubble. Approximately 65 feet offshore and east of the outfall at a depth of 3 to 6.5 feet is a boulder/cobble reef. Several large tabletop limestone reefs are also present 65 to 100 feet off the end of the pipeline.

Outfall 05 - Runway Storm Drain Outfall

The runway storm drain is located on the southern side of the active runway and approximately 490 feet west of the Bulky Waste Landfill. Two types of discharges exist at this Site: a storm drain equipped with a one-way flood gate at the seaward end used to reduce seawater inflow, located approximately 3 feet beneath the water surface on the quay wall; and a surface drain constructed of asphalt with a concrete lip located directly above the storm drain providing drainage for the runway. Water depth is approximately 6.5 feet at the quay wall and gradually increases in depth away from the quay wall.

Outfall 06 - Inner Harbor Outfall

The Inner Harbor Outfall is an abandoned 24-inch diameter pipe located in the quay wall in the southwestern corner of the inner harbor. The discharge, approximately 1.5 feet below the water surface, is a suspected drain for oil from the area of the Superblock. The southwestern corner of the harbor is directly exposed to winds and wind-generated swells from the east.

Water depth at the outfall is 3 feet. Substrate at the outfall is coral rubble with some coral sand. Depth and substrate composition remain the same for approximately 19 to 65 feet away from the quay wall, where the slope and depth gradually increase to 10 to 16 feet. The sea floor in the Inner Harbor is mainly poorly consolidated, fine sand and silt.

Outfall 07 - Rocky Point Outfall

The outfall at Rocky Point is the discharge location for the abandoned power plant. The Site is located on the eastern side of Sand Island just north of the sheetpile and concrete breakwater that defines the northeast edge of the inner harbor. The shoreline is concrete rubble rip-rap. Coral rubble, with small pockets of sand, extends approximately 100 feet offshore from the rip-rap and breakwater. Sand predominates beyond the coral rubble but is interrupted by occasional patch reefs. The pipeline is broken near shore. The section from the break to approximately 80 feet offshore does not have a top and is filled with

sand. The pipeline continues beyond this point and disappears into the sand approximately 115 feet offshore.

Outfall 08 - Southwest Outfall / Outfall 09 - Southeast Outfall

The southwest and southeast abandoned outfalls, are located on the southern side of Eastern Island. They are broken in several places but appear to have been perpendicular to the shore. This area is approximately 490 feet from the fringing reef and is exposed periodically to large swells and wind. On relatively calm days, a strong longshore current to the west was evident; during storm periods this current was extremely pronounced. Although many of the biological characteristics are similar, each outfall is considered a separate location.

17.6.1.2 Stressor Identification

Because of the early availability of chemical analysis data, ECs were computed and CPECs identified at this point in the SERA process using methods previously described in Sections 4.3.1.1.1 and 4.3.1.1.2. Results for each outfall are presented below.

Outfall 01 - Old Sewer Outfall

CPEC selection for marine sediments, shown in Table 17.6-1, indicates that the principal CPECs include tin, hexachlorobenzene, and 12 PCB congeners.

Outfall 02 - Active Sewer Outfall

CPEC selection for marine sediments, shown in Table 17.6-2, indicates that the principal CPECs include mirex and nine PCB congeners. CPECs in seawater samples collected at this Site are summarized in Table 17.6-10. The principal CPECs in seawater are tin, acenaphthylene, and biphenyl.

Outfall 03 - West NAVFAC Outfall

CPEC selection for marine sediments, shown in Table 17.6-3, indicates that the principal CPECs include alpha-BHC, hexachlorobenzene, and six PCB congeners.

Outfall 04. East NAVFAC Outfall

CPEC selection for marine sediments, shown in Table 17.6-4, indicates that the principal CPECs include tin and three PCB congeners.

Outfall 05 - Runway Storm Drain Outfall

CPEC selection for the single marine sediment sample collected onsite is shown in Table 17.6-5. The principal CPECs include metals, pesticides, PAHs, and 11 PCB congeners.

Outfall 06 - Inner Harbor Outfall

CPEC selection for marine sediments, shown in Table 17.6-6, indicates that the principal CPECs include manganese, selenium, and tin, alpha-chlordane, and 13 PCB congeners. Principal CPECs in seawater collected at this Site, summarized in Table 17.6-11, were tin, PAHs, endrin ketone, and PCB-180.

Outfall 07 - Rocky Point Outfall

CPEC selection for marine sediments, shown in Table 17.6-7, indicate that the principal CPECs include tin and eight PCB congeners.

Outfall 08 - Southwest Outfall

CPEC selection for marine sediments, shown in Table 17.6-8, indicates that the principal CPECs include manganese, tin, trans-nonachlor, and five PCB congeners.

Outfall 09 - Southeast Outfall

CPEC selection for marine sediments, shown in Table 17.6-9, indicates that the principal CPECs include thallium, 1,2,4-trichlorobenzene, hexachlorobenzene, and PCB-180.

17.6.1.3 Potential Ecological Effects

CPECs that may adversely affect receptors onsite are pesticides, PCBs, SVOCs, PAHs, and metals (Table 17.6-12). The physicochemical and toxicological properties of these CPECs, as they relate to potential exposure routes and sensitive ecological receptors, are discussed briefly in Section 4.2.3 and in greater detail in Appendix J.

17.6.1.4 Ecological Receptor Identification

The primary ecological receptors of contaminants transported into the marine environment are the Pacific green sea turtle and the Hawaiian monk seal. Additional receptors include marine fishes, invertebrates, and algae, which form a food web with the sea turtle and monk seal at higher trophic levels. Through this food web, CPECs have the potential of being bioconcentrated and/or biomagnified to levels that could affect these higher trophic level ecological receptors. Outfall-specific marine receptors and communities are described below.

Outfall 01 - Old Sewer Outfall

Few organisms were observed on the sand beside and at the end of the outfall structure; however, fish, sea urchins (*Echinometra mathaei* and *Tripneustes gratilla*), and sea cucumbers (*Holothuria* spp.) were present on or about the structure. A conger eel (*Conger cinereus*) was observed inside one of the pipes. Fish present in the vicinity of this outfall included schools of sea chubs (*Kyphosus bigibbus*) and goatfishes (*Mulloidichthys flavolineatus* and *Parupeneus* spp.) Ghost crabs (ocypodids) were observed on the beach.

Several patch reefs were located near the outfall. Most consisted of low relief coral rubble. These reefs supported abundant filamentous green algae and a sparse cover of a red alga (*Asparagopsis taxiformis*). Typical fish and invertebrate species associated with coral rubble were observed in these areas (Section 2.0).

In addition to the low-relief rubble, a reef with moderate relief (approximately 5 feet high) lies about 65 feet northwest of this discharge. This reef is comprised primarily of a limestone base with numerous live colonies of a coral (*Pocillopora*). Other than coral, the most abundant species on the reef was a sea urchin (*Echinometra*). Sea urchins (*Echinothrix diadema*, *Heterocentrotus mammillatus*, and *Echinostrephus aciculatus*) also occurred at low densities. Fish, including wrasses, butterflyfishes, and surgeonfishes, were fairly abundant on this reef.

Outfall 02 - Active Sewer Outfall

The substrate immediately off the end of the pipe was sand. No animals or evidence of animal activity were observed along the transects. Several species of algae were observed,

including two species of calcareous articulate green algae (*Halimeda discoidea* and *H. opuntia*) and three species of brown algae (*Padina japonica*, *P. thivyi*, and *Ralfsia pangoensis*). Squirrelfish (*Heteropriacanthus cruentatus*) were observed hiding inside the terminus of the pipeline. Nearby limestone and coral rubble reefs were inhabited with the typical fish and invertebrates (c.f. Section 2.0). The area near the leak along the pipeline and nearby reefs had more fish than adjacent areas. Fishes and invertebrates commonly found in reef habitats were observed at the leak.

Outfall 03 - West NAVFAC Outfall

The biota was relatively diverse and typical of undisturbed areas on Midway Atoll. Several species of brown, green, and red algae were observed on the outfall and reefs surrounding the outfall. Reefs of limestone and coral rubble in the nearby vicinity were inhabited with the typical fish and invertebrates. Monk seals were sighted on numerous occasions during the day hauling out adjacent to the outfall.

Outfall 04 - East NAVFAC Outfall

Limestone reefs and coral rubble in the vicinity of the pipeline were inhabited with fairly diverse and typical assemblages of algae, invertebrates, and fishes. Many species of algae were observed on the outfall and reefs.

Outfall 05 - Runway Storm Drain Outfall

Within a 32.5-foot radius of the drains, the substrate is comprised mainly of small pieces of asphalt (approximately 1 inch in diameter) and coral rubble. Sand with some coral rubble was the predominant substrate beyond this area. Several species of algae were observed; however, animals were uncommon in the asphalt area. A sea urchin (*Echinometra mathaei*), a cone snail (*Conus lividus*), and moon snail egg cases (Naticid) were present. The only fishes seen in the immediate area of the drains were bluestripe butterflyfish (*Chaetodon fremblii*), elegant coris (*Coris venusta*), and yellowmargin moray (*Gymnothorax flavimarginatus*). A patch reef approximately 50 feet southeast supported a large school of convict tang (*Acanthurus triostegus*) and various damselfishes and wrasses.

Outfall 06 - Inner Harbor Outfall

Species composition in these substrates was similar, but differences in abundance were apparent. The coral rubble in the area near the quay wall provided a habitat for a few

species of algae (*Dictyota bartayresii*, *Padina thivyi*, and *Caulerpa sertularioides*), the coral *Pocillopora meandrina*; the sea urchin *Echinometra mathaei*; and a tube-dwelling worm (*Pseudopolydora* sp.). Small burrows observed in the area suggest that mantis shrimp (*Stomatopoda*) and alpheid shrimp inhabit this area. In the deeper areas, algae were more sparse but the tubicolous polychaete *Pseudopolydora* sp. was common.

Fishes were most common over the coral rubble bottom and near the quay wall. Common fishes observed were the convict tang (*Acanthurus triostegus*), butterflyfishes (*Chaetodon fremblii* and *C. auriga*), goatfishes (*Mulloidichthys flavolineatus*, *M. vanicolensis*, *Parupeneus porphyreus*, *P. pleurostigma*, and *P. multifasciatus*), and damselfishes (*Abudefduf sordidus*, *Dascyllus albisella*, and *Stegastes fasciolatus*). Green sea turtles and monk seals were commonly observed in or near this area.

Outfall 07 - Rocky Point Outfall

The cobble rubble habitat was characterized by a fairly diverse community of attached and free-swimming biota commonly found in this type of habitat (Section 2.0). Eight species of algae, sponges (*Cliona* sp. and a fleshy red sponge), an attached clam (*Chama iostoma*), a sea urchin (*Echinometra mathaei*), and corals (*Pocillopora damicornis*, *P. meandrina*, and *Porites lobata*) were all observed around the outfall. Fish that were abundant in the area included convict tang (*Acanthurus triostegus*), butterflyfishes (*Chaetodon auriga*, *C. fremblii*, and *C. miliaris*), milkfish (*Chanos chanos*), hawkfishes (*Cirrhitops fasciatus*, *Paracirrhites forsteri*), porcupinefish (*Diodon hystrix*), a goby (*Psilogobius mainlandi*), sea chubs (*Kyphosus* spp.), wrasses (*Anampses cuvier*, *Coris flavovittata*, *C. venusta*, *Stethojulis balteata*, *Thalassoma ballieui*, and *T. duperrey*), goatfishes (*Mulloidichthys flavolineatus*, *Parupeneus multifasciatus*, *P. pleurostigma*, and *P. porphyreus*), bar jack (*Carangoides ferdau*), and bluefin trevally (*Caranx melampygus*).

Outfall 08 - Southwest Outfall

At the southwestern outfall, coral rubble with pockets of coral sand and rocky outcroppings provide a habitat for a diverse assemblage of algae. Over twenty species of green, brown, and red algae were observed in this community. Reefs of limestone and coral rubble in the nearby vicinity were inhabited with the typical fish and invertebrates (Section 2.0). The sea urchin *Echinometra mathaei* and coral *Pocillopora damicornis*

were present on most of the hard substrata, while a tube-building worm (*Pseudopolydora*) and a sea cucumber (*Holothuria* sp.) were found in sandier areas. Fish included surgeonfishes (*Acanthurus triostegus* and *A. nigroris*), jacks (*Caranx ignobilis* and *C. melampygus*), butterflyfishes (*Chaetodon auriga, C. fremblii, C. miliaris, C. ornatissimus*), hawkfish (*Cirrhitus pinnulatus*), wrasses (*Anampses cuvier, Bodianus bilunulatus, Coris ballieui, C. flavovittata, Thalassoma* sp.), goatfishes (*Mulloidichthys flavolineatus* and *Parupeneus multifasciatus*), and damselfishes (*Stegastes fasciolatus, Abudefduf sordidus*, and *Dascyllus albisella*). Monk seals were also observed hauled out on the beach adjacent to the outfall on several occasions.

Outfall 09 - Southeast Outfall

The Southeast Outfall had species and communities similar to those described for the Southwest Outfall.

17.6.1.5 Exposure Pathway Identification

The CSM appropriate to this Site is shown in Figure 4.2-2. The outfall pipelines could carry potential contaminants directly into the sea at each offshore outfall. These contaminants may remain suspended in the marine surface water or may precipitate out onto the sediment. Potential exposure routes to marine receptors would include direct contact with contaminated sediment and surface water and ingestion of sediment and contaminated prey.

17.6.1.6 Endpoints

Assessment endpoints and testable hypotheses appropriate for these locations are listed in Sections 4.2.6.1 and 4.2.6.2, respectively. As all effluents were discharged into the surrounding waters of either Sand or Eastern Island, measurement endpoints selected for this Site include those listed in Section 4.2.6.3 that focused on the marine environment.

17.6.1.7 Summary

Based on the preceding information, it was concluded that these locations met the three criteria that indicate the potential for risk and that completion of the SERA process was required for each of the outfalls.

17.6.2 Exposure Analysis

Exposure was evaluated for the marine species at these locations using the following three approaches (some approaches are not applicable to all locations):

1. Food chain models were used to estimate exposure (dose) to higher trophic level receptors. Exposure pathway models (c.f., Section 4.3.1.3) applicable to the marine aspects of this Site were used for sea turtles (#4) and monk seals (#5). These exposure pathways and endpoints were evaluated using models described in Section 4.3.1.4. Results of these evaluations are shown in Table 17.6-13.
2. Sediment bioassays were used to provide corroborating evidence as to the potential for bioavailability of contaminants.
3. Chemical analysis of tissues taken from various trophic levels, as available, were collected at the active outfall and the Inner Harbor outfall and from a background Site well out of contact with any Site-related contaminants. Results are shown in Tables 17.6-14 and 17.6-15.

<u>Outfall 01 - Old Sewer Outfall</u>

Sampling for the Old Sewer Outfall location did not include collection of tissue samples. Assessment of the bioavailability of CPECs associated with the location was made from results of the bioassay tests (Table 17.6-16).

Conservative food chain modeling estimated that species at higher trophic levels could receive doses from direct exposure to CPECs in abiotic media (Table 17.6-13). The toxicity results did indicate that species exposed to sediments from this location were subject to chronic effects suggesting the uptake of CPECs is occurring.

Outfall 02 - Active Sewer Outfall

Chemical data for marine tissues collected at the terminus of the outfall pipeline and at the break in the pipeline is summarized in Tables 17.6-14. Results indicate that concentrations of more than 20 inorganic and organic analytes at this location exceeded background levels for five of the six tissues sampled. The sixth sample, tissue from *Holothuria* collected near the break, had 14 analytes that exceeded background levels. Of these chemicals, two metals (lead and zinc) and four PCB congeners exceeded background levels in all tissues collected at this location (both terminus and break). Thirty contaminants (seven metals, eleven chlorinated pesticides, six PAHs, and six PCBs) were detected in tissue samples that were not present in other media from the Site. With the possible exception of the wrasse *Thalasomma ballieui*, these animals are not likely to have foraged outside of the vicinity of this location. It should be noted that results of background tissue analyses also indicate some contaminants, particularly metals, were at levels above those found in tissues at this location. This suggests either an offsite source or an atoll-wide distribution for some contaminants.

Conservative food chain modeling estimated that species at higher trophic levels could receive doses from direct exposure to CPECs in abiotic media (Table 17.6-13) and from secondary exposure to Site-related CPECs that have bioaccumulated in their prey or forage items.

Outfall 03 - West NAVFAC Outfall

Sampling for the West NAVFAC Outfall location did not include collection of tissue samples. Assessment of the bioavailability of CPECs associated with the location were made from results of the bioassay tests (Table 17.6-20).

Conservative food chain modeling estimated that species at higher trophic levels could receive doses from direct exposure to CPECs in abiotic media (Table 17.6-13). Toxicity test results indicate that species exposed to sediments from this location suffer neither acute nor chronic effects, suggesting that CPEC exposure, bioavailability, and uptake are minimal.

Outfall 04 East NAVFAC Outfall

Sampling for the East NAVFAC Outfall location did not include collection of tissue samples. Assessment of the bioavailability of CPECs associated with the location were made from results of the bioassay tests (Table 17.6-22).

Conservative food chain modeling estimated that species at higher trophic levels could receive doses from direct exposure to CPECs in abiotic media (Table 17.6-13); however, there is no direct evidence of secondary exposure to Site-related CPECs that have bioaccumulated in their prey or forage items because no tissue samples were taken. Toxicity test results indicate that species exposed to sediments from this location suffer neither acute nor chronic effects, suggesting that CPEC exposure, bioavailability, and uptake are minimal.

Outfall 05 - Runway Storm Drain Outfall

Sampling for the Runway Storm Drain Outfall location did not include collection of tissue samples. Assessment of the bioavailability of CPECs associated with the location were made from results of the bioassay tests on one horizontal sediment sample (Table 17.6-4).

Conservative food chain modeling estimated that species at higher trophic levels could receive doses from direct exposure to CPEC in abiotic media (Table 17.6-13). There is, however, no direct evidence to suggest that higher trophic levels may be exposed to Site-related CPECs that have bioaccumulated in their prey or forage items because no tissue samples were taken. Toxicity test results indicate that species exposed to sediments from this location suffer neither acute nor chronic effects, suggesting that CPEC exposure, bioavailability, and uptake are minimal.

Outfall 06 - Inner Harbor Outfall

Chemical data for marine tissues collected at the Inner Harbor Outfall (summarized in Tables 17.6-15) indicate that concentrations of 52 inorganic and organic analytes at this location exceeded background levels for at least one of the four tissues sampled. Fifteen of these analytes exceeded background levels in all four tissues. Seventeen contaminants (six metals, eight chlorinated pesticides, and three PAHs) were detected in tissue samples that were not CPECs in sediment from the Site. The animals selected for tissue analysis, with the possible exception of the tang *Acanthurus triostegus*, are not likely to have

foraged outside of the vicinity of this location. Background tissue analyses also indicate some contaminants, particularly metals, were at levels above those found in tissues at this location. This suggests either an offsite source or an atoll-wide distribution for some contaminants.

Conservative food chain modeling estimated that species at higher trophic levels could receive doses from direct exposure to CPECs in abiotic media (Table 17.6-13) and from secondary exposure to Site-related CPECs that have bioaccumulated in their prey or forage items.

Outfall 07 - Rocky Point Outfall

Sampling for the Rocky Point Outfall location did not include collection of tissue samples. The bioavailability of CPECs associated with the location was therefore assessed on the basis of bioassays performed on one horizontal sediment sample (collected beside the pipeline in sand just beyond the rubble), and one vertical sediment sample (recovered offshore of the broken end of the pipeline) (Table 17.6-7).

Conservative food chain modeling estimated that species at higher trophic levels could receive doses from direct exposure to CPECs in abiotic media (Table 17.6-13). There is, however, no direct evidence to suggest that higher trophic levels may be exposed to Site-related CPECs that have bioaccumulated in their prey or forage items because no tissue samples were taken. The toxicity results indicated that it was unlikely that species exposed to sediments from this location experienced chronic effects, although there was some possibility of acute effects in surficial sediments at one location.

Outfall 08 - Southwest Outfall

Sampling for the Southwest Outfall location did not include collection of tissue samples. Assessment of the bioavailability of CPECs associated with the location were made from results of the bioassay tests (Table 17.6-29).

Conservative food chain modeling estimated that species at higher trophic levels could receive doses from direct exposure to CPECs in abiotic media (Table 17.6-13); however, there is no direct evidence of secondary exposure to Site-related CPECs that have bioaccumulated in their prey or forage items because no tissue samples were taken.

Toxicity results indicated that species exposed to sediments from this location could develop chronic effects, suggesting uptake of CPECs.

Outfall 09 - Southeast Outfall

Sampling for the Southeast Outfall location did not include collection of tissue samples. Assessment of the bioavailability of CPECs associated with the location were made from results of the bioassay tests (Table 17.6-30). While no tissue analyses are available for this location, it should be noted that results of background tissue analyses indicate some contaminants at levels well above those found in onsite tissues at other locations and sites on Midway Atoll. This suggests either an offsite source or an atoll-wide distribution for some contaminants.

Conservative food chain modeling estimated that species at higher trophic levels could receive doses from direct exposure to CPECs in abiotic media (Table 17.6-13); however, there is no direct evidence of secondary exposure to Site-related CPECs that have bioaccumulated in their prey or forage items because no tissue samples were taken. The toxicity results did indicate that species exposed to sediments from this location could develop chronic effects, suggesting uptake of CPECs.

17.6.3 Ecological Effects Analysis

The potential for adverse ecological effects in the marine environment was evaluated using the following three approaches.

1. Sediment bioassays were used to consider both chronic (percentage normality [% normal]) and acute (percentage survival [% survival]) endpoints.
2. Comparison of onsite and reference area benthic infaunal macroinvertebrate communities in terms of the presence/absence of specific species, species diversity (H' index), and assemblage evenness (J index) was completed at some of the outfalls.
3. Literature-derived data on CPEC toxicity was considered with respect to specific target receptors, and when such data were not available, to appropriate surrogate test species. Toxicity reference values are provided in Appendix J.

Outfall 01 - Old Sewer Outfall

Mean % normal was significantly less ($P<0.05$) in onsite sediments than in those taken from background sites, suggesting that sediment-related contaminants have the potential to induce chronic adverse effects in individual invertebrates (Table 17.6-16). No significant differences in mean % survival were observed between the onsite and reference samples. Presence of significant chronic effects suggests that sediment-related contaminants have the potential to induce adverse effects in benthic invertebrates, possibly by affecting their reproductive success. The potential for acute effects appears low. This further suggests that contaminants apparently occur at levels below the acute threshold but above the chronic threshold. Consequently, chronic effects could, over time, lead to changes in benthic community structure and reductions in prey availability for receptors at higher trophic levels.

Infauna was sampled at two locations for the Old Sewer Outfall. Two shallow reference sites were sampled to place the results in perspective. Descriptive statistics were calculated on the mean of the three replicates collected at each location and are presented below. The term "taxa" is used to refer to the taxonomic categories present in each sample that were identified to family level or to higher level if identification to family would be time consuming.

There were no obvious differences in numbers of individuals at the old sewer outfall compared with the shallow reference sites, but there were more taxa at the outfall (Table 17.6-17). The species diversity and evenness were higher at the outfall suggesting a more diverse community that is not dominated by one taxon. Similar taxa were found in both the Site and reference samples. The Site also had amphipods, decapods, and mollusks, that added to the diversity of the Site. There are no obvious effects to the infaunal community from the CPECs identified in the sediment.

Table 17.6-17

OLD SEWER OUTFALL INFAUNA SUMMARY STATISTICS

	Number of Individuals		Number of Taxa	Species Diversity	Evenness
	Mean	SE	(H')	(J)	
Active Sewer Outfall Sampling Location					
M25MI01S01	65.3	3.18	14	0.84	0.74
M25MI01S03	82.3	30.23	18	0.82	0.65
Shallow Reference Site Sampling Locations					
M00MI01S01	119.0	6.11	10	0.13	0.13
M00MI02S01	42.7	10.53	8	0.42	0.46

Outfall 02 - Active Sewer Outfall

Mean % normal was significantly less ($P<0.05$) in onsite sediments at the three locations near the pipeline terminus than in those taken from background sites (Table 17.6-18). This suggests that sediment-related contaminants have the potential to induce chronic adverse effects in subtidal infauna. Results at the pipeline break were not as clear; mean % normal in only one of two samples was significantly lower than background. Mean % survival also differed between samples taken at the break; one sample had significantly lower mean % survival than the background samples (suggesting that contaminants at this location may induce acute effects), whereas the other had significantly higher % survival, suggesting no effect or possible enhancement of survival. None of the acute tests from the active outfall had significantly lower survival than the reference mean. These findings suggest that sediment-related contaminants have the potential to induce chronic adverse effects in individual infaunal organisms near the pipeline terminus, possibly by affecting their reproductive success, even though the potential for acute effects appears low. This further suggests that contaminants apparently occur at levels below the acute threshold but above the chronic threshold at this location. Chronic effects could, over time, lead to changes in benthic community structure and reductions in prey availability for receptors at higher trophic levels. Results at the pipeline break, however, were less clear with possible chronic and acute effects southwest of the break but no impact northeast of the break.

Infauna was sampled at five locations for the Active Sewer Outfall Site. Two shallow reference sites were sampled to place the results in perspective. Descriptive statistics were calculated on the mean of the three replicates collected at each location and presented below.

The mean number of individuals was highest at sampling location M25MI02S09, within the plume originating from the leak at the time of sampling (Table 17.6-19). Sampling location M25MI02S06, northwest of the terminus, had the fewest mean number of individuals. The largest number of taxa (family level or above) were present at the leak, while the fewest were found at the end of the outfall. Species diversities were low at all locations, as would be expected in a shallow area (water approximately 4 feet deep) exposed to considerable physical disturbance from waves. Species evenness was similar and moderately high at all locations, indicating that no one taxon dominated the number of individuals. Compared to infauna at the terminus, infauna at the leak had a higher population of individuals and a more diverse group of taxa.

The active outfall infauna samples contained fewer individuals, but more species than the shallow reference sites. The outfall samples also contained amphipods, isopods, decapods, some mollusks, and one echinoderm. There is no clear evidence that the infaunal community has been adversely effected by the CPECs found in the sediment onsite.

Table 17.6-19

ACTIVE SEWER OUTFALL INFAUNA SUMMARY STATISTICS

	Number of Individuals		Number of Taxa	Species Diversity	Evenness
	Mean	SE	(H')	(J)	
Active Sewer Outfall Sampling Location					
M25MI02S01	8.0	2.31	11	0.91	0.88
M25MI0203	15.7	12.68	10	0.77	0.77
M25MI0205	10.0	6.03	12	0.97	0.90
M25MI0207	27.3	4.06	20	1.07	0.82
M25MI0209	37.3	10.97	15	0.91	0.77
Shallow Reference Site Sampling Locations					
M00MI01S01	119.0	6.11	10	0.13	0.13
M00MI02S01	42.7	10.53	8	0.42	0.46

Outfall 03 - West NAVFAC Outfall

Mean % normal and mean % survival did not differ significantly between onsite and background sediments (Table 17.6-20). This information suggests that sediment-related contaminants are unlikely to induce acute or chronic adverse effects in individual invertebrates. This further suggests that contaminants apparently occur at levels below acute and chronic thresholds and are unlikely, over time, to lead to changes in benthic community structure and to reductions in prey availability for receptors at higher trophic levels.

Infauna was sampled in one location at the West NAVFAC Site. Two shallow reference sites were sampled to place the results in perspective. Descriptive statistics were calculated on the mean of the three replicates collected at each location and are presented below.

There were far fewer individuals (mean numbers) and far more taxa at the west NAVFAC outfall than at the shallow reference locations (Table 17.6-21). On average there was only one of each taxa onsite. The high evenness value was due to the presence of four taxa with similar high abundances: Nematoda (4.0 individuals per liter), the

annelid family Spionidae (4.3), the arthropod family Paratanaidae (4.3), and the gastropod mollusk family Marginellidae (3.0). Although there were fewer individuals, there is no clear evidence of adverse effects to the infaunal community from CPECs identified in the sediments onsite.

Table 17.6-21

WEST NAVFAC OUTFALL INFAUNA SUMMARY STATISTICS

	Number of Individuals Mean	SE	Number of Taxa (H')	Species Diversity (J)	Evenness
West NAVFAC Outfall Sampling Location					
M25MI03S01	26.3	5.61	22	1.12	0.83
Shallow Reference Site Sampling Locations					
M00MI01S01	119.0	6.11	10	0.13	0.13
M00MI02S01	42.7	10.53	8	0.42	0.46

Outfall 04 - East NAVFAC Outfall

Mean % normal and mean % survival did not differ significantly between onsite and background sediments (Table 17.6-22). This information suggests that sediment-related contaminants are unlikely to induce acute or chronic adverse effects in individual invertebrates. This further suggests that contaminants apparently occur at levels below the acute and chronic thresholds and are unlikely, over time, to lead to changes in benthic community structure or to reductions in prey availability for receptors at higher trophic levels.

Infauna was sampled at one location for the East NAVFAC Site. Two shallow reference sites were sampled to place the results in perspective. Descriptive statistics were calculated on the mean of the three replicates collected at each location and are presented below.

The number of individuals found at this Site was less than the number of individuals found at the reference locations (Table 17.6-23). The number of taxa, species diversity,

and evenness were greater than the values at the reference locations. The most abundant taxon was Nematoda (16.0 individuals per liter). Although there were fewer individuals, there is no clear evidence of adverse effects to the infaunal community from CPECs identified in the sediments onsite.

Table 17.6-23

EAST NAVFAC OUTFALL INFAUNA SUMMARY STATISTICS

	Number of Individuals		Number of Taxa	Species Diversity	Evenness
	Mean	SE	(H')	(J)	
East NAVFAC Sampling Location					
M25MI04S01	27.3	11.39	14	0.71	0.62
Shallow Reference Site Sampling Locations					
M00MI01S01	119.0	6.11	10	0.13	0.13
M00MI02S01	42.7	10.53	8	0.42	0.46

Outfall 05 - Runway Storm Drain Outfall

Mean % normal was significantly less in the single sediment sample collected at this location than in samples collected at background sites (Table 17.6-24), suggesting that sediment-related contaminants have the potential to induce chronic adverse effects in infauna. Mean % survival did not differ significantly between sediments from this location and the background sites. These findings suggest that sediment-related contaminants have the potential to induce chronic adverse effects in individual invertebrates, possibly by affecting their reproductive success, even though the potential for acute effects appears low. This further suggests that contaminants apparently occur at levels below the acute threshold but above the chronic threshold. Chronic effects could, over time, lead to changes in benthic community structure and to reductions in prey availability for receptors at higher trophic levels.

Infauna was sampled at one location for the Runway Storm Drain Site. Two shallow reference sites were sampled to place the results in perspective. Descriptive statistics

were calculated on the mean of the three replicates collected at each location and presented below.

Samples taken at the Runway Storm Drain contained slightly more individuals than samples from the reference locations (Table 17.6-25). Twice as many taxa were found at the outfall as at the reference sites. Species diversity and evenness were also higher at the outfall than at the reference sites. A number of CPECs were detected in the sample from this location, although there is no evidence that the infaunal community has been adversely effected by contamination. The taxa identified onsite may, however, represent pollution tolerant species.

Table 17.6-25

RUNWAY STORM DRAIN INFAUNA SUMMARY STATISTICS

	Number of Individuals Mean	SE	Number of Taxa (H')	Species Diversity (J)	Evenness
Runway Storm Drain Sampling Location					
M25MI05S01	129.7	15.07	24	0.90	0.65
Shallow Reference Site Sampling Locations					
M00MI01S01	119.0	6.11	10	0.13	0.13
M00MI02S01	42.7	10.53	8	0.42	0.46

Outfall 06 - Inner Harbor Outfall

Mean % survival (acute) and % normal (chronic) were significantly less in sediments taken at two locations onsite than in sediments from reference sites (Table 17.6-26). These findings suggest that sediment-related contaminants have the potential to induce acute and chronic adverse effects in individual benthic invertebrates near the outfall. This further suggests that contaminants apparently occur at levels above acute and chronic thresholds at this location. Chronic toxicity often affects the reproductive success of organisms and could, over time, lead to changes in benthic community structure and reductions in prey availability for receptors at higher trophic levels. No infauna samples were collected at this outfall.

Outfall 07 - Rocky Point Outfall

Two chronic tests and one of two acute tests indicated no significant differences between onsite sediments and reference sites (Table 17.6-27). These findings suggest that sediment-related contaminants are unlikely to induce chronic adverse effects in individual benthic invertebrates near the outfall. This indicates that contaminants apparently occur at levels below chronic thresholds at this location. One test on a horizontal sediment sample exhibited significantly lower survival than reference sediments, indicating that some surficial sediments may cause acute toxicity.

Infauna was sampled at two locations for the Rocky Point outfall. Two shallow reference sites were sampled to place the results in perspective. Descriptive statistics were calculated on the mean of the three replicates collected at each location and are presented below.

The descriptive characteristics calculated from the replicates taken at the Rocky Point locations were within the range of those taken at the reference locations (Table 17.6-28). The number of individuals, number of taxa, species diversity, and evenness were within the range from the reference locations for both locations. Although the species diversity and evenness were within the reference ranges, the values were low indicating that one or a few taxa were numerically dominant. There was one dominant taxon at sampling location M25MI07S01, Nematoda (66.0 individuals per liter). At sampling location M25MI07S02 there were two dominant taxa: Syllidae and Nematoda (24.3 and 20.3 individuals per liter, respectively). Although there are fewer individuals, there is no clear evidence of adverse effects to the infaunal community from CPECs identified in the sediments onsite.

Table 17.6-28

ROCKY POINT OUTFALL INFAUNA SUMMARY STATISTICS

	Number of Individuals Mean	SE	Number of Taxa (H')	Species Diversity (J)	Evenness
Rocky Point Sampling Location					
M25MI07S01	84.0	32.56	17	0.41	0.34
M25MI07S02	51.3	11.10	10	0.54	0.54
Shallow Reference Site Sampling Locations					
M00MI01S01	119.0	6.11	10	0.13	0.13
M00MI02S01	42.7	10.53	8	0.42	0.46

Outfall 08 - Southwest Outfall

Mean % normal was significantly lower in sediments from this location than from background sites, indicating a significant chronic effect. No significant acute effects were observed (Table 17.6-29), suggesting that sediment-related contaminants may induce chronic adverse effects in individual invertebrates, but are unlikely to induce acute effects. This further suggests that contaminants apparently occur at levels below the acute, but above chronic, thresholds. Chronic toxicity often affects the reproductive success of organisms and could, over time, lead to changes in benthic community structure and to reductions in prey availability for receptors at higher trophic levels. No infauna samples were collected at this outfall.

Outfall 09 - Southeast Outfall

Mean % normal and mean % survival in sediment bioassays differed significantly between onsite and background sediments, suggesting that sediment-related contaminants may induce acute or chronic adverse effects in individual invertebrates (Table 17.6-30). This further suggests that contaminants are present at levels above acute and chronic thresholds, and may, over time, lead to changes in benthic community structure and to reductions in prey availability for receptors at higher trophic levels. No infauna samples were collected at this outfall.

17.6.4 Risk Characterization

Risk was estimated using a quotient methodology described in Section 4.3.3.1; results of these calculations are shown in Table 7.6-31. Results of the risk description weight-of-evidence analyses are summarized in Table 7.6-32 and discussed below.

Outfall 01 - Old Sewer Outfall

Five PCBs had TQs greater than zero for benthic marine invertebrates. The primary risk drivers were two PCB congeners (52 and 101). Both congeners had TQs greater than two, suggesting an extremely high potential for adverse effects to invertebrates present in sediment. Two other PCB congeners (105 and 118) had TQs greater than one, suggesting high risk. These findings are in agreement with those from bioassay tests, which suggested potential for chronic toxicity. The infaunal community comparisons with reference sites were inconclusive.

No seawater or macrophyte tissue samples were collected; therefore, contaminant exposure to green sea turtles could not be estimated at this outfall. The low concentrations of CPECs in sediment are considered unlikely to have significant effects on sea turtles.

All monk seal TQs were less than zero, indicating that monk seals were not at risk from the CPECs at this location.

Outfall 02 - Active Sewer Outfall

Mirex and PCB-101 had TQs of 3.95 and 0.94 for marine benthic invertebrates, suggesting an extremely high potential for adverse effects from Mirex, and a moderate potential for adverse effects from PCB-101. Mirex was detected at 10 parts per trillion in one sediment sample collected at the leak; however, Mirex was not detected in sea cucumber or sea urchin samples collected at the leak, and was detected at less than 1 ppb in sea urchins collected at the terminus. Bioassay results indicate potentially acute toxicity at the leak in the outfall (but not at the terminus) and the potential for chronic effects in three of the five samples collected at the terminus and the leak. The acute toxicity may be due to the high levels of Mirex, or may be the result of another factor associated with the

leak in the active outfall. The chronic toxicity may be due to the PCB-101 congener, which has potential moderate effects on invertebrates.

TQ analysis for green sea turtles suggests that the potential for adverse effects to turtles from exposure to CPECs in ground water or seawater is negligible.

Analysis of risk to monk seals benefited from the availability of tissue data for benthic invertebrates and marine fish. Although the invertebrates sampled, the sea urchin *Echinometra mathaei* and the sea cucumber *Holothuria* sp., are not necessarily food for monk seal, they were used as surrogates to establish the possibility for CPEC bioaccumulation in monk seal food items. There were no TQs greater than zero for monk seals suggesting that the potential for adverse effects to seals from exposure to CPECs in sediment, seawater, or tissues is negligible.

Outfall 03 - West NAVFAC Outfall

None of the CPECs identified in the sediment had TQs greater than zero for marine benthic invertebrates, sea turtles, or monk seals, indicating that the potential for adverse effects to marine species from CPECs in sediments is negligible. These findings agree with those from the bioassays that suggested little potential for acute or chronic toxicity.

Outfall 04 - East NAVFAC Outfall

None of the CPECs identified in the sediment had TQs greater than zero for marine benthic invertebrates, sea turtles, or monk seals, indicating that the potential for adverse effects to marine species from CPECs in sediments is negligible. These findings agree with those from the bioassays that suggested little potential for acute or chronic toxicity.

Outfall 05 - Runway Storm Drain Outfall

Nineteen CPECs (chromium, manganese, nickel, fluorene-C3, phenanthrenes + anthracene-C4, mirex, photomirex, methoxychlor, lindane, 4,4'-DDE, 4,4'-DDD, and eight PCB congeners [-8, -18, -105, -118, -138, -153, -170, and -180]) had TQs greater than zero for marine benthic invertebrates. The greatest potential for adverse effects was indicated by C3-alkyl substituted fluorenes, manganese, methoxychlor, mirex, and PCB-18, all with TQs greater than two. Five other CPECs (PCB-105, PCB-118, nickel, phenanthrenes + anthracene, photomirex) had TQs greater than one, suggesting the

potential for high risk. Significant chronic toxicity was indicated by the bioassay, but no significant acute toxicity was indicated, as was suggested by the TQ analysis alone. The results of the infaunal analysis were inconclusive; however, a risk to invertebrates falling between the acute and chronic thresholds appears to exist at this location,.

No seawater or macrophyte tissue samples were collected; therefore, no exposure to green sea turtles could be estimated at this outfall. The low concentrations of CPECs in sediment are considered unlikely to have significant effects on sea turtles.

The TQ analysis for monk seals had no values greater than zero, indicating that the potential for adverse effects to seals from CPECs in sediments is negligible.

Outfall 06 - Inner Harbor Outfall

TQ analyses for marine benthic invertebrates showed that one CPEC, PCB-101, had a TQ greater than 2. These findings suggest extremely high potential for adverse effects from this CPEC. Two other CPECs, manganese and PCB-118, had TQs greater than one, suggesting high potential for adverse effects from these CPECs. These findings agree with those from the bioassays that suggest there was potential for acute and chronic toxicity at this location. Infauna results were inconclusive.

None of the CPECs identified in sediment or seawater had TQs greater than zero for sea turtles or monk seals, indicating that the potential for adverse effects to these species from CPECs is negligible at this location.

Outfall 07 - Rocky Point Outfall

Three PCB congeners identified in abiotic media had TQs greater than zero for benthic marine invertebrates. One congener, PCB-101, had a TQ greater than one suggesting high potential for adverse effects to invertebrates. These findings disagree with findings of the bioassays, which indicate little potential for chronic toxicity. Generally, invertebrates exposed to PCB contaminants can exhibit sublethal effects such as inhibited reproductive output at low concentrations and mortality at higher concentrations (Dipinto et al. 1993). Infaunal communities did not appear affected, but results were inconclusive.

No seawater or macrophyte tissue samples were collected; therefore, no exposure to green sea turtles could be estimated at this outfall. The low concentrations of CPECs in sediment are considered unlikely to have significant effects on sea turtles.

All monk seal TQs were less than zero, indicating that the risk to seals from CPECs was negligible at this location.

Outfall 08 - Southwest Outfall, Eastern Island

Manganese,•PCB-28, PCB-52, and PCB-126 all had TQs greater than zero for benthic marine invertebrates. Manganese and PCB-52 both had TQ values greater than one suggesting a high potential for adverse effects. These findings agree with the bioassay results, which indicated a potential for chronic toxicity, but did not show significant mortality in the acute tests.

No seawater or macrophyte tissue samples were collected; therefore, exposure to green sea turtles could not be estimated at this outfall. The low concentrations of CPECs in sediment are considered unlikely to have significant effects on sea turtles.

Analysis of risk to monk seals benefited from the availability of TRVs. All TQs were less than zero, indicating that the risk to seals from the Site CPECs was negligible.

Outfall 09 - Southeast Outfall, Eastern Island

None of the CPECs identified in the sediment had TQs greater than zero for marine benthic invertebrates, sea turtles, or monk seals, indicating that the potential for adverse effects to marine species from CPECs in sediments is negligible.

17.6.5 Uncertainty Analysis

All uncertainties discussed in Section 4.3.3.3 apply to this Site.

17.6.6 SERA Conclusions

Outfall 01 - Old Sewer Outfall

The assessment endpoint for the benthic invertebrate community is not expected to be met because of the risk associated with five PCB congeners. These findings agree with the chronic toxicity indicated by the bioassay tests. The assessment endpoint for special status marine vertebrates is expected to be met. Although the risk to green sea turtles could not be fully estimated, it is expected to be negligible. Risk to monk seals from CPECs in the marine sediment is considered negligible.

Outfall 02 - Active Sewer Outfall

The assessment endpoint for the benthic invertebrate community is not expected to be met because of the risk associated with Mirex and PCB-101. Acute toxicity was indicated in the bioassay samples from the leak at the active outfall and chronic toxicity was indicated in three out of five samples from the leak and terminus of the outfall. The assessment endpoint for special status marine vertebrates is expected to be met. Risk to green sea turtles and monk seals from CPECs in the sediment, seawater, and tissues is considered negligible.

Outfall 03 - West NAVFAC Outfall

The assessment endpoints for benthic invertebrate communities and special status marine vertebrates are expected to be met, as no adverse effects were indicated in the TQ analysis or in the bioassay tests.

Outfall 04 - East NAVFAC Outfall

The assessment endpoints for benthic invertebrate communities and special status marine vertebrates are expected to be met, as no adverse effects were indicated in the TQ analysis or in the bioassay tests.

Outfall 05 - Runway Storm Drain Outfall

The assessment endpoint for the benthic invertebrate community is not expected to be met because of the risk associated with nineteen CPECs. Chronic toxicity was indicated by the bioassay test while the TQ analysis suggested the potential for acute affects. The risk is judged to fall between the chronic and acute thresholds. The assessment endpoint for

special status marine vertebrates is expected to be met. Although the risk to green sea turtles could not be measured, it is estimated to be negligible. Risk to monk seals from CPECs in the marine sediment is considered negligible.

Outfall 06 - Inner Harbor Outfall

The assessment endpoint for the benthic invertebrate community is not expected to be met because of the risk associated with PCB-101, PCB-118, and manganese. These findings are in agreement with the bioassay results which showed significant acute and chronic effects. The assessment endpoint for special status marine vertebrates is expected to be met. Risk to green sea turtles and monk seals from CPECs in the sediment, seawater, and tissues is considered negligible.

Outfall 07 - Rocky Point Outfall

The assessment endpoint for the benthic invertebrate community is not expected to be met because of the risk associated with three PCB congeners. The bioassay tests showed acute effects in one of the two samples and no chronic effects. The assessment endpoint for special status marine vertebrates is expected to be met. Although the risk to green sea turtles could not be measured, it is estimated to be negligible. Risk to monk seals from CPECs in the marine sediment is considered negligible.

Outfall 08 - Southwest Outfall, Eastern Island

The assessment endpoint for the benthic invertebrate community is not expected to be met because of the risk associated with three PCB congeners and manganese. The assessment endpoint for special status marine vertebrates is expected to be met. Although the risk to green sea turtles could not be measured, it is estimated to be negligible. Risk to monk seals from CPECs in the marine sediment is considered negligible.

Outfall 09 - Southeast Outfall, Eastern Island

The assessment endpoints for benthic invertebrate communities and special status marine vertebrates are expected to be met, as no adverse effects were indicated by the TQ analysis.

17.7 CONCLUSIONS AND RECOMMENDATIONS

Marine sediment samples were collected in the vicinity of nine outfalls. Low levels, in the part-per-billion to part-per-trillion range, of a variety of organic and/or inorganic compounds were detected in sediment samples collected in the vicinity of every outfall sampled. Sediment toxicity analysis results ranged from no observable effects to indication of chronic toxicity.

Seawater and marine tissue samples were collected only in the vicinity of the Active Outfall (Outfall 02) and the Inner Harbor Outfall (Outfall 06). Low levels of pesticides, PCBs, and metals were detected in the seawater and tissue samples.

Based primarily upon sediment toxicity testing results, there appears to be a high risk to benthic communities in the vicinity of Outfalls 01 and 02 (the Old and Active Sewer Outfalls), 05 (Runway Storm Drain), 06 (Inner Harbor), 07 (Rocky Point), and 08 (Southwest Eastern Island). Risk to green sea turtles and monk seals from CPECs in the sediment, seawater, and tissues was estimated by the SERA to be negligible. Sources of risk appear to be confined to the sediments. Rather than undertaking further investigations and/or active remediation (i.e., dredging) of sediments in the vicinity of any of the outfalls, we recommend a combined strategy of pollution prevention and source control combined with natural attenuation through biodegradation, chemical degradation, and burial through normal deposition.

For abandoned outfalls, or outfalls not anticipated to be used in the future (e.g. Outfalls 01, 03, 04, 06, 07) we recommend that the outfalls be sealed. For the Eastern Island outfalls, sealing is not recommended due to their poor condition (i.e. broken pieces) and the unlikely possibility that effluent could be discharged through the pipes in the future. For the Runway Storm Drain (Outfall 05), efforts should be made to eliminate potential sources of contaminants (if any) near the inlets to the storm drain system.

For the Active Sewer Outfall (Outfall 02), we recommend that the leak in the outfall be sealed. If the Active Outfall will be used in the future (beyond base closure), we recommend that the Midway wastewater treatment facilities be upgraded so that

discharges are in compliance with specifications set forth in the NPDES Permit (No. MW0110001).

Tables
Section 17

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ANALYTICAL METHODS
SEWER OUTFALLS (SITE 25)

				SPECIAL ANALYTICAL LABORATORY				
	ANALYTICAL METHOD	STIV141A	STIV141C	STIII213	STIV141E	9060 M	ASTM GRSZ	TOXICITY
EPA ID	OGDEN ID	LL SVOC	LL PCB	LL METALS	LL PEST	TOC		
SEA WATER SAMPLES								
MH503	M25SW06S01D000	X	X	X	X	-	-	-
MH504	M25SW02S03D020	X	X	X	X	-	-	-
MH505	M25SW02D03D020	X	X	X	X	-	-	-
MH506	M25SW02S09D020	X	X	X	X	-	-	-
MARINE SEDIMENT SAMPLES								
MH500	M25MS01S01D000	X	X	X	X	X	X	X
MH501	M25MS01S02D020	X	X	X	X	X	X	-
MH502	M25MS01S03D020	X	X	X	X	X	X	X
MH509	M25MS02S01D000	X	X	X	X	-	-	X
MH510	M25MS02S02D020	X	X	X	X	-	-	-
MH511	M25MS02S03D000	X	X	X	X	-	-	X
MH512	M25MS02D03D000	X	X	X	X	-	-	X
MH513	M25MS02S04D020	X	X	X	X	-	-	-
MH514	M25MS02S05D000	X	X	X	X	-	-	X
MH515	M25MS02S06D020	X	X	X	X	-	-	-
MH521	M25MS02S07D000	X	X	X	X	X	X	X
MH522	M25MS02S08D020	X	X	X	X	X	X	-
MH523	M25MS02S09D000	X	X	X	X	X	X	X
MH526	M25MS06S01D000	X	X	X	X	X	X	X
MH527	M25MS06S02D000	X	X	X	X	X	X	X
MH528	M25MS06D02D000	X	X	X	X	X	X	X
MH534	M25MS05S01D000	X	X	X	X	X	X	X
MH535	M25MS07S01D020	X	X	X	X	X	X	X
MH536	M25MS07S02D000	X	X	X	X	X	X	X
MH537	M25MS03S01D020	X	X	X	X	X	X	X
MH538	M25MS03S02D020	X	X	X	X	X	X	-
MH539	M25MS03S03D020	X	X	X	X	X	X	-

"X" = Indicates analytical method performed on sample.

TABLE 17.3-1 (Page 2 of 2)
ANALYTICAL METHODS
SEWER OUTFALLS (SITE 25)

				SPECIAL ANALYTICAL LABORATORY				
	ANALYTICAL METHOD	STIV141A	STIV141C	STIII213	STIV141E	9060 M	ASTM GRSZ	TOXICITY
EPA ID	OGDEN ID	LL SVOC	LL PCB	LL METALS	LL PEST	TOC		
MH540	M25MS03S04D000	X	X	X	X	X	X	-
MH541	M25MS04S01D000	X	X	X	X	X	X	X
MH542	M25MS04D01D000	X	X	X	X	X	X	-
MH543	M25MS04S02D020	X	X	X	X	X	X	-
MH544	M25MS04S03D020	X	X	X	X	X	X	-
MH545	M25MS08S01D000	X	X	X	X	X	X	-
MH546	M25MS09S01D000	X	X	X	X	X	X	X
MH547	M25MS09S01D020	X	X	X	X	X	X	-
MARINE TISSUE SAMPLES								
MH516	M25MT02S05D013	X	X	X	X	-	-	-
MH517	M25MT02S05D015	X	X	X	X	-	-	-
MH518	M25MT02S05D016	X	X	X	X	-	-	-
MH519	M25MT02S05D010	X	X	X	X	-	-	-
MH520	M25MT02D05D010	X	X	X	X	-	-	-
MH524	M25MT02S07D010	X	X	X	X	-	-	-
MH525	M25MT02S07D013	X	X	X	X	-	-	-
MH529	M25MT06S01D018	X	X	X	X	-	-	-
MH530	M25MT06D01D018	X	X	X	X	-	-	-
MH531	M25MT06S01D017	X	X	X	X	-	-	-
MH532	M25MT06S01D010	X	X	X	X	-	-	-
MH533	M25MT06S01D009	X	X	X	X	-	-	-
EQUIPMENT RINSATE SAMPLES								
MH507	M25XW00E01D000	X	X	X	X	-	-	-
MH508	M25XW00E02D000	X	X	X	X	-	-	-

"X" = Indicates analytical method performed on sample.

Table 17.5-1
Summary of Marine Sediment Results for Organics
Sewer Outfalls, Sand Island (Site 25)

			Site 25									Atoll Background (Shallow Sites)							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
9060M	Total Organic Carbon	UG/G	27	27	0			300	12600	M25MS02S03	J	4	4	0			300	3600	1290
STIV141A	1,2,4-Trichlorobenzene	UG/KG	1	31	4	0.14	1.4	0.19	0.19	M25MS09S01		0	6	2	0.17	0.18			
STIV141A	Acenaphthene	UG/KG	2	31	4	0.19	1.9	0.14	0.58	M25MS05S01		0	6	2	0.24	0.25			
STIV141A	Acenaphthylene	UG/KG	3	31	4	0.19	1.9	0.047	0.57	M25MS07S01		0	6	2	0.24	0.25			
STIV141A	Anthracene	UG/KG	9	31	4	0.17	1.8	0.028	1.4	M25MS07S01		0	6	2	0.22	0.23			
STIV141A	Benzo(a)Anthracene	UG/KG	24	31	4	0.25	2.2	0.034	12	M25MS07S01		0	6	2	0.28	0.29			
STIV141A	Benzo(a)Pyrene	UG/KG	22	31	4	0.17	1.4	0.009	14	M25MS07S01		0	6	2	0.17	0.18			
STIV141A	Benzo(b)Fluoranthene	UG/KG	26	31	4	3.1	3.1	0.02	23	M25MS07S01		1	6	2	0.38	0.4	0.058	0.058	0.143
STIV141A	Benzo(e)pyrene	UG/KG	25	31	4	0.31	2.5	0.008	9.1	M25MS07S01		0	6	2	0.31	0.33			
STIV141A	Benzo(g,h,i)perylene	UG/KG	18	31	4	0.061	3	0.012	12	M25MS05S01		0	6	2	0.37	0.39			
STIV141A	Benzo(k)Fluoranthene	UG/KG	26	31	4	2.6	2.6	0.008	7.7	M25MS07S01		0	6	2	0.32	0.35			
STIV141A	Biphenyl	UG/KG	5	31	4	0.2	2	0.062	0.32	M25MS05S01	J	0	6	2	0.25	0.27			
STIV141A	Chrysene	UG/KG	24	31	4	0.33	3	0.015	15	M25MS05S01		0	6	2	0.37	0.39			
STIV141A	Chrysenes, C1-alkyl-substitute	UG/KG	9	31	4	0.29	3	0.051	45	M25MS05S01		0	6	2	0.37	0.39			
STIV141A	Chrysenes, C2-alkyl-substitute	UG/KG	5	31	4	0.29	3	0.63	110	M25MS05S01		0	6	2	0.37	0.39			
STIV141A	Chrysenes, C3-alkyl-substitute	UG/KG	5	31	4	0.29	3	0.64	160	M25MS05S01		0	6	2	0.37	0.39			
STIV141A	Chrysenes, C4-alkyl-substitute	UG/KG	5	31	4	0.29	3	0.82	140	M25MS05S01		0	6	2	0.37	0.39			
STIV141A	Dibenzo(a,h)Anthracene	UG/KG	10	31	4	0.33	3.3	0.03	2.3	M25MS07S01		0	6	2	0.41	0.44			
STIV141A	Dibenzothiophene	UG/KG	5	31	4	0.18	1.9	0.037	4.8	M25MS05S01		0	6	2	0.23	0.25			
STIV141A	Dibenzothiophenes, C1-alkyl-su	UG/KG	4	31	4	0.18	1.9	0.42	42	M25MS05S01		0	6	2	0.23	0.25			
STIV141A	Dibenzothiophenes, C2-alkyl-su	UG/KG	4	31	4	0.18	1.9	0.94	140	M25MS05S01		0	6	2	0.23	0.25			
STIV141A	Dibenzothiophenes, C3-alkyl-su	UG/KG	4	31	4	0.18	1.9	0.76	310	M25MS05S01		0	6	2	0.23	0.25			
STIV141A	Fluoranthene	UG/KG	24	31	4	0.28	2.3	0.029	16	M25MS07S01		2	6	2	0.28	0.3	0.04	0.054	0.0821
STIV141A	Fluoranthenes+Pyrenes, C1-alk	UG/KG	10	31	4	0.23	2.3	0.13	68	M25MS05S01		0	6	2	0.28	0.3			
STIV141A	Fluoranthenes+Pyrenes, C2-alk	UG/KG	6	31	4	0.23	2.3	0.76	76	M25MS05S01		0	6	2	0.28	0.3			
STIV141A	Fluoranthenes+Pyrenes, C3-alk	UG/KG	5	31	4	0.23	2.3	0.46	150	M25MS05S01		0	6	2	0.28	0.3			
STIV141A	Fluorene	UG/KG	4	31	4	0.25	2.5	0.024	0.73	M25MS05S01		0	6	2	0.31	0.33			
STIV141A	Fluorenes, C1-alkyl-substitute	UG/KG	8	31	4	0.26	2.5	0.043	1.6	M25MS05S01		0	6	2	0.31	0.33			
STIV141A	Fluorenes, C2-alkyl-substitute	UG/KG	2	31	4	0.25	2.5	0.49	18	M25MS05S01		0	6	2	0.31	0.33			
STIV141A	Fluorenes, C3-alkyl-substitute	UG/KG	1	31	4	0.25	2.5	90	90	M25MS05S01		0	6	2	0.31	0.33			

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles

#D = No. of Detects

#S = Total No. of Samples

#R = No. of Samples Rejected During Data Validation

FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)

*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)

Mean = Geometric Mean

SI25MSS.XLS

Table 17.5-1
Summary of Marine Sediment Results for Organics
Sewer Outfalls, Sand Island (Site 25)

			Site 25									Atoll Background (Shallow Sites)							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
STIV141A	Indeno(1,2,3-cd)pyrene	UG/KG	20	31	4	0.25	2.3	0.019	10	M25MS07S01		0	6	2	0.28	0.3			
STIV141A	Naphthalene	UG/KG	6	31	4	0.12	2.6	0.18	0.56	M25MS04S01	J	0	6	2	0.33	0.35			
STIV141A	Naphthalenes, C1-alkyl-substit	UG/KG	11	31	4	0.13	2.6	0.25	0.82	M25MS07S02	J	2	6	2	0.33	0.35	0.12	0.2	0.162
STIV141A	Naphthalenes, C2-alkyl-substit	UG/KG	4	31	4	0.26	2.6	0.57	2.3	M25MS05S01	J	0	6	2	0.33	0.35			
STIV141A	Naphthalenes, C3-alkyl-substit	UG/KG	4	31	4	0.26	2.6	0.53	17	M25MS05S01	J	0	6	2	0.33	0.35			
STIV141A	Naphthalenes, C4-alkyl-substit	UG/KG	2	31	4	0.26	2.6	12	88	M25MS05S01	J	0	6	2	0.33	0.35			
STIV141A	Perylene	UG/KG	17	31	4	0.11	0.51	0.012	46	M25MS05S01		0	6	2	0.13	0.13			
STIV141A	Phenanthrene	UG/KG	14	31	4	0.034	3.1	0.027	8.9	M25MS05S01		2	6	2	0.39	0.41	0.071	0.076	0.121
STIV141A	Phenanthrenes+Anthra., C1-alk	UG/KG	8	31	4	0.31	3.1	0.11	33	M25MS05S01		0	6	2	0.39	0.41			
STIV141A	Phenanthrenes+Anthra., C2-alk	UG/KG	5	31	4	0.31	3.1	0.46	120	M25MS05S01		0	6	2	0.39	0.41			
STIV141A	Phenanthrenes+Anthra., C3-alk	UG/KG	5	31	4	0.31	3.1	0.34	180	M25MS05S01		0	6	2	0.39	0.41			
STIV141A	Phenanthrenes+Anthra., C4-alk	UG/KG	4	31	4	0.31	3.1	0.68	240	M25MS05S01		0	6	2	0.39	0.41			
STIV141A	Pyrene	UG/KG	18	31	4	0.038	2.3	0.096	19	M25MS05S01		2	6	2	0.28	0.3	0.035	0.067	0.0838
STIV141C	PCB-101 (2,2',3,5,5')	UG/KG	5	27	0	0.013	0.03	0.064	1.4	M25MS01S01		0	4	0	0.015	0.016			
STIV141C	PCB-105 (2,3,3',4,4')	UG/KG	2	27	0	0.015	0.066	0.54	1.5	M25MS05S01	J	0	4	0	0.017	0.018			
STIV141C	PCB-118 (2,3',4,4',5)	UG/KG	5	27	0	0.02	0.044	0.1	1.7	M25MS01S01		0	4	0	0.024	0.025			
STIV141C	PCB-126 (3,3',4,4',5)	UG/KG	1	27	0	0.037	0.18	0.036	0.036	M25MS08S01	J	0	4	0	0.047	0.05			
STIV141C	PCB-128 (2,2',3,3',4,4')	UG/KG	2	27	0	0.017	0.077	0.092	0.31	M25MS01S01		0	4	0	0.02	0.022			
STIV141C	PCB-138 (2,2',3,4,4',5')	UG/KG	12	27	0	0.02	0.11	0.021	2.8	M25MS05S01	J	0	4	0	0.022	0.024			
STIV141C	PCB-153 (2,2',4,4',5,5')	UG/KG	12	27	0	0.018	0.037	0.013	3.1	M25MS05S01	J	0	4	0	0.02	0.021			
STIV141C	PCB-170 (2,2',3,3',4,4',5)	UG/KG	12	27	0	0.072	0.15	0.013	4.3	M25MS05S01	J	0	4	0	0.079	0.084			
STIV141C	PCB-18 (2,2',5)	UG/KG	1	27	0	0.043	0.21	1	1	M25MS05S01	J	0	4	0	0.055	0.058			
STIV141C	PCB-180 (2,2',3,4,4',5,5')	UG/KG	11	27	0	0.021	0.042	0.017	3.4	M25MS05S01	J	0	4	0	0.023	0.024			
STIV141C	PCB-187 (2,2',3,4',5,5',6)	UG/KG	8	27	0	0.03	0.069	0.048	0.78	M25MS06S01		0	4	0	0.035	0.038			
STIV141C	PCB-195 (2,2',3,3',4,4',5,6)	UG/KG	5	27	0	0.013	0.06	0.043	0.72	M25MS05S01	J	0	4	0	0.016	0.017			
STIV141C	PCB-206 (2,2',3,3',4,4',5,5',6	UG/KG	7	27	0	0.011	0.053	0.0035	0.76	M25MS05S01	J	0	4	0	0.014	0.015			
STIV141C	PCB-209 (2,2',3,3',4,4',5,5',6	UG/KG	3	27	0	0.013	0.063	0.03	3	M25MS06S01		0	4	0	0.017	0.018			
STIV141C	PCB-28 (2,4,4')	UG/KG	4	27	0	0.029	0.073	0.04	0.15	M25MS08S01		1	4	0	0.037	0.039	0.079	0.079	0.0271
STIV141C	PCB-44 (2,2',3,5')	UG/KG	2	27	0	0.015	0.069	0.4	0.57	M25MS05S01	J	0	4	0	0.018	0.02			
STIV141C	PCB-52 (2,2',5,5')	UG/KG	3	27	0	0.013	0.06	0.028	0.84	M25MS01S01		0	4	0	0.016	0.017			

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles
STIV141C = NOAA Status and Trends PCBs

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 17.5-1
Summary of Marine Sediment Results for Organics
Sewer Outfalls, Sand Island (Site 25)

			Site 25									Atoll Background (Shallow Sites)							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
STIV141C	PCB-77 (3,3',4,4')	UG/KG	6	27	0	0.024	0.11	0.027	0.27	M25MS06S02		0	4	0	0.03	0.032			
STIV141C	PCB-8 (2,4')	UG/KG	3	27	0	0.021	0.1	0.023	0.48	M25MS05S01	J	0	4	0	0.026	0.028			
STIV141E	2,4'-DDD	UG/KG	3	27	0	0.017	0.042	0.15	0.49	M25MS07S02		0	4	0	0.021	0.023			
STIV141E	2,4'-DDT	UG/KG	2	27	0	0.026	0.065	0.34	0.34	M25MS07S01		0	4	0	0.033	0.035			
STIV141E	4,4'-DDD	UG/KG	4	27	0	0.029	0.067	0.1	4.2	M25MS05S01	J	0	4	0	0.037	0.039			
STIV141E	4,4'-DDE	UG/KG	5	27	0	0.016	0.038	0.079	2.2	M25MS05S01	J	0	4	0	0.02	0.022			
STIV141E	4,4'-DDT	UG/KG	4	27	0	0.023	0.057	0.047	1.5	M25MS07S02		0	4	0	0.029	0.031			
STIV141E	alpha-BHC	UG/KG	1	27	0	0.013	0.063	0.004	0.004	M25MS03S01	J	0	4	0	0.017	0.018			
STIV141E	alpha-Chlordane	UG/KG	3	27	0	0.017	0.039	0.069	1.2	M25MS05S01	J	0	4	0	0.021	0.022			
STIV141E	beta-BHC	UG/KG	1	27	0	0.024	0.11	0.12	0.12	M25MS05S01	J	0	4	0	0.03	0.032			
STIV141E	Endrin	UG/KG	1	27	0	0.0061	0.029	0.99	0.99	M25MS05S01	J	0	4	0	0.0077	0.0082			
STIV141E	gamma-BHC (Lindane)	UG/KG	1	27	0	0.017	0.082	0.61	0.61	M25MS05S01	J	0	4	0	0.022	0.023			
STIV141E	Hexachlorobenzene	UG/KG	4	27	0	0.02	0.095	0.011	1.5	M25MS01S02		1	4	0	0.025	0.027	0.01	0.01	0.0121
STIV141E	Methoxychlor	UG/KG	1	27	0	0.086	0.41	0.17	0.17	M25MS05S01	J	0	4	0	0.11	0.12			
STIV141E	Mirex	UG/KG	2	27	0	0.02	0.095	0.011	0.78	M25MS05S01	J	0	4	0	0.025	0.027			
STIV141E	Photomirex	UG/KG	1	27	0	0.027	0.13	1.1	1.1	M25MS05S01	J	0	4	0	0.034	0.036			
STIV141E	trans-Nonachlor	UG/KG	1	27	0	0.0099	0.047	0.03	0.03	M25MS08S01		0	4	0	0.013	0.013			

Notes:

STIV141E = NOAA Status and Trends Pesticides

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 17.5-2
Summary of Marine Sediment Results for Inorganics
Sewer Outfalls, Sand Island (Site 25)

			Site 25									Atoll Background (Shallow Sites)							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
STIII213	Antimony	MG/KG	13	27	0	0.115	0.115	0.123	0.438	M25MS05S01		4	4	0			0.147	0.233	0.206
STIII213	Arsenic	MG/KG	5	27	0	1	3.2	1.99	3.23	M25MS05S01		0	4	0	2.4	2.9			
STIII213	Cadmium	MG/KG	27	27	0			0.041	0.214	M25MS02S06	J	4	4	0			0.048	0.076	0.0584
STIII213	Chromium	MG/KG	2	27	0	8.2	12	12.5	81	M25MS05S01		0	4	0	9.1	12			
STIII213	Copper	MG/KG	11	27	0	3.2	4.7	3.8	20.7	M25MS05S01		4	4	0			5.7	8.3	6.96
STIII213	Iron	MG/KG	27	27	0			16.4	25600	M25MS05S01		4	4	0			15.6	59.7	32.2
STIII213	Lead	MG/KG	6	27	0	3.1	5.4	3.9	9.7	M25MS03S04		0	4	0	4.2	5.4			
STIII213	Manganese	MG/KG	3	27	0	17	35	16.7	349	M25MS05S01		0	4	0	21	34			
STIII213	Mercury	MG/KG	2	27	0	0.025	0.025	0.025	0.038	M25MS04S03	J	1	4	0	0.025	0.025	0.033	0.033	0.0159
STIII213	Nickel	MG/KG	15	27	0	0.54	5.6	0.309	73.5	M25MS05S01		0	4	0	1	2.2			
STIII213	Selenium	MG/KG	2	27	0	0.3	0.3	0.31	0.7	M25MS02S03	J	0	4	0	0.3	0.3			
STIII213	Silicon	MG/KG	1	27	0	2300	5400	30800	30800	M25MS05S01		0	4	0	3200	5100			
STIII213	Thallium	MG/KG	4	27	0	0.024	0.032	0.03	0.038	M25MS09S02	J	2	4	0	0.024	0.024	0.029	0.031	0.019
STIII213	Tin	MG/KG	12	27	0	0.081	0.264	0.049	1.14	M25MS08S01	J	2	4	0	0.047	0.047	0.052	0.055	0.0355
STIII213	Zinc	MG/KG	11	27	0	2.2	2.8	2.9	28.2	M25MS05S01		2	4	0	2.9	3.8	3.7	3.8	2.49

Notes:

STIII213 = NOAA Status and Trends Low Level Metals

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 17.5-3
Summary of Seawater Results for Organics
Sewer Outfalls, Sand Island (Site 25)

			Site 25									Background						
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT
STIV141A	1,2,4-Trichlorobenzene	UG/L	1	4	1	0.005	0.0095	0.0025	0.0025	M25SW02S03	J	0	1	0	0.005	0.005		
STIV141A	Acenaphthylene	UG/L	1	4	1	0.0043	0.0079	0.0018	0.0018	M25SW02S09	J	0	1	0	0.0041	0.0041		
STIV141A	Benzo(a)Anthracene	UG/L	1	4	1	0.0087	0.0091	0.0022	0.0022	M25SW06S01	J	0	1	0	0.0087	0.0087		
STIV141A	Benzo(a)Pyrene	UG/L	1	4	1	0.0071	0.0074	0.0025	0.0025	M25SW06S01	J	0	1	0	0.0071	0.0071		
STIV141A	Benzo(b)Fluoranthene	UG/L	1	4	1	0.0089	0.0093	0.0077	0.0077	M25SW06S01	J	0	1	0	0.0089	0.0089		
STIV141A	Benzo(e)pyrene	UG/L	1	4	1	0.0072	0.0076	0.0059	0.0059	M25SW06S01	J	0	1	0	0.0072	0.0072		
STIV141A	Benzo(g,h,i)perylene	UG/L	1	4	1	0.0084	0.0087	0.005	0.005	M25SW06S01	J	0	1	0	0.0084	0.0084		
STIV141A	Benzo(k)Fluoranthene	UG/L	1	4	1	0.007	0.0073	0.0023	0.0023	M25SW06S01	J	0	1	0	0.007	0.007		
STIV141A	Biphenyl	UG/L	2	4	1	0.0035	0.0035	0.0024	0.07	M25SW06S01		0	1	0	0.0034	0.0034		
STIV141A	Chrysene	UG/L	1	4	1	0.0032	0.0034	0.0059	0.0059	M25SW06S01	J	0	1	0	0.0032	0.0032		
STIV141A	Chrysenes, C1-alkyl-substitute	UG/L	1	4	1	0.0032	0.0034	0.011	0.011	M25SW06S01		0	1	0	0.0032	0.0032		
STIV141A	Chrysenes, C2-alkyl-substitute	UG/L	1	4	1	0.0032	0.0034	0.026	0.026	M25SW06S01		0	1	0	0.0032	0.0032		
STIV141A	Chrysenes, C3-alkyl-substitute	UG/L	1	4	1	0.0032	0.0034	0.023	0.023	M25SW06S01		0	1	0	0.0032	0.0032		
STIV141A	Dibenzothiophenes, C1-alkyl-su	UG/L	1	4	1	0.0022	0.0023	0.063	0.063	M25SW06S01		0	1	0	0.0022	0.0022		
STIV141A	Dibenzothiophenes, C2-alkyl-su	UG/L	1	4	1	0.0022	0.0023	0.2	0.2	M25SW06S01		0	1	0	0.0022	0.0022		
STIV141A	Dibenzothiophenes, C3-alkyl-su	UG/L	1	4	1	0.0022	0.0023	0.18	0.18	M25SW06S01		0	1	0	0.0022	0.0022		
STIV141A	Fluoranthene	UG/L	2	4	1	0.0026	0.0026	0.0011	0.0069	M25SW06S01		0	1	0	0.0025	0.0025		
STIV141A	Fluoranthenes+Pyrenes, C1-alk	UG/L	1	4	1	0.0025	0.0026	0.051	0.051	M25SW06S01		0	1	0	0.0025	0.0025		
STIV141A	Fluoranthenes+Pyrenes, C2-alk	UG/L	1	4	1	0.0025	0.0026	0.048	0.048	M25SW06S01		0	1	0	0.0025	0.0025		
STIV141A	Fluoranthenes+Pyrenes, C3-alk	UG/L	1	4	1	0.0025	0.0026	0.042	0.042	M25SW06S01		0	1	0	0.0025	0.0025		
STIV141A	Fluorene	UG/L	1	4	1	0.0031	0.0033	0.022	0.022	M25SW06S01		0	1	0	0.0031	0.0031		
STIV141A	Fluorenes, C1-alkyl-substitute	UG/L	1	4	1	0.0031	0.0033	0.044	0.044	M25SW06S01		0	1	0	0.0031	0.0031		
STIV141A	Fluorenes, C2-alkyl-substitute	UG/L	1	4	1	0.0031	0.0033	0.14	0.14	M25SW06S01		0	1	0	0.0031	0.0031		
STIV141A	Fluorenes, C3-alkyl-substitute	UG/L	1	4	1	0.0031	0.0033	0.23	0.23	M25SW06S01		0	1	0	0.0031	0.0031		
STIV141A	Indeno(1,2,3-cd)pyrene	UG/L	1	4	1	0.0066	0.0069	0.0037	0.0037	M25SW06S01	J	0	1	0	0.0066	0.0066		
STIV141A	Naphthalene	UG/L	1	4	1	0.0046	0.019	0.11	0.11	M25SW06S01		0	1	0	0.0094	0.0094		
STIV141A	Naphthalenes, C1-alkyl-substit	UG/L	3	4	1			0.0044	0.021	M25SW02S09		0	1	0	0.0044	0.0044		
STIV141A	Naphthalenes, C2-alkyl-substit	UG/L	2	4	1	0.0046	0.0046	0.028	0.21	M25SW06S01		0	1	0	0.0044	0.0044		

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles

#D = No. of Detects

#S = Total No. of Samples

#R = No. of Rejected Samples

FL = Data Validation Qualifier (Flag)

Table 17.5-3
Summary of Seawater Results for Organics
Sewer Outfalls, Sand Island (Site 25)

			Site 25									Background						
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT
STIV141A	Naphthalenes, C3-alkyl-substit	UG/L	2	4	1	0.0046	0.0046	0.021	0.47	M25SW06S01		0	1	0	0.0044	0.0044		
STIV141A	Naphthalenes, C4-alkyl-substit	UG/L	1	4	1	0.0044	0.0046	0.7	0.7	M25SW06S01		0	1	0	0.0044	0.0044		
STIV141A	Perylene	UG/L	1	4	1	0.0069	0.0072	0.0032	0.0032	M25SW06S01	J	0	1	0	0.0069	0.0069		
STIV141A	Phenanthrene	UG/L	1	4	1	0.0019	0.0034	0.0024	0.0024	M25SW02S09		0	1	0	0.0018	0.0018		
STIV141A	Phenanthrenes+Anthra., C2-alk	UG/L	1	4	1	0.0018	0.0019	0.094	0.094	M25SW06S01		0	1	0	0.0018	0.0018		
STIV141A	Phenanthrenes+Anthra., C3-alk	UG/L	1	4	1	0.0018	0.0019	0.14	0.14	M25SW06S01		0	1	0	0.0018	0.0018		
STIV141A	Pyrene	UG/L	1	4	1	0.0044	0.0046	0.031	0.031	M25SW06S01		0	1	0	0.0044	0.0044		
STIV141C	PCB-180 (2,2',3,4,4',5,5')	UG/L	1	3	0	0.00071	0.00074	0.0012	0.0012	M25SW06S01		0	1	0	0.00071	0.00071		
STIV141E	Endrin ketone	UG/L	1	3	0	0.0003	0.00032	0.0035	0.0035	M25SW06S01		0	1	0	0.0003	0.0003		
STIV141E	Hexachlorobenzene	UG/L	3	3	0			0.0003	0.0056	M25SW06S01		1	1	0			0.001	0.001

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles
STIV141C = NOAA Status and Trends PCBs
STIV141E = NOAA Status and Trends Pesticides

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Rejected Samples
FL = Data Validation Qualifier (Flag)

Table 17.5-4
Summary of Seawater Results for Inorganics
Sewer Outfalls, Sand Island (Site 25)

			Site 25									Atoll Background						
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETEC	MAX DETEC	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETEC	MAX DETECT
STIII213	Aluminum	UG/L	2	3	0	0.81	0.81	12.2	22.3	M25SW02S09		0	1	0	0.81	0.81		
STIII213	Antimony	UG/L	3	3	0			0.541	0.645	M25SW02S09		1	1	0			0.458	0.458
STIII213	Arsenic	UG/L	3	3	0			1.2	1.46	M25SW02S09		1	1	0			1.29	1.29
STIII213	Chromium	UG/L	1	3	0	0.23	0.24	0.55	0.55	M25SW02S09	J	0	1	0	0.209	0.209		
STIII213	Copper	UG/L	2	3	0	0.135	0.135	1	1.82	M25SW02S09		0	1	0	0.118	0.118		
STIII213	Iron	UG/L	3	3	0			1.3	52	M25SW02S09	J	0	1	0	0.85	0.85		
STIII213	Lead	UG/L	2	3	0	0.075	0.075	0.293	0.863	M25SW06S01		0	1	0	0.019	0.019		
STIII213	Manganese	UG/L	3	3	0			0.412	2.43	M25SW06S01		1	1	0			0.463	0.463
STIII213	Thallium	UG/L	3	3	0			0.072	0.113	M25SW02S09		1	1	0			0.151	0.151
STIII213	Tin	UG/L	3	3	0			0.541	0.679	M25SW06S01		1	1	0			0.181	0.181
STIII213	Zinc	UG/L	2	3	0	0.92	0.92	1.14	2.11	M25SW02S09	J	0	1	0	0.92	0.92		

Notes:

STIII213 = NOAA Status and Trends Low Level Metals

#D =No. of Detects

#S = Total No. of Samples

#R = No. of Samples Rejected During Data Validation

FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)

Table 17.6-1

Marine Sediment CPEC Selection, Old Sewer Outfall - Site 25

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of Detected Concentrations Minimum (mg/kg)	Range of Detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic									
Antimony	67	1.15E-01	1.61E-01	1.99E-01	1.23E-01	1.99E-01	2.00E+00	2.06E-01	No(5)
Cadmium	100		7.30E-02	1.03E-01	8.68E-02	1.03E-01	1.20E+00	5.84E-02	No(5)
Iron	100		2.91E+01	4.12E+01	3.47E+01	4.12E+01		3.22E+01	No(5)
Lead	67	4.37E+00	3.90E+00	8.10E+00	4.10E+00	8.10E+00	4.67E+01		No(6)
Nickel	100		3.69E-01	4.76E-01	4.08E-01	4.76E-01	2.09E+01		No(6)
Tin	33	8.10E-02	6.86E-01	6.86E-01	1.04E-01	6.86E-01		3.55E-02	YES
Organic									
Benzo(a)anthracene	100		6.30E-05	2.50E-04	1.36E-04	2.50E-04	2.61E-01		No(6)
Benzo(a)pyrene	100		4.80E-05	5.00E-04	1.50E-04	5.00E-04	4.30E-01		No(6)
Benzo(b)fluoranthene	100		9.90E-05	7.90E-04	2.76E-04	7.90E-04	1.70E+00		No(6)
Benzo(e)pyrene	100		7.90E-05	5.00E-04	1.89E-04	5.00E-04	1.70E+00		No(6)
Benzo(g,h,i)perylene	100		6.80E-05	4.40E-04	1.69E-04	4.40E-04	1.70E+00		No(6)
Benzo(k)fluoranthene	100		3.00E-05	1.90E-04	7.29E-05	1.90E-04	1.70E+00		No(6)
Chrysene	100		5.50E-05	2.80E-04	1.32E-04	2.80E-04	3.84E-01		No(6)
Chrysenes, C1-alky	67	2.90E-04	5.10E-05	2.30E-04	1.19E-04	2.30E-04	3.84E-01		No(6)
Dibenzo(a,h)anthracene	33	3.30E-04	9.00E-05	9.00E-05	1.37E-04	9.00E-05	6.34E-02		No(6)
Fluoranthene	100		4.80E-05	1.40E-04	9.56E-05	1.40E-04	6.00E-01		No(6)
Fluoranth+Pyr, C1-alky	67	2.30E-04	1.30E-04	1.50E-04	1.31E-04	1.50E-04	6.00E-01		No(6)
Fluorenes, C1-alky	67	2.90E-04	4.30E-05	1.00E-04	8.54E-05	1.00E-04	1.90E-02		No(6)
Hexachlorobenzene	33	2.00E-05	1.50E-03	1.50E-03	5.57E-05	1.50E-03			YES
Indeno(1,2,3-cd)pyrene	100		6.60E-05	4.30E-04	1.62E-04	4.30E-04	1.70E+00		No(6)
PCB-44	33	1.60E-05	4.00E-04	4.00E-04	3.01E-05	4.00E-04			YES
PCB-52	67	1.40E-05	1.70E-04	8.40E-04	1.00E-04	8.40E-04			YES
PCB-101	67	1.40E-05	2.60E-04	1.40E-03	1.37E-04	1.40E-03			YES
PCB-105	33	1.50E-05	5.40E-04	5.40E-04	3.19E-05	5.40E-04			YES
PCB-118	67	2.10E-05	3.20E-04	1.70E-03	1.79E-04	1.70E-03			YES
PCB-128	33	1.70E-05	3.10E-04	3.10E-04	2.93E-05	3.10E-04			YES
PCB-138	67	2.00E-05	2.10E-04	1.20E-03	1.36E-04	1.20E-03			YES
PCB-153	67	1.80E-05	2.30E-04	1.40E-03	1.43E-04	1.40E-03			YES
PCB-170	100		4.80E-05	1.80E-04	7.80E-05	1.80E-04			YES
PCB-180	67	2.10E-05	5.70E-05	2.30E-04	5.16E-05	2.30E-04			YES

Table 17.6-1
Marine Sediment CPEC Selection, Old Sewer Outfall - Site 25

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of Detected Concentrations Minimum (mg/kg)	Range of Detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
PCB-187	33	3.00E-05	9.20E-05	9.20E-05	2.81E-05	9.20E-05			YES
PCB-195	33	1.40E-05	1.10E-04	1.10E-04	1.79E-05	1.10E-04			YES
Perylene	67	1.10E-04	1.70E-05	1.50E-04	5.20E-05	1.50E-04	1.70E+00		No(6)
Pyrene	33	2.30E-04	1.50E-04	1.50E-04	1.31E-04	1.50E-04	6.65E-01		No(6)

*TBC values used for sediments are the ER-L values from Long and Morgan (1992 and 1994). Values for PAHs were used for alkyl substitued PAHS as well.
**Mean value of background marine sediment samples taken at Midway Atoll.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 17.6-2
Marine Sediment CPEC Selection, Active Sewer Outfall - Site 25

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of Detected Concentrations Minimum (mg/kg)	Range of Detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic									
Arsenic	22.2	1.40E+00	1.99E+00	2.59E+00	1.00E+00	1.52E+00	8.20E+00		No(6)
Cadmium	100		4.70E-02	2.14E-01	7.86E-02	1.21E-01	1.20E+00	5.84E-02	No(6)
Iron	100		1.64E+01	2.09E+02	3.39E+01	6.32E+01		3.22E+01	No(5)
Nickel	100		3.09E-01	1.17E+00	4.13E-01	6.17E-01	2.09E+01		No(6)
Organic									
Anthracene	22.2	1.90E-04	4.10E-05	2.30E-04	9.98E-05	1.45E-04	8.53E-02		No(6)
Benzo(a)anthracene	88.9	2.50E-04	3.40E-05	1.30E-03	1.03E-04	4.36E-04	2.61E-01		No(6)
Benzo(a)pyrene	100		9.00E-06	5.50E-04	4.44E-05	2.24E-04	4.30E-01		No(6)
Benzo(b)fluoranthene	100		2.00E-05	1.40E-03	1.05E-04	4.81E-04	1.70E+00		No(6)
Benzo(e)pyrene	100		8.00E-06	4.80E-04	5.04E-05	2.10E-04	1.70E+00		No(6)
Benzo(g,h,i)perylene	66.7	3.30E-04	1.20E-05	2.60E-04	1.03E-04	1.91E-04	1.70E+00		No(6)
Benzo(k)fluoranthene	100		8.00E-06	1.20E-03	4.12E-05	3.63E-04	1.70E+00		No(6)
Chrysene	88.9	3.30E-04	1.50E-05	1.10E-03	7.52E-05	3.86E-04	3.84E-01		No(6)
Chrysenes, C1-alky	11.1	3.10E-04	1.40E-04	1.40E-04	1.64E-04	1.40E-04	3.84E-01		No(6)
Dibenzo(a,h)anthracene	11.1	3.50E-04	1.40E-04	1.40E-04	1.80E-04	1.40E-04	6.34E-02		No(6)
Fluoranthene	100		2.90E-05	2.20E-03	1.17E-04	6.64E-04	6.00E-01		No(6)
Fluoranth+Pyr, C1-alky	11.1	2.40E-04	3.70E-04	3.70E-04	1.57E-04	2.32E-04	6.00E-01		No(6)
Fluorene	11.1	2.70E-04	2.40E-05	2.40E-05	1.27E-04	2.40E-05	1.90E-02		No(6)
Fluorenes, C1-alky	33.3	2.70E-04	6.00E-05	1.50E-04	1.33E-04	1.50E-04	1.90E-02		No(6)
Indeno(1,2,3-cd)pyrene	66.7	2.50E-04	1.90E-05	3.70E-04	9.78E-05	1.99E-04	1.70E+00		No(6)
Mirex	11.1	2.10E-05	1.10E-05	1.10E-05	1.23E-05	1.10E-05			YES
Naphthalene	33.3	1.20E-04	1.80E-04	2.30E-04	1.65E-04	2.28E-04	1.60E-01		No(6)
Naphthalenes, C1-alky	22.2	1.30E-04	2.50E-04	2.50E-04	1.66E-04	2.35E-04	1.60E-01		No(6)
PCB-77	11.1	2.50E-05	6.00E-05	6.00E-05	1.72E-05	3.18E-05			YES
PCB-101	11.1	1.30E-05	6.40E-05	6.40E-05	9.77E-06	2.81E-05			YES
PCB-138	33.3	2.00E-05	9.40E-05	2.30E-04	2.79E-05	1.29E-04			YES
PCB-153	33.3	1.80E-05	9.50E-05	3.60E-04	2.84E-05	1.79E-04			YES
PCB-170	44.4	7.30E-05	3.40E-05	1.50E-04	5.24E-05	9.01E-05			YES
PCB-180	33.3	2.10E-05	8.50E-05	2.90E-04	2.96E-05	1.53E-04			YES
PCB-187	33.3	3.20E-05	1.10E-04	2.30E-04	3.87E-05	1.34E-04			YES
PCB-195	33.3	1.40E-05	4.30E-05	7.90E-05	1.54E-05	4.31E-05			YES

Table 17.6-2
Marine Sediment CPEC Selection, Active Sewer Outfall - Site 25

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of Detected Concentrations Minimum (mg/kg)	Range of Detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
PCB-206	33.3	1.30E-05	1.10E-05	2.50E-05	1.00E-05	1.77E-05			YES
Perylene	44.4	1.10E-04	1.20E-05	1.40E-04	4.86E-05	8.32E-05	1.70E+00		No(6)
Phenanthrene	66.7	3.40E-05	2.70E-05	1.10E-03	1.05E-04	3.99E-04	2.40E-01		No(6)
Phenanth+Anthra), C1-alky	22.2	3.30E-04	1.10E-04	3.00E-04	1.77E-04	2.19E-04	2.40E-01		No(6)
Pyrene	44.4	3.80E-05	1.10E-04	1.30E-03	1.69E-04	5.14E-04	6.65E-01		No(6)

*TBC values used for sediments are the ER-L values from Long and Morgan (1992 and 1994). Values for PAHs were used for alkyl substitued PAHS as well.
**Mean value of background marine sediment samples taken at Midway Atoll.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 17.6-3
Marine Sediment CPEC Selection, West NAVFAC Outfall - Site 25

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of Detected Concentrations Minimum (mg/kg)	Range of Detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic									
Cadmium	100		8.50E-02	1.29E-01	1.06E-01	1.29E-01	1.20E+00	5.84E-02	No(6)
Copper	50	3.30E+00	3.80E+00	5.40E+00	2.83E+00	5.40E+00	3.40E+01	6.96E+00	No(5)
Iron	100		6.44E+01	4.03E+02	1.17E+02	3.80E+02		3.22E+01	No(p)
Lead	25	3.60E+00	9.70E+00	9.70E+00	2.78E+00	8.93E+00	4.67E+01		No(6)
Thallium	25	3.20E-02	3.00E-02	3.00E-02	1.87E-02	2.92E-02		1.90E-02	No(5)
Organic									
Acenaphthylene	25	2.40E-04	4.70E-05	4.70E-05	1.34E-04	4.70E-05	4.40E-02		No(6)
alpha-BHC	25	1.60E-05	4.00E-06	4.00E-06	6.93E-06	4.00E-06			YES
Anthracene	75	8.80E-04	2.80E-05	2.10E-04	9.31E-05	2.10E-04	8.53E-02		No(6)
Benzo(a)anthracene	100		1.00E-04	8.40E-04	2.41E-04	8.09E-04	2.61E-01		No(6)
Benzo(a)pyrene	75	6.90E-04	1.50E-04	8.80E-04	2.87E-04	8.65E-04	4.30E-01		No(6)
Benzo(b)fluoranthene	100		2.60E-04	1.40E-03	4.28E-04	1.32E-03	1.70E+00		No(6)
Benzo(e)pyrene	100		1.70E-04	7.70E-04	2.72E-04	7.33E-04	1.70E+00		No(6)
Benzo(g,h,i)perylene	75	1.50E-03	2.00E-04	7.20E-04	3.83E-04	7.20E-04	1.70E+00		No(6)
Benzo(k)fluoranthene	100		9.60E-05	5.20E-04	1.53E-04	4.93E-04	1.70E+00		No(6)
Biphenyl	75	1.00E-03	6.20E-05	8.30E-05	1.19E-04	8.30E-05	5.52E-01		No(6)
Chrysene	100		1.00E-04	9.80E-04	2.50E-04	9.31E-04	3.84E-01		No(6)
Chrysenes, C1-alky	25	3.50E-04	6.90E-04	6.90E-04	3.60E-04	6.90E-04	3.84E-01		No(6)
Chrysenes, C2-alky	25	3.50E-04	6.30E-04	6.30E-04	3.52E-04	6.30E-04	3.84E-01		No(6)
Chrysenes, C3-alky	25	3.50E-04	6.40E-04	6.40E-04	3.53E-04	6.40E-04	3.84E-01		No(6)
Chrysenes, C4-alky	25	3.50E-04	8.20E-04	8.20E-04	3.76E-04	8.20E-04	3.84E-01		No(6)
Dibenzo(a,h)anthracene	75	1.70E-03	3.00E-05	1.70E-04	1.11E-04	1.70E-04	6.34E-02		No(6)
Dibenzothiophene	25	2.20E-04	3.70E-05	3.70E-05	1.21E-04	3.70E-05	5.52E-01		No(6)
Fluoranthene	75	1.10E-03	1.10E-04	1.40E-03	3.56E-04	1.40E-03	6.00E-01		No(6)
Fluoranth+Pyr, C1-alky	25	2.70E-04	1.10E-03	1.10E-03	3.27E-04	1.10E-03	6.00E-01		No(6)
Fluoranth+Pyr, C2-alky	25	2.70E-04	7.60E-04	7.60E-04	2.98E-04	7.60E-04	6.00E-01		No(6)
Fluoranth+Pyr, C3-alky	25	2.70E-04	4.60E-04	4.60E-04	2.63E-04	4.60E-04	6.00E-01		No(6)
Fluorene	25	3.00E-04	9.00E-05	9.00E-05	1.92E-04	9.00E-05	1.90E-02		No(6)
Hexachlorobenzene	25	2.50E-05	1.10E-05	1.10E-05	1.22E-05	1.10E-05			YES
Indeno(1,2,3-cd)pyrene	75	1.10E-03	1.60E-04	7.40E-04	3.19E-04	7.40E-04	1.70E+00		No(6)
Naphthalenes, C1-alky	75	1.30E-03	2.80E-04	3.20E-04	3.67E-04	3.20E-04	1.60E-01		No(6)

Table 17.6-3
Marine Sediment CPEC Selection, West NAVFAC Outfall - Site 25

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of Detected Concentrations Minimum (mg/kg)	Range of Detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
PCB-8	25	2.50E-05	2.30E-05	2.30E-05	1.50E-05	2.25E-05			YES
PCB-77	50	2.80E-05	2.70E-05	5.10E-05	2.32E-05	5.07E-05			YES
PCB-138	75	2.30E-05	2.10E-05	2.90E-05	2.00E-05	2.90E-05			YES
PCB-153	25	1.90E-05	4.40E-05	4.40E-05	1.43E-05	4.21E-05			YES
PCB-180	25	2.20E-05	6.60E-05	6.60E-05	1.76E-05	6.29E-05			YES
PCB-187	25	3.30E-05	4.80E-05	4.80E-05	2.23E-05	4.63E-05			YES
Perylene	100		4.90E-05	2.80E-04	1.24E-04	2.80E-04	1.70E+00		No(6)
Phenanthrene	25	3.70E-04	6.70E-04	6.70E-04	3.73E-04	6.70E-04	2.40E-01		No(6)
Phenanth+Anthra), C1-alky	50	3.90E-04	1.30E-04	4.20E-04	3.04E-04	4.20E-04	2.40E-01		No(6)
Phenanth+Anthra, C2-alky	25	3.70E-04	4.60E-04	4.60E-04	3.39E-04	4.60E-04	2.40E-01		No(6)
Phenanth+Anthra, C3-alky	25	3.70E-04	3.40E-04	3.40E-04	3.15E-04	3.40E-04	2.40E-01		No(6)
Phenanth+Anthra, C4-alky	25	3.70E-04	6.80E-04	6.80E-04	3.74E-04	6.80E-04	2.40E-01		No(6)
Pyrene	75	1.10E-03	9.60E-05	1.60E-03	3.41E-04	1.60E-03	6.65E-01		No(6)

*TBC values used for sediments are the ER-L values from Long and Morgan (1992 and 1994). Values for PAHs were used for alkyl substitued PAHS as well.
**Mean value of background marine sediment samples taken at Midway Atoll.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 17.6-4
Marine Sediment CPEC Selection, East NAVFAC Outfall - Site 25

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of Detected Concentrations Minimum (mg/kg)	Range of Detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic									
Cadmium	100		9.00E-02	1.78E-01	1.35E-01	1.78E-01	1.20E+00	5.84E-02	No(6)
Copper	100		6.60E+00	1.02E+01	8.00E+00	1.02E+01	3.40E+01	6.96E+00	No(5)
Iron	100		7.30E+01	1.97E+02	1.15E+02	1.97E+02		3.22E+01	No(p)
Tin	100		7.00E-02	1.03E+00	1.98E-01	1.03E+00		3.55E-02	YES
Organic									
4,4'-DDT	66.7	2.80E-05	4.70E-05	1.70E-04	4.82E-05	1.70E-04	1.58E-03		No(6)
Benzo(a)anthracene	33.3	1.10E-03	4.80E-04	4.80E-04	6.62E-04	4.80E-04	2.61E-01		No(6)
Benzo(a)pyrene	33.3	6.60E-04	2.10E-04	2.10E-04	3.65E-04	2.10E-04	4.30E-01		No(6)
Benzo(b)fluoranthene	66.7	3.10E-03	3.80E-04	4.60E-04	6.47E-04	4.60E-04	1.70E+00		No(6)
Benzo(e)pyrene	66.7	2.50E-03	2.80E-04	3.10E-04	4.77E-04	3.10E-04	1.70E+00		No(6)
Benzo(k)fluoranthene	66.7	2.60E-03	1.10E-04	2.10E-04	3.11E-04	2.10E-04	1.70E+00		No(6)
Chrysene	33.3	1.50E-03	3.70E-04	3.70E-04	7.47E-04	3.70E-04	3.84E-01		No(6)
Fluoranthene	66.7	2.30E-03	2.70E-04	4.50E-04	5.19E-04	4.50E-04	6.00E-01		No(6)
Indeno(1,2,3-cd)pyrene	66.7	2.30E-03	2.20E-04	2.70E-04	4.09E-04	2.70E-04	1.70E+00		No(6)
Naphthalene	33.3	1.30E-03	5.60E-04	5.60E-04	7.79E-04	5.60E-04	1.60E-01		No(6)
PCB-77	66.7	3.00E-05	1.10E-04	1.30E-04	5.99E-05	1.30E-04			YES
PCB-170	33.3	7.60E-05	1.30E-05	1.30E-05	2.69E-05	1.30E-05			YES
PCB-206	33.3	1.40E-05	3.50E-06	3.50E-06	5.56E-06	3.50E-06			YES
Perylene	33.3	4.90E-04	1.40E-03	1.40E-03	4.44E-04	1.40E-03	1.70E+00		No(6)
Phenanthrene	33.3	1.60E-03	3.30E-04	3.30E-04	7.42E-04	3.30E-04	2.40E-01		No(6)
Pyrene	66.7	2.30E-03	3.30E-04	4.80E-04	5.67E-04	4.80E-04	6.65E-01		No(6)

*TBC values used for sediments are the ER-L values from Long and Morgan (1992 and 1994). Values for PAHs were used for alkyl substitued PAHS as well.
**Mean value of background marine sediment samples taken at Midway Atoll.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 17.6-5
Marine Sediment CPEC Selection, Runway Storm Drain Outfall - Site 25

Analyte	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic				
Antimony	4.38E-01	2.00E+00		No(6)
Arsenic	3.23E+00	8.20E+00		No(6)
Chromium	8.10E+01	8.10E+01		YES
Copper	2.07E+01	3.40E+01	6.96E+00	No(6)
Iron	2.56E+04		3.22E+01	No(p)
Lead	7.50E+00	4.67E+01		No(6)
Manganese	3.49E+02			YES
Nickel	7.35E+01	2.09E+01		YES
Silicon	3.08E+04			No(p)
Tin	6.84E-01		3.55E-02	YES
Zinc	2.82E+01	1.50E+02		No(6)
Organic				
4,4'-DDD	4.20E-03	2.00E-03		YES
4,4'-DDE	2.20E-03	2.20E-03		YES
Acenaphthene	5.80E-04	1.60E-02		No(6)
alpha-Chlordane	1.20E-03	2.00E-02		No(6)
Benzo(a)anthracene	3.20E-03	2.61E-01		No(6)
Benzo(b)fluoranthene	2.30E-03	1.70E+00		No(6)
Benzo(g,h,i)perylene	1.20E-02	1.70E+00		No(6)
Benzo(k)fluoranthene	4.80E-03	1.70E+00		No(6)
beta-BHC	1.20E-04			YES
Biphenyl	3.20E-04	5.52E-01		No(6)
Chrysene	1.50E-02	3.84E-01		No(6)
Chrysenes, C1-alky	4.50E-02	3.84E-01		No(6)
Chrysenes, C2-alky	1.10E-01	3.84E-01		No(6)
Chrysenes, C3-alky	1.60E-01	3.84E-01		No(6)
Chrysenes, C4-alky	1.40E-01	3.84E-01		No(6)
Dibenzo(a,h)anthracene	1.60E-03	6.34E-02		No(6)
Dibenzothiophene	4.80E-03	5.52E-01		No(6)
Dibenzothiophenes, C1-alky	4.20E-02	5.52E-01		No(6)
Dibenzothiophenes, C2-alky	1.40E-01	5.52E-01		No(6)
Dibenzothiophenes, C3-alky	3.10E-01	5.52E-01		No(6)
Endrin	9.90E-04	2.00E-05		YES
Fluoranth+Pyr, C1-alky	6.80E-02	6.60E-01		No(6)
Fluoranth+Pyr, C2-alky	7.60E-02	6.60E-01		No(6)
Fluoranth+Pyr, C3-alky	1.50E-01	6.60E-01		No(6)
Fluorene	7.30E-04	1.90E-02		No(6)
Fluorenes, C1-alky	1.60E-03	1.90E-02		No(6)
Fluorenes, C2-alky	1.80E-02	1.90E-02		No(6)
Fluorenes, C3-alky	9.00E-02	1.90E-02		YES
gamma-BHC (Lindane)	6.10E-04			YES
Hexachlorobenzene	3.30E-04			YES
Indeno(1,2,3-cd)pyrene	3.40E-03	1.70E+00		No(6)
Methoxychlor	1.70E-04			YES
Mirex	7.80E-04			YES
Naphthalenes, C1-alky	4.10E-04	1.60E-01		No(6)

Table 17.6-5
Marine Sediment CPEC Selection, Runway Storm Drain Outfall - Site 25

Analyte	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Naphthalenes, C2-alky	2.30E-03	1.60E-01		No(6)
Naphthalenes, C3-alky	1.70E-02	1.60E-01		No(6)
Naphthalenes, C4-alky	8.80E-02	1.60E-01		No(6)
PCB-8	4.80E-04			YES
PCB-18	1.00E-03			YES
PCB-44	5.70E-04			YES
PCB-105	1.50E-03			YES
PCB-118	7.80E-04			YES
PCB-138	2.80E-03			YES
PCB-153	3.10E-03			YES
PCB-170	4.30E-03			YES
PCB-180	3.40E-03			YES
PCB-195	7.20E-04			YES
PCB-206	7.60E-04			YES
Perylene	4.60E-02	1.70E+00		No(6)
Phenanthrene	8.90E-03	2.40E-01		No(6)
Phenanth+Anthra., C1-alky	3.30E-02	2.40E-01		No(6)
Phenanth+Anthra., C2-alky	1.20E-01	2.40E-01		No(6)
Phenanth+Anthra., C3-alky	1.80E-01	2.40E-01		No(6)
Phenanth+Anthra., C4-alky	2.40E-01	2.40E-01		YES
Photomirex	1.10E-03			YES
Pyrene	1.90E-02	6.65E-01		No(6)

*TBC values used for sediments are the ER-L values from Long and Morgan (1992 and 1994). Values for PAHs were used for alkyl substitued PAHS as well.
**Mean value of background marine sediment samples taken at Midway Atoll.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common lab contaminant
No(2): frequency of detect. <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concen. < 2x background concen.
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 17.6-6
Marine Sediment CPEC Selection, Inner Harbor Outfall - Site 25

Analyte	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic				
Antimony	1.38E-01	2.00E+00		No(5)
Cadmium	9.20E-02	1.20E+00	5.84E-02	No(5)
Copper	4.70E+00	3.40E+01	6.96E+00	No(5)
Iron	1.11E+03		3.22E+01	No(p)
Lead	4.60E+00	4.67E+01		No(6)
Manganese	1.67E+01			YES
Mercury	2.50E-02	1.50E-01		No(5)
Nickel	5.77E-01	2.09E+01		No(6)
Selenium	3.10E-01			YES
Tin	3.56E-01		3.55E-02	YES
Zinc	3.60E+00	1.50E+02		No(5)
Organic				
2,4'-DDD	2.00E-04	2.00E-03		No(6)
4,4'-DDD	3.00E-04	2.00E-03		No(6)
4,4'-DDE	3.60E-04	2.20E-03		No(6)
alpha-Chlordane	6.90E-05			YES
Anthracene	2.60E-04	8.53E-02		No(6)
Benzo(a)anthracene	5.90E-04	2.61E-01		No(6)
Benzo(a)pyrene	1.30E-03	4.30E-01		No(6)
Benzo(b)fluoranthene	4.30E-03	1.70E+00		No(6)
Benzo(e)pyrene	2.00E-03	1.70E+00		No(6)
Benzo(g,h,i)perylene	2.30E-03	1.70E+00		No(6)
Benzo(k)fluoranthene	1.00E-03	1.70E+00		No(6)
Chrysene	8.80E-04	3.84E-01		No(6)
Chrysenes, C1-alky	1.50E-03	3.84E-01		No(6)
Chrysenes, C2-alky	2.20E-03	3.84E-01		No(6)
Chrysenes, C3-alky	3.70E-03	3.84E-01		No(6)
Chrysenes, C4-alky	3.80E-03	3.84E-01		No(6)
Dibenzo(a,h)anthracene	4.40E-04	6.34E-02		No(6)
Dibenzothiophene	2.20E-04	5.52E-01		No(6)
Dibenzothiophenes, C1-alky	2.30E-03	5.52E-01		No(6)
Dibenzothiophenes, C2-alky	5.50E-03	5.52E-01		No(6)
Dibenzothiophenes, C3-alky	5.50E-03	5.52E-01		No(6)
Fluoranthene	1.30E-03	6.00E-01		No(6)
Fluoranth+Pyr, C1-alky	3.10E-03	6.00E-01		No(6)
Fluoranth+Pyr, C2-alky	4.20E-03	6.00E-01		No(6)
Fluoranth+Pyr, C3-alky	3.80E-03	6.00E-01		No(6)
Fluorenes, C1-alky	4.30E-04	1.90E-02		No(6)
Indeno(1,2,3-cd)pyrene	2.70E-03	1.70E+00		No(6)
Naphthalene	2.30E-04	1.60E-01		No(6)
Naphthalenes, C1-alky	2.70E-04	1.60E-01		No(6)
Naphthalenes, C2-alky	2.10E-03	1.60E-01		No(6)
Naphthalenes, C3-alky	1.20E-02	1.60E-01		No(6)
Naphthalenes, C4-alky	1.20E-02	1.60E-01		No(6)
PCB-8	7.80E-05			YES
PCB-28	7.90E-05			YES

Table 17.6-6
Marine Sediment CPEC Selection, Inner Harbor Outfall - Site 25

Analyte	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
PCB-77	2.70E-04			YES
PCB-101	3.70E-04			YES
PCB-118	2.50E-04			YES
PCB-128	9.20E-05			YES
PCB-138	9.50E-04			YES
PCB-153	1.30E-03			YES
PCB-170	4.40E-04			YES
PCB-180	1.00E-03			YES
PCB-187	7.80E-04			YES
PCB-206	3.90E-04			YES
PCB-209	3.00E-03			YES
Perylene	4.00E-04	1.70E+00		No(6)
Phenanthrene	3.60E-04	2.40E-01		No(6)
Phenanth+Anthra., C1-alky	1.80E-03	2.40E-01		No(6)
Phenanth+Anthra., C2-alky	3.20E-03	2.40E-01		No(6)
Phenanth+Anthra., C3-alky	3.00E-03	2.40E-01		No(6)
Pyrene	2.70E-03	6.65E-01		No(6)

*TBC values used for sediments are the ER-L values from Long and Morgan (1992 and 1994). Values for PAHs were used for alkyl substitued PAHS as well.
**Mean value of background marine sediment samples taken at Midway Atoll.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common lab contaminan
No(2): frequency of detect. <=
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concen. < 2x background concen.
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 17.6-7
Marine Sediment CPEC Selection, Rocky Point Outfall - Site 25

Analyte	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic				
Antimony	1.60E-01	2.00E+00	2.06E-01	No(5)
Arsenic	2.03E+00	8.20E+00		No(6)
Cadmium	1.63E-01	1.20E+00	5.84E-02	No(6)
Copper	6.50E+00	3.40E+01	6.96E+00	No(5)
Iron	4.19E+03		3.22E+01	No(p)
Tin	6.78E-01		3.55E-02	YES
Zinc	2.14E+01	1.50E+02	2.49E+00	No(6)
Organic				
2,4'-DDD	4.90E-04	2.00E-03		No(6)
2,4'-DDT	3.40E-04	1.58E-03		No(6)
4,4'-DDD	7.90E-04	2.00E-03		No(6)
4,4'-DDE	1.60E-03	2.20E-03		No(6)
4,4'-DDT	1.50E-03	1.58E-03		No(6)
Acenaphthene	1.40E-04	1.60E-02		No(6)
Acenaphthylene	5.70E-04	4.40E-02		No(6)
alpha-Chlordane	8.30E-05	2.00E-02		No(6)
Anthracene	1.40E-03	8.53E-02		No(6)
Benzo(a)anthracene	1.20E-02	2.61E-01		No(6)
Benzo(a)pyrene	1.40E-02	4.30E-01		No(6)
Benzo(b)fluoranthene	2.30E-02	1.70E+00		No(6)
Benzo(e)pyrene	9.10E-03	1.70E+00		No(6)
Benzo(g,h,i)perylene	9.90E-03	1.70E+00		No(6)
Benzo(k)fluoranthene	7.70E-03	1.70E+00		No(6)
Biphenyl	1.10E-04	5.52E-01		No(6)
Chrysene	1.20E-02	3.84E-01		No(6)
Chrysenes, C1-alky	7.10E-03	3.84E-01		No(6)
Chrysenes, C2-alky	2.20E-02	3.84E-01		No(6)
Chrysenes, C3-alky	3.70E-02	3.84E-01		No(6)
Chrysenes, C4-alky	3.30E-02	3.84E-01		No(6)
Dibenzo(a,h)anthracene	2.30E-03	6.34E-02		No(6)
Dibenzothiophene	1.10E-04	5.52E-01		No(6)
Dibenzothiophenes, C1-alky	4.30E-04	5.52E-01		No(6)
Dibenzothiophenes, C2-alky	1.80E-03	5.52E-01		No(6)
Dibenzothiophenes, C3-alky	7.70E-03	5.52E-01		No(6)
Fluoranthene	1.60E-02	6.00E-01		No(6)
Fluoranth+Pyr, C1-alky	1.20E-02	6.00E-01		No(6)
Fluoranth+Pyr, C2-alky	1.40E-02	6.00E-01		No(6)
Fluoranth+Pyr, C3-alky	2.40E-02	6.00E-01		No(6)
Fluorene	1.30E-04	1.90E-02		No(6)
Fluorenes, C1-alky	2.10E-04	1.90E-02		No(6)
Fluorenes, C2-alky	4.90E-04	1.90E-02		No(6)
Indeno(1,2,3-cd)pyrene	1.00E-02	1.70E+00		No(6)
Naphthalenes, C1-alky	8.20E-04	1.60E-01		No(6)
Naphthalenes, C2-alky	1.30E-03	1.60E-01		No(6)
Naphthalenes, C3-alky	2.40E-03	1.60E-01		No(6)
PCB-28	1.10E-04			YES

Table 17.6-7
Marine Sediment CPEC Selection, Rocky Point Outfall - Site 25

Analyte	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
PCB-101	1.50E-04			YES
PCB-118	1.00E-04			YES
PCB-138	4.90E-04			YES
PCB-153	4.00E-04			YES
PCB-170	1.40E-04			YES
PCB-180	4.00E-04			YES
PCB-187	2.70E-04			YES
Perylene	2.00E-02	1.70E+00		No(6)
Phenanthrene	2.40E-03	2.40E-01		No(6)
Phenanth+Anthra., C1-alky	3.90E-03	2.40E-01		No(6)
Phenanth+Anthra., C2-alky	4.40E-03	2.40E-01		No(6)
Phenanth+Anthra., C3-alky	1.30E-02	2.40E-01		No(6)
Phenanth+Anthra., C4-alky	2.20E-02	2.40E-01		No(6)
Pyrene	1.60E-02	6.65E-01		No(6)

*TBC values used for sediments are the ER-L values from Long and Morgan (1992 and 1994). Values for PAHs were used for alkyl substitued PAHS as well.
**Mean value.of background marine sediment samples taken at Midway Atoll.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common lab contaminant
No(2): frequency of detect. <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concen. < 2x background concen.
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 17.6-8
Marine Sediment CPEC Selection, Southwest Outfall, Eastern Island - Site 25

Analyte	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic				
Antimony	2.60E-01	2.00E+00		No(6)
Cadmium	9.00E-02	1.20E+00	5.84E-02	No(5)
Chromium	1.25E+01	8.10E+01		No(6)
Copper	1.55E+01	3.40E+01	6.96E+00	No(6)
Iron	3.37E+03		3.22E+01	No(p)
Manganese	3.40E+01			YES
Thallium	3.60E-02		1.90E-02	No(5)
Tin	1.14E+00		3.55E-02	YES
Zinc	1.02E+01	1.50E+02		No(6)
Organic				
Benzo(a)anthracene	6.90E-05	2.61E-01		No(6)
Benzo(b)fluoranthene	1.10E-04	1.70E+00		No(6)
Benzo(e)pyrene	7.80E-05	1.70E+00		No(6)
Benzo(k)fluoranthene	3.70E-05	1.70E+00		No(6)
Chrysene	9.20E-05	3.84E-01		No(6)
Fluoranthene	1.60E-04	6.00E-01		No(6)
PCB-28	1.50E-04			YES
PCB-52	2.80E-05			YES
PCB-126	3.60E-05			YES
PCB-153	1.30E-05			YES
PCB-209	3.00E-05			YES
Pyrene	1.10E-04	6.65E-01		No(6)
trans-Nonachlor	3.00E-05			YES

*TBC values used for sediments are the ER-L values from Long and Morgan (1992 and 1994). Values for PAHs were used for alkyl substitued PAHS as well.
**Mean value of background marine sediment samples taken at Midway Atoll.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common lab contaminant
No(2): frequency of detect. <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concen. < 2x background concen.
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 17.6-9
Marine Sediment CPEC Selection, Southeast Outfall, Eastern Island - Site 25

Analyte	Environmental Concentration (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic				
Antimony	1.63E-01	2.00E+00		No(6)
Cadmium	9.00E-02	1.20E+00	5.84E-02	No(5)
Copper	9.20E+00	3.40E+01	6.96E+00	No(5)
Iron	5.33E+01		3.22E+01	No(5)
Lead	4.70E+00	4.67E+01		No(6)
Thallium	3.80E-02		1.90E-02	YES
Zinc	2.90E+00	1.50E+02		No(6)
Organic				
1,2,4-Trichlorobenzene	1.90E-04			YES
Benzo(a)anthracene	4.70E-04	2.61E-01		No(6)
Benzo(a)pyrene	4.30E-04	4.30E-01		No(6)
Benzo(b)fluoranthene	7.20E-04	1.70E+00		No(6)
Benzo(e)pyrene	3.90E-04	1.70E+00		No(6)
Benzo(g,h,i)perylene	3.00E-04	1.70E+00		No(6)
Benzo(k)fluoranthene	2.60E-04	1.70E+00		No(6)
Chrysene	6.60E-04	3.84E-01		No(6)
Fluoranthene	8.80E-04	6.00E-01		No(6)
Fluoranth+Pyr, C1-alky	3.60E-04	6.00E-01		No(6)
Hexachlorobenzene	4.30E-05			YES
Indeno(1,2,3-cd)pyrene	2.70E-04	1.70E+00		No(6)
Naphthalenes, C1-alky	2.80E-04	1.60E-01		No(6)
PCB-180	1.70E-05			YES
Perylene	8.80E-05	1.70E+00		No(6)
Phenanthrene	2.60E-04	2.40E-01		No(6)
Pyrene	7.10E-04	6.65E-01		No(6)

*TBC values used for sediments are the ER-L values from Long and Morgan (1992 and 1994). Values for PAHs were used for alkyl substitued PAHS as well.
**Mean value of background marine sediment samples taken at Midway Atoll.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common lab contaminant
No(2): frequency of detect. <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concen. < 2x background concen.
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 17.6-10
Seawater CPEC Selection, Active Sewer Outfall - Site 25

Analyte	Environmental Concentration (ug/L)	ARAR Value (ug/L)	Background Concentration** (ug/L)	CPEC?
Inorganic				
Aluminum	2.23E+01	2.60E+02		No(6)
Antimony	6.45E-01	1.60E+03	4.58E-01	No(5)
Arsenic	1.46E+00	3.60E+01	1.29E+00	No(5)
Chromium	5.50E-01	5.00E+01		No(6)
Copper	1.82E+00	2.90E+00		No(6)
Iron	5.20E+01	1.00E+03		No(6)
Lead	2.93E-01	5.60E+00		No(6)
Manganese	1.63E+00	1.10E+01	4.63E-01	No(6)
Thallium	1.13E-01	4.00E+01	1.51E-01	No(5)
Tin	5.80E-01		1.81E-01	YES
Zinc	2.11E+00	8.60E+01		No(6)
Organic				
1,2,4-Trichlorobenzene	2.50E-03	1.29E+02		No(6)
Acenaphthylene	1.80E-03			YES
Biphenyl	2.40E-03			YES
Fluoranthene	1.10E-03	1.60E+01		No(6)
Hexachlorobenzene	4.20E-04	1.29E+02		No(6)
Naphthalenes, C1-alky	2.10E-02	6.20E+02		No(6)
Naphthalenes, C2-alky	2.80E-02	6.20E+02		No(6)
Naphthalenes, C3-alky	2.10E-02	6.20E+02		No(6)
Phenanthrene	2.40E-03	4.30E-01		No(6)

*The lowest marine chronic value from the NAWQC and HWQC was used when available, then freshwater chronic and freshwater and marine acute values were used if no chronic numbers were listed.
**Mean value of background seawater samples taken at Midway Atoll.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concen. < 2x background concen.
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 17.6-11
Seawater CPEC Selection, Inner Harbor Outfall - Site 25

Analyte	Environmental Concentration (ug/L)	ARAR Value (ug/L)	Background Concentration** (ug/L)	CPEC?
Inorganic				
Aluminum	1.22E+01	2.60E+02		No(6)
Antimony	6.13E-01	1.60E+03	4.58E-01	No(5)
Arsenic	1.34E+00	3.60E+01	1.29E+00	No(5)
Copper	1.00E+00	2.90E+00		No(6)
Iron	4.10E+01	1.00E+03		No(6)
Lead	8.63E-01	5.60E+00		No(6)
Manganese	2.43E+00	1.10E+01	4.63E-01	No(6)
Thallium	7.20E-02	4.00E+01	1.51E-01	No(5)
Tin	6.79E-01		1.81E-01	YES
Zinc	1.14E+00	8.60E+01		No(6)
Organic				
Benzo(a)anthracene	2.20E-03	2.70E-03		No(6)
Benzo(a)pyrene	2.50E-03	1.30E-03		YES
Benzo(b)fluoranthene	7.70E-03			YES
Benzo(e)pyrene	5.90E-03			YES
Benzo(g,h,i)perylene	5.00E-03			YES
Benzo(k)fluoranthene	2.30E-03			YES
Biphenyl	7.00E-02			YES
Chrysene	5.90E-03			YES
Chrysenes, C1-alky	1.10E-02			YES
Chrysenes, C2-alky	2.60E-02			YES
Chrysenes, C3-alky	2.30E-02			YES
Dibenzothiophenes, C1-alky	6.30E-02			YES
Dibenzothiophenes, C2-alky	2.00E-01			YES
Dibenzothiophenes, C3-alky	1.80E-01			YES
Endrin ketone	3.00E-03	2.30E-03		YES
Fluoranthene	6.90E-03	1.60E+01		No(6)
Fluoranth+Pyr, C1-alky	5.10E-02	1.60E+01		No(6)
Fluoranth+Pyr, C2-alky	4.80E-02	1.60E+01		No(6)
Fluoranth+Pyr, C3-alky	4.20E-02	1.60E+01		No(6)
Fluorene	2.20E-02			YES
Fluorenes, C1-alky	4.40E-02			YES
Fluorenes, C2-alky	1.40E-01			YES
Fluorenes, C3-alky	2.30E-01			YES
Hexachlorobenzene	5.00E-03	1.29E+02		No(6)
Indeno(1,2,3-cd)pyrene	3.70E-03			YES
Naphthalene	1.10E-01	6.20E+02		No(6)
Naphthalenes, C1-alky	1.50E-02	6.20E+02		No(6)
Naphthalenes, C2-alky	2.10E-01	6.20E+02		No(6)
Naphthalenes, C3-alky	4.70E-01	6.20E+02		No(6)
Naphthalenes, C4-alky	7.00E-01	6.20E+02		No(6)
PCB-180	1.00E-03			YES
Perylene	3.20E-03			YES
Phen+Anthra., C2-alky	9.40E-02	4.30E-01		No(6)
Phen+Anthra., C3-alky	1.40E-01	4.30E-01		No(6)
Pyrene	3.10E-02			YES

*The lowest marine chronic value from the NAWQC and HWQC was used when available, then freshwater chronic and freshwater and marine acute values were used if no chronic numbers were listed.
**Mean value of background seawater samples taken at Midway Atoll.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concen. < 2x background concen.
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 17.6-12
CPEC Summary All Outfalls - Site 25

Analyte	Sediment Environmental Concentrations (ECs)									Seawater ECs	
	Old Sewer Outfall 1 (mg/kg)	Active Sewer Outfall 2 (mg/kg)	West NAVFAC Outfall 3 (mg/kg)	East NAVFAC Outfall 4 (mg/kg)	Runway Storm Drain Outfall 5 (mg/kg)	Inner Harbor Outfall 6 (mg/kg)	Rocky Point Outfall 7 (mg/kg)	SW Eastern Isl. Outfall 8 (mg/kg)	SE Eastern Isl. Outfall 9 (mg/kg)	Active Sewer Outfall 2 (mg/L)	Inner Harbor Outfall 6 (mg/L)
Inorganic											
Chromium					8.10E+01						
Manganese					3.49E+02	1.67E+01		3.40E+01			
Nickel					7.35E+01						
Selenium						3.10E-01					
Thallium									3.80E-02		
Tin	6.86E-01			1.03E+00	6.84E-01	3.56E-01	6.78E-01	1.14E+00		5.80E-04	6.79E-04
Organic											
4,4'-DDD					4.20E-03						
4,4'-DDE					2.20E-03						
1,2,4-Trichlorobenzene									1.90E-04		
Acenaphthylene										1.80E-06	
alpha-BHC			4.00E-06								
alpha-Chlordane						6.90E-05					
beta-BHC					1.20E-04						
Benzo(a)pyrene											2.50E-06
Benzo(b)fluoranthene											7.70E-06
Benzo(e)pyrene											5.90E-06
Benzo(g,h,i)perylene											5.00E-06
Benzo(k)fluoranthene											2.30E-06
Biphenyl										2.40E-06	7.00E-05
Chrysene											5.90E-06
Chrysenes, C1-alky											1.10E-05
Chrysenes, C2-alky											2.60E-05
Chrysenes, C3-alky											2.30E-05
Dibenzothiophenes, C1-alky											6.30E-05
Dibenzothiophenes, C2-alky											2.00E-04
Dibenzothiophenes, C3-alky											1.80E-04
Endrin					9.90E-04						
Endrin ketone											3.00E-06
Fluorene											2.20E-05
Fluorenes, C1-alky											4.40E-05
Fluorenes, C2-alky											1.40E-04
Fluorenes, C3-alky					9.00E-02						2.30E-04
gamma-BHC (Lindane)					6.10E-04						

Table 17.6-12
CPEC Summary All Outfalls - Site 25

Analyte	Sediment Environmental Concentrations (ECs)									Seawater ECs	
	Old Sewer Outfall 1 (mg/kg)	Active Sewer Outfall 2 (mg/kg)	West NAVFAC Outfall 3 (mg/kg)	East NAVFAC Outfall 4 (mg/kg)	Runway Storm Drain Outfall 5 (mg/kg)	Inner Harbor Outfall 6 (mg/kg)	Rocky Point Outfall 7 (mg/kg)	SW Eastern Isl. Outfall 8 (mg/kg)	SE Eastern Isl. Outfall 9 (mg/kg)	Active Sewer Outfall 2 (mg/L)	Inner Harbor Outfall 6 (mg/L)
Hexachlorobenzene	1.50E-03		1.10E-05		3.30E-04				4.30E-05		
Indeno(1,2,3-cd)pyrene											3.70E-06
Methoxychlor					1.70E-04						
Mirex		1.10E-05			7.80E-04						
PCB-8			2.25E-05		4.80E-04	7.80E-05					
PCB-18					1.00E-03						
PCB-28						7.90E-05	1.10E-04	1.50E-04			
PCB-44	4.00E-04				5.70E-04						
PCB-52	8.40E-04							2.80E-05			
PCB-77		3.18E-05	5.07E-05	1.30E-04		2.70E-04					
PCB-101	1.40E-03	2.81E-05				3.70E-04	1.50E-04				
PCB-105	5.40E-04				1.50E-03						
PCB-118	1.70E-03				7.80E-04	2.50E-04	1.00E-04				
PCB-126								3.60E-05			
PCB-128	3.10E-04					9.20E-05					
PCB-138	1.20E-03	1.29E-04	2.90E-05		2.80E-03	9.50E-04	4.90E-04				
PCB-153	1.40E-03	1.79E-04	4.21E-05		3.10E-03	1.30E-03	4.00E-04	1.30E-05			
PCB-170	1.80E-04	9.01E-05		1.30E-05	4.30E-03	4.40E-04	1.40E-04				
PCB-180	2.30E-04	1.53E-04	6.29E-05		3.40E-03	1.00E-03	4.00E-04		1.70E-05		1.00E-06
PCB-187	9.20E-05	1.34E-04	4.63E-05			7.80E-04	2.70E-04				
PCB-195	1.10E-04	4.31E-05			7.20E-04						
PCB-206		1.77E-05		3.50E-06	7.60E-04	3.90E-04					
PCB-209						3.00E-03		3.00E-05			
Perylene											3.20E-06
Phenanth+Anthra., C4-alky					2.40E-01						
Photomirex					1.10E-03						
Pyrene											3.10E-05
trans-Nonachlor								3.00E-05			

Blanks indicate that the analyte was not chosen as a CPEC for that medium

Table 17.6-13
Target Receptor Exposure Point Values - Site 25

Old Sewer - Outfall 1

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates	Marine Reptile (green sea turtle)		Marine Mammal (monk seal)	
	EPV_{inv} (mg/L)	ingestion (sw)* (mg/kg-d)	EPV_{st} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{ms} (mg/kg-d)
Inorganic					
Tin	2.74E-03	ND	ND	DG	DG
Organic					
Hexachlorobenzene	8.06E-07	ND	ND	4.42E-05	4.42E-05
PCB-44	6.95E-08	ND	ND	9.60E-06	9.60E-06
PCB-52	8.40E-05	ND	ND	6.37E-05	6.37E-05
PCB-101	8.63E-05	ND	ND	9.73E-05	9.73E-05
PCB-105	4.39E-06	ND	ND	2.60E-05	2.60E-05
PCB-118	1.38E-05	ND	ND	8.18E-05	8.18E-05
PCB-128	9.15E-09	ND	ND	5.40E-06	5.40E-06
PCB-138	1.99E-07	ND	ND	2.86E-05	2.86E-05
PCB-153	2.17E-07	ND	ND	3.29E-05	3.29E-05
PCB-170	1.30E-08	ND	ND	3.69E-06	3.69E-06
PCB-180	1.42E-08	ND	ND	4.58E-06	4.58E-06
PCB-187	4.83E-09	ND	ND	1.78E-06	1.78E-06
PCB-195	8.94E-09	ND	ND	2.30E-06	2.30E-06

Active Sewer - Outfall 2

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates	Marine Reptile (green sea turtle)		Marine Mammal (monk seal)	
	EPV_{inv} (mg/L)	ingestion (sw)* (mg/kg-d)	EPV_{st} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{ms} (mg/kg-d)
Inorganic					
Tin	ND	DG	DG	1.30E-03	1.30E-03
Organic					
Acenaphthylene	ND	1.50E-07	1.50E-07	8.75E-06	8.75E-06
Biphenyl	ND	2.57E-08	2.57E-08	1.01E-05	1.01E-05
Mirex	8.94E-03	ND	ND	9.92E-06	9.92E-06
PCB-77	2.36E-08	ND	ND	2.30E-05	2.30E-05
PCB-101	1.73E-06	ND	ND	9.39E-05	9.39E-05
PCB-138	2.14E-08	ND	ND	2.60E-04	2.60E-04
PCB-153	2.77E-08	ND	ND	3.66E-04	3.66E-04
PCB-170	6.53E-09	ND	ND	9.72E-05	9.72E-05
PCB-180	9.44E-09	ND	ND	2.86E-04	2.86E-04
PCB-187	7.03E-09	ND	ND	2.46E-04	2.46E-04
PCB-195	3.50E-09	ND	ND	2.37E-05	2.37E-05
PCB-206	1.04E-11	ND	ND	1.35E-05	1.35E-05

* assumes ingestion of aquatic macrophytes exposed to surface waters
** assumes ingestion of aquatic macrophytes exposed to undiluted ground water discharged into surface waters
ND = CPEC not detected
DG = data gap; no parameter available for exposure calculation

Table 17.6-13
Target Receptor Exposure Point Values - Site 25

West NAVFAC - Outfall 3

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates	Marine Reptile (green sea turtle)		Marine Mammal (monk seal)	
	EPV_{inv} (mg/L)	ingestion (sw)* (mg/kg-d)	EPV_{st} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{ms} (mg/kg-d)
Organic					
alpha-BHC	5.04E-07	ND	ND	3.16E-07	3.16E-07
Hexachlorobenzene	5.91E-09	ND	ND	3.24E-07	3.24E-07
PCB-8	5.65E-08	ND	ND	8.76E-07	8.76E-07
PCB-77	3.76E-08	ND	ND	1.58E-06	1.58E-06
PCB-138	4.81E-09	ND	ND	6.90E-07	6.90E-07
PCB-153	6.52E-09	ND	ND	9.90E-07	9.90E-07
PCB-180	3.88E-09	ND	ND	1.25E-06	1.25E-06
PCB-187	2.43E-09	ND	ND	8.95E-07	8.95E-07

East NAVFAC - Outfall 4

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates	Marine Reptile (green sea turtle)		Marine Mammal (monk seal)	
	EPV_{inv} (mg/L)	ingestion (sw)* (mg/kg-d)	EPV_{st} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{ms} (mg/kg-d)
Inorganic					
Tin	4.12E-03	ND	ND	DG	DG
Organic					
PCB-77	9.64E-08	ND	ND	4.06E-06	4.06E-06
PCB-170	9.42E-10	ND	ND	2.66E-07	2.66E-07
PCB-206	2.06E-12	ND	ND	3.00E-08	3.00E-08

* assumes ingestion of aquatic macrophytes exposed to surface waters
** assumes ingestion of aquatic macrophytes exposed to undiluted ground water discharged into surface waters
ND = CPEC not detected
DG = data gap; no parameter available for exposure calculation

Table 17.6-13
Target Receptor Exposure Point Values - Site 25

Runway Storm Drain - Outfall 5

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates	Marine Reptile (green sea turtle)		Marine Mammal (monk seal)	
	EPV_{inv} (mg/L)	ingestion (sw)* (mg/kg-d)	EPV_{st} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{ms} (mg/kg-d)
Inorganic					
Chromium	9.53E-02	ND	ND	1.02E-02	1.02E-02
Manganese	5.37E+00	ND	ND	DG	DG
Nickel	4.90E-01	ND	ND	1.53E-01	1.53E-01
Tin	2.74E-03	ND	ND	DG	DG
Organic					
4,4'-DDD	3.19E-06	ND	ND	1.32E-04	1.32E-04
4,4'-DDE	3.25E-06	ND	ND	7.78E-05	7.78E-05
beta-BHC	1.26E-05	ND	ND	9.17E-06	9.17E-06
Endrin	2.02E-06	ND	ND	3.71E-05	3.71E-05
Fluorenes, C3-alky	4.83E-03	ND	ND	6.10E-03	6.10E-03
gamma-BHC (Lindane)	9.45E-05	ND	ND	5.01E-05	5.01E-05
Hexachlorobenzene	1.77E-07	ND	ND	9.71E-06	9.71E-06
Methoxychlor	1.38E-01	ND	ND	DG	DG
Mirex	6.34E-01	ND	ND	DG	DG
PCB-8	1.21E-06	ND	ND	1.87E-05	1.87E-05
PCB-18	1.05E-04	ND	ND	7.65E-05	7.65E-05
PCB-44	9.91E-08	ND	ND	1.37E-05	1.37E-05
PCB-105	1.22E-05	ND	ND	7.22E-05	7.22E-05
PCB-118	6.34E-06	ND	ND	3.75E-05	3.75E-05
PCB-138	4.65E-07	ND	ND	6.66E-05	6.66E-05
PCB-153	4.80E-07	ND	ND	7.29E-05	7.29E-05
PCB-170	3.12E-07	ND	ND	8.81E-05	8.81E-05
PCB-180	2.10E-07	ND	ND	6.76E-05	6.76E-05
PCB-195	5.85E-08	ND	ND	1.51E-05	1.51E-05
PCB-206	4.48E-10	ND	ND	6.52E-06	6.52E-06
Phen+Anthra., C4-alky	6.77E-03	ND	ND	1.45E-02	1.45E-02
Photomirex	1.13E-05	ND	ND	5.52E-05	5.52E-05

* assumes ingestion of aquatic macrophytes exposed to surface waters
** assumes ingestion of aquatic macrophytes exposed to undiluted ground water discharged into surface waters
ND = CPEC not detected
DG = data gap; no parameter available for exposure calculation

Table 17.6-13
Target Receptor Exposure Point Values - Site 25

Harbor Outfall 6

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates	Marine Reptile (green sea turtle)		Marine Mammal (monk seal)	
	EPV_{inv} (mg/L)	ingestion (sw)* (mg/kg-d)	EPV_{st} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{ms} (mg/kg-d)
Inorganic					
Manganese	2.57E-01	ND	ND	3.24E-02	3.24E-02
Selenium	1.03E-03	ND	ND	1.05E-02	1.05E-02
Tin	1.42E-03	3.03E-03	3.03E-03	9.89E-04	9.89E-04
Organic					
alpha-Chlordane	5.61E-08	ND	ND	2.19E-06	2.19E-06
Benzo(a)pyrene	ND	2.61E-05	2.61E-05	3.82E-04	3.82E-04
Benzo(b)fluoranthene	ND	1.86E-04	1.86E-04	2.97E-03	2.97E-03
Benzo(e)pyrene	ND	9.56E-05	9.56E-05	1.81E-03	1.81E-03
Benzo(g,h,i)perylene	ND	1.05E-04	1.05E-04	6.13E-03	6.13E-03
Benzo(k)fluoranthene	ND	6.38E-05	6.38E-05	1.42E-03	1.42E-03
Biphenyl	ND	7.50E-07	7.50E-07	1.49E-04	1.49E-04
Chrysene	ND	1.25E-03	1.25E-03	7.56E-04	7.56E-04
Chrysenes, C1-alky	ND	3.26E-05	3.26E-05	1.41E-03	1.41E-03
Chrysenes, C2-alky	ND	2.38E-05	2.38E-05	3.33E-03	3.33E-03
Chrysenes, C3-alky	ND	1.31E-04	1.31E-04	2.95E-03	2.95E-03
Dibenzothiophenes, C1-alky	ND	DG	DG	DG	DG
Dibenzothiophenes, C2-alky	ND	DG	DG	DG	DG
Dibenzothiophenes, C3-alky	ND	DG	DG	DG	DG
Endrin ketone	ND	7.91E-06	7.91E-06	2.12E-04	2.12E-04
Fluorene	ND	2.35E-06	2.35E-06	1.30E-04	1.30E-04
Fluorenes, C1-alky	ND	4.71E-06	4.71E-06	2.59E-04	2.59E-04
Fluorenes, C2-alky	ND	1.50E-05	1.50E-05	8.25E-04	8.25E-04
Fluorenes, C3-alky	ND	2.46E-05	2.46E-05	1.35E-03	1.35E-03
Indeno(1,2,3-cd)pyrene	ND	1.15E-04	1.15E-04	9.62E-03	9.62E-03
PCB-8	1.96E-07	ND	ND	2.26E-06	2.26E-06
PCB-28	1.54E-07	ND	ND	1.11E-05	1.11E-05
PCB-77	2.00E-07	ND	ND	8.43E-06	8.43E-06
PCB-101	2.28E-05	ND	ND	6.59E-05	6.59E-05
PCB-118	2.03E-06	ND	ND	7.79E-05	7.79E-05
PCB-128	2.72E-09	ND	ND	1.80E-05	1.80E-05
PCB-138	1.58E-07	ND	ND	3.53E-04	3.53E-04
PCB-153	2.01E-07	ND	ND	5.53E-04	5.53E-04
PCB-170	3.19E-08	ND	ND	1.21E-04	1.21E-04
PCB-180	6.17E-08	5.14E-06	5.14E-06	3.16E-04	3.16E-04
PCB-187	4.09E-08	ND	ND	3.06E-04	3.06E-04
PCB-206	2.30E-10	ND	ND	5.66E-05	5.66E-05
PCB-209	1.57E-11	ND	ND	2.13E-04	2.13E-04
Perylene	ND	1.53E-05	1.53E-05	5.06E-04	5.06E-04
Pyrene	ND	2.44E-04	2.44E-04	2.12E-04	2.12E-04

* assumes ingestion of aquatic macrophytes exposed to surface waters
** assumes ingestion of aquatic macrophytes exposed to undiluted ground water discharged into surface waters
ND = CPEC not detected
DG = data gap; no parameter available for exposure calculation

Table 17.6-13
Target Receptor Exposure Point Values - Site 25

Rocky Point - Outfall 7

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates	Marine Reptile (green sea turtle)		Marine Mammal (monk seal)	
	EPV_{inv} (mg/L)	ingestion (sw)* (mg/kg-d)	EPV_{st} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{ms} (mg/kg-d)
Inorganic					
Tin	2.71E-03	ND	ND	DG	DG
Organic					
PCB-28	2.15E-07	ND	ND	4.09E-06	4.09E-06
PCB-101	9.25E-06	ND	ND	1.04E-05	1.04E-05
PCB-118	8.13E-07	ND	ND	4.81E-06	4.81E-06
PCB-138	8.13E-08	ND	ND	1.17E-05	1.17E-05
PCB-153	6.20E-08	ND	ND	9.40E-06	9.40E-06
PCB-170	1.01E-08	ND	ND	2.87E-06	2.87E-06
PCB-180	2.47E-08	ND	ND	7.96E-06	7.96E-06
PCB-187	1.42E-08	ND	ND	5.22E-06	5.22E-06

SW Eastern Island - Outfall 8

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates	Marine Reptile (green sea turtle)		Marine Mammal (monk seal)	
	EPV_{inv} (mg/L)	ingestion (sw)* (mg/kg-d)	EPV_{st} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{ms} (mg/kg-d)
Inorganic					
Manganese	5.23E-01	ND	ND	DG	DG
Tin	4.56E-03	ND	ND	DG	DG
Organic					
PCB-28	2.93E-07	ND	ND	5.58E-06	5.58E-06
PCB-52	2.80E-06	ND	ND	2.12E-06	2.12E-06
PCB-126	2.93E-07	ND	ND	1.73E-06	1.73E-06
PCB-153	2.01E-09	ND	ND	3.06E-07	3.06E-07
PCB-209	1.57E-13	ND	ND	1.09E-07	1.09E-07
trans-Nonachlor	2.44E-02	ND	ND	DG	DG

SE Eastern Island - Outfall 9

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates	Marine Reptile (green sea turtle)		Marine Mammal (monk seal)	
	EPV_{inv} (mg/L)	ingestion (sw)* (mg/kg-d)	EPV_{st} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{ms} (mg/kg-d)
Inorganic					
Thallium	5.85E-05	ND	ND	DG	DG
Organic					
1,2,4-Trichlorobenzene	1.38E-05	ND	ND	1.36E-05	1.36E-05
Hexachlorobenzene	2.31E-08	ND	ND	1.27E-06	1.27E-06
PCB-180	1.05E-09	ND	ND	3.38E-07	3.38E-07

* assumes ingestion of aquatic macrophytes exposed to surface waters
** assumes ingestion of aquatic macrophytes exposed to undiluted ground water discharged into surface waters
ND = CPEC not detected
DG = data gap; no parameter available for exposure calculation

Table 17.6-14
Marine Tissue Chemical Analysis Results - Site 25 (Location 02/05)

Analyte	sea cucumber *Holothuria* sp. Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?	fish *Stegastes fasciolatus* Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?
Inorganic						
Aluminum	1.88E+00	2.71E+00	no	ND	ND	no
Arsenic	2.16E+01	1.04E+01	yes	2.20E+00	3.82E+00	no
Cadmium	1.33E-01	5.18E-01	no	5.36E-01	7.28E-01	no
Chromium	2.47E+00	7.49E+00	no	8.41E-01	2.47E-01	yes
Copper	6.10E+00	4.50E+00	yes	3.94E+00	2.93E+00	yes
Iron	5.81E+01	7.42E+01	no	1.06E+02	8.31E+01	yes
Lead	2.93E-01	2.02E-01	yes	8.28E-01	3.69E-01	yes
Manganese	ND	ND	no	9.77E+00	9.95E+00	no
Mercury	3.70E-02	6.60E-02	no	4.80E-02	4.40E-02	yes
Nickel	4.00E+00	4.14E+00	no	6.07E-01	6.94E-01	no
Selenium	5.55E+00	4.81E+00	yes	5.90E-01	ND	yes
Silver	2.20E-01	2.20E-01	no	5.00E-02	4.15E-02	yes
Tin	ND	ND	no	ND	ND	no
Zinc	2.66E+01	1.10E+01	yes	7.32E+01	3.18E+01	yes
Silicon	ND	ND	no	ND	ND	no
Organic						
2,4'-DDD	ND	ND	no	ND	ND	no
4,4'-DDD	ND	ND	no	2.40E-03	ND	yes
4,4'-DDE	ND	ND	no	5.10E-03	ND	yes
4,4'-DDT	ND	ND	no	3.50E-03	ND	yes
alpha-BHC	ND	ND	no	4.40E-04	ND	yes
Benzo(a)anthracene	5.80E-04	2.90E-04	yes	ND	ND	no
Benzo(g,h,i)perylene	ND	ND	no	4.40E-04	ND	yes
Benzo(k)fluoranthene	ND	ND	no	ND	ND	no
beta-BHC	ND	ND	no	1.20E-04	ND	yes
Biphenyl	1.90E-04	3.60E-03	no	ND	ND	no
bis(2-Ethylhexyl)phthalate	3.50E-02	ND	yes	2.80E-02	3.00E-02	no
Chrysene	5.80E-04	1.50E-04	yes	ND	ND	no
delta-BHC	ND	ND	no	ND	ND	no
Dibenzothiophene	3.60E-04	2.10E-04	yes	ND	ND	no
Dibenzothiophenes, C1-alky	1.20E-03	7.20E-04	yes	ND	ND	no
Dibenzothiophenes, C2-alky	3.20E-03	1.50E-03	yes	ND	ND	no
Dibenzothiophenes, C3-alky	3.40E-03	1.70E-03	yes	ND	ND	no
Endrin ketone	ND	ND	no	ND	ND	no
Fluoranthene	1.80E-03	4.60E-04	yes	7.60E-04	ND	yes
Fluorene	6.20E-04	3.20E-04	yes	ND	ND	no
gamma-Chlordane	ND	ND	no	ND	ND	no
Heptachlor	ND	ND	no	ND	ND	no
Hexachlorobenzene	ND	ND	no	5.00E-04	3.30E-04	yes
Indeno(1,2,3-cd)pyrene	ND	ND	no	ND	ND	no
Methoxychlor	ND	ND	no	ND	ND	no
Mirex	ND	ND	no	ND	ND	no
Naphthalene	5.10E-03	ND	yes	6.50E-03	ND	yes
Naphthalenes, C1-alky	2.70E-03	2.80E-03	no	ND	ND	no
Naphthalenes, C2-alky	2.80E-03	2.30E-03	yes	ND	ND	no
Naphthalenes, C3-alky	3.70E-03	1.90E-03	yes	ND	ND	no
PCB-8	ND	ND	no	ND	ND	no
PCB-52	ND	ND	no	ND	ND	no
PCB-77	ND	ND	no	3.30E-03	ND	yes
PCB-101	ND	ND	no	5.60E-03	ND	yes
PCB-105	ND	ND	no	5.60E-04	ND	yes
PCB-118	ND	ND	no	3.50E-03	ND	yes

Table 17.6-14
Marine Tissue Chemical Analysis Results - Site 25 (Location 02/05)

	sea cucumber *Holothuria* sp.			fish *Stegastes fasciolatus*		
Analyte	Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?	Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?
PCB-126	ND	ND	no	2.80E-03	ND	yes
PCB-128	ND	ND	no	1.30E-03	ND	yes
PCB-138	3.80E-03	ND	yes	2.00E-02	ND	yes
PCB-153	1.70E-03	1.10E-03	yes	3.70E-02	1.20E-03	yes
PCB-170	ND	ND	no	1.30E-02	3.10E-04	yes
PCB-180	3.90E-04	ND	yes	3.70E-02	1.30E-03	yes
PCB-187	7.60E-03	1.60E-03	yes	1.90E-02	ND	yes
PCB-195	ND	ND	no	3.30E-03	ND	yes
PCB-206	ND	ND	no	1.60E-03	3.10E-04	yes
Phenanthrene	2.70E-03	1.10E-03	yes	1.20E-03	3.80E-02	no
Phenanth+Anthra., C1-alky	1.60E-03	1.00E-03	yes	ND	ND	no
Phenanth+Anthra, C2-alky	2.90E-03	1.10E-03	yes	ND	ND	no
Pyrene	1.10E-03	3.10E-04	yes	3.40E-04	4.20E-04	no
trans-Nonachlor	ND	ND	no	ND	ND	no

*mean concentration if two or more data points available, otherwise, one data point reported
ND = not detected

Table 17.6-14
Marine Tissue Chemical Analysis Results - Site 25 (Location 02/05)

Analyte	fish *Thalassoma ballieui* Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?	sea urchin *Echinometra mathaei* Mean Site Concentration* (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?
Inorganic						
Aluminum	ND	ND	no	ND	ND	no
Arsenic	1.03E+01	3.16E+00	yes	1.96E+00	3.20E+00	no
Cadmium	9.30E-02	1.10E+00	no	6.47E-01	8.89E-01	no
Chromium	8.34E-01	7.19E-01	yes	2.84E-01	1.86E-01	yes
Copper	3.46E+00	4.59E+00	no	7.00E+00	5.90E+00	yes
Iron	6.51E+01	1.09E+02	no	9.40E+01	1.47E+01	yes
Lead	1.05E-01	ND	yes	2.08E-01	1.24E-01	yes
Manganese	3.61E+00	1.62E+00	yes	ND	ND	no
Mercury	1.49E-01	2.64E-01	no	ND	ND	no
Nickel	5.03E-01	1.40E+00	no	1.45E+00	2.55E+00	no
Selenium	1.30E+00	1.47E+00	no	ND	ND	no
Silver	ND	ND	no	ND	ND	no
Tin	ND	ND	no	1.94E-01	2.18E-01	no
Zinc	8.53E+01	6.83E+01	yes	5.70E+00	2.90E+00	yes
Silicon	ND	ND	no	9.30E+03	ND	yes
Organic						
2,4'-DDD	2.20E-03	ND	yes	5.40E-04	3.10E-04	yes
4,4'-DDD	3.70E-03	2.40E-03	yes	5.20E-03	ND	yes
4,4'-DDE	4.80E-02	1.96E-02	yes	1.60E-04	ND	yes
4,4'-DDT	ND	ND	no	ND	ND	no
alpha-BHC	ND	ND	no	2.45E-04	ND	yes
Benzo(a)anthracene	ND	ND	no	3.85E-04	3.80E-04	yes
Benzo(g,h,i)perylene	ND	ND	no	ND	ND	no
Benzo(k)fluoranthene	ND	ND	no	1.20E-04	5.00E-05	yes
beta-BHC	2.30E-04	1.00E-03	no	ND	ND	no
Biphenyl	5.90E-04	ND	yes	ND	ND	no
bis(2-Ethylhexyl)phthalate	4.10E-02	1.60E-02	yes	ND	ND	no
Chrysene	ND	ND	no	2.35E-04	1.50E-04	yes
delta-BHC	ND	ND	no	1.50E-04	ND	yes
Dibenzothiophene	ND	ND	no	ND	ND	no
Dibenzothiophenes, C1-alky	ND	ND	no	ND	ND	no
Dibenzothiophenes, C2-alky	ND	ND	no	ND	ND	no
Dibenzothiophenes, C3-alky	ND	ND	no	ND	ND	no
Endrin ketone	ND	ND	no	2.00E-03	ND	yes
Fluoranthene	8.30E-04	ND	yes	1.25E-03	3.60E-04	yes
Fluorene	ND	ND	no	ND	ND	no
gamma-Chlordane	ND	ND	no	1.13E-03	ND	yes
Heptachlor	ND	ND	no	1.05E-04	2.10E-04	no
Hexachlorobenzene	7.80E-04	2.20E-04	yes	8.50E-05	ND	yes
Indeno(1,2,3-cd)pyrene	ND	ND	no	5.50E-05	8.00E-05	no
Methoxychlor	ND	ND	no	1.08E-02	ND	yes
Mirex	1.30E-03	1.30E-03	no	1.90E-04	ND	yes
Naphthalene	3.20E-03	ND	yes	1.30E-03	ND	yes
Naphthalenes, C1-alky	ND	ND	no	5.80E-04	ND	yes
Naphthalenes, C2-alky	ND	ND	no	ND	ND	no
Naphthalenes, C3-alky	ND	ND	no	ND	ND	no
PCB-8	ND	ND	no	2.20E-03	ND	yes
PCB-52	5.00E-03	ND	yes	ND	ND	no
PCB-77	ND	ND	no	ND	ND	no
PCB-101	3.10E-03	ND	yes	ND	ND	no
PCB-105	1.20E-03	1.60E-03	no	ND	ND	no
PCB-118	4.10E-03	ND	yes	ND	ND	no

Table 17.6-14
Marine Tissue Chemical Analysis Results - Site 25 (Location 02/05)

	fish *Thalassoma ballieui*			sea urchin *Echinometra mathaei*		
Analyte	Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?	Mean Site Concentration* (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?
PCB-126	ND	ND	no	ND	ND	no
PCB-128	1.30E-03	6.00E-04	yes	4.70E-05	ND	yes
PCB-138	1.30E-02	2.40E-03	yes	9.30E-04	7.30E-05	yes
PCB-153	1.80E-02	1.04E-03	yes	7.45E-04	ND	yes
PCB-170	1.40E-02	9.60E-04	yes	4.10E-05	ND	yes
PCB-180	4.00E-02	2.65E-03	yes	2.05E-03	4.40E-05	yes
PCB-187	2.00E-02	1.85E-03	yes	6.20E-04	ND	yes
PCB-195	3.10E-03	1.90E-04	yes	ND	ND	no
PCB-206	1.90E-03	1.52E-04	yes	ND	ND	no
Phenanthrene	1.40E-03	ND	yes	ND	ND	no
Phenanth+Anthra., C1-alky	ND	ND	no	ND	ND	no
Phenanth+Anthra, C2-alky	ND	ND	no	ND	ND	no
Pyrene	ND	ND	no	3.60E-04	3.10E-04	yes
trans-Nonachlor	2.20E-03	1.60E-03	yes	2.30E-04	ND	yes

*mean concentration if two or more data points available, otherwise, one data point reported
ND = not detected

Table 17.6-14
Marine Tissue Chemical Analysis Results - Site 25 (Location 02/07)

	sea urchin *Echinometra mathaei*			sea cucumber *Holothuria* sp.		
Analyte	Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?	Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?
Inorganic						
Aluminum	1.02E+01	ND	yes	2.11E+00	2.71E+00	no
Arsenic	3.17E+00	3.20E+00	no	1.72E+01	1.04E+01	yes
Cadmium	7.48E-01	8.89E-01	no	1.37E-01	5.18E-01	no
Chromium	3.93E-01	1.86E-01	yes	2.94E+00	7.49E+00	no
Copper	7.50E+00	5.90E+00	yes	4.60E+00	4.50E+00	yes
Iron	3.46E+01	1.47E+01	yes	7.17E+01	7.42E+01	no
Lead	2.53E-01	1.24E-01	yes	3.43E-01	2.02E-01	yes
Mercury	2.90E-02	ND	yes	3.00E-02	6.60E-02	no
Nickel	1.39E+00	2.55E+00	no	3.14E+00	4.14E+00	no
Selenium	ND	ND	no	8.00E+00	4.81E+00	yes
Tin	1.02E-01	2.18E-01	no	ND	ND	no
Zinc	9.60E+00	2.90E+00	yes	1.74E+01	1.10E+01	yes
Silicon	1.12E+04	ND	yes	ND	ND	no
Organic						
4,4'-DDE	1.80E-03	ND	yes	ND	ND	no
Benzo(a)anthracene	2.80E-04	3.80E-04	no	3.40E-04	2.90E-04	yes
Benzo(b)fluoranthene	1.70E-04	1.70E-04	no	ND	ND	no
Benzo(k)fluoranthene	4.60E-05	5.00E-05	no	ND	ND	no
Biphenyl	8.30E-04	ND	yes	9.20E-04	3.60E-03	no
Chrysene	3.90E-04	1.50E-04	yes	1.40E-04	1.50E-04	no
delta-BHC	2.00E-04	ND	yes	ND	ND	no
Fluoranthene	1.20E-03	3.60E-04	yes	4.10E-04	4.60E-04	no
gamma-Chlordane	5.50E-04	ND	yes	ND	ND	no
Hexachlorobenzene	7.10E-05	ND	yes	ND	ND	no
Naphthalenes, C1-alky	3.80E-03	ND	yes	1.40E-03	2.80E-03	no
Naphthalenes, C2-alky	1.20E-02	ND	yes	1.10E-03	2.30E-03	no
Naphthalenes, C3-alky	9.00E-03	ND	yes	ND	ND	no
PCB-52	2.90E-03	ND	yes	ND	ND	no
PCB-101	8.50E-03	ND	yes	ND	ND	no
PCB-105	2.10E-03	1.40E-04	yes	6.60E-04	ND	yes
PCB-118	ND	ND	no	1.00E-03	ND	yes
PCB-128	1.10E-03	ND	yes	4.70E-04	ND	yes
PCB-138	1.90E-02	7.30E-05	yes	6.80E-03	ND	yes
PCB-153	1.80E-02	ND	yes	7.50E-03	1.10E-03	yes
PCB-170	5.70E-04	ND	yes	5.90E-04	ND	yes
PCB-180	2.90E-03	4.40E-05	yes	5.50E-04	ND	yes
PCB-187	1.70E-02	ND	yes	1.20E-02	1.60E-03	yes
PCB-195	2.60E-04	ND	yes	ND	ND	no
PCB-206	1.30E-04	2.90E-05	yes	ND	ND	no
Phenanthrene	1.00E-03	ND	yes	1.10E-03	1.10E-03	no
Phenanth+Anthra., C1-alky	1.80E-03	ND	yes	6.60E-04	1.00E-03	no
Phenanth+Anthra, C2-alky	2.10E-03	ND	yes	ND	ND	no
Pyrene	7.60E-04	3.10E-04	yes	3.10E-04	3.10E-04	no
trans-Nonachlor	1.10E-04	ND	yes	ND	ND	no

ND = not detected

Table 17.6-14
Marine Tissue Chemical Analysis Results Site - 25 (Location 06)

Analyte	alga *Dictyota acutiloba* Mean Site Concentration* (mg/kg)	alga *Dictyota acutiloba* Background Concentration (mg/kg)	alga *Dictyota acutiloba* Site Exceeds Background?	fish *Acanthurus triostegus* Site Concentration (mg/kg)	fish *Acanthurus triostegus* Background Concentration (mg/kg)	fish *Acanthurus triostegus* Site Exceeds Background?
Inorganic						
Aluminum	1.18E+02	1.78E+01	yes	4.27E+00	ND	yes
Antimony	1.47E-01	1.90E-01	no	ND	ND	no
Arsenic	1.04E+01	1.39E+01	no	1.24E+01	2.39E+00	yes
Cadmium	6.95E-02	4.81E-01	no	8.10E-02	1.66E+00	no
Chromium	5.44E+00	3.36E+00	yes	6.78E-01	9.36E-01	no
Copper	4.00E+01	8.60E+00	yes	6.08E+00	3.18E+00	yes
Iron	9.91E+02	4.13E+01	yes	1.52E+02	8.11E+01	yes
Lead	8.02E+00	7.74E-01	yes	3.39E+00	1.83E-01	yes
Manganese	9.29E+00	5.06E+00	yes	1.91E+00	1.07E+00	yes
Mercury	5.40E-02	3.40E-02	yes	1.02E-01	5.90E-02	yes
Nickel	1.91E+00	3.80E+00	no	6.83E-01	1.01E+00	no
Selenium	ND	ND	no	ND	ND	no
Silver	1.80E-02	2.17E-02	no	2.30E-02	1.71E-01	no
Thallium	1.70E-02	1.45E-02	yes	ND	ND	no
Tin	2.04E+00	1.17E+00	yes	ND	ND	no
Zinc	1.29E+01	4.50E+00	yes	6.44E+01	3.65E+01	yes
Silicon	8.40E+03	ND	yes	ND	ND	no
Organic						
2,4'-DDD	3.60E-03	ND	yes	ND	ND	no
2,4'-DDT	ND	ND	no	ND	ND	no
4,4'-DDD	9.60E-04	ND	yes	7.70E-03	ND	yes
4,4'-DDE	6.00E-04	ND	yes	8.20E-03	ND	yes
Acenaphthene	ND	ND	no	7.90E-03	4.90E-03	yes
Acenaphthylene	2.65E-03	ND	yes	ND	ND	no
alpha-BHC	1.35E-03	4.20E-03	no	ND	ND	no
Anthracene	8.40E-03	ND	yes	ND	ND	no
Benzo(a)anthracene	6.72E-02	ND	yes	5.10E-04	ND	yes
Benzo(a)pyrene	1.75E-02	ND	yes	ND	ND	no
Benzo(b)fluoranthene	1.25E-01	ND	yes	ND	ND	no
Benzo(e)pyrene	6.42E-02	ND	yes	ND	ND	no
Benzo(g,h,i)perylene	7.05E-02	ND	yes	2.30E-04	ND	yes
Benzo(k)fluoranthene	4.28E-02	ND	yes	ND	ND	no
beta-BHC	5.20E-04	ND	yes	ND	ND	no
Biphenyl	ND	ND	no	ND	ND	no
bis(2-Ethylhexyl)phthalate	ND	ND	no	3.00E-02	4.10E-02	no
Chrysene	8.39E-02	ND	yes	7.80E-04	ND	yes
Chrysenes, C1-alky	2.19E-02	ND	yes	ND	ND	no
Chrysenes, C2-alky	1.60E-02	ND	yes	ND	ND	no
Chrysenes, C3-alky	ND	ND	no	ND	ND	no
Chrysenes, C4-alky	ND	ND	no	ND	ND	no
delta-BHC	1.70E-03	ND	yes	ND	ND	no
Dibenzo(a,h)anthracene	1.04E-02	ND	yes	ND	ND	no
Dibenzothiophene	4.90E-03	ND	yes	ND	ND	no
Dibenzothiophenes, C1-alky	ND	ND	no	ND	ND	no
Dibenzothiophenes, C2-alky	ND	ND	no	ND	ND	no
Dibenzothiophenes, C3-alky	ND	ND	no	ND	ND	no
Dieldrin	ND	ND	no	2.00E-03	ND	yes
Fluoranthene	1.84E-01	ND	yes	8.00E-03	2.80E-04	yes
Fluoranth+Pyr, C1-alky	6.90E-02	ND	yes	ND	ND	no
Fluoranth+Pyr, C2-alky	3.20E-02	ND	yes	ND	ND	no
Fluoranth+Pyr, C3-alky	ND	ND	no	ND	ND	no
Fluorene	ND	ND	no	5.80E-03	ND	yes

Table 17.6-14
Marine Tissue Chemical Analysis Results Site - 25 (Location 06)

	alga *Dictyota acutiloba*			fish *Acanthurus triostegus*		
Analyte	Mean Site Concentration* (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?	Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?
gamma-BHC (Lindane)	3.40E-04	ND	yes	ND	ND	no
gamma-Chlordane	7.20E-04	ND	yes	ND	ND	no
Hexachlorobenzene	ND	ND	no	5.00E-04	4.90E-04	yes
Indeno(1,2,3-cd)pyrene	7.70E-02	ND	yes	ND	ND	no
Mirex	ND	ND	no	ND	ND	no
Naphthalene	5.15E-03	2.40E-03	yes	5.20E-03	ND	yes
Naphthalenes, C1-alky	3.10E-03	ND	yes	1.10E-02	ND	yes
Naphthalenes, C2-alky	1.50E-03	ND	yes	2.10E-02	ND	yes
Naphthalenes, C3-alky	ND	ND	no	ND	ND	no
Naphthalenes, C4-alky	ND	ND	no	ND	ND	no
PCB-8	8.35E-04	ND	yes	ND	ND	no
PCB-18	1.15E-03	5.10E-03	no	ND	ND	no
PCB-28	ND	ND	no	1.40E-03	ND	yes
PCB-44	1.70E-03	ND	yes	ND	ND	no
PCB-52	7.75E-03	ND	yes	6.60E-03	3.70E-03	yes
PCB-66	ND	ND	no	ND	ND	no
PCB-101	6.90E-04	ND	yes	8.10E-03	ND	yes
PCB-105	ND	ND	no	3.10E-03	ND	yes
PCB-118	1.90E-04	ND	yes	9.70E-03	ND	yes
PCB-128	2.00E-04	ND	yes	2.40E-03	ND	yes
PCB-138	7.40E-03	2.80E-03	yes	3.00E-02	ND	yes
PCB-153	4.85E-03	ND	yes	6.20E-02	1.20E-03	yes
PCB-170	1.25E-03	6.80E-04	yes	1.50E-02	1.70E-04	yes
PCB-180	3.45E-03	1.30E-03	yes	4.00E-02	9.60E-04	yes
PCB-187	ND	ND	no	2.50E-02	8.00E-04	yes
PCB-195	1.55E-03	ND	yes	2.80E-03	ND	yes
PCB-206	1.90E-03	ND	yes	6.90E-03	ND	yes
PCB-209	2.05E-02	ND	yes	1.90E-02	ND	yes
Perylene	1.03E-02	ND	yes	ND	ND	no
Phenanthrene	2.92E-02	ND	yes	1.20E-02	7.20E-03	yes
Phenanth+Anthra., C1-alky	3.40E-02	ND	yes	ND	ND	no
Phenanth+Anthra, C2-alky	2.90E-02	ND	yes	ND	ND	no
Phenanth+Anthra, C3-alky	2.30E-02	ND	yes	ND	ND	no
Phenanth+Anthra, C4-alky	ND	ND	no	ND	ND	no
Pyrene	1.64E-01	5.00E-03	yes	1.80E-03	6.50E-04	yes
trans-Nonachlor	6.30E-04	3.70E-03	no	1.90E-03	ND	yes

*mean concentration if two or more data points available, otherwise, one data point reported
ND = not detected

Table 17.6-14
Marine Tissue Chemical Analysis Results Site - 25 (Location 06)

Analyte	sea urchin *Echinometra mathaei* Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?	bivalve *Chama iostoma* Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?
Inorganic						
Aluminum	1.77E+01	ND	yes	4.14E+01	ND	yes
Antimony	ND	ND	no	ND	ND	no
Arsenic	7.80E+00	3.20E+00	yes	1.39E+02	4.87E+01	yes
Cadmium	2.31E-01	8.89E-01	no	2.92E+00	1.94E+01	no
Chromium	5.85E-01	1.86E-01	yes	5.18E+00	7.44E+00	no
Copper	7.30E+00	5.90E+00	yes	1.97E+01	6.63E+01	no
Iron	1.32E+02	1.47E+01	yes	3.89E+02	3.43E+01	yes
Lead	1.17E+00	1.24E-01	yes	3.89E+00	1.02E-01	yes
Manganese	2.69E+00	ND	yes	2.96E+00	1.08E+00	yes
Mercury	ND	ND	no	3.78E-01	3.25E-01	yes
Nickel	2.04E+00	2.55E+00	no	1.39E+01	1.61E+01	no
Selenium	ND	ND	no	1.58E+00	ND	yes
Silver	ND	ND	no	4.40E-02	2.60E+01	no
Thallium	ND	ND	no	ND	ND	no
Tin	1.23E-01	2.18E-01	no	1.48E-01	2.78E+00	no
Zinc	7.30E+00	2.90E+00	yes	3.40E+02	ND	yes
Silicon	9.40E+03	ND	yes	ND	ND	no
Organic						
2,4'-DDD	ND	ND	no	2.10E-03	ND	yes
2,4'-DDT	ND	ND	no	3.90E-04	ND	yes
4,4'-DDD	2.00E-04	ND	yes	1.20E-03	ND	yes
4,4'-DDE	1.80E-03	ND	yes	2.90E-03	ND	yes
Acenaphthene	4.30E-04	ND	yes	ND	ND	no
Acenaphthylene	2.40E-04	ND	yes	2.90E-03	ND	yes
alpha-BHC	ND	ND	no	ND	ND	no
Anthracene	5.70E-04	ND	yes	8.70E-03	ND	yes
Benzo(a)anthracene	8.80E-04	3.80E-04	yes	5.20E-03	ND	yes
Benzo(a)pyrene	4.30E-04	ND	yes	3.90E-03	ND	yes
Benzo(b)fluoranthene	1.00E-03	1.70E-04	yes	5.70E-02	ND	yes
Benzo(e)pyrene	1.10E-03	ND	yes	1.80E-02	ND	yes
Benzo(g,h,i)perylene	7.80E-04	ND	yes	1.00E-02	ND	yes
Benzo(k)fluoranthene	5.10E-04	5.00E-05	yes	2.00E-02	ND	yes
beta-BHC	ND	ND	no	ND	ND	no
Biphenyl	3.70E-04	3.20E-04	yes	1.20E-02	ND	yes
bis(2-Ethylhexyl)phthalate	6.60E-03	3.30E-03	yes	2.70E-02	ND	yes
Chrysene	1.40E-03	1.50E-04	yes	1.40E-02	ND	yes
Chrysenes, C1-alky	ND	ND	no	8.40E-03	ND	yes
Chrysenes, C2-alky	ND	ND	no	7.40E-03	ND	yes
Chrysenes, C3-alky	ND	ND	no	4.60E-03	ND	yes
Chrysenes, C4-alky	ND	ND	no	3.40E-03	ND	yes
delta-BHC	ND	ND	no	ND	ND	no
Dibenzo(a,h)anthracene	1.20E-04	ND	yes	2.10E-03	ND	yes
Dibenzothiophene	ND	ND	no	4.30E-03	ND	yes
Dibenzothiophenes, C1-alky	ND	ND	no	3.10E-03	ND	yes
Dibenzothiophenes, C2-alky	ND	ND	no	4.00E-03	ND	yes
Dibenzothiophenes, C3-alky	ND	ND	no	1.30E-02	ND	yes
Dieldrin	ND	ND	no	ND	ND	no
Fluoranthene	4.80E-03	3.60E-04	yes	4.30E-02	ND	yes
Fluoranth+Pyr, C1-alky	1.50E-03	ND	yes	2.00E-02	ND	yes
Fluoranth+Pyr, C2-alky	ND	ND	no	1.20E-02	ND	yes
Fluoranth+Pyr, C3-alky	ND	ND	no	8.60E-03	ND	yes
Fluorene	3.20E-04	ND	yes	1.10E-02	ND	yes

Table 17.6-14
Marine Tissue Chemical Analysis Results Site - 25 (Location 06)

	sea urchin *Echinometra mathaei*			bivalve *Chama iostoma*		
Analyte	Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?	Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?
gamma-BHC (Lindane)	ND	ND	no	2.60E-04	ND	yes
gamma-Chlordane	ND	ND	no	ND	ND	no
Hexachlorobenzene	6.80E-05	ND	yes	ND	ND	no
Indeno(1,2,3-cd)pyrene	6.70E-04	ND	yes	2.10E-02	ND	yes
Mirex	2.70E-05	ND	yes	ND	ND	no
Naphthalene	2.80E-03	ND	yes	1.10E-02	ND	yes
Naphthalenes, C1-alky	9.20E-04	ND	yes	3.40E-02	ND	yes
Naphthalenes, C2-alky	2.80E-03	ND	yes	5.10E-02	3.90E-03	yes
Naphthalenes, C3-alky	ND	ND	no	5.30E-02	ND	yes
Naphthalenes, C4-alky	ND	ND	no	2.10E-02	ND	yes
PCB-8	ND	ND	no	3.40E-04	ND	yes
PCB-18	ND	ND	no	1.30E-03	ND	yes
PCB-28	2.60E-04	ND	yes	ND	ND	no
PCB-44	ND	ND	no	ND	ND	no
PCB-52	ND	ND	no	6.40E-04	ND	yes
PCB-66	2.90E-04	ND	yes	ND	ND	no
PCB-101	1.20E-03	ND	yes	1.80E-03	ND	yes
PCB-105	2.20E-04	1.40E-04	yes	1.10E-03	ND	yes
PCB-118	ND	ND	no	2.00E-03	ND	yes
PCB-128	3.10E-04	ND	yes	ND	ND	no
PCB-138	3.50E-03	7.30E-05	yes	8.30E-03	1.90E-03	yes
PCB-153	5.10E-03	ND	yes	1.50E-02	ND	yes
PCB-170	2.60E-04	ND	yes	3.10E-03	ND	yes
PCB-180	1.10E-03	4.40E-05	yes	7.40E-03	8.70E-04	yes
PCB-187	2.40E-03	ND	yes	7.20E-03	ND	yes
PCB-195	1.40E-04	ND	yes	3.50E-04	8.10E-05	yes
PCB-206	1.40E-04	2.90E-05	yes	1.60E-03	2.30E-04	yes
PCB-209	8.10E-04	ND	yes	1.30E-02	2.20E-04	yes
Perylene	ND	ND	no	1.10E-03	ND	yes
Phenanthrene	1.30E-03	ND	yes	2.90E-02	2.70E-03	yes
Phenanth+Anthra., C1-alky	ND	ND	no	1.30E-02	ND	yes
Phenanth+Anthra, C2-alky	ND	ND	no	1.10E-02	ND	yes
Phenanth+Anthra, C3-alky	ND	ND	no	7.40E-03	ND	yes
Phenanth+Anthra, C4-alky	ND	ND	no	1.40E-02	ND	yes
Pyrene	2.30E-03	3.10E-04	yes	3.00E-02	ND	yes
trans-Nonachlor	1.70E-04	ND	yes	ND	ND	no

*mean concentration if two or more data points available, otherwise, one data point reported
ND = not detected

Table 17.6-15
Marine Tissue Chemical Analysis Results Site - 25 (Location 06)

Analyte	alga *Dictyota acutiloba* Mean Site Concentration* (mg/kg)	alga *Dictyota acutiloba* Background Concentration (mg/kg)	alga *Dictyota acutiloba* Site Exceeds Background?	fish *Acanthurus triostegus* Site Concentration (mg/kg)	fish *Acanthurus triostegus* Background Concentration (mg/kg)	fish *Acanthurus triostegus* Site Exceeds Background?
Inorganic						
Aluminum	1.18E+02	1.78E+01	yes	ND	ND	no
Antimony	1.90E-01	1.90E-01	no	1.90E-01	1.90E-01	no
Arsenic	1.04E+01	1.39E+01	no	1.24E+01	2.39E+00	yes
Cadmium	8.10E-02	4.81E-01	no	8.15E-02	1.66E+00	no
Chromium	5.44E+00	3.36E+00	yes	6.79E-01	9.36E-01	no
Copper	4.00E+01	8.60E+00	yes	6.08E+00	3.18E+00	yes
Iron	9.91E+02	7.57E+01	yes	1.52E+02	8.11E+01	yes
Lead	8.02E+00	7.74E-01	yes	3.39E+00	1.83E-01	yes
Manganese	9.29E+00	5.06E+00	yes	1.91E+00	1.40E+00	yes
Mercury	5.40E-02	3.40E-02	yes	1.02E-01	5.90E-02	yes
Nickel	1.91E+00	3.80E+00	no	6.83E-01	1.01E+00	no
Selenium	1.40E+00	1.40E+00	no	9.30E-01	9.30E-01	no
Silicon	8.40E+03	3.70E+03	yes	1.30E+03	1.50E+03	no
Silver	ND	ND	no	2.20E-01	2.20E-01	no
Thallium	4.00E-02	4.00E-02	no	4.00E-02	4.27E-02	no
Tin	2.04E+00	1.17E+00	yes	4.30E-02	4.30E-02	no
Zinc	1.29E+01	4.50E+00	yes	6.44E+01	3.65E+01	yes
Organic						
1,2,4-trichlorobenzene	3.50E-03	4.80E-03	no	4.10E-03	3.40E-03	yes
1,3,5-trichlorobenzene	3.05E-03	4.20E-03	no	3.50E-03	2.90E-03	yes
2,4'-DDD	3.60E-03	5.60E-04	yes	9.40E-04	7.70E-04	yes
2,4'-DDE	3.70E-04	5.10E-04	no	8.50E-04	7.00E-04	yes
2,4'-DDT	2.35E-04	3.20E-04	no	5.40E-04	4.50E-04	yes
2,4-dinitrophenol	6.60E+01	9.10E+01	no	7.60E+01	6.30E+01	yes
4,4'-DDD	9.60E-04	1.40E-03	no	7.70E-03	1.90E-03	yes
4,4'-DDE	6.00E-04	2.20E-03	no	8.20E-03	3.00E-03	yes
4,4'-DDT	3.60E-04	4.90E-04	no	8.30E-04	6.80E-04	yes
Acenaphthene	2.15E-03	5.80E-03	no	7.90E-03	4.90E-03	yes
Acenaphthylene	2.65E-03	3.60E-03	no	3.10E-03	2.50E-03	yes
aldrin	6.60E-04	9.10E-04	no	1.50E-03	1.30E-03	yes
alpha-BHC	1.35E-03	4.20E-03	no	5.30E-04	6.80E-04	no
alpha-chlordane	3.70E-04	5.10E-04	no	8.50E-04	7.00E-04	yes
Anthracene	8.40E-03	2.90E-03	yes	2.40E-03	2.00E-03	yes
Benzo(a)anthracene	6.72E-02	5.20E-03	yes	5.10E-04	3.60E-03	no
Benzo(a)pyrene	1.75E-02	7.70E-03	yes	6.50E-03	5.30E-03	yes
Benzo(b)fluoranthene	1.25E-01	9.00E-03	yes	7.60E-03	6.20E-03	yes
Benzo(e)pyrene	6.42E-02	9.10E-03	yes	7.70E-03	6.30E-03	yes
Benzo(g,h,i)perylene	7.05E-02	1.10E-02	yes	9.30E-03	7.60E-03	yes
Benzo(k)fluoranthene	4.28E-02	9.10E-03	yes	7.70E-03	6.30E-03	yes
beta-BHC	5.20E-04	2.50E-04	yes	4.20E-04	3.50E-04	yes
Biphenyl	1.35E-03	1.90E-03	no	1.60E-03	1.30E-03	yes
Chrysene	8.39E-02	7.30E-03	yes	6.10E-03	5.00E-03	yes
Chrysenes, C1-alky	2.19E-02	7.30E-03	yes	6.10E-03	5.00E-03	yes
Chrysenes, C2-alky	1.02E-02	7.30E-03	yes	6.10E-03	5.00E-03	yes
Chrysenes, C3-alky	5.30E-03	7.30E-03	no	6.10E-03	5.00E-03	yes
Chrysenes, C4-alky	5.30E-03	7.30E-03	no	6.10E-03	5.00E-03	yes
Dibenzo(a,h)anthracene	1.04E-02	1.20E-02	no	1.00E-02	8.40E-03	yes
Dibenzothiophene	3.20E-03	2.40E-03	yes	2.00E-03	1.70E-03	yes
Dibenzothiophenes, C1-alky	1.80E-03	2.40E-03	no	2.00E-03	1.70E-03	yes
Dibenzothiophenes, C2-alky	1.80E-03	2.40E-03	no	2.00E-03	1.70E-03	yes
Dibenzothiophenes, C3-alky	1.80E-03	2.40E-03	no	2.00E-03	1.70E-03	yes
dieldrin	2.40E-04	3.30E-04	no	2.00E-03	4.60E-04	yes
endosulfan sulfate	4.85E-04	3.10E-03	no	1.10E-03	9.30E-04	yes
endrin	1.35E-04	1.90E-04	no	3.10E-04	2.60E-04	yes
endrin ketone	3.35E-04	4.50E-03	no	7.70E-04	5.20E-03	no
Fluoranth+Pyr, C1-alky	6.90E-02	7.30E-03	yes	6.10E-03	5.00E-03	yes
Fluoranth+Pyr, C2-alky	1.82E-02	7.30E-03	yes	6.10E-03	5.00E-03	yes

Table 17.6-15
Marine Tissue Chemical Analysis Results Site - 25 (Location 06)

	alga *Dictyota acutiloba*			fish *Acanthurus triostegus*		
Analyte	Mean Site Concentration* (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?	Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?
Fluoranth+Pyr, C3-alky	5.30E-03	7.30E-03	no	6.10E-03	5.00E-03	yes
Fluoranthene	1.84E-01	7.30E-03	yes	8.00E-03	2.80E-04	yes
Fluorene	3.20E-03	4.40E-03	no	5.80E-03	3.00E-03	yes
Fluorenes, C1-alky	3.20E-03	4.40E-03	no	3.70E-03	3.00E-03	yes
Fluorenes, C2-alky	3.20E-03	4.40E-03	no	3.70E-03	3.00E-03	yes
Fluorenes, C3-alky	3.20E-03	4.40E-03	no	3.70E-03	3.00E-03	yes
gamma-BHC (Lindane)	3.40E-04	2.60E-04	yes	4.30E-04	3.60E-04	yes
gamma-chlordane	7.20E-04	9.00E-04	no	1.50E-03	1.20E-03	yes
Hexachlorobenzene	1.50E-04	2.10E-04	no	5.00E-04	4.90E-04	yes
Indeno(1,2,3-cd)pyrene	7.70E-02	1.30E-02	yes	1.10E-02	9.10E-03	yes
methoxychlor	2.80E-04	3.90E-04	no	6.50E-04	5.40E-04	yes
mirex	2.30E-04	6.10E-04	no	5.30E-04	8.60E-04	no
Naphthalene	5.15E-03	2.40E-03	yes	6.50E-03	5.30E-03	yes
Naphthalenes, C1-alky	3.10E-03	7.70E-03	no	1.10E-02	5.30E-03	yes
Naphthalenes, C2-alky	7.05E-03	7.70E-03	no	2.10E-02	5.30E-03	yes
Naphthalenes, C3-alky	5.55E-03	7.70E-03	no	6.50E-03	5.30E-03	yes
Naphthalenes, C4-alky	5.55E-03	7.70E-03	no	6.50E-03	5.30E-03	yes
oxychlordane	2.20E-04	3.10E-04	no	5.20E-04	4.20E-04	yes
Oxychlorostyrene	1.20E-04	1.60E-04	no	2.80E-04	2.30E-04	yes
PCB-8	8.35E-04	2.30E-04	yes	3.80E-04	3.10E-04	yes
PCB-18	1.15E-03	5.10E-03	no	4.90E-04	4.00E-04	yes
PCB-28	2.05E-04	2.80E-04	no	1.40E-03	3.90E-04	yes
PCB-44	9.20E-04	2.40E-04	yes	4.00E-04	3.30E-04	yes
PCB-52	7.75E-03	5.10E-04	yes	6.60E-03	3.70E-03	yes
PCB-66	2.90E-04	4.00E-04	no	6.70E-04	5.50E-04	yes
PCB-77	3.85E-04	5.30E-04	no	8.80E-04	7.30E-04	yes
PCB-101	6.90E-04	1.20E-03	no	8.10E-03	1.70E-03	yes
PCB-105	2.15E-04	2.90E-04	no	3.10E-03	4.00E-04	yes
PCB-118	5.20E-04	1.40E-03	no	9.70E-03	1.90E-03	yes
PCB-126	3.10E-04	4.30E-04	no	7.20E-04	5.90E-04	yes
PCB-128	3.95E-04	6.90E-04	no	2.40E-03	9.60E-04	yes
PCB-138	7.40E-03	2.80E-03	yes	3.00E-02	3.80E-03	yes
PCB-153	4.85E-03	2.20E-03	yes	6.20E-02	1.20E-03	yes
PCB-170	1.25E-03	6.80E-04	yes	1.50E-02	1.70E-04	yes
PCB-180	3.45E-03	1.30E-03	yes	4.00E-02	9.60E-04	yes
PCB-187	7.25E-04	1.00E-03	no	2.50E-02	8.00E-04	yes
PCB-195	1.55E-03	4.90E-04	yes	2.80E-03	6.80E-04	yes
PCB-206	1.90E-03	4.00E-04	yes	6.90E-03	5.60E-04	yes
PCB-209	2.05E-02	2.20E-04	yes	1.90E-02	3.10E-04	yes
Perylene	1.03E-02	7.20E-03	yes	6.00E-03	5.00E-03	yes
Phenan+Anthra, C1-alky	1.77E-02	2.30E-03	yes	1.90E-03	1.60E-03	yes
Phenan+Anthra, C2-alky	1.52E-02	2.30E-03	yes	1.90E-03	1.60E-03	yes
Phenan+Anthra, C3-alky	1.22E-02	2.30E-03	yes	1.90E-03	1.60E-03	yes
Phenan+Anthra, C4-alky	1.70E-03	2.30E-03	no	1.90E-03	1.60E-03	yes
Phenanthrene	2.92E-02	2.30E-03	yes	1.20E-02	7.20E-03	yes
photomirex	3.40E-04	4.70E-04	no	7.90E-04	6.50E-04	yes
Pyrene	1.64E-01	5.00E-03	yes	1.80E-03	6.50E-04	yes
trans-nonachlor	5.15E-04	3.70E-03	no	1.90E-03	6.50E-04	yes

*mean concentration if two or more data points available, otherwise, one data point reported
ND = not detected

Table 17.6-15
Marine Tissue Chemical Analysis Results Site - 25 (Location 06)

Analyte	sea urchin *Echinometra mathaei* Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?	bivalve *Chama iostoma* Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?
Inorganic						
Aluminum	ND	ND	no	ND	ND	no
Antimony	1.90E-01	1.90E-01	no	1.90E-01	1.90E-01	no
Arsenic	7.80E+00	3.20E+00	yes	1.39E+02	4.87E+01	yes
Cadmium	2.32E-01	8.89E-01	no	2.92E+00	1.94E+01	no
Chromium	5.85E-01	1.86E-01	yes	5.18E+00	7.44E+00	no
Copper	7.30E+00	5.90E+00	yes	1.97E+01	6.63E+00	yes
Iron	1.32E+02	1.47E+01	yes	3.89E+02	3.43E+01	yes
Lead	1.17E+00	1.24E-01	yes	3.89E+00	1.02E-01	yes
Manganese	2.69E+00	1.40E+00	yes	2.96E+00	1.08E+00	yes
Mercury	2.80E-02	2.80E-02	no	3.78E-01	3.25E-01	yes
Nickel	2.04E+00	2.55E+00	no	1.39E+01	1.61E+01	no
Selenium	1.30E+00	1.40E+00	no	1.58E+00	2.60E+00	no
Silicon	9.40E+03	7.40E+03	yes	9.00E+02	9.20E+02	no
Silver	ND	ND	no	2.20E-01	2.78E+00	no
Thallium	4.00E-02	4.00E-02	no	4.00E-02	4.00E-02	no
Tin	1.24E-01	2.18E-01	no	1.49E-01	1.68E-01	no
Zinc	7.30E+00	2.90E+00	yes	3.40E+02	2.47E+02	yes
Organic						
1,2,4-trichlorobenzene	4.90E-04	4.90E-04	no	2.10E-03	2.90E-03	no
1,3,5-trichlorobenzene	4.30E-04	4.20E-04	yes	1.80E-03	2.50E-03	no
2,4'-DDD	1.10E-04	3.10E-04	no	2.10E-03	6.80E-04	yes
2,4'-DDE	1.00E-04	1.00E-04	no	4.40E-04	6.10E-04	no
2,4'-DDT	6.60E-05	6.60E-05	no	3.90E-04	3.90E-04	no
2,4-dinitrophenol	9.30E+00	9.20E+00	yes	3.90E+01	5.50E+01	no
4,4'-DDD	2.00E-04	2.80E-04	no	1.20E-03	1.70E-03	no
4,4'-DDE	1.80E-03	4.40E-04	yes	2.90E-03	2.60E-03	yes
4,4'-DDT	1.00E-04	1.00E-04	no	4.30E-04	6.00E-04	no
Acenaphthene	4.30E-04	3.00E-04	yes	1.30E-03	1.80E-03	no
Acenaphthylene	2.40E-04	3.70E-04	no	2.90E-03	2.20E-03	yes
aldrin	1.90E-04	1.90E-04	no	7.90E-04	1.10E-03	no
alpha-BHC	6.40E-05	6.40E-05	no	2.70E-04	3.80E-04	no
alpha-chlordane	1.00E-04	1.00E-04	no	4.40E-04	6.10E-04	no
Anthracene	5.70E-04	2.90E-04	yes	8.70E-03	1.70E-03	yes
Benzo(a)anthracene	8.80E-04	3.80E-04	yes	5.20E-03	3.10E-03	yes
Benzo(a)pyrene	4.30E-04	7.80E-04	no	3.90E-03	4.70E-03	no
Benzo(b)fluoranthene	1.00E-03	1.70E-04	yes	5.70E-02	5.50E-03	yes
Benzo(e)pyrene	1.10E-03	9.30E-04	yes	1.80E-02	5.50E-03	yes
Benzo(g,h,i)perylene	1.10E-03	1.10E-03	no	1.00E-02	6.70E-03	yes
Benzo(k)fluoranthene	5.10E-04	4.50E-05	yes	2.00E-02	5.50E-03	yes
beta-BHC	5.10E-05	5.10E-05	no	2.20E-04	3.00E-04	no
Biphenyl	3.70E-04	3.20E-04	yes	1.20E-02	1.10E-03	yes
Chrysene	1.40E-03	1.50E-04	yes	1.40E-02	4.40E-03	yes
Chrysenes, C1-alky	7.40E-04	7.40E-04	no	8.40E-03	4.40E-03	yes
Chrysenes, C2-alky	7.40E-04	7.40E-04	no	7.40E-03	4.40E-03	yes
Chrysenes, C3-alky	7.40E-04	7.40E-04	no	4.60E-03	4.40E-03	yes
Chrysenes, C4-alky	7.40E-04	7.40E-04	no	3.40E-03	4.40E-03	no
Dibenzo(a,h)anthracene	1.20E-04	1.20E-03	no	2.10E-03	7.30E-03	no
Dibenzothiophene	2.50E-04	2.50E-04	no	4.30E-03	1.50E-03	yes
Dibenzothiophenes, C1-alky	2.50E-04	2.50E-04	no	3.10E-03	1.50E-03	yes
Dibenzothiophenes, C2-alky	2.50E-04	2.50E-04	no	4.00E-03	1.50E-03	yes
Dibenzothiophenes, C3-alky	2.50E-04	2.50E-04	no	1.30E-02	1.50E-03	yes
dieldrin	6.80E-05	6.80E-05	no	2.90E-04	4.00E-04	no
endosulfan sulfate	1.40E-04	1.40E-04	no	5.80E-04	8.10E-04	no
endrin	3.80E-05	3.80E-05	no	1.60E-04	2.20E-04	no
endrin ketone	9.40E-05	9.30E-05	yes	4.00E-04	5.60E-04	no
Fluoranth+Pyr, C1-alky	1.50E-03	7.40E-04	yes	2.00E-02	4.40E-03	yes
Fluoranth+Pyr, C2-alky	7.40E-04	7.40E-04	no	1.20E-02	4.40E-03	yes

Table 17.6-15
Marine Tissue Chemical Analysis Results Site - 25 (Location 06)

	sea urchin *Echinometra mathaei*			bivalve *Chama iostoma*		
Analyte	Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?	Site Concentration (mg/kg)	Background Concentration (mg/kg)	Site Exceeds Background?
Fluoranth+Pyr, C3-alky	7.40E-04	7.40E-04	no	8.60E-03	4.40E-03	yes
Fluoranthene	4.80E-03	3.60E-04	yes	4.30E-02	4.40E-03	yes
Fluorene	3.20E-04	4.50E-04	no	1.10E-02	2.70E-03	yes
Fluorenes, C1-alky	4.50E-04	4.50E-04	no	1.90E-03	2.70E-03	no
Fluorenes, C2-alky	4.50E-04	4.50E-04	no	1.90E-03	2.70E-03	no
Fluorenes, C3-alky	4.50E-04	4.50E-04	no	1.90E-03	2.70E-03	no
gamma-BHC (Lindane)	5.30E-05	5.20E-05	yes	2.60E-04	3.10E-04	no
gamma-chlordane	1.80E-04	1.80E-04	no	7.80E-04	1.10E-03	no
Hexachlorobenzene	6.80E-05	4.20E-05	yes	1.80E-04	3.40E-04	no
Indeno(1,2,3-cd)pyrene	6.70E-04	7.50E-05	yes	2.10E-02	8.00E-03	yes
methoxychlor	8.00E-05	7.90E-05	yes	3.40E-04	4.70E-04	no
mirex	2.70E-05	6.40E-05	no	2.70E-04	1.90E-04	yes
Naphthalene	2.80E-03	1.80E-03	yes	1.10E-02	4.70E-03	yes
Naphthalenes, C1-alky	9.20E-04	7.80E-04	yes	3.40E-02	5.30E-03	yes
Naphthalenes, C2-alky	2.80E-03	7.80E-04	yes	5.10E-02	3.90E-03	yes
Naphthalenes, C3-alky	7.90E-04	7.80E-04	yes	5.30E-02	4.70E-03	yes
Naphthalenes, C4-alky	7.90E-04	7.80E-04	yes	2.10E-02	4.70E-03	yes
oxychlordane	6.30E-05	6.20E-05	yes	2.70E-04	3.70E-04	no
Oxychlorostyrene	3.30E-05	3.30E-05	no	1.40E-04	2.00E-04	no
PCB-8	4.60E-05	4.60E-05	no	3.40E-04	2.70E-04	yes
PCB-18	6.00E-05	6.00E-05	no	1.30E-03	3.60E-04	yes
PCB-28	2.60E-04	5.70E-05	yes	2.50E-04	1.20E-02	no
PCB-44	4.80E-05	4.80E-05	no	2.10E-04	2.90E-04	no
PCB-52	1.00E-04	1.00E-04	no	6.40E-04	6.20E-04	yes
PCB-66	2.90E-04	8.00E-05	yes	3.40E-04	4.80E-04	no
PCB-77	1.10E-04	1.10E-04	no	4.60E-04	6.40E-04	no
PCB-101	1.20E-03	2.50E-04	yes	1.80E-03	1.50E-03	yes
PCB-105	2.20E-04	1.40E-04	yes	1.10E-03	3.50E-04	yes
PCB-118	2.90E-04	2.90E-04	no	2.00E-03	1.70E-03	yes
PCB-126	8.80E-05	8.70E-05	yes	3.70E-04	5.20E-04	no
PCB-128	3.10E-04	1.40E-04	yes	6.00E-04	8.40E-04	no
PCB-138	3.50E-03	7.30E-05	yes	8.30E-03	1.90E-03	yes
PCB-153	5.10E-03	4.50E-04	yes	1.50E-02	2.70E-03	yes
PCB-170	2.60E-04	6.90E-05	yes	3.10E-03	4.10E-04	yes
PCB-180	1.10E-03	4.40E-05	yes	7.40E-03	8.70E-04	yes
PCB-187	2.40E-03	2.00E-04	yes	7.20E-03	1.20E-03	yes
PCB-195	1.40E-04	9.90E-05	yes	3.50E-04	8.10E-05	yes
PCB-206	1.40E-04	2.90E-05	yes	1.60E-03	2.30E-04	yes
PCB-209	8.10E-04	4.60E-05	yes	1.30E-02	2.20E-04	yes
Perylene	7.30E-04	7.30E-04	no	1.10E-03	4.30E-03	no
Phenan+Anthra, C1-alky	2.40E-04	2.30E-04	yes	1.30E-02	1.40E-03	yes
Phenan+Anthra, C2-alky	2.40E-04	2.30E-04	yes	1.10E-02	1.40E-03	yes
Phenan+Anthra, C3-alky	2.40E-04	2.30E-04	yes	7.40E-03	1.40E-03	yes
Phenan+Anthra, C4-alky	2.40E-04	2.30E-04	yes	1.40E-02	1.40E-03	yes
Phenanthrene	1.30E-03	2.30E-04	yes	2.90E-02	2.70E-03	yes
photomirex	9.60E-05	9.60E-05	no	4.10E-04	5.70E-04	no
Pyrene	2.30E-03	3.10E-04	yes	3.00E-02	3.50E-03	yes
trans-nonachlor	1.70E-04	9.60E-05	yes	4.10E-04	5.70E-04	no

*mean concentration if two or more data points available, otherwise, one data point reported
ND = not detected

Table 17.6-16

Sediment Bioassay Test Results - Site 25 (Location 01)

SAMPLE TYPE / ID#	EPA	REP	VIAL	# NORMAL	# ABNORMAL	TOTAL/ML	% NORMAL	% ABNORMAL	% SURVIVAL	AVERAGE % NORMALITY	AVERAGE % SURVIVAL
Control	CONTROL	A	1	231	22	253	91.3	8.7	110.0		
	CONTROL	B	32	192	16	208	92.3	7.7	90.4		
	CONTROL	C	59	272	32	304	89.5	10.5	132.2		
	CONTROL	D	60	135	24	159	84.9	15.1	69.1		
	CONTROL	E	4	225	19	244	92.2	7.8	106.1	90.0	101.6
Reference											
M00MS01S01	MA665	A	52	133	14	[illegible]	90.5	9.5	63.9		
	MA665	B	87	111	6	117	94.9	5.1	50.9		
	MA665	C	104	186	7	193	96.4	3.6	83.9		
	MA665	D	137	163	6	169	96.4	3.6	73.5		
	MA665	E	53	174	18	192	90.6	9.4	83.5	93.8	71.1
M00MS02S01	MA668	A	9	149	7	156	95.5	4.5	67.8		
	MA668	B	116	160	8	168	95.2	4.8	73.0		
	MA668	C	12	220	8	228	96.5	3.5	99.1		
	MA668	D	115	145	3	148	98.0	2.0	64.3		
	MA668	E	69	210	10	220	95.5	4.5	95.7		
M00MS02D01	MA670	A	28	223	25	248	89.9	10.1	107.8		
	MA670	B	78	258	5	263	98.1	1.9	114.3		
	MA670	C	105	134	2	136	98.5	1.5	59.1		
	MA670	D	118	166	6	172	96.5	3.5	74.8		
	MA670	E	85	174	6	180	96.7	3.3	78.3	96.0	83.4
Onsite											
M25MS01S01	MH 500	A	122	138	19	157	87.9	12.1	68.3		
	MH 500	B	89	158	19	177	89.3	10.7	77.0		
	MH 500	C	136	152	36	188	80.9	19.1	81.7		
	MH 500	D	69	147	120	267	55.1	44.9	116.1		
	MH 500	E	70	35	148	183	19.1	80.9	79.6	66.4	84.5
M25MS01S03	MH 502	A	90	221	16	237	93.2	6.8	103.0		
	MH 502	B	134	164	17	181	90.6	9.4	78.7		
	MH 502	C	77	155	23	178	87.1	12.9	77.4		
	MH 502	D	139	168	33	201	83.6	16.4	87.4		
	MH 502	E	95	23	3	26	88.5	11.5	11.3	88.6	71.6

Table 17.6-18
Sediment Bioassay Test Results - Site 25 (Location 02 end)

SAMPLE TYPE / ID#	EPA	REP	VIAL	# NORMAL	# ABNORMAL	TOTAL/ML	% NORMAL	% ABNORMAL	% SURVIVAL	AVERAGE % NORMALITY	AVERAGE % SURVIVAL
Control	CONTROL	A	1	231	22	253	91.3	8.7	110.0		
	CONTROL	B	32	192	16	208	92.3	7.7	90.4		
	CONTROL	C	59	272	32	304	89.5	10.5	132.2		
	CONTROL	D	60	135	24	159	84.9	15.1	69.1		
	CONTROL	E	4	225	19	244	92.2	7.8	106.1	90.0	101.6
Reference											
M00MS01S01	MA665	A	52	133	14	147	90.5	9.5	63.9		
	MA665	B	87	111	6	117	94.9	5.1	50.9		
	MA665	C	104	186	7	193	96.4	3.6	83.9		
	MA665	D	137	163	6	169	96.4	3.6	73.5		
	MA665	E	53	174	18	192	90.6	9.4	83.5	93.8	71.1
M00MS02S01	MA668	A	9	149	7	156	95.5	4.5	67.8		
	MA668	B	116	160	8	168	95.2	4.8	73.0		
	MA668	C	12	220	8	228	96.5	3.5	99.1		
	MA668	D	115	145	3	148	98.0	2.0	64.3		
	MA668	E	69	210	10	220	95.5	4.5	95.7		
M00MS02D01	MA670	A	28	223	25	248	89.9	10.1	107.8		
	MA670	B	78	258	5	263	98.1	1.9	114.3		
	MA670	C	105	134	2	136	98.5	1.5	59.1		
	MA670	D	118	166	6	172	96.5	3.5	74.8		
	MA670	E	85	174	6	180	96.7	3.3	78.3	96.0	83.4
Onsite											
M25MS02S01	MH 509	A	62	208	39	247	84.2	15.8	107.4		
	MH 509	B	96	163	32	195	83.6	16.4	84.8		
	MH 509	C	135	162	11	173	93.6	6.4	75.2		
	MH 509	D	129	188	41	229	82.1	17.9	99.6		
	MH 509	E	120	92	87	179	51.4	48.6	77.8	79.0	89.0
M25MS02S03	MH 511	A	63	168	26	194	86.6	13.4	84.3		
	MH 511	B	107	159	13	172	92.4	7.6	74.8		
	MH 511	C	140	194	17	211	91.9	8.1	91.7		
	MH 511	D	119	163	13	176	92.6	7.4	76.5		
	MH 511	E	71	142	50	192	74.0	26.0	83.5		
M25MS02D03	MH 512	A	79	163	51	214	76.2	23.8	93.0		
	MH 512	B	114	110	61	171	64.3	35.7	74.3		
	MH 512	C	78	166	24	190	87.4	12.6	82.6		
	MH 512	D	130	139	59	198	70.2	29.8	86.1		
	MH 512	E	80	179	73	252	71.0	29.0	109.6	80.7	85.7
M25MS02S05	MH 514	A	53	174	44	218	79.8	20.2	94.8		
	MH 514	B	121	176	26	202	87.1	12.9	87.8		
	MH 514	C	94	32	19	51	62.7	37.3	22.2		
	MH 514	D	113	152	47	199	76.4	23.6	86.5		
	MH 514	E	58	144	90	234	61.5	38.5	101.7	73.5	78.6

Table 17.6-18

Sediment Bioassay Test Results - Site 25 (Location 02 leak)

SAMPLE TYPE / ID#	EPA	REP	VIAL	# NORMAL	# ABNORMAL	TOTAL/ML	% NORMAL	% ABNORMAL	% SURVIVAL	AVERAGE % NORMALITY	AVERAGE % SURVIVAL
Control	CONTROL	A	1	231	22	253	91.3	8.7	110.0		
	CONTROL	B	32	192	16	208	92.3	7.7	90.4		
	CONTROL	C	59	272	32	304	89.5	10.5	132.2		
	CONTROL	D	60	135	24	159	84.9	15.1	69.1		
	CONTROL	E	4	225	19	244	92.2	7.8	106.1	90.0	101.6
Reference											
M00MS01S01	MA665	A	52	133	14	147	90.5	9.5	63.9		
	MA665	B	87	111	6	117	94.9	5.1	50.9		
	MA665	C	104	186	7	193	96.4	3.6	83.9		
	MA665	D	137	163	6	169	96.4	3.6	73.5		
	MA665	E	53	174	18	192	90.6	9.4	83.5	93.8	71.1
M00MS02S01	MA668	A	9	149	7	156	95.5	4.5	67.8		
	MA668	B	116	160	8	168	95.2	4.8	73.0		
	MA668	C	12	220	8	228	96.5	3.5	99.1		
	MA668	D	115	145	3	148	98.0	2.0	64.3		
	MA668	E	69	210	10	220	95.5	4.5	95.7		
M00MS02D01	MA670	A	28	223	25	248	89.9	10.1	107.8		
	MA670	B	78	258	5	263	98.1	1.9	114.3		
	MA670	C	105	134	2	136	98.5	1.5	59.1		
	MA670	D	118	166	6	172	96.5	3.5	74.8		
	MA670	E	85	174	6	180	96.7	3.3	78.3	96.0	83.4
Onsite											
M25MS02S07	MH521	A	51	134	8	142	94.4	5.6	61.7		
	MH521	B	95	124	8	132	93.9	6.1	57.4		
	MH521	C	119	118	10	128	92.2	7.8	55.7		
	MH521	D	140	113	18	131	86.3	13.7	57.0		
	MH521	E	48	107	10	117	91.5	8.5	50.9	91.6	56.5
M25MS02S09	MH523	A	10	205	9	214	95.8	4.2	93.0		
	MH523	B	50	215	5	220	97.7	2.3	95.7		
	MH523	C	90	238	24	262	90.8	9.2	113.9		
	MH523	D	106	148	44	192	77.1	22.9	83.5		
	MH523	E	11	224	3	227	98.7	1.3	98.7	92.0	97.0

Table 17.6-20

Sediment Bioassay Test Results - Site 25 (Location 03)

SAMPLE TYPE / ID#	EPA	REP	VIAL	# NORMAL	# ABNORMAL	TOTAL/ML	% NORMAL	% ABNORMAL	% SURVIVAL	AVERAGE % NORMALITY	AVERAGE % SURVIVAL
Control	CONTROL	A	1	231	22	253	91.3	8.7	110.0		
	CONTROL	B	32	192	16	208	92.3	7.7	90.4		
	CONTROL	C	59	272	32	304	89.5	10.5	132.2		
	CONTROL	D	60	135	24	159	84.9	15.1	69.1		
	CONTROL	E	4	225	19	244	92.2	7.8	106.1	90.0	101.6
Reference											
M00MS01S01	MA665	A	52	133	14	147	90.5	9.5	63.9		
	MA665	B	87	111	6	117	94.9	5.1	50.9		
	MA665	C	104	186	7	193	96.4	3.6	83.9		
	MA665	D	137	163	6	169	96.4	3.6	73.5		
	MA665	E	53	174	18	192	90.6	9.4	83.5	93.8	71.1
M00MS02S01	MA668	A	9	149	7	156	95.5	4.5	67.8		
	MA668	B	116	160	8	168	95.2	4.8	73.0		
	MA668	C	12	220	8	228	96.5	3.5	99.1		
	MA668	D	115	145	3	148	98.0	2.0	64.3		
	MA668	E	69	210	10	220	95.5	4.5	95.7		
M00MS02D01	MA670	A	28	223	25	248	89.9	10.1	107.8		
	MA670	B	78	258	5	263	98.1	1.9	114.3		
	MA670	C	105	134	2	136	98.5	1.5	59.1		
	MA670	D	118	166	6	172	96.5	3.5	74.8		
	MA670	E	85	174	6	180	96.7	3.3	78.3	96.0	83.4
Onsite											
M25MS03S01	MH537	A	17	219	18	237	92.4	7.6	103.0		
	MH537	B	64	105	22	127	82.7	17.3	55.2		
	MH537	C	7	85	5	90	94.4	5.6	39.1		
	MH537	D	120	100	7	107	93.5	6.5	46.5		
	MH537	E	63	117	9	126	92.9	7.1	54.8	91.2	59.7

Table 17.6-22

Sediment Bioassay Test Results - Site 25 (Location 04)

SAMPLE TYPE / ID#	EPA	REP	VIAL	# NORMAL	# ABNORMAL	TOTAL/ML	% NORMAL	% ABNORMAL	% SURVIVAL	AVERAGE % NORMALITY	AVERAGE % SURVIVAL
Control	CONTROL	A	1	231	22	253	91.3	8.7	110.0		
	CONTROL	B	32	192	16	208	92.3	7.7	90.4		
	CONTROL	C	59	272	32	304	89.5	10.5	132.2		
	CONTROL	D	60	135	24	159	84.9	15.1	69.1		
	CONTROL	E	4	225	19	244	92.2	7.8	106.1	90.0	101.6
Reference											
M00MS01S01	MA665	A	52	133	14	147	90.5	9.5	63.9		
	MA665	B	87	111	6	117	94.9	5.1	50.9		
	MA665	C	104	186	7	193	96.4	3.6	83.9		
	MA665	D	137	163	6	169	96.4	3.6	73.5		
	MA665	E	53	174	18	192	90.6	9.4	83.5	93.8	71.1
M00MS02S01	MA668	A	9	149	7	156	95.5	4.5	67.8		
	MA668	B	116	160	8	168	95.2	4.8	73.0		
	MA668	C	12	220	8	228	96.5	3.5	99.1		
	MA668	D	115	145	3	148	98.0	2.0	64.3		
	MA668	E	69	210	10	220	95.5	4.5	95.7		
M00MS02D01	MA670	A	28	223	25	248	89.9	10.1	107.8		
	MA670	B	78	258	5	263	98.1	1.9	114.3		
	MA670	C	105	134	2	136	98.5	1.5	59.1		
	MA670	D	118	166	6	172	96.5	3.5	74.8		
	MA670	E	85	174	6	180	96.7	3.3	78.3	96.0	83.4
Onsite											
M25MS04S01	MH541	A	31	173	14	187	92.5	7.5	81.3		
	MH541	B	73	94	35	129	72.9	27.1	56.1		
	MH541	C	23	159	19	178	89.3	10.7	77.4		
	MH541	D	83	215	6	221	97.3	2.7	96.1		
	MH541	E	101	179	7	186	96.2	3.8	80.9	89.6	78.3

Table 17.6-24

Sediment Bioassay Test Results - Site 25 (location 05)

SAMPLE TYPE / ID#	EPA	REP	VIAL	# NORMAL	# ABNORMAL	TOTAL/ML	% NORMAL	% ABNORMAL	% SURVIVAL	AVERAGE % NORMALITY	AVERAGE % SURVIVAL
Control	CONTROL	A	1	231	22	253	91.3	8.7	110.0		
	CONTROL	B	32	192	16	208	92.3	7.7	90.4		
	CONTROL	C	59	272	32	304	89.5	10.5	132.2		
	CONTROL	D	60	135	24	159	84.9	15.1	69.1		
	CONTROL	E	4	225	19	244	92.2	7.8	106.1	90.0	101.6
Reference											
M00MS01S01	MA665	A	52	133	14	147	90.5	9.5	63.9		
	MA665	B	87	111	6	117	94.9	5.1	50.9		
	MA665	C	104	186	7	193	96.4	3.6	83.9		
	MA665	D	137	163	6	169	96.4	3.6	73.5		
	MA665	E	53	174	18	192	90.6	9.4	83.5	93.8	71.1
M00MS02S01	MA668	A	9	149	7	156	95.5	4.5	67.8		
	MA668	B	116	160	8	168	95.2	4.8	73.0		
	MA668	C	12	220	8	228	96.5	3.5	99.1		
	MA668	D	115	145	3	148	98.0	2.0	64.3		
	MA668	E	69	210	10	220	95.5	4.5	95.7		
M00MS02D01	MA670	A	28	223	25	248	89.9	10.1	107.8		
	MA670	B	78	258	5	263	98.1	1.9	114.3		
	MA670	C	105	134	2	136	98.5	1.5	59.1		
	MA670	D	118	166	6	172	96.5	3.5	74.8		
	MA670	E	85	174	6	180	96.7	3.3	78.3	96.0	83.4
Onsite											
M25MS05S01	MH534	A	6	193	21	214	90.2	9.8	93.0		
	MH534	B	74	132	15	147	89.8	10.2	63.9		
	MH534	C	75	135	13	148	91.2	8.8	64.3		
	MH534	D	91	167	13	180	92.8	7.2	78.3		
	MH534	E	16	136	6	142	95.8	4.2	61.7	92.0	72.3

Table 17.6-26

Sediment Bioassay Test Results - Site 25 (Location 06)

SAMPLE TYPE / ID#	EPA	REP	VIAL	# NORMAL	# ABNORMAL	TOTAL/ML	% NORMAL	% ABNORMAL	% SURVIVAL	AVERAGE % NORMALITY	AVERAGE % SURVIVAL
Control	CONTROL	A	1	231	22	253	91.3	8.7	110.0		
	CONTROL	B	32	192	16	208	92.3	7.7	90.4		
	CONTROL	C	59	272	32	304	89.5	10.5	132.2		
	CONTROL	D	60	135	24	159	84.9	15.1	69.1		
	CONTROL	E	4	225	19	244	92.2	7.8	106.1	90.0	101.6
Reference											
M00MS01S01	MA665	A	52	133	14	147	90.5	9.5	63.9		
	MA665	B	87	111	6	117	94.9	5.1	50.9		
	MA665	C	104	186	7	193	96.4	3.6	83.9		
	MA665	D	137	163	6	169	96.4	3.6	73.5		
	MA665	E	53	174	18	192	90.6	9.4	83.5	93.8	71.1
M00MS02S01	MA668	A	9	149	7	156	95.5	4.5	67.8		
	MA668	B	116	160	8	168	95.2	4.8	73.0		
	MA668	C	12	220	8	228	96.5	3.5	99.1		
	MA668	D	115	145	3	148	98.0	2.0	64.3		
	MA668	E	69	210	10	220	95.5	4.5	95.7		
M00MS02D01	MA670	A	28	223	25	248	89.9	10.1	107.8		
	MA670	B	78	258	5	263	98.1	1.9	114.3		
	MA670	C	105	134	2	136	98.5	1.5	59.1		
	MA670	D	118	166	6	172	96.5	3.5	74.8		
	MA670	E	85	174	6	180	96.7	3.3	78.3	96.0	83.4
Onsite											
M25MS06S01	MH526	A	14	64	94	158	40.5	59.5	68.7		
	MH526	B	76	26	112	138	18.8	81.2	60.0		
	MH526	C	107	35	48	83	42.2	57.8	36.1		
	MH526	D	96	110	44	154	71.4	28.6	67.0		
	MH526	E	77	31	88	119	26.1	73.9	51.7	39.8	56.7
M25MS06S02	MH527	A	46	6	140	146	4.1	95.9	63.5		
	MH527	B	26	25	112	137	18.2	81.8	59.6		
	MH527	C	97	18	101	119	15.1	84.9	51.7		
	MH527	D	108	52	85	137	38.0	62.0	59.6		
	MH527	E	49	41	121	162	25.3	74.7	70.4		
M25MS06D02	MH528	A	2	59	80	139	42.4	57.6	60.4		
	MH528	B	13	42	107	149	28.2	71.8	64.8		
	MH528	C	86	66	69	135	48.9	51.1	58.7		
	MH528	D	25	14	68	82	17.1	82.9	35.7		
	MH528	E	3	92	41	133	69.2	30.8	57.8	30.7	58.2

Table 17.6-27

Sediment Bioassay Test Results - Site 25 (Location 07)

SAMPLE TYPE / ID#	EPA	REP	VIAL	# NORMAL	# ABNORMAL	TOTAL/ML	% NORMAL	% ABNORMAL	% SURVIVAL	AVERAGE % NORMALITY	AVERAGE % SURVIVAL
Control	CONTROL	A	1	231	22	253	91.3	8.7	110.0		
	CONTROL	B	32	192	16	208	92.3	7.7	90.4		
	CONTROL	C	59	272	32	304	89.5	10.5	132.2		
	CONTROL	D	60	135	24	159	84.9	15.1	69.1		
	CONTROL	E	4	225	19	244	92.2	7.8	106.1	90.0	101.6
Reference											
M00MS01S01	MA665	A	52	133	14	147	90.5	9.5	63.9		
	MA665	B	87	111	6	117	94.9	5.1	50.9		
	MA665	C	104	186	7	193	96.4	3.6	83.9		
	MA665	D	137	163	6	169	96.4	3.6	73.5		
	MA665	E	53	174	18	192	90.6	9.4	83.5	93.8	71.1
M00MS02S01	MA668	A	9	149	7	156	95.5	4.5	67.8		
	MA668	B	116	160	8	168	95.2	4.8	73.0		
	MA668	C	12	220	8	228	96.5	3.5	99.1		
	MA668	D	115	145	3	148	98.0	2.0	64.3		
	MA668	E	69	210	10	220	95.5	4.5	95.7		
M00MS02D01	MA670	A	28	223	25	248	89.9	10.1	107.8		
	MA670	B	78	258	5	263	98.1	1.9	114.3		
	MA670	C	105	134	2	136	98.5	1.5	59.1		
	MA670	D	118	166	6	172	96.5	3.5	74.8		
	MA670	E	85	174	6	180	96.7	3.3	78.3	96.0	83.4
Onsite											
M25MS07S01	MH535	A	24	120	8	128	93.8	6.3	55.7		
	MH535	B	62	248	13	261	95.0	5.0	113.5		
	MH535	C	100	167	6	173	96.5	3.5	75.2		
	MH535	D	99	104	24	128	81.3	18.8	55.7		
	MH535	E	61	140	42	182	76.9	23.1	79.1	88.7	75.8
M25MS07S02	MH536	A	58	148	14	162	91.4	8.6	70.4		
	MH536	B	121	103	9	112	92.0	8.0	48.7		
	MH536	C	33	78	53	131	59.5	40.5	57.0		
	MH536	D	111	145	19	164	88.4	11.6	71.3		
	MH536	E	84	147	1	148	99.3	0.7	64.3	86.1	62.3

Table 17.6-29

Sediment Bioassay Test Results - Site 25 (Location 08)

SAMPLE TYPE / ID#	EPA	REP	VIAL	# NORMAL	# ABNORMAL	TOTAL/ML	% NORMAL	% ABNORMAL	% SURVIVAL	AVERAGE % NORMALITY	AVERAGE % SURVIVAL
Control	CONTROL	A	1	231	22	253	91.3	8.7	110.0		
	CONTROL	B	32	192	16	208	92.3	7.7	90.4		
	CONTROL	C	59	272	32	304	89.5	10.5	132.2		
	CONTROL	D	60	135	24	159	84.9	15.1	69.1		
	CONTROL	E	4	225	19	244	92.2	7.8	106.1	90.0	101.6
Reference											
M00MS01S01	MA665	A	52	133	14	147	90.5	9.5	63.9		
	MA665	B	87	111	6	117	94.9	5.1	50.9		
	MA665	C	104	186	7	193	96.4	3.6	83.9		
	MA665	D	137	163	6	169	96.4	3.6	73.5		
	MA665	E	53	174	18	192	90.6	9.4	83.5	93.8	71.1
M00MS02S01	MA668	A	9	149	7	156	95.5	4.5	67.8		
	MA668	B	116	160	8	168	95.2	4.8	73.0		
	MA668	C	12	220	8	228	96.5	3.5	99.1		
	MA668	D	115	145	3	148	98.0	2.0	64.3		
	MA668	E	69	210	10	220	95.5	4.5	95.7		
M00MS02D01	MA670	A	28	223	25	248	89.9	10.1	107.8		
	MA670	B	78	258	5	263	98.1	1.9	114.3		
	MA670	C	105	134	2	136	98.5	1.5	59.1		
	MA670	D	118	166	6	172	96.5	3.5	74.8		
	MA670	E	85	174	6	180	96.7	3.3	78.3	96.0	83.4
Onsite											
M25MS08S01	MH545	A	22	131	19	150	87.3	12.7	65.2		
	MH545	B	43	161	19	180	89.4	10.6	78.3		
	MH545	C	110	152	9	161	94.4	5.6	70.0		
	MH545	D	128	191	12	203	94.1	5.9	88.3		
	MH545	E	42	190	30	220	86.4	13.6	95.7	90.3	79.5

Table 17.6-30

Sediment Bioassay Test Results - Site 25 (Location 09)

SAMPLE TYPE / ID#	EPA	REP	VIAL	# NORMAL	# ABNORMAL	TOTAL/ML	% NORMAL	% ABNORMAL	% SURVIVAL	AVERAGE % NORMALITY	AVERAGE % SURVIVAL
Control	CONTROL	A	1	231	22	253	91.3	8.7	110.0		
	CONTROL	B	32	192	16	208	92.3	7.7	90.4		
	CONTROL	C	59	272	32	304	89.5	10.5	132.2		
	CONTROL	D	60	135	24	159	84.9	15.1	69.1		
	CONTROL	E	4	225	19	244	92.2	7.8	106.1	90.0	101.6
Reference											
M00MS01S01	MA665	A	52	133	14	147	90.5	9.5	63.9		
	MA665	B	87	111	6	117	94.9	5.1	50.9		
	MA665	C	104	186	7	193	96.4	3.6	83.9		
	MA665	D	137	163	6	169	96.4	3.6	73.5		
	MA665	E	53	174	18	192	90.6	9.4	83.5	93.8	71.1
M00MS02S01	MA668	A	9	149	7	156	95.5	4.5	67.8		
	MA668	B	116	160	8	168	95.2	4.8	73.0		
	MA668	C	12	220	8	228	96.5	3.5	99.1		
	MA668	D	115	145	3	148	98.0	2.0	64.3		
	MA668	E	69	210	10	220	95.5	4.5	95.7		
M00MS02D01	MA670	A	28	223	25	248	89.9	10.1	107.8		
	MA670	B	78	258	5	263	98.1	1.9	114.3		
	MA670	C	105	134	2	136	98.5	1.5	59.1		
	MA670	D	118	166	6	172	96.5	3.5	74.8		
	MA670	E	85	174	6	180	96.7	3.3	78.3	96.0	83.4
Onsite											
M25MS09S01	MH546	A	8	14	22	36	38.9	61.1	15.7		
	MH546	B	57	69	17	86	80.2	19.8	37.4		
	MH546	C	98	56	26	82	68.3	31.7	35.7		
	MH546	D	123	72	28	100	72.0	28.0	43.5		
	MH546	E	41	185	14	199	93.0	7.0	86.5	70.5	43.7

Table 17.6-31
Toxicity Quotients for Target Receptors - Site 25

Old Sewer - Outfall 1

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates			Marine Reptile (green sea turtle)			Marine Mammal (monk seal)		
	EPV	TRV	TQ *	EPV	TRV	TQ*	EPV	TRV	TQ*
Inorganic									
Tin	2.74E-03	3.50e-02		ND	1.40e+00		DG	1.40e+01	DG
Organic									
Hexachlorobenzene	8.06E-07	1.29e-01		ND	1.00e+00		4.42E-05	1.00e-02	
PCB-44	6.95E-08	2.00e-07		ND	1.40e-01		9.60E-06	6.60e-03	
PCB-52	8.40E-05	2.00e-07	2.62	ND	2.82e-01		6.37E-05	1.36e-03	
PCB-101	8.63E-05	2.00e-07	2.64	ND	2.38e-01		9.73E-05	2.82e-03	
PCB-105	4.39E-06	2.00e-07	1.34	ND	1.89e+00		2.60E-05	3.20e-04	
PCB-118	1.38E-05	2.00e-07	1.84	ND	1.52e-01		8.18E-05	8.90e-04	
PCB-128	9.15E-09	2.00e-07		ND	3.75e+01		5.40E-06	3.96e-03	
PCB-138	1.99E-07	2.00e-07		ND	1.68e-01		2.86E-05	3.76e-02	
PCB-153	2.17E-07	2.00e-07	0.04	ND	2.38e-01		3.29E-05	4.51e-02	
PCB-170	1.30E-08	2.00e-07		ND	2.60e-02		3.69E-06	5.92e-03	
PCB-180	1.42E-08	2.00e-07		ND	8.20e-02		4.58E-06	2.87e-03	
PCB-187	4.83E-09	2.00e-07		ND	8.70e-02		1.78E-06	4.73e-02	
PCB-195	8.94E-09	2.00e-07		ND	2.38e-01		2.30E-06	2.87e-03	
PCB-206	ND	2.00e-07		ND	2.38e-01		ND	2.87e-03	
PCB-209	ND	2.00e-07		ND	2.38e-01		ND	2.87e-03	
Perylene	ND	1.30e-06		ND	3.50e+01		ND	6.00e-02	
Phen+Anthra., C4-alky	ND	4.30e-04		ND	3.50e+01		ND	3.40e+03	
Photomirex	ND	1.00e-06		ND	2.20e-01		ND	3.69e+00	
Pyrene	ND	1.30e-06		ND	3.50e+01		ND	7.20e+03	
trans-Nonachlor	ND	DG		ND	8.60e-02		ND	1.00e+01	

Active Sewer - Outfall 2

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates			Marine Reptile (green sea turtle)			Marine Mammal (monk seal)		
	EPV	TRV	TQ *	EPV	TRV	TQ *	EPV	TRV	TQ *
Inorganic									
Selenium	1.08E-03	5.40e-02		ND	7.50e-03		6.19E-02	1.70e+02	
Tin	ND	3.50e-02		DG	1.40e+00	DG	1.29E-03	1.40e+01	
Organic									
Acenaphthylene	ND	1.30e-06		1.50E-07	3.50e+01		8.75E-06	3.40e+01	
Biphenyl	ND	1.30e-06		2.57E-08	5.00e+00		1.01E-05	5.00e+01	
Mirex	8.94E-03	1.00e-06	3.95	ND	2.20e-01		9.92E-06	3.69e+00	
PCB-77	2.36E-08	2.00e-07		ND	1.89e-01		2.30E-05	3.90e-04	
PCB-101	1.73E-06	2.00e-07	0.94	ND	2.38e-01		9.39E-05	2.82e-03	
PCB-138	2.14E-08	2.00e-07		ND	1.68e-01		2.60E-04	3.76e-02	
PCB-153	2.77E-08	2.00e-07		ND	2.38e-01		3.66E-04	4.51e-02	
PCB-170	6.53E-09	2.00e-07		ND	2.60e-02		9.72E-05	5.92e-03	
PCB-180	9.44E-09	2.00e-07		ND	8.20e-02		2.86E-04	2.87e-03	
PCB-187	7.03E-09	2.00e-07		ND	8.70e-02		2.46E-04	4.73e-02	
PCB-195	3.50E-09	2.00e-07		ND	2.38e-01		2.37E-05	2.87e-03	
PCB-206	1.04E-11	2.00e-07		ND	2.38e-01		1.35E-05	2.87e-03	

* TQ = log(EPV/TRV); only data gaps (DG) and TQ values greater than or equal to 0 are shown
ND = not detected/not selected as CPEC
DG = data gap; no parameter available for exposure calculation

Table 17.6-31
Toxicity Quotients for Target Receptors - Site 25

West NAVFAC - Outfall 3

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates			Marine Reptile (green sea turtle)			Marine Mammal (monk seal)		
	EPV	TRV	TQ *	EPV	TRV	TQ*	EPV	TRV	TQ*
Inorganic									
Tin	4.88E-04	3.50e-02		ND	1.40e+00		DG	1.40e+01	DG
Organic									
alpha-BHC	5.04E-07	2.40e-04		ND	1.10e-01		3.16E-07	4.90e-01	
Hexachlorobenzene	5.91E-09	1.29e-01		ND	1.00e+00		3.24E-07	1.00e-02	
PCB-8	5.65E-08	2.00e-07		ND	2.82e-01		8.76E-07	5.40e-05	
PCB-77	3.76E-08	2.00e-07		ND	1.89e-01		1.58E-06	3.90e-04	
PCB-138	4.81E-09	2.00e-07		ND	1.68e-01		6.90E-07	3.76e-02	
PCB-153	6.52E-09	2.00e-07		ND	2.38e-01		9.90E-07	4.51e-02	
PCB-180	3.88E-09	2.00e-07		ND	8.20e-02		1.25E-06	2.87e-03	
PCB-187	2.43E-09	2.00e-07		ND	8.70e-02		8.95E-07	4.73e-02	

East NAVFAC - Outfall 4

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates			Marine Reptile (green sea turtle)			Marine Mammal (monk seal)		
	EPV	TRV	TQ *	EPV	TRV	TQ*	EPV	TRV	TQ*
Inorganic									
Tin	4.12E-03	3.50e-02		ND	1.40e+00		DG	1.40e+01	DG
Organic									
PCB-77	9.64E-08	2.00e-07		ND	1.89e-01		4.06E-06	3.90e-04	
PCB-170	9.42E-10	2.00e-07		ND	2.60e-02		2.66E-07	5.92e-03	
PCB-206	2.06E-12	2.00e-07		ND	2.38e-01		3.00E-08	2.87e-03	

* TQ = log(EPV/TRV); only data gaps (DG) and TQ values greater than or equal to 0 are shown
ND = not detected/not selected as CPEC
DG = data gap; no parameter available for exposure calculation

Table 17.6-31
Toxicity Quotients for Target Receptors - Site 25

Runway Storm Drain - Outfall 5

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates			Marine Reptile (green sea turtle)			Marine Mammal (monk seal)		
	EPV	TRV	TQ *	EPV	TRV	TQ*	EPV	TRV	TQ*
Inorganic									
Chromium	9.53E-02	5.00e-02	0.28	ND	6.00e-01		1.02E-02	1.40e+00	
Manganese	5.37E+00	1.10e-02	2.69	ND	1.80e+01		DG	1.80e+02	DG
Nickel	7.35E+00	8.30e-03	2.95	ND	9.90e-01		4.89E+00	5.00e+00	
Tin	2.74E-03	3.50e-02		ND	1.40e+00		DG	1.40e+01	DG
Organic									
4,4'-DDD	3.19E-06	4.20e-07	0.88	ND	8.00e+02		1.32E-04	2.20e-01	
4,4'-DDE	3.25E-06	1.00e-06	0.51	ND	2.53e-01		7.78E-05	3.50e-01	
beta-BHC	1.26E-05	2.40e-04		ND	1.10e-01		9.17E-06	5.00e-01	
Endrin	2.02E-06	2.30e-06		ND	4.20e-01		3.71E-05	2.50e-01	
Fluorenes, C3-alky	4.83E-03	1.30e-06	3.57	ND	3.50e+01		6.10E-03	1.25e+02	
gamma-BHC (Lindane)	9.45E-05	8.00e-05	0.07	ND	1.10e-01		5.01E-05	3.60e-01	
Hexachlorobenzene	1.77E-07	1.29e-01		ND	1.00e+00		9.71E-06	1.00e-02	
Methoxychlor	1.38E-01	3.00e-05	3.66	ND	4.00e+01		DG	3.71e+01	DG
Mirex	6.34E-01	1.00e-06	5.80	ND	2.20e-01		DG	3.69e+00	DG
PCB-8	1.21E-06	2.00e-07	0.78	ND	2.82e-01		1.87E-05	5.40e-05	
PCB-18	1.05E-04	2.00e-07	2.72	ND	2.28e-01		7.65E-05	1.36e-03	
PCB-44	9.91E-08	2.00e-07		ND	1.40e-01		1.37E-05	6.60e-03	
PCB-105	1.22E-05	2.00e-07	1.79	ND	1.89e+00		7.22E-05	3.20e-04	
PCB-118	6.34E-06	2.00e-07	1.50	ND	1.52e-01		3.75E-05	8.90e-04	
PCB-138	4.65E-07	2.00e-07	0.37	ND	1.68e-01		6.66E-05	3.76e-02	
PCB-153	4.80E-07	2.00e-07	0.38	ND	2.38e-01		7.29E-05	4.51e-02	
PCB-170	3.12E-07	2.00e-07	0.19	ND	2.60e-02		8.81E-05	5.92e-03	
PCB-180	2.10E-07	2.00e-07	0.02	ND	8.20e-02		6.76E-05	2.87e-03	
PCB-195	5.85E-08	2.00e-07		ND	2.38e-01		1.51E-05	2.87e-03	
PCB-206	4.48E-10	2.00e-07		ND	2.38e-01		6.52E-06	2.87e-03	
Phen+Anthra., C4-alky	6.77E-03	4.30e-04	1.20	ND	3.50e+01		1.45E-02	3.40e+03	
Photomirex	1.13E-05	1.00e-06	1.05	ND	2.20e-01		5.52E-05	3.69e+00	

* TQ = log(EPV/TRV); only data gaps (DG) and TQ values greater than or equal to 0 are shown
ND = not detected/not selected as CPEC
DG = data gap; no parameter available for exposure calculation

Table 17.6-31
Toxicity Quotients for Target Receptors - Site 25

Harbor Outfall 6

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates			Marine Reptile (green sea turtle)			Marine Mammal (monk seal)		
	EPV	TRV	TQ *	EPV	TRV	TQ*	EPV	TRV	TQ*
Inorganic									
Manganese	2.57E-01	1.10e-02	1.37	ND	1.80e+01		3.24E-02	1.80e+02	
Selenium	1.03E-03	5.40e-02		ND	7.50e-03		1.05E-02	1.70e+02	
Tin	1.42E-03	3.50e-02		3.03E-03	1.40e+00		9.86E-04	1.40e+01	
Organic									
alpha-Chlordane	5.61E-08	4.00e-06		ND	1.20e-01		2.19E-06	5.50e-01	
Benzo(a)pyrene	ND	1.30e-06		2.61E-05	3.50e+01		3.82E-04	1.00e+01	
Benzo(b)fluoranthene	ND	1.30e-06		1.86E-04	3.50e+01		2.97E-03	4.00e+00	
Benzo(e)pyrene	ND	1.30e-06		9.56E-05	3.60e+01		1.81E-03	6.00e-02	
Benzo(g,h,i)perylene	ND	1.30e-06		1.05E-04	3.60e+01		6.13E-03	6.00e-02	
Benzo(k)fluoranthene	ND	1.30e-06		6.38E-05	3.50e+01		1.42E-03	7.20e+00	
Biphenyl	ND	1.30e-06		7.50E-07	5.00e+00		1.49E-04	5.00e+01	
Chrysene	ND	1.30e-06		1.25E-03	3.50e+01		7.56E-04	9.90e+00	
Chrysenes, C1-alky	ND	1.30e-06		3.26E-05	3.50e+01		1.41E-03	9.90e+00	
Chrysenes, C2-alky	ND	1.30e-06		2.38E-05	3.50e+01		3.33E-03	9.90e+00	
Chrysenes, C3-alky	ND	1.30e-06		1.31E-04	3.50e+01		2.95E-03	9.90e+00	
Dibenzothiophenes, C1-alky	ND	1.30e-06		DG	3.50e+01	DG	DG	9.40e+00	DG
Dibenzothiophenes, C2-alky	ND	1.30e-06		DG	3.50e+01	DG	DG	9.40e+00	DG
Dibenzothiophenes, C3-alky	ND	1.30e-06		DG	3.50e+01	DG	DG	9.40e+00	DG
Endrin ketone	ND	2.30e-06		7.91E-06	4.20e-01		2.12E-04	2.50e-01	
Fluorene	ND	1.30e-06		2.35E-06	3.50e+01		1.30E-04	1.25e+02	
Fluorenes, C1-alky	ND	1.30e-06		4.71E-06	3.50e+01		2.59E-04	1.25e+02	
Fluorenes, C2-alky	ND	1.30e-06		1.50E-05	3.50e+01		8.25E-04	1.25e+02	
Fluorenes, C3-alky	ND	1.30e-06		2.46E-05	3.50e+01		1.35E-03	1.25e+02	
Indeno(1,2,3-cd)pyrene	ND	1.30e-06		1.15E-04	3.50e+01		9.62E-03	7.20e+00	
PCB-8	1.96E-07	2.00e-07		ND	2.82e-01		2.26E-06	5.40e-05	
PCB-28	1.54E-07	2.00e-07		ND	2.82e-01		1.11E-05	5.40e-05	
PCB-77	2.00E-07	2.00e-07	0.00	ND	1.89e-01		8.43E-06	3.90e-04	
PCB-101	2.28E-05	2.00e-07	2.06	ND	2.38e-01		6.59E-05	2.82e-03	
PCB-118	2.03E-06	2.00e-07	1.01	ND	1.52e-01		7.79E-05	8.90e-04	
PCB-128	2.72E-09	2.00e-07		ND	3.75e+01		1.80E-05	3.96e-03	
PCB-138	1.58E-07	2.00e-07		ND	1.68e-01		3.53E-04	3.76e-02	
PCB-153	2.01E-07	2.00e-07	0.00	ND	2.38e-01		5.53E-04	4.51e-02	
PCB-170	3.19E-08	2.00e-07		ND	2.60e-02		1.21E-04	5.92e-03	
PCB-180	6.17E-08	2.00e-07		5.14E-06	8.20e-02		3.16E-04	2.87e-03	
PCB-187	4.09E-08	2.00e-07		ND	8.70e-02		3.06E-04	4.73e-02	
PCB-206	2.30E-10	2.00e-07		ND	2.38e-01		5.66E-05	2.87e-03	
PCB-209	1.57E-11	2.00e-07		ND	2.38e-01		2.13E-04	2.87e-03	
Perylene	ND	1.30e-06		1.53E-05	3.50e+01		5.06E-04	6.00e-02	
Pyrene	ND	1.30e-06		2.44E-04	3.50e+01		2.12E-04	7.20e+03	

* TQ = log(EPV/TRV); only data gaps (DG) and TQ values greater than or equal to 0 are shown
ND = not detected/not selected as CPEC
DG = data gap; no parameter available for exposure calculation

Table 17.6-31
Toxicity Quotients for Target Receptors - Site 25

Rocky Point - Outfall 7

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates			Marine Reptile (green sea turtle)			Marine Mammal (monk seal)		
	EPV	TRV	TQ *	EPV	TRV	TQ*	EPV	TRV	TQ*
Inorganic									
Tin	2.71E-03	3.50e-02		ND	1.40e+00		DG	1.40e+01	DG
Organic									
PCB-28	2.15E-07	2.00e-07	0.03	ND	2.82e-01		4.09E-06	5.40e-05	
PCB-101	9.25E-06	2.00e-07	1.67	ND	2.38e-01		1.04E-05	2.82e-03	
PCB-118	8.13E-07	2.00e-07	0.61	ND	1.52e-01		4.81E-06	8.90e-04	
PCB-138	8.13E-08	2.00e-07		ND	1.68e-01		1.17E-05	3.76e-02	
PCB-153	6.20E-08	2.00e-07		ND	2.38e-01		9.40E-06	4.51e-02	
PCB-170	1.01E-08	2.00e-07		ND	2.60e-02		2.87E-06	5.92e-03	
PCB-180	2.47E-08	2.00e-07		ND	8.20e-02		7.96E-06	2.87e-03	
PCB-187	1.42E-08	2.00e-07		ND	8.70e-02		5.22E-06	4.73e-02	

SW Eastern Island - Outfall 8

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates			Marine Reptile (green sea turtle)			Marine Mammal (monk seal)		
	EPV	TRV	TQ *	EPV	TRV	TQ*	EPV	TRV	TQ*
Inorganic									
Manganese	5.23E-01	1.10e-02	1.68	ND	1.80e+01		DG	1.80e+02	DG
Thallium	5.54E-05	4.00e-02		ND	7.40e-04		DG	7.40e-03	DG
Tin	4.56E-03	3.50e-02		ND	1.40e+00		DG	1.40e+01	DG
Organic									
PCB-28	2.93E-07	2.00e-07	0.17	ND	2.82e-01		5.58E-06	5.40e-05	
PCB-52	2.80E-06	2.00e-07	1.15	ND	2.82e-01		2.12E-06	1.36e-03	
PCB-126	2.93E-07	2.00e-07	0.17	ND	1.89e-02		1.73E-06	8.70e-06	
PCB-153	2.01E-09	2.00e-07		ND	2.38e-01		3.06E-07	4.51e-02	
PCB-209	1.57E-13	2.00e-07		ND	2.38e-01		1.09E-07	2.87e-03	
trans-Nonachlor	2.44E-02	DG	DG	ND	8.60e-02		DG	1.00e+01	DG

SE Eastern Island - Outfall 9

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates			Marine Reptile (green sea turtle)			Marine Mammal (monk seal)		
	EPV	TRV	TQ *	EPV	TRV	TQ*	EPV	TRV	TQ*
Inorganic									
Thallium	5.85E-05	4.00e-02		ND	7.40e-04		DG	7.40e-03	DG
Tin	3.92E-04	3.50e-02		ND	1.40e+00		DG	1.40e+01	DG
Organic									
1,2,4-Trichlorobenzene	1.38E-05	1.29e-01		ND	1.48e+00		1.36E-05	1.48e+01	
Hexachlorobenzene	2.31E-08	1.29e-01		ND	1.00e+00		1.27E-06	1.00e-02	
PCB-180	1.05E-09	2.00e-07		ND	8.20e-02		3.38E-07	2.87e-03	

* TQ = log(EPV/TRV); only data gaps (DG) and TQ values greater than or equal to 0 are shown
ND = not detected/not selected as CPEC
DG = data gap; no parameter available for exposure calculation

Table 17.6-32
Risk Description (Weight of Evidence) Summary - Site 25-Old Sewer Outfall (01)

ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
_ Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
Maintenance of a subtidal infaunal and reef fish community not affected by acute or chronic exposure to site-related CPEC.							NO
_ Direct testing of acute and chronic toxicity of CPEC in sediment	CPECs present in sediment		Several TQs >0		No significant (P<0.05) adverse effects in samples (N=2)	Significant (P<0.05) adverse effects in samples (N=2)	
_ Direct measurement of tissue chemistry (tissue concentration)		DG					
_ Several metrics describing the abundance and trophic structure of the benthic infaunal macroinvertebrate community				No apparent differences between onsite and reference locations.			
No probability for acute or chronic adverse affects in any individuals of special status marine species from direct and/or secondary exposure to site-related CPEC.							YES
_ Chronic toxicity in green sea turtles	CPECs present in sediment	No tissue samples collected at this location	All TQ <0				
_ Impairment of reproduction in Hawaiian monk seals	CPECs present in sediment	No tissue samples collected at this location	All TQ <0				

DG = data gap precludes possibility of analysis

Table 17.6-32
Risk Description (Weight of Evidence) Summary - Site 25-Active Sewer Outfall (02)

ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
_ Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
Maintenance of a subtidal infaunal and reef fish community not affected by acute or chronic exposure to site-related CPEC.							NO
_ Direct testing of acute and chronic toxicity of CPEC in sediment	CPECs present in several abiotic media		TQ for mirex = 3.95; for PCB-101 = 0.94		1 of 5 samples with significant (P<0.05) acute effects	4 of 5 samples with significant (P<0.05) chronic effects	
_ Direct measurement of tissue chemistry (tissue concentration)		CPECs found in tissues of two species of invertebrates at two locations					
_ Several metrics describing the abundance and trophic structure of the benthic infaunal macroinvertebrate community				No apparent differences between onsite and reference locations.			
No probability for acute or chronic adverse affects in any individuals of special status marine species from direct and/or secondary exposure to site-related CPEC.							YES
_ Chronic toxicity in green sea turtles	CPEC present in several abiotic media	Marine algal or plant tissue not abundant enough to collect	All TQ <0				
_ Impairment of reproduction in Hawaiian monk seals	CPEC present in several abiotic media	CPECs found in tissues of two species of invertebrates and two species of fish	All TQ <0				

DG = data gap precludes possibility of analysis

Table 17.6-32
Risk Description (Weight of Evidence) Summary - Site 25-West NAVFAC Outfall (03)

ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
_ Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
Maintenance of a subtidal infaunal and reef fish community not affected by acute or chronic exposure to site-related CPEC.							YES
_ Direct testing of acute and chronic toxicity of CPEC in sediment	CPECs present in sediment		All TQ <0		No significant (P<0.05) acute effects (N=1)	No significant (P<0.05) chronic effects (N=1)	
_ Direct measurement of tissue chemistry (tissue concentration)		DG					
_ Several metrics describing the abundance and trophic structure of the benthic infaunal macroinvertebrate community				No apparent differences between onsite and reference locations.			
No probability for acute or chronic adverse affects in any individuals of special status marine species from direct and/or secondary exposure to site-related CPEC.							YES
_ Chronic toxicity in green sea turtles	CPECs present in sediment	No tissue samples collected at this location	All TQ <0				
_ Impairment of reproduction in Hawaiian monk seals	CPECs present in sediment	No tissue samples collected at this location	All TQ <0				

DG = data gap precludes possibility of analysis

Table 17.6-32
Risk Description (Weight of Evidence) Summary - Site 25-East NAVFAC Outfall (04)

ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
_ Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
Maintenance of a subtidal infaunal and reef fish community not affected by acute or chronic exposure to site-related CPEC.							YES
_ Direct testing of acute and chronic toxicity of CPEC in sediment	CPECs present in sediment		All TQ <0		No significant (P<0.05) acute effects (N=1)	No significant (P<0.05) chronic effects (N=1)	
_ Direct measurement of tissue chemistry (tissue concentration)		DG					
_ Several metrics describing the abundance and trophic structure of the benthic infaunal macroinvertebrate community				No apparent differences between onsite and reference locations.			
No probability for acute or chronic adverse affects in any individuals of special status marine species from direct and/or secondary exposure to site-related CPEC.							YES
_ Chronic toxicity in green sea turtles	CPECs present in sediment	No tissue samples collected at this location	All TQ <0				
_ Impairment of reproduction in Hawaiian monk seals	CPECs present in sediment	No tissue samples collected at this location	All TQ <0				

DG = data gap precludes possibility of analysis

Table 17.6-32
Risk Description (Weight of Evidence) Summary - Site 25-Runway Storm Drain (05)

ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
_ Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
Maintenance of a subtidal infaunal and reef fish community not affected by acute or chronic exposure to site-related CPEC.							NO
_ Direct testing of acute and chronic toxicity of CPEC in sediment	CPECs present in sediment		several TQs > 0		No significant (P<0.05) acute effects (N=1)	Significant (P<0.05) chronic effects (N=1)	
_ Direct measurement of tissue chemistry (tissue concentration)		DG					
_ Several metrics describing the abundance and trophic structure of the benthic infaunal macroinvertebrate community				No apparent differences between onsite and reference locations.			
No probability for acute or chronic adverse affects in any individuals of special status marine species from direct and/or secondary exposure to site-related CPEC.							YES
_ Chronic toxicity in green sea turtles	CPECs present in sediment	No tissue samples collected at this location	All TQ <0				
_ Impairment of reproduction in Hawaiian monk seals	CPECs present in sediment	No tissue samples collected at this location	All TQ <0				

DG = data gap precludes possibility of analysis

Table 17.6-32
Risk Description (Weight of Evidence) Summary - Site 25-Inner Harbor Outfall (06)

ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
_ Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
Maintenance of a subtidal infaunal and reef fish community not affected by acute or chronic exposure to site-related CPEC.							NO
_ Direct testing of acute and chronic toxicity of CPEC in sediment	CPECs present in several abiotic media		several TQs > 0		Significant (P<0.05) adverse effects in samples (N=2)	Significant (P<0.05) adverse effects in samples (N=2)	
_ Direct measurement of tissue chemistry (tissue concentration)		Numerous CPECs in invertebrate tissues					
_ Several metrics describing the abundance and trophic structure of the benthic infaunal macroinvertebrate community				DG			
No probability for acute or chronic adverse affects in any individuals of special status marine species from direct and/or secondary exposure to site-related CPEC.							YES
_ Chronic toxicity in green sea turtles	CPECs present in several abiotic media	CPECs present in algal tissue	All TQ <0				
_ Impairment of reproduction in Hawaiian monk seals	CPECs present in several abiotic media	CPECs present in tissues from 2 invertebrate species and 1 fish species	All TQ <0				

DG = data gap precludes possibility of analysis

Table 17.6-32
Risk Description (Weight of Evidence) Summary - Site 25-Rocky Point Outfall (07)

ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
_ Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
Maintenance of a subtidal infaunal and reef fish community not affected by acute or chronic exposure to site-related CPEC.							NO
_ Direct testing of acute and chronic toxicity of CPEC in sediment	CPECs present in sediment		several TQ <0		Vertical sample not significant (P<0.05), horizontal sample significant	No significant (P<0.05) chronic effects (N=2)	
_ Direct measurement of tissue chemistry (tissue concentration)		DG					
_ Several metrics describing the abundance and trophic structure of the benthic infaunal macroinvertebrate community				No apparent differences between onsite and reference locations.			
No probability for acute or chronic adverse affects in any individuals of special status marine species from direct and/or secondary exposure to site-related CPEC.							YES
_ Chronic toxicity in green sea turtles	CPECs present in sediment	No tissue samples collected at this location	All TQ <0				
_ Impairment of reproduction in Hawaiian monk seals	CPECs present in sediment	No tissue samples collected at this location	All TQ <0				

DG = data gap precludes possibility of analysis

Table 17.6-32
Risk Description (Weight of Evidence) Summary - Site 25-Southwest EI Outfall (08)

ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
_ Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
Maintenance of a subtidal infaunal and reef fish community not affected by acute or chronic exposure to site-related CPEC.							NO
_ Direct testing of acute and chronic toxicity of CPEC in sediment	CPECs present in sediment		several TQ <0		No significant (P<0.05) acute effects (N=1)	Significant (P<0.05) adverse effects (N=1)	
_ Direct measurement of tissue chemistry (tissue concentration)		DG					
_ Several metrics describing the abundance and trophic structure of the benthic infaunal macroinvertebrate community				DG			
No probability for acute or chronic adverse affects in any individuals of special status marine species from direct and/or secondary exposure to site-related CPEC.							YES
_ Chronic toxicity in green sea turtles	CPECs present in sediment	No tissue samples collected at this location	All TQ <0				
_ Impairment of reproduction in Hawaiian monk seals	CPECs present in sediment	No tissue samples collected at this location	All TQ <0				

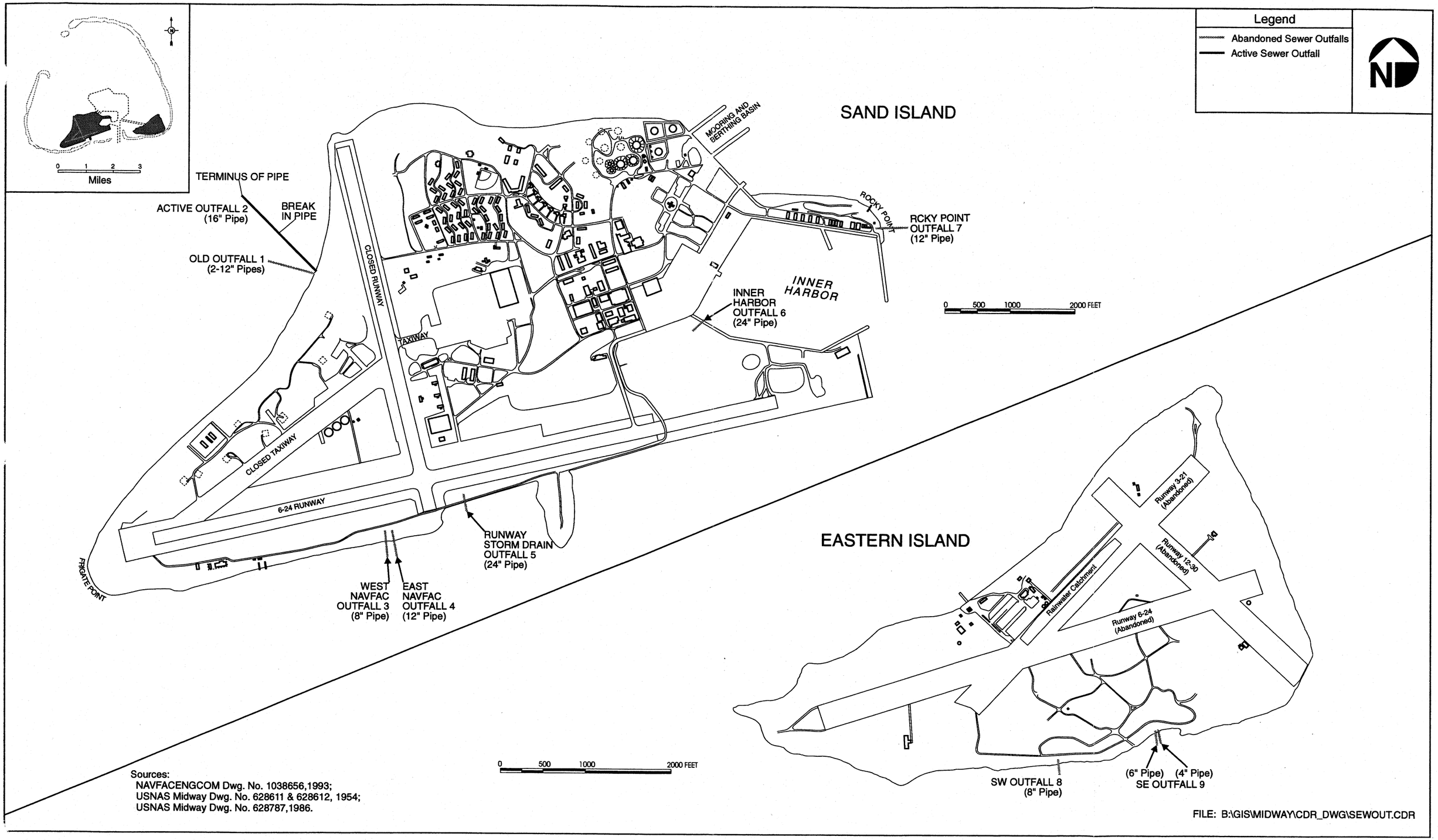
DG = data gap precludes possibility of analysis

Table 17.6-32
Risk Description (Weight of Evidence) Summary - Site 25-Southeast EI Outfall (09)

ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
_ Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
Maintenance of a subtidal infaunal and reef fish community not affected by acute or chronic exposure to site-related CPEC.							YES
_ Direct testing of acute and chronic toxicity of CPEC in sediment	CPECs present in sediment		All TQ <0		Significant (P<0.05) acute effects (N=1)	Significant (P<0.05) adverse effects (N=1)	
_ Direct measurement of tissue chemistry (tissue concentration)		DG					
_ Several metrics describing the abundance and trophic structure of the benthic infaunal macroinvertebrate community				DG			
No probability for acute or chronic adverse affects in any individuals of special status marine species from direct and/or secondary exposure to site-related CPEC.							YES
_ Chronic toxicity in green sea turtles	CPECs present in sediment	No tissue samples collected at this location	All TQ <0				
_ Impairment of reproduction in Hawaiian monk seals	CPECs present in sediment	No tissue samples collected at this location	All TQ <0				

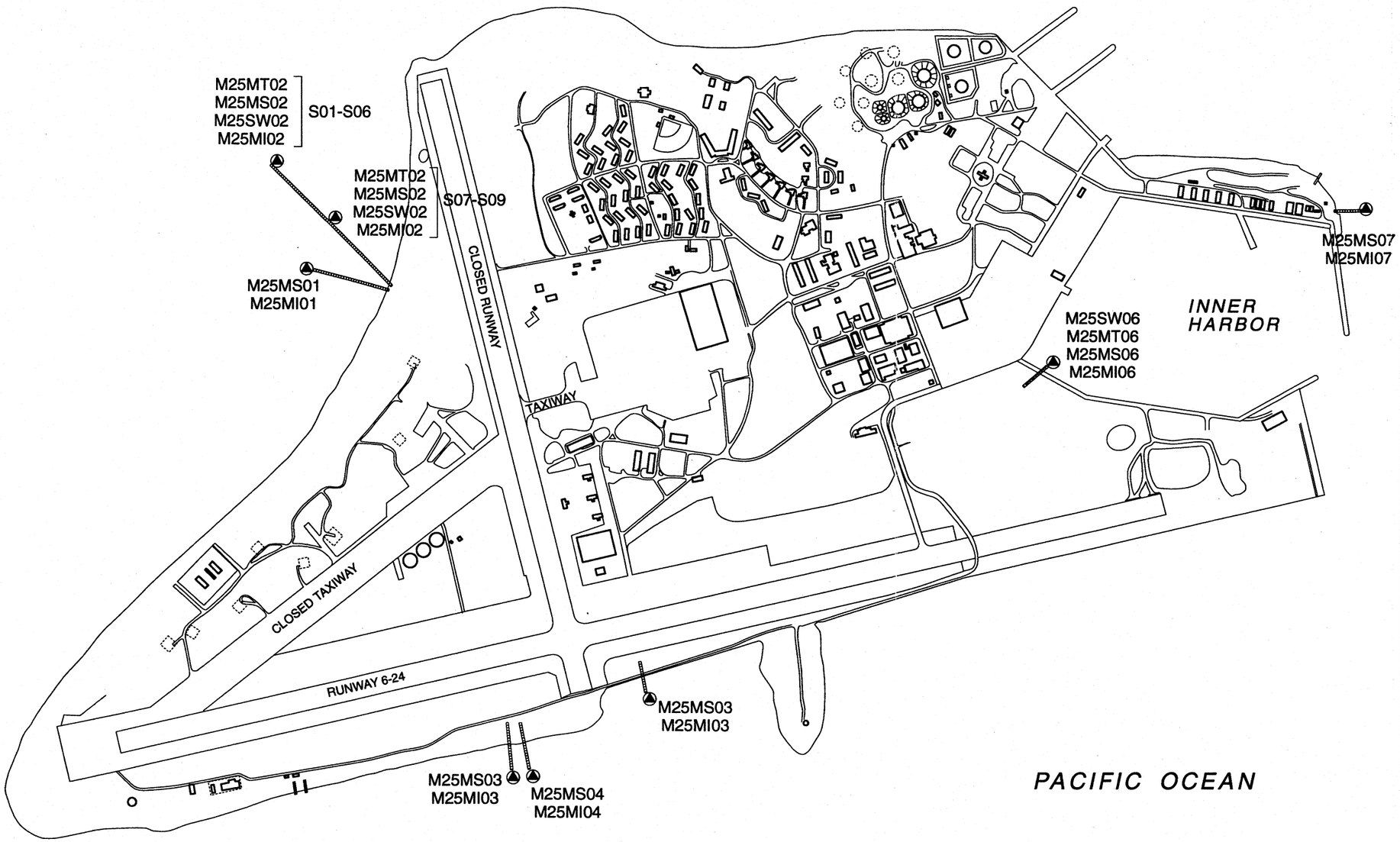
DG = data gap precludes possibility of analysis

Figures
Section 17



SEWER OUTFALLS (SITE 25)
SAND AND EASTERN ISLANDS

FIGURE
17.1-1



LEGEND

M##MS##	MARINE SEDIMENT SAMPLE LOCATION AND IDENTIFICATION NUMBER(S)
M##SW##	MARINE SEA WATER SAMPLE LOCATION AND IDENTIFICATION NUMBER(S)
M##MT##	MARINE TISSUE SAMPLE LOCATION AND IDENTIFICATION NUMBER(S)
M##MI##	MARINE INFAUNA SAMPLE LOCATION AND IDENTIFICATION NUMBER(S)
	SEWER PIPE

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING EINGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWA ISLAND
5. PROJECT NUMBER: 110190136
6. FILE: ..\MIDWAY\SITEINVS\CORELDRW\05199557.CDR

SOURCES

PERRY ASSOCIATES INC.
U.S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

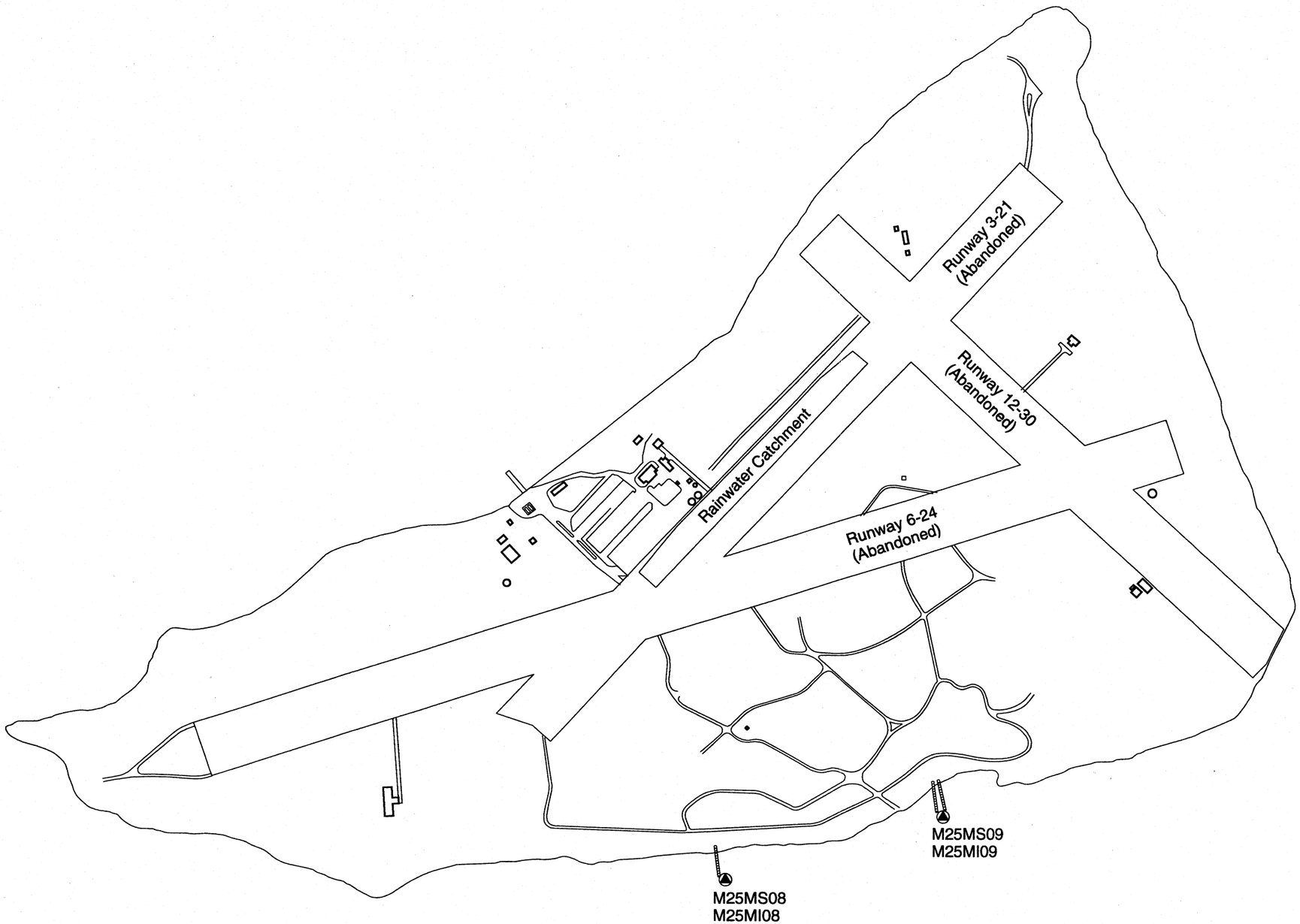
MARINE SAMPLE LOCATIONS
(SITE 25)
SAND ISLAND

N

FEET
500 0 500 1000 2000

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
6\15\95	DLF	JCS		HFP		BDH	

FIGURE
17.2-1



LEGEND

M##MS## — MARINE SEDIMENT SAMPLE LOCATION AND IDENTIFICATION NUMBER(S)

M##MI## — MARINE INFAUNA SAMPLE LOCATION AND IDENTIFICATION NUMBER(S)

SEWER PIPE

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWA ISLAND
5. PROJECT NUMBER: 110190136
6. FILE: ..\MIDWAY\SITEINVS\CORELDRW\05199558.CDR

SOURCES

PERRY ASSOCIATES INC.
U.S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

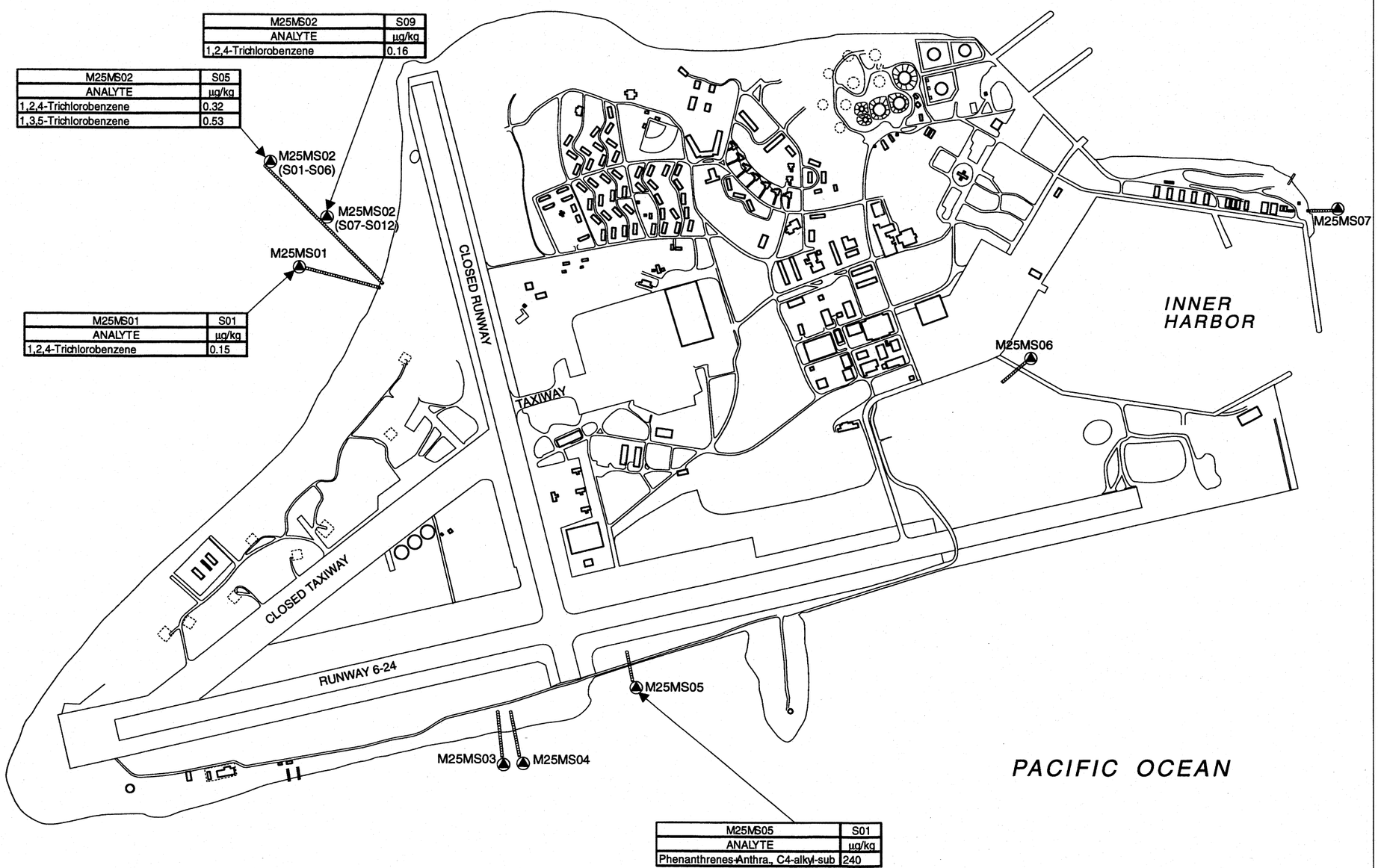
MARINE SAMPLE LOCATIONS
(SITE 25)
EASTERN ISLAND

N

FEET
500 0 500 1000

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
6\16\95	DLF	JCS		HFP		BDH	

FIGURE
17.2-2



M25MS02	S09
ANALYTE	µg/kg
1,2,4-Trichlorobenzene	0.16

M25MS02	S05
ANALYTE	µg/kg
1,2,4-Trichlorobenzene	0.32
1,3,5-Trichlorobenzene	0.53

M25MS01	S01
ANALYTE	µg/kg
1,2,4-Trichlorobenzene	0.15

M25MS05	S01
ANALYTE	µg/kg
Phenanthrenes-Anthra., C4-alkyl-sub	240

LEGEND

▲	MARINE SEDIMENT SAMPLE LOCATION
	SEWER PIPE
M02MW02	OGDEN SAMPLE ID
0.02	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN
S##	SAMPLE NUMBER

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING EINGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWA ISLAND
5. PROJECT NUMBER: 110190136
6. FILE: ..\MIDWAY\SITEINVS\CORELDRW\06099501.CDR

SOURCES

PERRY ASSOCIATES INC.
U.S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

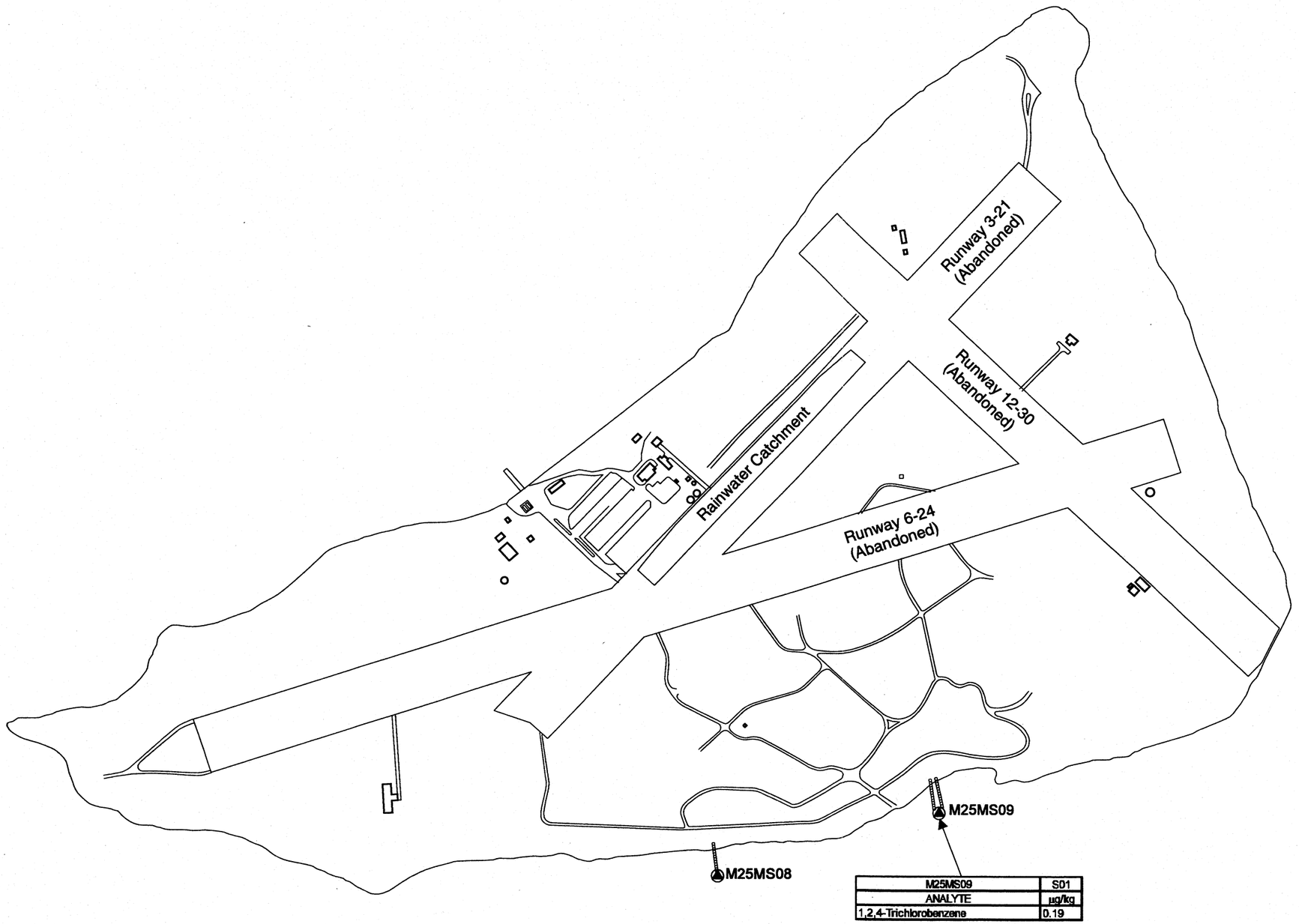
LOW LEVEL SEMIVOLATILE ORGANIC COMPOUNDS DETECTED IN MARINE SEDIMENT (SITE 25) SAND ISLAND

N

FEET
500 0 500 1000 2000

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
6\21\95	DLF	JCS		HFP		BDH	

FIGURE 17.5-1



M25MS09	S01
ANALYTE	µg/kg
1,2,4-Trichlorobenzene	0.19

LEGEND

▲	MARINE SEDIMENT SAMPLE LOCATION
	SEWER PIPE
M02MW02	OGDEN SAMPLE ID
0.02	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN
S##	SAMPLE NUMBER

NOTES

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2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWA ISLAND
5. PROJECT NUMBER: 110190136
6. FILE: ..\MIDWAY\SITEINVS\CORELDRW\05229506.CDR

SOURCES

PERRY ASSOCIATES INC.
U.S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

LOW LEVEL SEMIVOLATILE ORGANIC COMPOUNDS DETECTED IN MARINE SEDIMENT (SITE 25) EASTERN ISLAND

N

FEET
500 0 500 1000

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
6\21\95		JCS		HFP		BDH	

FIGURE
17.5-2

M25MS02	S05
ANALYTE	µg/kg
PCB-101 (2,2',3,5,5')	0.029
PCB-138 (2,2',3,4,4',5')	0.041
PCB-153 (2,2',4,4',5,5')	0.037
PCB-170 (2,2',3,3',4,4',5)	0.15
PCB-180 (2,2',3,4,4',5,5')	0.042
PCB-187 (2,2',3,4',5,5',6)	0.065
PCB-195 (2,2',3,3',4,4',5,6)	0.029
PCB-206 (2,2',3,3',4,4',5,5',6)	0.026
PCB-77 (3,3',4,4')	0.055
Mirex	0.046

M25MS02	S08
ANALYTE	µg/kg
PCB-101 (2,2',3,5,5')	0.064
PCB-153 (2,2',4,4',5,5')	0.36
PCB-206 (2,2',3,3',4,4',5,5',6)	0.025
	S09
PCB-138 (2,2',3,4,4',5')	0.23
PCB-170 (2,2',3,3',4,4',5)	0.15
PCB-180 (2,2',3,4,4',5,5')	0.29
PCB-187 (2,2',3,4',5,5',6)	0.23
PCB-195 (2,2',3,3',4,4',5,6)	0.079
PCB-77 (3,3',4,4')	0.06
	S07
Mirex	0.022

M25MS01	S01
ANALYTE	µg/kg
PCB-101 (2,2',3,5,5')	1.4
PCB-105 (2,3,3',4,4')	0.54
PCB-118 (2,3',4,4',5)	1.7
PCB-128 (2,2',3,3',4,4')	0.31
PCB-138 (2,2',3,4,4',5')	1.2
PCB-153 (2,2',4,4',5,5')	1.4
PCB-170 (2,2',3,3',4,4',5)	0.18
PCB-180 (2,2',3,4,4',5,5')	0.23
PCB-187 (2,2',3,4',5,5',6)	0.092
PCB-195 (2,2',3,3',4,4',5,6)	0.11
PCB-44 (2,2',3,5')	0.4
PCB-52 (2,2',5,5')	0.84
PCB-77 (3,3',4,4')	0.027
PCB-8 (2,4')	0.024
Hexachlorobenzene	0.023

M25MS07	S02
ANALYTE	µg/kg
PCB-101 (2,2',3,5,5')	0.15
PCB-118 (2,3',4,4',5)	0.1
PCB-138 (2,2',3,4,4',5')	0.49
PCB-153 (2,2',4,4',5,5')	0.4
PCB-170 (2,2',3,3',4,4',5)	0.14
PCB-180 (2,2',3,4,4',5,5')	0.4
PCB-187 (2,2',3,4',5,5',6)	0.27
PCB-28 (2,4,4')	0.11

M25MS06	S01
ANALYTE	µg/kg
PCB-101 (2,2',3,5,5')	0.37
PCB-105 (2,3,3',4,4')	0.016
PCB-118 (2,3',4,4',5)	0.25
PCB-126 (3,3',4,4',5)	0.044
PCB-128 (2,2',3,3',4,4')	0.092
PCB-138 (2,2',3,4,4',5')	0.95
PCB-153 (2,2',4,4',5,5')	1.3
PCB-170 (2,2',3,3',4,4',5)	0.44
PCB-18 (2,2',5)	0.052
PCB-180 (2,2',3,4,4',5,5')	1
PCB-187 (2,2',3,4',5,5',6)	0.78
PCB-195 (2,2',3,3',4,4',5,6)	0.015
PCB-206 (2,2',3,3',4,4',5,5',6)	0.39
PCB-209 (2,2',3,3',4,4',5,5',6,6')	3
PCB-28 (2,4,4')	0.079
PCB-44 (2,2',3,5')	0.017
PCB-52 (2,2',5,5')	0.015
PCB-66 (2,3',4,4')	0.019
PCB-77 (3,3',4,4')	0.028
PCB-8 (2,4')	0.025
alpha-Chlordane	0.069

M25MS03	S01
ANALYTE	µg/kg
PCB-101 (2,2',3,5,5')	0.016
PCB-105 (2,3,3',4,4')	0.018
PCB-118 (2,3',4,4',5)	0.024
PCB-126 (3,3',4,4',5)	0.048
PCB-128 (2,2',3,3',4,4')	0.021
PCB-138 (2,2',3,4,4',5')	0.029
PCB-153 (2,2',4,4',5,5')	0.044
PCB-170 (2,2',3,3',4,4',5)	0.081
PCB-18 (2,2',5)	0.056
PCB-180 (2,2',3,4,4',5,5')	0.066
PCB-187 (2,2',3,4',5,5',6)	0.048
PCB-195 (2,2',3,3',4,4',5,6)	0.016
PCB-206 (2,2',3,3',4,4',5,5',6)	0.014
PCB-209 (2,2',3,3',4,4',5,5',6,6')	0.017
PCB-28 (2,4,4')	0.038
PCB-44 (2,2',3,5')	0.019
PCB-52 (2,2',5,5')	0.016
PCB-66 (2,3',4,4')	0.021
PCB-77 (3,3',4,4')	0.051
Hexachlorobenzene	0.026
	S04
PCB-8 (2,4')	0.027

6-24

M25MS04	S01
ANALYTE	µg/kg
PCB-170 (2,2',3,3',4,4',5)	0.079
PCB-206 (2,2',3,3',4,4',5,5',6)	0.014
PCB-77 (3,3',4,4')	0.13

M25MS05	S01
ANALYTE	µg/kg
PCB-105 (2,3,3',4,4')	1.5
PCB-118 (2,3',4,4',5)	0.78
PCB-126 (3,3',4,4',5)	0.092
PCB-128 (2,2',3,3',4,4')	0.04
PCB-138 (2,2',3,4,4',5')	2.8
PCB-153 (2,2',4,4',5,5')	3.1
PCB-170 (2,2',3,3',4,4',5)	4.3
PCB-18 (2,2',5)	1
PCB-180 (2,2',3,4,4',5,5')	3.4
PCB-195 (2,2',3,3',4,4',5,6)	0.72
PCB-206 (2,2',3,3',4,4',5,5',6)	0.76
PCB-44 (2,2',3,5')	0.57
PCB-8 (2,4')	0.48
4,4'-DDD	4.2
Endrin	0.99
Hexachlorobenzene	0.33
Methoxychlor	0.17
Mirex	0.78
Photomirex	1.1
beta-BHC	0.12
gamma-BHC (Lindane)	0.61

LEGEND

▲	MARINE SEDIMENT SAMPLE LOCATION
	SEWER PIPE
M02MW02	OGDEN SAMPLE ID
0.02	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN
S##	SAMPLE NUMBER

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING EINGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWA ISLAND
5. PROJECT NUMBER: 110190136
6. FILE: ..\MIDWAY\SITEINVS\CORELDRW\06099502.CDR

SOURCES

PERRY ASSOCIATES INC.
U.S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

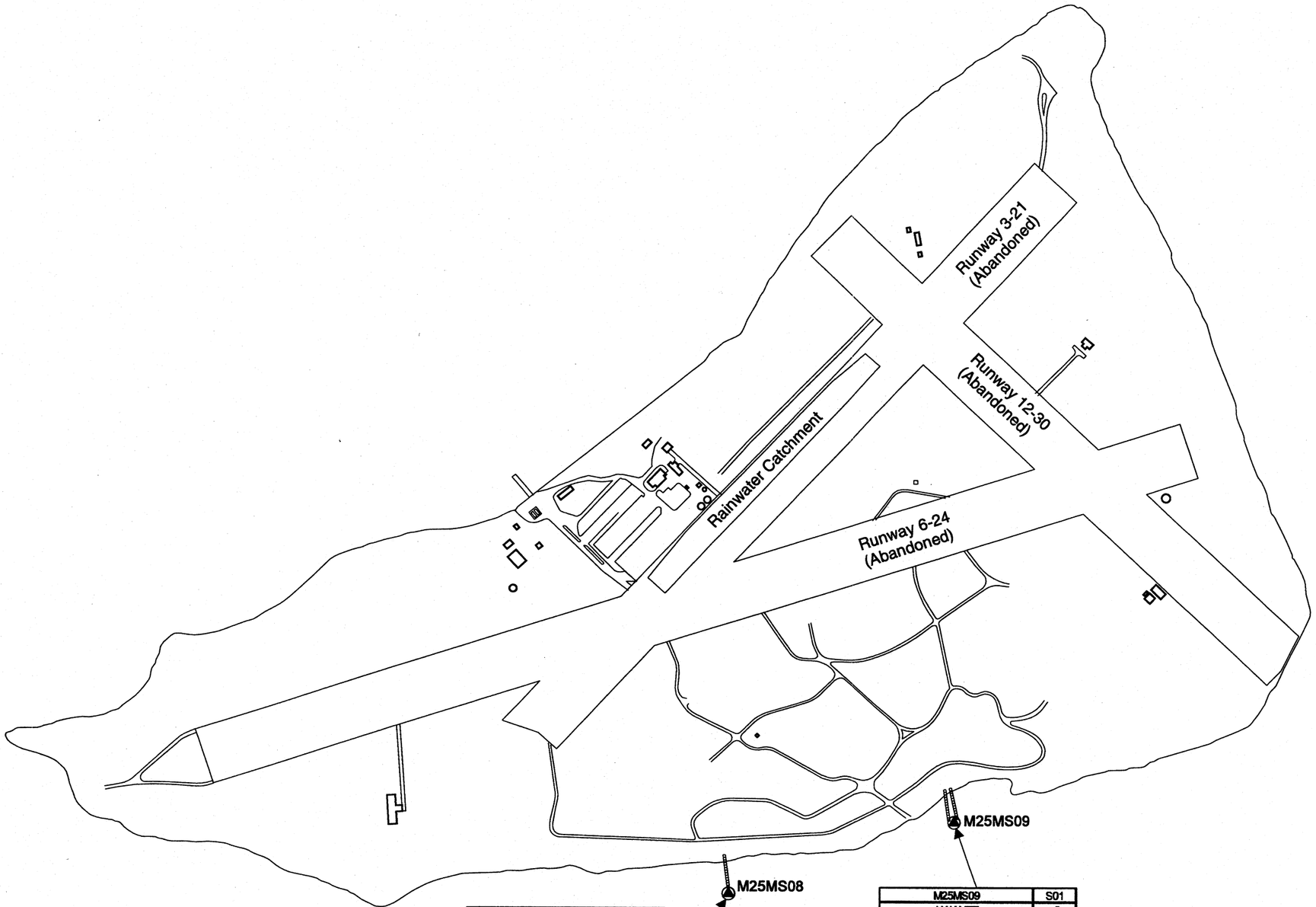
LOW LEVEL PESTICIDES AND PCBs DETECTED IN MARINE SEDIMENT (SITE 25) SAND ISLAND

N

FEET
500 0 500 1000 2000

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
6\21\95	DLF	JCS		HFP		BDH	

FIGURE 17.5-3



M25MS08	S01
ANALYTE	µg/kg
PCB-126 (3,3',4,4',5)	0.036
PCB-138 (2,2',3,4,4',5')	0.1
PCB-153 (2,2',4,4',5,5')	0.013
PCB-206 (2,2',3,3',4,4',5,5',6)	0.032
PCB-209 (2,2',3,3',4,4',5,5',6,6')	0.03
PCB-28 (2,4,4')	0.15
PCB-52 (2,2',5,5')	0.028
trans-Nonachlor	0.03

M25MS09	S01
ANALYTE	µg/kg
PCB-180 (2,2',3,4,4',5,5')	0.024
Hexachlorobenzene	0.043
	S02
PCB-138 (2,2',3,4,4',5')	0.11

LEGEND

●	MARINE SEDIMENT SAMPLE LOCATION
	SEWER PIPE
M02MW02	OGDEN SAMPLE ID
0.02	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN
S##	SAMPLE NUMBER

NOTES

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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWA ISLAND
5. PROJECT NUMBER: 110190136
6. FILE: ..\MIDWAY\SITEINVS\CORELDRW\05229506.CDR

SOURCES

PERRY ASSOCIATES INC.
U.S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

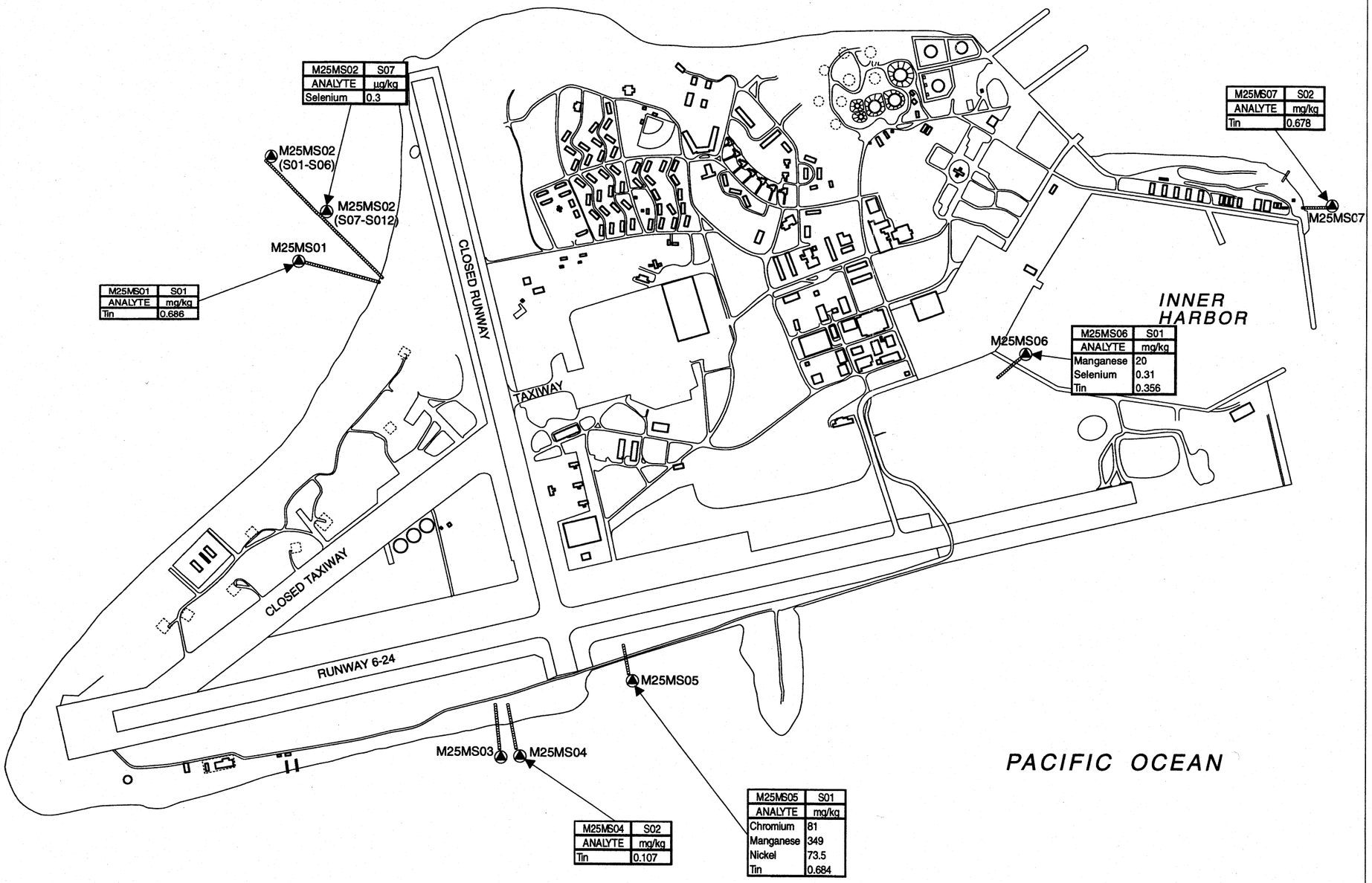
LOW LEVEL PESTICIDES AND PCBs DETECTED IN MARINE SEDIMENT (SITE 25) EASTERN ISLAND

N

FEET
500 0 500 1000

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
6\21\95		JCS		HFP		BDH	

FIGURE
17.5-4



M25MS02	S07
ANALYTE	µg/kg
Selenium	0.3

M25MS01	S01
ANALYTE	mg/kg
Tin	0.686

M25MS07	S02
ANALYTE	mg/kg
Tin	0.678

M25MS06	S01
ANALYTE	mg/kg
Manganese	20
Selenium	0.31
Tin	0.356

M25MS04	S02
ANALYTE	mg/kg
Tin	0.107

M25MS05	S01
ANALYTE	mg/kg
Chromium	81
Manganese	349
Nickel	73.5
Tin	0.684

LEGEND

▲	MARINE SEDIMENT SAMPLE LOCATION
	SEWER PIPE
M02MW02	OGDEN SAMPLE ID
0.02	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN (DATA NOT VALIDATED)
S##	SAMPLE NUMBER

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING EINGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWA ISLAND
5. PROJECT NUMBER: 110190136
6. FILE: ..\MIDWAY\SITEINVS\CORELDRW\06149530.CDR

SOURCES

PERRY ASSOCIATES INC.
U.S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

LOW LEVEL METAL CONCENTRATIONS DETECTED IN MARINE SEDIMENT (SITE 25) SAND ISLAND

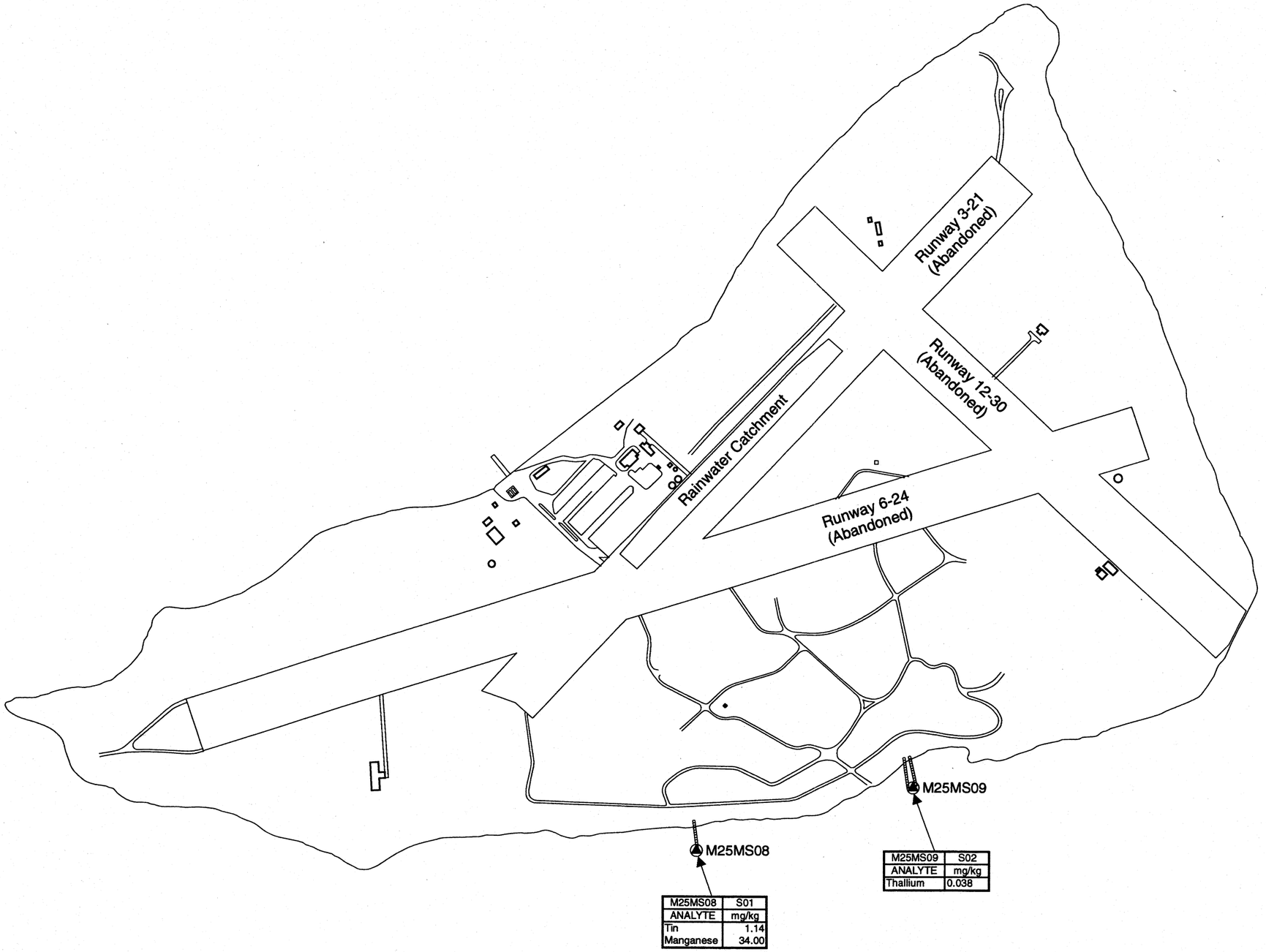
N

FEET
500 0 500 1000 2000

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
6\21\95	DLF	JCS		HFP		BDH	

FIGURE

17.5-5



LEGEND

▲	MARINE SEDIMENT SAMPLE LOCATION
	SEWER PIPE
M02MW02	OGDEN SAMPLE ID
0.02	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN (DATA NOT VALIDATED)
S##	SAMPLE NUMBER

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING EINGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWA ISLAND
5. PROJECT NUMBER: 110190136
6. FILE: ..\MIDWAY\SITEINVS\CORELDRW\05229506.CDR

SOURCES

PERRY ASSOCIATES INC.
U.S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

LOW LEVEL METAL CONCENTRATIONS DETECTED IN MARINE SEDIMENT (SITE 25) EASTERN ISLAND

N

FEET
500 0 500 1000

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
6\21\95		JCS		HFP		BDH	

FIGURE
17.5-6

Section 18

SECTION 18
PESTICIDE SHOP, BUILDING 361 (SITE 34)

This report describes the results of the SI field work conducted intermittently from August through November 1994 at the Pesticide Shop, Sand Island (Site 34). The purpose of the review was to determine whether hazardous substances were released at Site 34, and to assess the likelihood for soil and ground-water contamination at the Site. A discussion of the work conducted during the SI, along with findings, conclusions, and recommendations, is presented below.

This report is organized as follows: Site background information is documented in Section 18.1; a description of SI field sampling activities is presented in Section 18.2; methods used for sample analysis are summarized in Section 18.3; physical characteristics of the Site observed during the investigation activities are discussed in Section 18.4; a summary of analytical results is presented in Section 18.5; the SERA is described in Section 18.6; and conclusions and recommendations for the Site are presented in Section 18.7.

18.1 BACKGROUND INFORMATION

Building 361, a former electrical substation, is now used to store and mix pesticides (Figure 18.1-1). A sink in the building, reportedly used for pesticide mixing and washing, drains to a unknown destination. During the 1993 EBS Site visit, the facility was found to contain numerous containers of pesticides and herbicides, all of which appeared to be properly stored and labeled. No information on past leaks or spills was uncovered, and no evidence of improper storage/disposal activities, leaks or spills was observed.

To develop an understanding of Site-specific conditions and screen for hazardous materials, a list of potential chemical contaminants and associated analytical categories was developed (Table 18.1-1).

Table 18.1-1

POTENTIAL CHEMICAL CONTAMINANTS, PESTICIDE SHOP, BUILDING 361 SITE 34

Waste Type	Years of Disposal	Potential Chemical Constituents	Analytical Category
Pesticides and Herbicides	1980s-Present	Pesticides and Herbicides	Total Fuel Hydrocarbons Semi Volatile Organic Compounds Organochlorine Pesticides, Organophosphorus Pesticides, Organochlorine Herbicides, Carbamate and Urea Pesticides, Triazine Pesticides, Metals (As, Cd, Cu, Pb, Hg)

18.2 SAMPLING METHODS AND LOCATIONS

Surface Soil

Four surface soil samples and one QC duplicate sample were collected from four locations around the Pesticide Shop where spills or releases of hazardous substances might be expected (Figure 18.2-1). Two of the sampling points were located at the ends of two 1.5-inch diameter PVC drain pipes The other two sampling points were located adjacent to the concrete ramp and doorway where runoff may have carried constituents away from the building. Soil samples were taken at depths of 6 inches or less with a stainless steel trowel and then placed in glass jars and packed on ice for transport to the analytical laboratory.

Hand Auger

Four hand auger soil samples and one QC duplicate sample were collected from locations where spills or releases of hazardous substances might be expected (Figure 18.2-1). Samples were typically taken between 12 and 18 inches bgs, placed in glass jars, and packed on ice for transport to the analytical laboratory.

18.3 ANALYTICAL METHODS

Surface Soil and Hand Auger Samples

Surface soil and hand auger samples were analyzed for fuels, CLP SVOCs, CLP pesticides/PCBs, organophosphorus pesticides, chlorinated herbicides, triazine pesticides, carbamate pesticides, and CLP metals. Total organic carbon and low-detection-level SVOCs, PCBs, metals, and pesticides were not originally specified in the FSP but were added to the parameter list in the field. Dioxins and furans were inadvertently omitted from the sampling program. Table 18.3-1 lists the samples and analytical methods.

18.4 PHYSICAL CHARACTERISTICS

Building 361 is located at the corner of Brannon and Nimitz Avenues (Figure 1.4-1), approximately 800 feet west of the Inner Harbor, and 150 feet south of the SE corner of the Superblock. The building consists of a storage area (16 ft by 36 ft) with a small office (4.5 ft by 7.5 ft) annexed to its southeast corner.

18.4.1 Topography

The building is situated on a flat grassy lot (elevations range between 6 and 7 feet above MLLW). A concrete ramp leads up to the building on the south side.

18.4.2 Geology and Soils

The geologic description of this Site is based on the lithology of four surface soil samples (0-6 inches bgs) and a series of four (18-inch-deep) hand auger holes. Surface soils consist of dry, loose, light gray to brown, fine sandy silt; and silty, fine- to medium-grained sand with coral gravels and organics. Between 10 and 12 inches bgs, a hard layer of small coral cobbles was exposed by the hand auger holes. A gravelly, fine- to medium-grained sand was encountered beneath the cobble layer down to the bottom of the auger holes at 18 inches bgs.

18.4.3 Hydrogeology

The hydrogeologic characteristics of the Site were not investigated; however, data from monitoring wells installed in the Superblock (the boundary of the Superblock is located approximately 100 feet northwest of this Site), indicate that the depth to ground-water is between 4 and 5 fbgs (approximately 1.5 ft MLLW) in the vicinity of the Pesticide Shop. The hydraulic conductivity (K) was estimated to be 817 ft/day (mean) to 3,308 ft/day (tide statistics). The direction of ground-water flow is west toward the Inner Harbor.

east

18.5 SUMMARY OF ANALYTICAL RESULTS

The sections and tables presented below summarize the results of laboratory analyses performed on Site 34 samples. Analytical results for organic and inorganic compounds in soil samples are shown in Tables 18.5-1 and 18.5-2, respectively.

The tables list the analytical methods, the number of detects, the total number of samples, the number of samples rejected during data validation, the minimum undetected concentration, the maximum undetected concentration, the minimum detected concentration, the maximum detected concentration, and the sample with the maximum concentration. In addition, the concentrations of compounds detected at Site 34 are compared to Sand Island background levels. Analytical results for all samples and analytes are contained in Appendix L. Complete CLP and low-level analytical data are available at PACNAVFACENGCOM offices at Pearl Harbor, Hawaii.

18.5.1 Surface soil

Among the Site 34 surface soil samples, concentrations of 19 of the 27 pesticide analytes detected, and 36 of the 39 metal analytes detected, were above mean Sand Island background levels. Of the pesticides detected by CLP methods, 4,4'-DDT had the highest concentration at 6,400 µg/kg. The low-level method did not detect any pesticide concentrations above 5,100 µg/kg (4,4'-DDT). The maximum concentration of a CLP PCB analyte (Aroclor-1260) was 150 µg/kg. Fifteen PCB congeners were detected by low-level methods in this group of samples; the congener with the highest concentration was PCB-138 at 53 µg/kg. The maximum concentration of lead detected in a surface soil

sample was 1,230 mg/kg. Figures 18.5-1, 18.5-2, 18.5-3, 18.5-4, and 18.5-5 depict the sampling locations and selected concentration data.

18.5.2 Subsurface soil

Among the subsurface (hand auger) soil samples, concentrations of only 1 of the 27 pesticides detected and 14 of the 30 metals detected exceeded mean Sand Island background levels. Of the pesticides detected by CLP methods, 4,4'-DDT had the highest concentration (1,300 µg/kg). The maximum pesticide concentration detected by the low-level method was 960 µg/kg (4,4'-DDE). Fourteen PCB congeners were detected by low-level methods in this group of samples; the congener with the highest concentration was PCB-101 at 13 µg/kg. The maximum concentration of lead detected in a subsurface soil sample was 105 mg/kg. Figures 18.5-6, 18.5-7, 18.5-8, and 18.5-9 depict the sampling locations and selected concentration values.

18.6 Screening Ecological Risk Assessment

18.6.1 Problem Formulation

Tasks to be accomplished during Problem Formulation include (a) developing a Site description based on current Site investigations;, existing literature, any prior preliminary assessments, and Site history; (b) identifying potential stressors, exposure pathways, and ecological receptors (habitats and species); (c) discussing the nature of adverse effects associated with a given stressor; (d) defining ecologically appropriate assessment and measurement endpoints; and (e) making an initial evaluation of risks posed by the Site.

For a Site to present the potential for risk, it must exhibit the following three criteria: contain stressors in abiotic media at detectable and biologically significant concentrations, provide exposure pathways linking stressors to ecological receptors, and have ecological receptors (those associated with assessment endpoints) that either utilize the Site, are present nearby, or are in range of stressors migrating from the Site. If Problem Formulation determines that one or more of these criteria are absent, the Site is recommended for NFA and the risk assessment is concluded at this point. If all criteria are met, then completion of the SERA process is required.

18.6.1.1 Site Description

Building 361 is a small building off Nimitz Road with ruderal habitat of lawn and ironwood trees around the outside. Site 34 was a former electrical substation, and is currently the location where pesticides are stored and mixed. Although there was no evidence of leaks or spills due to improper storage/use, the sink may have been used for pesticide disposal. The destination of the sink drain is unknown.

18.6.1.2 Stressor Identification

Because of the early availability of chemical analysis data, ECs were computed and CPECs identified at this point in the SERA process, using the methods previously described in Sections 4.3.1.1.1 and 4.3.1.1.2. Data obtained from the chemical analysis of field samples were used to calculate ECs, as described in Section 4.3.1.1.1. CPECs were then identified following the methods described in Section 4.3.1.1.2. Detailed results of CPEC selection for surface soils (<6 inches bgs) are shown in Table 18.6.-1, for subsurface soils (1.5 feet) in Table 18.6-2, and are summarized in Table 18.6-3. Principal CPECs were antimony, chromium, lead, DDT, and DDE.

18.6.1.3 Potential Ecological Effects

CPECs onsite that may have effects on ecological receptors include metals, SVOCs, and pesticides. Section 4.2.3 and Appendix J discuss the physicochemical and toxicological properties of these CPECs.

18.6.1.4 Ecological Receptor Identification

Potential ecological receptors associated with Site 34 include the Laysan albatross, red-tailed tropicbird, and white tern (Section 4.2.4). These were the only species observed outside the pesticide shop, nesting in moderate numbers.

18.6.1.5 Exposure Pathway Identification

The CSM for Site 34 is shown in Figure 4.2-1, and shows the potential exposure routes for ecological receptors present on the Site. Potentially complete terrestrial exposure routes for Site 34 include direct exposure to CPECs through dermal contact and incidental ingestion of contaminated surface soil. These exposure routes are of primary concern for the albatross and tropicbirds onsite.

18.6.1.6 Endpoints

The potential receptors onsite are comprised solely of terrestrial seabird species that feed offshore; therefore, only assessment endpoint #1 in Section 4.2.6.1 and testable hypothesis #1 in Section 4.2.6.2 are appropriate for this Site. Measurement endpoint #2 in Section 4.2.6.3 was selected for this Site.

18.6.1.7 Summary

Based on the preceding information, it was concluded that this Site met all three of the criteria that indicate the potential for ecological risk and that completion of the SERA process was required.

18.6.2 Exposure Analysis

Target receptors for Site 34 consist of seabird species that occupy the Site. Although these seabirds feed exclusively offshore, making onsite secondary exposure impossible, there are other potential exposure pathways. The model applicable to ground-nesting birds (#2) was used for both the Laysan albatross and red-tailed tropicbirds (c.f., Section 4.3.1.3). Laysan albatross exposure was evaluated for incidental ingestion and dermal absorption of contaminants from surface soils. Equations for calculating EPVs are given in Section 4.3.1.4. Exposure doses via each pathway and EPVs for each receptor are listed in Table 18.6-4.

18.6.3 Ecological Effects Analysis

The potential for adverse ecological effects was evaluated using literature-derived data on CPEC toxicity with respect to a specific target receptor, the Laysan albatross. Toxicity reference values were calculated, as described in Section 4.3.2.2, and appear in Table 18.5. Toxicity profiles for CPECs are provided in Appendix J.

18.6.4 Risk Characterization

Risk estimation was performed using a quotient methodology as described in Section 4.3.3.1; results of these calculations are shown in Table 18.6-5. Results of the risk description weight-of-evidence analyses are summarized in Table 18.6-6 and discussed below.

Four CPECs had toxicity quotients greater than zero for the ground-nesting birds evaluated at Site 34. Three metals and 4,4'-DDE indicated some level of risk to these bird species (Table 18.6-5).

The TQ for 4,4'-DDE with respect to ground-nesting birds was less than one, indicating that there is a low to moderate potential for risk. This contaminant was detected in both surface and subsurface soils. The highest concentration of this CPEC in surface and subsurface soils was approximately 5.6 mg/kg. The concentrations of this pesticide were one to two orders of magnitude higher than the concentrations found in the surface and subsurface soils at the background sites. Although the pesticide does present a moderate risk, the disposal area at Site 34 may not be the sole contributor of contamination. It is likely that the DDE concentration onsite is partially due to residues from island-wide spraying over the years. The principal route of DDE pesticide uptake for ground-nesting birds was via dermal absorption. Evidence suggests that the albatross were already uptaking larger doses of organochlorines, especially DDT and DDE, while feeding in the western Pacific (pers. comm. J. Ludwig, SERE group). Consequently, the additional marginal doses received on Midway could represent a greater risk to these birds than if they were not already exposed to another source.

Metals, especially antimony, chromium, and lead, showed the next highest potential for risk to ground-nesting birds. Although some of the TQs for metals indicate moderate risk, TQ analysis is based on total, rather than bioavailable metal concentrations; therefore, actual risk from all metals detected onsite is likely to be lower than indicated by the TQ analysis. Of all these metals, lead would be of greatest concern to bird receptors due to the toxicological effects of lead.

18.6.5 Uncertainty Analysis

Section 4.3.3.3 describes all of the uncertainties that apply to this Site. Data gaps contributed specifically to uncertainty at this Site. These gaps, including dietary and behavioral data for ground-nesting birds found onsite, would need to be addressed to reduce uncertainty in the risk assessment.

Several assumptions were made regarding the behavior patterns of ground-nesting birds onsite. First, it was assumed that ground-nesting birds, such as the Laysan albatross, would remain in direct contact with the soil onsite for the 4.5 months that it spends while nesting on the atoll. A second assumption for the species was that 2 percent of its diet would be composed of soil from the Site. A third assumption was that the EC for lead fairly represents its soil concentration throughout the Site. The SERA analysis conservatively included a surface soil sample (SS02S01) with a reported lead concentration of 1,234 mg/kg. However, this sample is considered to be an outlier resulting from laboratory analysis of foreign materials (lead paint chips/dust) within the soil sample. These highly conservative assumptions probably overstate the risk associated with lead in surface soils at the Site.

18.6.6 SERA Conclusions

The assessment endpoint for special status bird species is not expected to be met because of the potential risk to bird species from DDE and lead in surface soils. The DDE that presented a risk onsite occurred at concentrations that were significantly higher than those found at background sites. The use of this Site for current pesticide handling and storage, past island-wide applications, and atmospheric contributions are possible sources of these pesticides.

DDT and its metabolites are significant contaminants with respect to albatrosses known already to be contaminated with DDT from their feeding grounds (personal comm. with Jim Ludwig). DDT has been banned in the U.S. but continues to be produced and applied in Asia. This usage is the probable source of DDT contamination in the birds' food items.

The source of lead may be paint chips from nearby buildings or historical use of leaded fuels at and near the Site. Lead contamination has been associated with abnormal development in birds. Its presence at the Site could present a source of risk to ground-nesting birds (Sileo and Fefer 1987). If an allowance is made for the statistical overestimate of risk occasioned by one high outlier value (1,234 mg/kg), doses of lead are not at levels sufficient to induce chronic effects in special status bird species, including Laysan albatross. The probable actual risk to bird species from lead in surface soils is therefore judged to be minimal.

18.7 Conclusions and Recommendations

Elevated levels of pesticides, PAHs, and metals were detected in surface and subsurface soil samples collected in the vicinity of Building 361. Based on the results of the SERA, risk is estimated to exist for terrestrial wildlife and seabirds due to exposure to DDT and DDE in surface soils at the Site. Elevated lead concentrations in surface soils do not present a significant risk to nesting seabirds. We recommend that onsite surface soils found to contain levels of DDT and/or DDE greater than 1.0 ppm be removed from the Site and disposed of properly. Following removal of impacted soils, the Site should be returned to grade with clean soil and revegetated.

No further investigation or action is recommended regarding the potentially elevated lead concentrations detected in surface soils. Cleanup of lead-based paint during building demolition is currently being implemented as part of the Midway closure process. Soil around buildings with lead-based paint chips will be excavated. This action should reduce the risk to birds due to lead paint chips to negligible levels.

Tables
Section 18

TABLE 18.3-1 (Page 1 of 1)
ANALYTICAL METHODS
PESTICIDE SHOP/BUILDING 361 (SITE 34)

						ROUTINE ANALYTICAL LABORATORY						SPECIAL ANALYTICAL LABORATORY			
	ANALYTICAL METHOD	8015 M/OG	OLM01.8V	OLM01.8B	OLM01.8P	8140 M	8150 M	619 M	632 M	ILM03.OX	STIV141A	STIV141C	STIII213	STIV141E	9060 M
EPA ID	OGDEN ID	FUELS	VOC	SVOC	OC PEST/PCB	OP PEST	CHL HERB	TRI HERB	CARB PEST	METALS	LL SVOC	LL PCB	LL METALS	LL PEST	TOC
SURFACE SOIL SAMPLES															
MI001	M34SS01S01D0025	X	-	X	X	X	X	X	X	X	-	-	-	-	-
MI002	M34SS01S02D0025	-	-	-	-	-	-	-	-	-	X	X	X	X	X
MI006	M34SS02S01D0025	X	-	X	X	X	X	X	X	X	-	-	-	-	-
MI007	M34SS02S02D0025	-	-	-	-	-	-	-	-	-	X	X	X	X	X
MI010	M34SS03S01D0025	X	-	X	X	X	X	X	X	X	-	-	-	-	-
MI011	M34SS03S02D0025	-	-	-	-	-	-	-	-	-	X	X	X	X	X
MI014	M34SS04S01D0025	X	-	X	X	X	X	X	X	X	-	-	-	-	-
MI015	M34SS04D01D0025	X	-	X	X	X	X	X	X	X	-	-	-	-	-
MI016	M34SS04S02D0025	-	-	-	-	-	-	-	-	-	X	X	X	X	X
HAND AUGER SAMPLES															
MI003	M34BS01S01D015	X	-	X	X	X	X	X	X	X	-	-	-	-	-
MI004	M34BS01S02D015	-	-	-	-	-	-	-	-	-	X	X	X	X	X
MI005	M34BS01D02D015	-	-	-	-	-	-	-	-	-	X	X	X	X	X
MI008	M34BS02S01D015	X	-	X	X	X	X	X	X	X	-	-	-	-	-
MI009	M34BS02S02D015	-	-	-	-	-	-	-	-	-	X	X	X	X	X
MI012	M34BS03S01D015	X	-	X	X	X	X	X	X	X	-	-	-	-	-
MI013	M34BS03S02D015	-	-	-	-	-	-	-	-	-	X	X	X	X	X
MI017	M34BS04S01D015	X	-	X	X	X	X	X	X	X	-	-	-	-	-
MI018	M34BS04S02D015	-	-	-	-	-	-	-	-	-	X	X	X	X	X

"X" = Indicates analytical method performed on sample.

Table 18.5-1
Summary of Soil Results for Organics
Pesticide Shop (Bldg 361), Sand Island (Site 34)

			Site 34									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETEC	MAX UNDETEC	MIN DETEC	MAX DETEC	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETEC	MAX UNDETEC	MIN DETEC	MAX DETEC	MEAN CONC
SURFACE SOIL																			
8015B/OG	C14-C20 (Diesel Range)	MG/KG	3	4	0	5.9	5.9	9.7	26	M34SS03S01	J	1	8	0	5.2	5.9	10	10	3.27
8015B/OG	C20-C30 (Lubricant Oil Range	MG/KG	4	4	0			150	530	M34SS03S01	J	1	8	0	21	24	44	44	13.3
9060M	Total Organic Carbon	UG/G	4	4	0			17100	148000	M34SS03S02	J								
EPA 8140	Chlorpyrifos	UG/KG	3	4	0	72	72	25	330	M34SS03S01	J	0	8	0	35	40			
EPA 8150	Pentachlorophenol	UG/KG	2	4	1	1.2	1.2	2.2	3.2	M34SS04S01		0	8	0	1	1.2			
OLM01.0B	Anthracene	UG/KG	1	4	0	350	400	27	27	M34SS03S01	J	0	8	0	350	410			
OLM01.0B	Benzo(a)Anthracene	UG/KG	1	4	0	350	400	140	140	M34SS03S01	J	0	8	0	350	410			
OLM01.0B	Benzo(a)Pyrene	UG/KG	1	4	0	350	400	110	110	M34SS03S01	J	0	8	0	350	410			
OLM01.0B	Benzo(b)Fluoranthene	UG/KG	1	4	0	350	400	150	150	M34SS03S01	J	0	8	0	350	410			
OLM01.0B	Benzo(k)Fluoranthene	UG/KG	1	4	0	350	400	70	70	M34SS03S01	J	0	8	0	350	410			
OLM01.0B	bis(2-Ethylhexyl)phthalate	UG/KG	4	4	0			70	420	M34SS02S01		1	8	0	350	410	1600	1600	246
OLM01.0B	Chrysene	UG/KG	1	4	0	350	400	180	180	M34SS03S01	J	0	8	0	350	410			
OLM01.0B	Di-n-Butylphthalate	UG/KG	1	4	0	350	500	62	62	M34SS04S01	J	0	8	0	350	410			
OLM01.0B	Fluoranthene	UG/KG	3	4	0	350	350	25	180	M34SS03S01	J	0	8	0	350	410			
OLM01.0B	Phenanthrene	UG/KG	1	4	0	350	400	100	100	M34SS03S01	J	0	8	0	350	410			
OLM01.0B	Pyrene	UG/KG	2	4	0	350	400	32	210	M34SS03S01	J	0	8	0	350	410			
OLM01.0P	4,4'-DDD	UG/KG	4	6	2			18	630	M34SS01S01	J	0	10	2	3.4	16			
OLM01.0P	4,4'-DDE	UG/KG	3	6	2	35	35	62	5600	M34SS01S01		4	10	2	3.4	4	5.2	1900	13.1
OLM01.0P	4,4'-DDT	UG/KG	4	6	2			75	6400	M34SS01S01		2	10	2	3.4	4	200	320	6.3
OLM01.0P	alpha-Chlordane	UG/KG	4	6	2			23	1200	M34SS02S01		0	10	2	1.8	8.1			
OLM01.0P	Aroclor-1260	UG/KG	1	6	2	150	390	150	150	M34SS03S01	J	0	10	2	34	160			
OLM01.0P	gamma-Chlordane	UG/KG	4	6	2			27	1600	M34SS02S01		0	10	2	1.8	8.1			
OLM01.0P	Heptachlor	UG/KG	1	6	2	7.5	20	280	280	M34SS02S01		0	10	2	1.8	8.1			
OLM01.0P	Heptachlor epoxide	UG/KG	2	6	2	7.5	20	9	110	M34SS02S01		0	10	2	1.8	8.1			
STIV141A	Acenaphthene	UG/KG	1	4	0	4	4.5	7.2	7.2	M34SS03S02		3	9	1	0.17	0.18	0.072	5.2	0.154
STIV141A	Acenaphthylene	UG/KG	3	4	0	4	4	1.7	13	M34SS04S02		4	9	1	0.16	0.17	0.35	3.1	0.267
STIV141A	Anthracene	UG/KG	4	4	0			3.6	39	M34SS03S02		8	9	1			0.086	24	0.531
STIV141A	Benzo(a)Anthracene	UG/KG	4	4	0			21	260	M34SS03S02		8	9	1			1	260	4.1

Notes:

8015B/OG = Total Fuel Hydrocarbons
EPA 8140 = Organophospherous Pesticides
EPA 8150 = Chlorinated Herbicides
OLM01.0B = CLP Semi Volatiles
OLM01.0P = CLP Pesticides/PCBs
STIV141A = NOAA Status and Trends Semi Volatiles

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 18.5-1
Summary of Soil Results for Organics
Pesticide Shop (Bldg 361), Sand Island (Site 34)

			Site 34									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETEC	MAX UNDETEC	MIN DETEC	MAX DETEC	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETEC	MAX UNDETEC	MIN DETEC	MAX DETEC	MEAN CONC
SURFACE SOIL - continued																			
STIV141A	Benzo(a)Pyrene	UG/KG	4	4	0			18	220	M34SS03S02		8	9	1			0.84	270	3.89
STIV141A	Benzo(b)Fluoranthene	UG/KG	4	4	0			34	350	M34SS03S02		8	9	1			0.94	300	6.13
STIV141A	Benzo(e)pyrene	UG/KG	4	4	0			25	180	M34SS03S02		8	9	1			0.83	160	3.97
STIV141A	Benzo(g,h,i)perylene	UG/KG	4	4	0			23	150	M34SS03S02		8	9	1			0.79	55	3.27
STIV141A	Benzo(k)Fluoranthene	UG/KG	4	4	0			9.9	110	M34SS03S02		8	9	1			0.55	130	2.75
STIV141A	Biphenyl	UG/KG	1	4	0	4.3	4.8	1.1	1.1	M34SS03S02	J	0	8	0	0.049	0.2			
STIV141A	Chrysene	UG/KG	4	4	0			31	330	M34SS03S02		8	9	1			1.6	300	6.46
STIV141A	Chrysenes, C1-alkyl-substitute	UG/KG	4	4	0			20	210	M34SS03S02		8	9	1			0.57	180	2.97
STIV141A	Chrysenes, C2-alkyl-substitute	UG/KG	4	4	0			21	110	M34SS03S02		6	9	1	0.26	0.26	0.84	59	1.58
STIV141A	Chrysenes, C3-alkyl-substitute	UG/KG	4	4	0			18	47	M34SS03S02		3	9	1	0.26	0.28	7.1	22	0.731
STIV141A	Chrysenes, C4-alkyl-substitute	UG/KG	4	4	0			12	26	M34SS03S02		3	9	1	0.26	0.28	5	11	0.608
STIV141A	Dibenzo(a,h)Anthracene	UG/KG	4	4	0			3.8	37	M34SS03S02		8	9	1			0.15	20	0.676
STIV141A	Dibenzothiophene	UG/KG	3	4	0	4	4	1.2	9.3	M34SS03S02		4	9	1	0.16	0.17	0.097	4	0.149
STIV141A	Dibenzothiophenes, C1-alkyl-s	UG/KG	1	4	0	3.9	4.4	23	23	M34SS03S02		4	9	1	0.16	0.17	0.08	3.5	0.147
STIV141A	Dibenzothiophenes, C2-alkyl-s	UG/KG	1	4	0	3.9	4.4	59	59	M34SS03S02		4	9	1	0.16	0.17	0.2	6.5	0.243
STIV141A	Dibenzothiophenes, C3-alkyl-s	UG/KG	1	4	0	3.9	4.4	48	48	M34SS03S02		3	9	1	0.16	0.18	0.29	5.2	0.225
STIV141A	Fluoranthene	UG/KG	4	4	0			38	400	M34SS03S02		8	9	1			2	370	8.68
STIV141A	Fluoranthenes+Pyrenes, C1-alk	UG/KG	4	4	0			30	310	M34SS03S02		8	9	1			1.1	200	3.98
STIV141A	Fluoranthenes+Pyrenes, C2-alk	UG/KG	4	4	0			18	230	M34SS03S02		7	9	1	0.2	0.2	0.97	140	3
STIV141A	Fluoranthenes+Pyrenes, C3-alk	UG/KG	4	4	0			12	81	M34SS03S02		5	9	1	0.2	0.2	0.71	38	0.976
STIV141A	Fluorene	UG/KG	3	4	0	5.5	5.5	1.2	9.2	M34SS03S02		4	9	1	0.22	0.22	0.064	3	0.146
STIV141A	Fluorenes, C1-alkyl-substitute	UG/KG	1	4	0	5.3	6	6.5	6.5	M34SS03S02	J	1	9	1	0.22	0.25	2	2	0.164
STIV141A	Fluorenes, C2-alkyl-substitute	UG/KG	1	4	0	5.3	6	17	17	M34SS03S02		1	8	0	0.22	0.25	3	3	0.173
STIV141A	Indeno(1,2,3-cd)pyrene	UG/KG	4	4	0			15	150	M34SS03S02		8	9	1			0.67	180	3.2
STIV141A	Perylene	UG/KG	4	4	0			5.1	50	M34SS03S02		8	9	1			0.22	51	1.38
STIV141A	Phenanthrene	UG/KG	4	4	0			12	170	M34SS03S02		8	9	1			0.33	89	1.78
STIV141A	Phenanthrenes+Anthra., C1-alk	UG/KG	4	4	0			12	150	M34SS03S02		8	9	1			0.44	59	1.46
STIV141A	Phenanthrenes+Anthra., C2-alk	UG/KG	4	4	0			12	160	M34SS03S02		7	9	1	0.28	0.28	0.5	43	1.16
STIV141A	Phenanthrenes+Anthra., C3-alk	UG/KG	4	4	0			9.7	91	M34SS03S02		4	9	1	0.27	0.29	0.43	21	0.54
STIV141A	Phenanthrenes+Anthra., C4-alk	UG/KG	4	4	0			25	140	M34SS03S02		5	8	0	0.27	0.29	1.4	75	1.19

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles
STIV141C = NOAA Status and Trends PCBs

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 18.5-1
Summary of Soil Results for Organics
Pesticide Shop (Bldg 361), Sand Island (Site 34)

			Site 34									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETEC	MAX UNDETEC	MIN DETEC	MAX DETEC	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETEC	MAX UNDETEC	MIN DETEC	MAX DETEC	MEAN CONC
SURFACE SOIL - continued																			
STIV141A	Pyrene	UG/KG	4	4	0			37	400	M34SS03S02		8	9	1			2.1	390	8.67
STIV141C	PCB-101 (2,2',3,5,5')	UG/KG	1	5	1	0.027	1.5	57	57	M34SS03S02		4	8	0	0.011	0.012	0.1	1.7	0.054
STIV141C	PCB-105 (2,3,3',4,4')	UG/KG	1	5	1	0.03	1.7	19	19	M34SS03S02		5	8	0	0.012	0.014	0.11	1.2	0.0884
STIV141C	PCB-118 (2,3',4,4',5)	UG/KG	1	5	1	0.041	2.3	37	37	M34SS03S02		8	8	0			0.085	2.8	0.506
STIV141C	PCB-128 (2,2',3,3',4,4')	UG/KG	4	4	0			0.8	10	M34SS02S02		7	8	0	0.014	0.014	0.048	1.2	0.16
STIV141C	PCB-138 (2,2',3,4,4',5')	UG/KG	4	5	1			4.6	53	M34SS03S02		8	8	0			0.27	5.5	1.24
STIV141C	PCB-153 (2,2',4,4',5,5')	UG/KG	4	5	1			3.5	48	M34SS03S02		8	9	1			0.46	5.9	1.64
STIV141C	PCB-170 (2,2',3,3',4,4',5)	UG/KG	4	4	0			3.9	21	M34SS01S02		7	8	0	0.059	0.059	0.14	1.4	0.293
STIV141C	PCB-180 (2,2',3,4,4',5,5')	UG/KG	4	5	1			7	32	M34SS01S02		8	8	0			0.23	2	0.846
STIV141C	PCB-187 (2,2',3,4',5,5',6)	UG/KG	3	4	0	0.089	0.089	4.2	23	M34SS01S02		6	8	0	0.027	0.027	0.14	1.4	0.238
STIV141C	PCB-195 (2,2',3,3',4,4',5,6)	UG/KG	4	4	0			0.77	4.7	M34SS02S02		8	8	0			0.032	0.38	0.127
STIV141C	PCB-206 (2,2',3,3',4,4',5,5',6	UG/KG	4	4	0			0.98	11	M34SS02S02		7	8	0	0.011	0.011	0.036	0.76	0.0866
STIV141C	PCB-209 (2,2',3,3',4,4',5,5',6	UG/KG	4	4	0			0.38	5.5	M34SS02S02		7	8	0	0.013	0.013	0.037	0.94	0.0931
STIV141C	PCB-28 (2,4,4')	UG/KG	1	4	0	0.093	3.5	0.041	0.041	M34SS04S02	J	0	8	0	0.026	0.029			
STIV141C	PCB-44 (2,2',3,5')	UG/KG	2	4	0	0.046	1.7	2.4	44	M34SS02S02		1	8	0	0.013	0.014	0.27	0.27	0.0106
STIV141C	PCB-52 (2,2',5,5')	UG/KG	1	4	0	0.027	1.5	8.3	8.3	M34SS03S02		1	8	0	0.011	0.013	0.41	0.41	0.00984
STIV141E	2,4'-DDD	UG/KG	2	4	0	0.054	1.8	2.2	210	M34SS01S02		6	8	0	0.015	0.016	0.045	8.7	0.21
STIV141E	2,4'-DDE	UG/KG	1	4	0	0.043	2.1	77	77	M34SS01S02		2	8	0	0.017	0.02	3.7	4.6	0.0422
STIV141E	2,4'-DDT	UG/KG	3	6	2	2.8	2.8	9.5	1300	M34SS01S02		7	10	2	0.024	0.024	0.19	62	0.931
STIV141E	4,4'-DDD	UG/KG	3	4	0	3.1	3.1	4.6	440	M34SS01S02		5	8	0	0.026	0.029	0.063	8.3	0.169
STIV141E	4,4'-DDE	UG/KG	4	7	3			47	4700	M34SS01S02		8	12	4			0.6	1300	13.2
STIV141E	4,4'-DDT	UG/KG	4	8	4			55	5100	M34SS01S02		8	10	2			0.091	260	3.57
STIV141E	alpha-BHC	UG/KG	1	4	0	0.029	1.6	0.057	0.057	M34SS03S02		4	8	0	0.012	0.013	0.0035	0.045	0.00982
STIV141E	alpha-Chlordane	UG/KG	4	7	3			27	2300	M34SS02S02		6	8	0	0.014	0.015	0.03	4.1	0.107
STIV141E	beta-BHC	UG/KG	1	4	0	0.053	2.9	0.21	0.21	M34SS03S02		3	8	0	0.022	0.024	0.015	0.065	0.0175
STIV141E	Dieldrin	UG/KG	2	4	0	0.069	2.3	1.3	6.3	M34SS01S02		2	8	0	0.019	0.022	0.059	0.15	0.0177
STIV141E	Endrin ketone	UG/KG	1	4	0	0.045	1.7	0.0077	0.0077	M34SS04S02	J	1	8	0	0.013	0.014	0.69	0.69	0.012
STIV141E	gamma-BHC (Lindane)	UG/KG	2	4	0	1.8	2.1	0.024	0.22	M34SS03S02		2	8	0	0.015	0.017	0.073	0.11	0.0145
STIV141E	gamma-Chlordane	UG/KG	4	7	3			31	3000	M34SS02S02		4	8	0	0.016	0.018	0.029	1.8	0.0345
STIV141E	Heptachlor	UG/KG	3	4	0	2.3	2.3	2.3	400	M34SS02S02		0	8	0	0.017	0.019			

Notes:

STIV141C = NOAA Status and Trends PCBs
STIV141E = NOAA Status and Trends Pesticides

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 18.5-1
Summary of Soil Results for Organics
Pesticide Shop (Bldg 361), Sand Island (Site 34)

			Site 34									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETEC	MAX UNDETEC	MIN DETEC	MAX DETEC	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETEC	MAX UNDETEC	MIN DETEC	MAX DETEC	MEAN CONC
SURFACE SOIL - continued																			
STIV141E	Heptachlor epoxide	UG/KG	2	5	1	0.072	2.7	8.4	140	M34SS02S02		4	8	0	0.02	0.022	0.037	0.55	0.041
STIV141E	Hexachlorobenzene	UG/KG	1	4	0	0.043	2.4	4.1	4.1	M34SS02S02		6	8	0	0.018	0.019	0.0089	0.027	0.0121
STIV141E	Methoxychlor	UG/KG	2	4	0	9.2	10	0.18	1.7	M34SS03S02		0	8	0	0.076	0.086			
STIV141E	Mirex	UG/KG	4	4	0			0.43	6.9	M34SS01S02		8	8	0			0.13	2.8	0.609
STIV141E	Photomirex	UG/KG	2	4	0	2.9	3.3	0.014	0.55	M34SS03S02		1	8	0	0.024	0.027	0.45	0.45	0.0197
STIV141E	trans-Nonachlor	UG/KG	4	7	3			29	2000	M34SS02S02		8	9	1			0.043	18	0.699
SUBSURFACE SOIL																			
8015B/OG	C14-C20 (Diesel Range)	MG/KG	1	4	0	5.2	5.6	8.4	8.4	M34BS04S01		0	12	0	5.5	6.7			
8015B/OG	C20-C30 (Lubricant Oil Range	MG/KG	4	4	0			84	180	M34BS02S01		0	12	0	22	27			
9060M	Total Organic Carbon	UG/G	4	4	0			4200	13600	M34BS01S02	J								
OLM01.0B	Acenaphthylene	UG/KG	1	4	0	350	370	38	38	M34BS03S01	J	0	12	0	370	580			
OLM01.0B	Benzo(a)Anthracene	UG/KG	3	4	0	350	350	31	99	M34BS04S01	J	0	12	0	370	580			
OLM01.0B	Benzo(a)Pyrene	UG/KG	2	4	0	350	370	49	220	M34BS03S01	J	0	12	0	370	580			
OLM01.0B	Benzo(b)Fluoranthene	UG/KG	3	4	0	350	350	38	350	M34BS03S01	J	0	12	0	370	580			
OLM01.0B	Benzo(g,h,i)perylene	UG/KG	1	4	0	350	370	230	230	M34BS03S01	J	0	12	0	370	580			
OLM01.0B	Benzo(k)Fluoranthene	UG/KG	1	4	0	350	370	120	120	M34BS03S01	J	0	12	0	370	580			
OLM01.0B	bis(2-Ethylhexyl)phthalate	UG/KG	1	4	0	350	370	25	25	M34BS02S01	J	3	12	0	370	580	60	95	155
OLM01.0B	Chrysene	UG/KG	2	4	0	350	370	130	140	M34BS04S01	J	0	12	0	370	580			
OLM01.0B	Dibenzo(a,h)Anthracene	UG/KG	1	4	0	350	370	79	79	M34BS03S01	J	0	12	0	370	580			
OLM01.0B	Fluoranthene	UG/KG	2	4	0	350	370	100	100	M34BS03S01	J	0	12	0	370	580			
OLM01.0B	Indeno(1,2,3-cd)pyrene	UG/KG	1	4	0	350	370	210	210	M34BS03S01	J	0	12	0	370	580			
OLM01.0B	Pyrene	UG/KG	3	4	0	350	350	48	140	M34BS03S01	J	0	12	0	370	580			
OLM01.0P	4,4'-DDD	UG/KG	1	5	1	3.4	37	10	10	M34BS02S01	J	0	12	0	3.6	5.5			
OLM01.0P	4,4'-DDE	UG/KG	3	5	1	3.6	3.6	23	1100	M34BS01S01		1	12	0	3.6	5.5	5.3	5.3	2.13
OLM01.0P	4,4'-DDT	UG/KG	3	5	1	3.6	3.6	17	1300	M34BS01S01		0	12	0	3.6	5.5			
OLM01.0P	alpha-Chlordane	UG/KG	2	5	1	1.8	1.8	44	160	M34BS01S01		0	12	0	1.9	2.9			
OLM01.0P	Dieldrin	UG/KG	1	5	1	3.4	6.9	190	190	M34BS01S01		0	12	0	3.6	5.5			
OLM01.0P	gamma-Chlordane	UG/KG	2	5	1	1.8	1.8	56	150	M34BS01S01		0	12	0	1.9	2.9			
OLM01.0P	Heptachlor	UG/KG	1	5	1	1.8	19	15	15	M34BS02S01	J	0	12	0	1.9	2.9			

Notes:

STIV141E = NOAA Status and Trends Pesticides
8015B/OG = Total Fuel Hydrocarbons
OLM01.0B = CLP Semi Volatiles
OLM01.0P = CLP Pesticides/PCBs
STIV141A = NOAA Status and Trends Semi Volatiles

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 18.5-1
Summary of Soil Results for Organics
Pesticide Shop (Bldg 361), Sand Island (Site 34)

			Site 34									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETEC	MAX UNDETEC	MIN DETEC	MAX DETEC	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETEC	MAX UNDETEC	MIN DETEC	MAX DETEC	MEAN CONC
SUBSURFACE SOIL - continued																			
OLM01.0P	Heptachlor epoxide	UG/KG	1	5	1	1.8	19	8.2	8.2	M34BS02S01	J	0	12	0	1.9	2.9			
STIV141A	Acenaphthene	UG/KG	1	4	0	0.2	0.42	0.2	0.2	M34BS02S02	J								
STIV141A	Acenaphthylene	UG/KG	4	4	0			0.18	9.7	M34BS03S02									
STIV141A	Anthracene	UG/KG	4	4	0			0.33	14	M34BS03S02									
STIV141A	Benzo(a)Anthracene	UG/KG	4	4	0			1.1	57	M34BS03S02									
STIV141A	Benzo(a)Pyrene	UG/KG	4	4	0			1	94	M34BS03S02									
STIV141A	Benzo(b)Fluoranthene	UG/KG	4	4	0			2.1	150	M34BS03S02									
STIV141A	Benzo(e)pyrene	UG/KG	4	4	0			1.4	79	M34BS03S02									
STIV141A	Benzo(g,h,i)perylene	UG/KG	4	4	0			1.6	110	M34BS03S02									
STIV141A	Benzo(k)Fluoranthene	UG/KG	4	4	0			0.53	39	M34BS03S02									
STIV141A	Biphenyl	UG/KG	2	4	0	0.22	0.42	0.085	0.12	M34BS01S02	J								
STIV141A	Chrysene	UG/KG	4	4	0			1.8	62	M34BS03S02									
STIV141A	Chrysenes, C1-alkyl-substitute	UG/KG	4	4	0			0.84	48	M34BS03S02									
STIV141A	Chrysenes, C2-alkyl-substitute	UG/KG	3	4	0	0.32	0.32	3.6	26	M34BS03S02									
STIV141A	Chrysenes, C3-alkyl-substitute	UG/KG	3	4	0	0.32	0.32	3.1	17	M34BS01S02									
STIV141A	Chrysenes, C4-alkyl-substitute	UG/KG	3	4	0	0.32	0.32	2.1	17	M34BS03S02									
STIV141A	Dibenzo(a,h)Anthracene	UG/KG	4	4	0			0.28	22	M34BS03S02									
STIV141A	Dibenzothiophene	UG/KG	3	4	0	0.2	0.2	0.15	0.4	M34BS03S02									
STIV141A	Dibenzothiophenes, C1-alkyl-s	UG/KG	3	4	0	0.2	0.2	1.2	1.4	M34BS03S02									
STIV141A	Dibenzothiophenes, C2-alkyl-s	UG/KG	3	4	0	0.2	0.2	0.9	2.9	M34BS03S02									
STIV141A	Dibenzothiophenes, C3-alkyl-s	UG/KG	3	4	0	0.2	0.2	1.1	3.9	M34BS03S02									
STIV141A	Fluoranthene	UG/KG	4	4	0			2.7	67	M34BS03S02									
STIV141A	Fluoranthenes+Pyrenes, C1-alk	UG/KG	3	4	0	0.24	0.24	6.4	55	M34BS03S02									
STIV141A	Fluoranthenes+Pyrenes, C2-alk	UG/KG	4	4	0			0.13	46	M34BS03S02									
STIV141A	Fluoranthenes+Pyrenes, C3-alk	UG/KG	3	4	0	0.24	0.24	3.2	22	M34BS03S02									
STIV141A	Fluorene	UG/KG	3	4	0	0.27	0.27	0.18	0.49	M34BS03S02	J								
STIV141A	Fluorenes, C1-alkyl-substitute	UG/KG	2	4	0	0.26	0.27	0.31	0.63	M34BS03S02									
STIV141A	Fluorenes, C2-alkyl-substitute	UG/KG	2	4	0	0.26	0.27	0.73	1.5	M34BS03S02									
STIV141A	Fluorenes, C3-alkyl-substitute	UG/KG	1	4	0	0.26	0.56	7.8	7.8	M34BS03S02									
STIV141A	Indeno(1,2,3-cd)pyrene	UG/KG	4	4	0			1	96	M34BS03S02									

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles

#D = No. of Detects
#S = Total No. of Samples
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FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 18.5-1
Summary of Soil Results for Organics
Pesticide Shop (Bldg 361), Sand Island (Site 34)

Site 34												Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETEC	MAX UNDETEC	MIN DETEC	MAX DETEC	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETEC	MAX UNDETEC	MIN DETEC	MAX DETEC	MEAN CONC
SUBSURFACE SOIL - continued																			
STIV141A	Naphthalenes, C1-alkyl-substit	UG/KG	4	4	0			0.27	0.61	M34BS03S02									
STIV141A	Naphthalenes, C2-alkyl-substit	UG/KG	2	4	0	0.28	0.58	0.37	1	M34BS03S02									
STIV141A	Naphthalenes, C3-alkyl-substit	UG/KG	1	4	0	0.27	0.58	1.2	1.2	M34BS03S02									
STIV141A	Naphthalenes, C4-alkyl-substit	UG/KG	1	4	0	0.27	0.58	3.7	3.7	M34BS03S02									
STIV141A	Perylene	UG/KG	3	4	0	0.11	0.11	1.2	28	M34BS03S02									
STIV141A	Phenanthrene	UG/KG	4	4	0			0.87	9.4	M34BS01S02									
STIV141A	Phenanthrenes+Anthra., C1-alk	UG/KG	4	4	0			0.16	14	M34BS03S02									
STIV141A	Phenanthrenes+Anthra., C2-alk	UG/KG	4	4	0			0.22	17	M34BS03S02									
STIV141A	Phenanthrenes+Anthra., C3-alk	UG/KG	3	4	0	0.33	0.33	2.1	12	M34BS03S02									
STIV141A	Phenanthrenes+Anthra., C4-alk	UG/KG	3	4	0	0.33	0.33	3.4	22	M34BS03S02									
STIV141A	Pyrene	UG/KG	4	4	0			2.4	77	M34BS03S02									
STIV141C	PCB-101 (2,2',3,5,5')	UG/KG	3	8	4	0.025	0.025	0.33	13	M34BS01S02									
STIV141C	PCB-105 (2,3,3',4,4')	UG/KG	2	8	4	0.015	0.031	0.1	0.37	M34BS02S02	J								
STIV141C	PCB-126 (3,3',4,4',5)	UG/KG	1	8	4	0.039	0.083	0.11	0.11	M34BS03S02									
STIV141C	PCB-128 (2,2',3,3',4,4')	UG/KG	3	8	4	0.034	0.034	0.12	0.81	M34BS02S02	J								
STIV141C	PCB-138 (2,2',3,4,4',5')	UG/KG	4	8	4			0.32	5.4	M34BS01S02	J								
STIV141C	PCB-153 (2,2',4,4',5,5')	UG/KG	4	8	4			0.23	2.8	M34BS01S02	J								
STIV141C	PCB-170 (2,2',3,3',4,4',5)	UG/KG	4	8	4			0.26	2.2	M34BS01S02	J								
STIV141C	PCB-180 (2,2',3,4,4',5,5')	UG/KG	4	8	4			0.45	8.9	M34BS01S02	J								
STIV141C	PCB-187 (2,2',3,4',5,5',6)	UG/KG	4	8	4			0.36	2	M34BS01S02	J								
STIV141C	PCB-195 (2,2',3,3',4,4',5,6)	UG/KG	4	8	4			0.058	0.88	M34BS03S02									
STIV141C	PCB-206 (2,2',3,3',4,4',5,5',6	UG/KG	4	8	4			0.073	0.79	M34BS01S02	J								
STIV141C	PCB-209 (2,2',3,3',4,4',5,5',6	UG/KG	4	8	4			0.22	0.74	M34BS01S02	J								
STIV141C	PCB-28 (2,4,4')	UG/KG	2	8	4	0.032	0.061	0.079	0.19	M34BS02S02	J								
STIV141C	PCB-44 (2,2',3,5')	UG/KG	1	8	4	0.016	0.032	3.3	3.3	M34BS02S02	J								
STIV141E	2,4'-DDD	UG/KG	2	5	1	0.018	0.035	2.8	16	M34BS01S02									
STIV141E	2,4'-DDE	UG/KG	1	4	0	0.021	0.041	4.1	4.1	M34BS01S02	J								
STIV141E	2,4'-DDT	UG/KG	4	6	2			0.73	240	M34BS01S02									
STIV141E	4,4'-DDD	UG/KG	4	6	2			0.23	13	M34BS01S02									
STIV141E	4,4'-DDE	UG/KG	4	8	4			6	960	M34BS01S02									

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles
STIV141C = NOAA Status and Trends PCBs
STIV141E = NOAA Status and Trends Pesticides

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 18.5-1
Summary of Soil Results for Organics
Pesticide Shop (Bldg 361), Sand Island (Site 34)

			Site 34									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETEC	MAX UNDETEC	MIN DETEC	MAX DETEC	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETEC	MAX UNDETEC	MIN DETEC	MAX DETEC	MEAN CONC
SUBSURFACE SOIL - continued																			
STIV141E	4,4'-DDT	UG/KG	4	8	4			3.3	880	M34BS01S02									
STIV141E	alpha-Chlordane	UG/KG	4	6	2			0.27	130	M34BS01S02									
STIV141E	Dieldrin	UG/KG	2	5	1	0.024	0.045	1.1	160	M34BS01S02									
STIV141E	Endrin	UG/KG	1	4	0	0.0064	0.013	3.5	3.5	M34BS01S02	J								
STIV141E	Endrin ketone	UG/KG	2	4	0	0.016	0.03	0.0051	0.46	M34BS01S02	J								
STIV141E	gamma-Chlordane	UG/KG	4	6	2			0.26	140	M34BS01S02									
STIV141E	Heptachlor	UG/KG	3	5	1	0.04	0.04	0.071	16	M34BS02S02									
STIV141E	Heptachlor epoxide	UG/KG	3	6	2	0.047	0.047	0.22	15	M34BS01S02									
STIV141E	Hexachlorobenzene	UG/KG	1	4	0	0.022	0.044	1.5	1.5	M34BS02S02	J								
STIV141E	Methoxychlor	UG/KG	3	4	0	0.093	0.093	0.051	0.25	M34BS01S02	J								
STIV141E	Mirex	UG/KG	4	4	0			0.026	6.9	M34BS01S02	J								
STIV141E	Oxychlorostyrene	UG/KG	1	4	0	0.019	0.039	0.81	0.81	M34BS02S02	J								
STIV141E	Photomirex	UG/KG	1	4	0	0.029	0.06	0.15	0.15	M34BS02S02	J								
STIV141E	trans-Nonachlor	UG/KG	4	6	2			0.36	88	M34BS01S02									

Notes:

STIV141E = NOAA Status and Trends Pesticides

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 18.5-2
Summary of Soil Results for Inorganics
Pesticide Shop (Bldg 361), Sand Island (Site 34)

			Site 34									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL																			
ILM03.0	Aluminum	MG/KG	4	4	0			1700	27800	M34SS01S01	J	4	8	0	2.9	3.2	127	879	25.2
ILM03.0	Antimony	MG/KG	1	4	0	2.5	3.6	4.7	4.7	M34SS01S01	J	0	8	0	2.5	2.9			
ILM03.0	Arsenic	MG/KG	4	4	0			1.2	7.9	M34SS01S01		1	8	0	0.29	0.34	0.46	0.46	0.179
ILM03.0	Barium	MG/KG	4	4	0			23	60.5	M34SS02S01		8	8	0			6	15.3	8.68
ILM03.0	Beryllium	MG/KG	4	4	0			0.17	0.86	M34SS01S01		8	8	0			0.19	0.45	0.3
ILM03.0	Cadmium	MG/KG	4	4	0			0.34	2.4	M34SS02S01		8	8	0			0.39	0.99	0.617
ILM03.0	Calcium	MG/KG	4	4	0			159000	319000	M34SS02S01		8	8	0			32400	343000	244000
ILM03.0	Chromium	MG/KG	4	4	0			13.7	130	M34SS01S01		8	8	0			4.1	8	5.48
ILM03.0	Cobalt	MG/KG	3	4	0	0.99	0.99	5.1	24.2	M34SS01S01		2	8	0	0.97	1.1	1.5	2.2	0.712
ILM03.0	Copper	MG/KG	4	4	0			109	200	M34SS03S01	J	1	8	0	1	4.3	5.6	5.6	1.57
ILM03.0	Iron	MG/KG	4	4	0			2920	44700	M34SS01S01	J	8	8	0			37.4	1240	206
ILM03.0	Lead	MG/KG	4	4	0			59.9	1230	M34SS02S01		8	8	0			2.7	10.5	6.28
ILM03.0	Magnesium	MG/KG	4	4	0			8050	16300	M34SS03S01		8	8	0			14000	16800	15700
ILM03.0	Manganese	MG/KG	4	4	0			36.3	742	M34SS01S01		8	8	0			4.3	36.7	9.02
ILM03.0	Mercury	MG/KG	4	4	0			0.07	9	M34SS03S01		3	8	0	0.05	0.06	0.05	0.09	0.039
ILM03.0	Nickel	MG/KG	4	4	0			6.8	66.7	M34SS01S01		1	8	0	1.4	1.6	2.3	2.3	0.848
ILM03.0	Potassium	MG/KG	4	4	0			129	805	M34SS01S01		8	8	0			55.4	143	83.9
ILM03.0	Selenium	MG/KG	3	4	0	0.92	0.92	0.85	1.8	M34SS02S01		8	8	0			1.6	2.3	1.93
ILM03.0	Silver	MG/KG	1	4	0	1.4	1.9	1.5	1.5	M34SS02S01		1	8	0	1.3	1.6	1.8	1.8	0.814
ILM03.0	Sodium	MG/KG	4	4	0			2020	3380	M34SS04S01	J	8	8	0			2350	2550	2440
ILM03.0	Vanadium	MG/KG	4	4	0			7.6	111	M34SS01S01		8	8	0			1.1	3.5	1.71
ILM03.0	Zinc	MG/KG	4	4	0			105	536	M34SS03S01		8	8	0			7.5	121	22.1
STIII213	Aluminum	MG/KG	3	4	0	6400	6400	12200	56500	M34SS01S02		0	8	0	7000	8400			
STIII213	Antimony	MG/KG	4	4	0			1.15	7.51	M34SS01S02		8	8	0			0.288	1.06	0.537
STIII213	Arsenic	MG/KG	4	4	0			12.4	25	M34SS02S02		3	8	0	1.6	1.6	1.62	2	1.09
STIII213	Cadmium	MG/KG	4	4	0			0.658	3.01	M34SS03S02		8	8	0			0.53	1.44	0.946
STIII213	Chromium	MG/KG	4	4	0			19	228	M34SS01S02		1	8	0	7.66	10	12.4	12.4	4.74
STIII213	Copper	MG/KG	4	4	0			178	235	M34SS03S02		5	8	0	3.32	3.32	5.6	7.8	3.83
STIII213	Iron	MG/KG	4	4	0			4280	65300	M34SS01S02		8	8	0			64.2	2060	334

Notes:

ILM03.0 = CLP Metals
STIII213 = NOAA Status and Trends Low Level Metals

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
Mean = Geometric Mean

Table 18.5-2
Summary of Soil Results for Inorganics
Pesticide Shop (Bldg 361), Sand Island (Site 34)

			Site 34									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL - continued																			
STIII213	Lead	MG/KG	4	4	0			75	325	M34SS02S02		5	8	0	4.37	4.37	5.8	9.7	4.61
STIII213	Manganese	MG/KG	4	4	0			53	883	M34SS01S02		3	8	0	14	17	21	37.6	12.6
STIII213	Mercury	MG/KG	4	4	0			0.099	8.53	M34SS03S02		3	8	0	0.025	0.025	0.029	0.062	0.0203
STIII213	Nickel	MG/KG	3	4	0	4.8	4.8	54.2	127	M34SS01S02		2	8	0	5.7	7.3	5.9	9.8	3.84
STIII213	Selenium	MG/KG	1	4	0	0.3	0.42	0.52	0.52	M34SS03S02	J	4	8	0	0.3	0.3	0.322	0.594	0.25
STIII213	Silicon	MG/KG	4	4	0			9100	88600	M34SS04S02		2	8	0	2200	2400	2900	5600	1560
STIII213	Silver	MG/KG	4	4	0			0.055	0.544	M34SS03S02		7	8	0	0.04	0.04	0.0413	0.741	0.073
STIII213	Thallium	MG/KG	3	4	0	0.032	0.032	0.032	0.105	M34SS04S02		6	8	0	0.024	0.024	0.026	0.036	0.0238
STIII213	Tin	MG/KG	4	4	0			2.07	7.3	M34SS03S02		2	8	0	0.072	0.197	5	6.06	0.186
STIII213	Zinc	MG/KG	4	4	0			178	772	M34SS03S02		8	8	0			7.8	75.8	19.6
SUBSURFACE SOIL																			
ILM03.0	Aluminum	MG/KG	4	4	0			170	423	M34BS04S01	J	3	12	0	2.9	4.4	781	5440	9.29
ILM03.0	Barium	MG/KG	4	4	0			7.69	13.3	M34BS01S01		12	12	0			4.3	92.3	8.19
ILM03.0	Beryllium	MG/KG	4	4	0			0.17	0.22	M34BS01S01	J	8	12	0	0.33	0.5	0.21	0.57	0.264
ILM03.0	Cadmium	MG/KG	4	4	0			0.18	0.76	M34BS02S01		7	12	0	0.04	0.06	0.04	0.35	0.0615
ILM03.0	Calcium	MG/KG	4	4	0			336000	342000	M34BS04S01		12	12	0			34100	350000	276000
ILM03.0	Chromium	MG/KG	4	4	0			6	7.2	M34BS01S01		12	12	0			4.1	19	6.09
ILM03.0	Copper	MG/KG	4	4	0			3.8	54.2	M34BS02S01	J	1	12	0	0.56	6.2	26.8	26.8	0.767
ILM03.0	Iron	MG/KG	4	4	0			467	1630	M34BS02S01	J	11	12	0	2.7	2.7	2	6910	33.6
ILM03.0	Lead	MG/KG	4	4	0			11.9	80.9	M34BS02S01		5	12	0	0.19	0.28	0.29	171	0.402
ILM03.0	Magnesium	MG/KG	4	4	0			15000	15900	M34BS01S01		12	12	0			14900	20800	17200
ILM03.0	Manganese	MG/KG	4	4	0			9.89	13.6	M34BS01S01		12	12	0			3.2	124	7.21
ILM03.0	Mercury	MG/KG	1	4	0	0.05	0.05	0.08	0.08	M34BS02S01		0	12	0	0.05	0.06			
ILM03.0	Nickel	MG/KG	1	4	0	1.4	1.42	2.2	2.2	M34BS01S01		1	12	0	1.4	4.73	13.6	13.6	1.09
ILM03.0	Potassium	MG/KG	4	4	0			72.5	81.2	M34BS03S01	J	12	12	0			44.9	248	65.2
ILM03.0	Selenium	MG/KG	4	4	0			1.6	2.5	M34BS01S01		12	12	0			1.3	2.2	1.83
ILM03.0	Silver	MG/KG	2	4	0	1.3	1.36	1.4	1.5	M34BS01S01		2	12	0	1.4	2	1.4	2.2	0.861
ILM03.0	Sodium	MG/KG	4	4	0			2550	2950	M34BS04S01	J	12	12	0			2250	4110	2680
ILM03.0	Vanadium	MG/KG	4	4	0			3.1	4.1	M34BS01S01		11	12	0	0.76	0.76	0.9	12.5	1.58

Notes:

ILM03.0 = CLP Metals
STIII213 = NOAA Status and Trends Low Level Metals
#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)
J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
Mean = Geometric Mean

Table 18.5-2
Summary of Soil Results for Inorganics
Pesticide Shop (Bldg 361), Sand Island (Site 34)

Site 34												Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SUBSURFACE SOIL - continued																			
ILM03.0	Zinc	MG/KG	4	4	0			10	118	M34BS01S01		4	12	0	0.5	3.2	1.6	134	2.08
STIII213	Aluminum	MG/KG	1	4	0	7500	11000	9700	9700	M34BS04S02									
STIII213	Cadmium	MG/KG	4	4	0			0.225	1.3	M34BS02S02	J								
STIII213	Copper	MG/KG	4	4	0			14.5	48.9	M34BS02S02									
STIII213	Iron	MG/KG	4	4	0			315	3010	M34BS03S02									
STIII213	Lead	MG/KG	4	4	0			13.4	105	M34BS02S02									
STIII213	Silver	MG/KG	2	4	0	0.04	0.04	0.044	0.124	M34BS02S02									
STIII213	Thallium	MG/KG	3	4	0	0.024	0.024	0.025	0.03	M34BS01S02									
STIII213	Tin	MG/KG	2	4	0	0.33	0.463	1.04	2.23	M34BS02S02	J								
STIII213	Zinc	MG/KG	4	4	0			11.9	84.3	M34BS01S02									

Notes:

STIII213 = NOAA Status and Trends Low Level Metals
ILM03.0 = CLP Metals

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
Mean = Geometric Mean
Mean = Geometric Mean

Table 18.6-1
Surface Soil CPEC Selection - Site 34

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic									
Aluminum	75	6.40E+03	1.22E+04	5.65E+04	1.34E+04	5.65E+04	2.23E+02	2.52E+01	No(p)
Antimony	100		1.15E+00	7.51E+00	3.10E+00	7.51E+00	2.87E-01	5.37E-01	YES
Arsenic	100		1.24E+01	2.50E+01	1.56E+01	2.43E+01	1.90E+01	1.79E-01	YES
Barium	100		2.30E+01	6.05E+01	4.37E+01	6.05E+01	3.85E+01	8.68E+00	No(p)
Beryllium	100		1.70E-01	8.60E-01	3.55E-01	8.60E-01	3.41E+00	3.00E-01	No(p)
Cadmium	100		6.58E-01	3.01E+00	1.74E+00	3.01E+00	5.63E+00	6.17E-01	No(6)
Calcium	100		1.59E+05	3.19E+05	2.18E+05	3.19E+05		2.44E+05	No(3)
Chromium	100		1.90E+01	2.28E+02	6.31E+01	2.28E+02	3.99E+00	5.48E+00	YES
Cobalt	75	9.90E-01	5.10E+00	2.42E+01	5.37E+00	2.42E+01		7.12E-01	YES
Copper	100		1.78E+02	2.35E+02	2.02E+02	2.35E+02	1.00E+02	1.57E+00	YES
Iron	100		4.28E+03	6.53E+04	1.83E+04	6.53E+04		2.06E+02	No(p)
Lead	100		5.99E+01	1.23E+03	1.62E+02	1.09E+03	7.28E+00	6.28E+00	YES
Magnesium	100		8.05E+03	1.63E+04	1.28E+04	1.63E+04		1.57E+04	No(3)
Manganese	100		5.30E+01	8.83E+02	2.45E+02	8.83E+02	4.54E+02	9.02E+00	YES
Mercury	100		7.00E-02	9.00E+00	3.77E-01	7.91E+00	2.40E-02	3.90E-02	YES
Nickel	75	4.80E+00	5.42E+01	1.27E+02	3.22E+01	1.27E+02	2.65E+02	8.48E-01	No(6)
Potassium	100		1.29E+02	8.05E+02	3.94E+02	8.05E+02		8.39E+01	No(3)
Selenium	75	9.20E-01	8.50E-01	1.80E+00	8.99E-01	1.80E+00	1.85E+00	1.93E+00	No(5)
Silicon	100		9.10E+03	8.86E+04	3.90E+04	8.86E+04			No(3)
Silver	25	1.40E+00	1.50E+00	1.50E+00	9.30E-01	1.49E+00		8.14E-01	No(5)
Sodium	100		2.02E+03	3.38E+03	2.54E+03	3.38E+03		2.44E+03	No(3)
Thallium	75	3.20E-02	3.20E-02	1.05E-01	4.05E-02	1.05E-01	3.90E-02	2.66E-02	YES
Tin	100		2.07E+00	7.30E+00	3.57E+00	7.30E+00		3.14E-01	YES
Vanadium	100		7.60E+00	1.11E+02	2.43E+01	1.11E+02	4.44E+01	1.71E+00	YES
Zinc	100		1.78E+02	7.72E+02	3.39E+02	7.72E+02	1.11E+01	2.21E+01	YES
Organic									
2,4'-DDD	50	5.40E-05	2.20E-03	2.10E-01	1.83E-03	1.71E-01	1.58E-02		YES
2,4'-DDE	25	4.30E-05	7.70E-02	7.70E-02	4.84E-04	6.33E-02	1.58E-02		YES
2,4'-DDT	75	2.80E-03	9.50E-03	1.30E+00	2.13E-02	1.12E+00	1.58E-02		YES
4,4'-DDD	100		1.80E-02	6.30E-01	7.07E-02	6.30E-01	1.58E-02		YES
4,4'-DDE	75	3.50E-02	6.20E-02	5.60E+00	2.03E-01	5.60E+00	1.58E-02		YES

Table 18.6-1
Surface Soil CPEC Selection - Site 34

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
4,4'-DDT	100		7.50E-02	6.40E+00	3.39E-01	5.61E+00	1.58E-02		YES
Acenaphthene	25	4.00E-03	7.20E-03	7.20E-03	2.85E-03	6.78E-03	2.30E+00		No(6)
Acenaphthylene	75	4.00E-03	1.70E-03	1.30E-02	4.07E-03	1.30E-02	2.30E+00		No(6)
alpha-BHC	25	2.90E-05	5.70E-05	5.70E-05	1.47E-04	5.70E-05	1.12E+00		No(6)
alpha-Chlordane	100		2.70E-02	2.30E+00	1.47E-01	2.12E+00	3.20E+00		No(6)
Anthracene	100		3.60E-03	3.90E-02	1.13E-02	3.90E-02	2.30E+00		No(6)
Aroclor-1260	25	1.50E-01	1.50E-01	1.50E-01	1.40E-01	1.50E-01	1.24E-01		YES
Benzo(a)anthracene	100		2.10E-02	2.60E-01	4.84E-02	2.36E-01	2.30E+00		No(6)
Benzo(a)pyrene	100		1.80E-02	2.20E-01	4.53E-02	2.07E-01	2.30E+00		No(6)
Benzo(b)fluoranthene	100		3.40E-02	3.50E-01	8.54E-02	3.41E-01	2.30E+00		No(6)
Benzo(e)pyrene	100		2.50E-02	1.80E-01	5.59E-02	1.80E-01	2.30E+00		No(6)
Benzo(g,h,i)perylene	100		2.30E-02	1.50E-01	4.76E-02	1.49E-01	2.30E+00		No(6)
Benzo(k)fluoranthene	100		9.90E-03	1.10E-01	2.69E-02	1.09E-01	2.30E+00		No(6)
beta-BHC	25	5.30E-05	2.10E-04	2.10E-04	3.20E-04	2.10E-04	2.07E+00		No(6)
Biphenyl	25	4.30E-03	1.10E-03	1.10E-03	1.88E-03	1.10E-03	2.30E+00		No(6)
bis(2-Ethylhexyl)phthalate	100		7.00E-02	4.20E-01	2.28E-01	4.20E-01	2.22E+00		No(1)
Chlorpyrifos	75	7.20E-02	2.50E-02	3.30E-01	8.43E-02	3.30E-01			YES
Chrysene	100		3.10E-02	3.30E-01	7.48E-02	3.11E-01	2.30E+00		No(6)
Chrysenes, C1-alky	100		2.00E-02	2.10E-01	4.18E-02	1.89E-01	2.30E+00		No(6)
Chrysenes, C2-alky	100		2.10E-02	1.10E-01	3.50E-02	1.02E-01	2.30E+00		No(6)
Chrysenes, C3-alky	100		1.80E-02	4.70E-02	2.41E-02	4.50E-02	2.30E+00		No(6)
Chrysenes, C4-alky	100		1.20E-02	2.60E-02	1.63E-02	2.58E-02	2.30E+00		No(6)
Di-n-Butylphthalate	25	3.50E-01	6.20E-02	6.20E-02	1.53E-01	6.20E-02	2.22E-01		No(6)
Dibenzo(a,h)anthracene	100		3.80E-03	3.70E-02	8.70E-03	3.50E-02	2.30E+00		No(6)
Dibenzothiophene	75	4.00E-03	1.20E-03	9.30E-03	2.36E-03	8.68E-03	2.30E+00		No(6)
Dibenzothiophenes, C1-alky	25	3.90E-03	2.30E-02	2.30E-02	3.75E-03	2.04E-02	2.30E+00		No(6)
Dibenzothiophenes, C2-alky	25	3.90E-03	5.90E-02	5.90E-02	4.74E-03	4.98E-02	2.30E+00		No(6)
Dibenzothiophenes, C3-alky	25	3.90E-03	4.80E-02	4.80E-02	4.50E-03	4.10E-02	2.30E+00		No(6)
Dieldrin	50	6.90E-05	1.30E-03	6.30E-03	7.55E-04	6.30E-03	2.22E-01		No(6)
Endrin ketone	25	4.50E-05	7.70E-06	7.70E-06	1.03E-04	7.70E-06	1.17E+00		No(6)
Fluoranthene	100		3.80E-02	4.00E-01	8.56E-02	3.67E-01	2.30E+00		No(6)
Fluoranth+Pyr, C1-alky	100		3.00E-02	3.10E-01	5.77E-02	2.75E-01	2.30E+00		No(6)

Table 18.6-1
Surface Soil CPEC Selection - Site 34

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Fluoranth+Pyr, C2-alky	100		1.80E-02	2.30E-01	4.28E-02	2.09E-01	2.30E+00		No(6)
Fluoranth+Pyr, C3-alky	100		1.20E-02	8.10E-02	2.24E-02	7.65E-02	2.30E+00		No(6)
Fluorene	75	5.50E-03	1.20E-03	9.20E-03	2.64E-03	8.98E-03	2.30E+00		No(6)
Fluorenes, C1-alky	25	5.30E-03	6.50E-03	6.50E-03	3.45E-03	6.24E-03	2.30E+00		No(6)
Fluorenes, C2-alky	25	5.30E-03	1.70E-02	1.70E-02	4.39E-03	1.55E-02	2.30E+00		No(6)
gamma-BHC (Lindane)	50	1.80E-03	2.40E-05	2.20E-04	2.66E-04	2.20E-04	7.41E+00		No(6)
gamma-Chlordane	100		3.10E-02	3.00E+00	1.68E-01	2.67E+00	3.20E+00		No(6)
Heptachlor	75	2.30E-03	2.30E-03	4.00E-01	7.17E-03	3.07E-01	4.13E+00		No(6)
Heptachlor epoxide	50	7.20E-05	8.40E-03	1.40E-01	2.75E-03	1.40E-01	4.13E+00		No(6)
Hexachlorobenzene	25	4.30E-05	4.10E-03	4.10E-03	2.40E-04	4.10E-03			YES
Indeno(1,2,3-cd)pyrene	100		1.50E-02	1.50E-01	3.85E-02	1.50E-01	2.30E+00		No(6)
Methoxychlor	50	9.20E-03	1.80E-04	1.70E-03	1.63E-03	1.70E-03	2.06E+01		No(6)
Mirex	100		4.30E-04	6.90E-03	1.55E-03	6.90E-03			YES
PCB-28	25	9.30E-05	4.10E-05	4.10E-05	2.68E-04	4.10E-05	1.24E-01		No(6)
PCB-44	50	4.60E-05	2.40E-03	4.40E-02	1.20E-03	4.07E-02	1.24E-01		No(6)
PCB-52	25	2.70E-05	8.30E-03	8.30E-03	4.83E-04	7.75E-03	1.24E-01		No(6)
PCB-101	25	2.70E-05	5.70E-02	5.70E-02	7.83E-04	4.72E-02	1.24E-01		No(6)
PCB-105	25	3.00E-05	1.90E-02	1.90E-02	6.53E-04	1.70E-02	1.24E-01		No(6)
PCB-118	25	4.10E-05	3.70E-02	3.70E-02	9.66E-04	3.25E-02	1.24E-01		No(6)
PCB-128	100		8.00E-04	1.00E-02	3.76E-03	1.00E-02	1.24E-01		No(6)
PCB-138	100		4.60E-03	5.30E-02	2.23E-02	5.30E-02	1.24E-01		No(6)
PCB-153	100		3.50E-03	4.80E-02	1.90E-02	4.80E-02	1.24E-01		No(6)
PCB-170	100		3.90E-03	2.10E-02	1.04E-02	2.10E-02	1.24E-01		No(6)
PCB-180	100		7.00E-03	3.20E-02	1.69E-02	3.20E-02	1.24E-01		No(6)
PCB-187	75	8.90E-05	4.20E-03	2.30E-02	2.39E-03	2.30E-02	1.24E-01		No(6)
PCB-195	100		7.70E-04	4.70E-03	2.26E-03	4.70E-03	1.24E-01		No(6)
PCB-206	100		9.80E-04	1.10E-02	2.21E-03	1.04E-02	1.24E-01		No(6)
PCB-209	100		3.80E-04	5.50E-03	1.06E-03	5.12E-03	1.24E-01		No(6)
Pentachlorophenol	66.7	1.20E-03	2.20E-03	3.20E-03	1.62E-03	3.20E-03			YES
Perylene	100		5.10E-03	5.00E-02	1.27E-02	4.97E-02	2.30E+00		No(6)
Phenanthrene	100		1.20E-02	1.70E-01	3.12E-02	1.56E-01	2.30E+00		No(6)
Phenanth+Anthra., C1-alky	100		1.20E-02	1.50E-01	2.39E-02	1.32E-01	2.30E+00		No(6)

Table 18.6-1
Surface Soil CPEC Selection - Site 34

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Phenanth+Anthra., C2-alky	100		1.20E-02	1.60E-01	2.66E-02	1.44E-01	2.30E+00		No(6)
Phenanth+Anthra., C3-alky	100		9.70E-03	9.10E-02	2.86E-02	9.10E-02	2.30E+00		No(6)
Phenanth+Anthra., C4-alky	100		2.50E-02	1.40E-01	4.58E-02	1.34E-01	2.30E+00		No(6)
Photomirex	50	2.90E-03	1.40E-05	5.50E-04	3.68E-04	5.50E-04			YES
Pyrene	100		3.70E-02	4.00E-01	8.50E-02	3.69E-01	2.30E+00		No(6)
trans-Nonachlor	100		2.90E-02	2.00E+00	1.51E-01	1.96E+00			YES

*TBC values are NOAEL dietary concentrations assuming a diet of 100% soil, from Opresko et. al. (1994) ; values for B(a)P were substituted for PAHs without a dose in Opresko, and the value for Arochlor 1248 was substituted for all the PCB congeners.
**Mean value of background surface soil samples taken on Sand Island.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 18.6-2
Subsurface soil CPEC Selection - Site 34

METHOD	Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
	Inorganic									
STIII213	Aluminum	25	7.50E+03	9.70E+03	9.70E+03	5.62E+03	9.70E+03	2.23E+02	9.29E+00	No(p)
ILM03.0	Barium	100		7.69E+00	1.33E+01	9.95E+00	1.33E+01	3.85E+01	8.19E+00	No(5)
ILM03.0	Beryllium	100		1.70E-01	2.20E-01	1.91E-01	2.20E-01	3.41E+00	2.64E-01	No(5)
STIII213	Cadmium	100		2.25E-01	1.30E+00	4.34E-01	1.26E+00	5.63E+00	6.15E-02	No(6)
ILM03.0	Calcium	100		3.36E+05	3.42E+05	3.39E+05	3.42E+05		2.76E+05	No(3)
ILM03.0	Chromium	100		6.00E+00	7.20E+00	6.34E+00	7.14E+00	3.99E+00	6.09E+00	No(5)
ILM03.0	Copper	100		3.80E+00	5.42E+01	1.36E+01	5.42E+01	1.00E+02	7.67E-01	No(6)
STIII213	Iron	100		3.15E+02	3.01E+03	9.34E+02	3.01E+03		3.36E+01	No(p)
STIII213	Lead	100		1.34E+01	1.05E+02	3.35E+01	1.05E+02	7.28E+00	4.02E-01	YES
ILM03.0	Magnesium	100		1.50E+04	1.59E+04	1.54E+04	1.59E+04		1.72E+04	No(3)
ILM03.0	Manganese	100		9.89E+00	1.36E+01	1.18E+01	1.36E+01	4.54E+02	7.21E+00	No(5)
ILM03.0	Mercury	25	5.00E-02	8.00E-02	8.00E-02	3.34E-02	7.68E-02	2.40E-02		YES
ILM03.0	Nickel	25	1.40E+00	2.20E+00	2.20E+00	9.36E-01	2.09E+00	2.65E+02	1.09E+00	No(5)
ILM03.0	Potassium	100		7.25E+01	8.12E+01	7.56E+01	8.11E+01		6.52E+01	No(3)
ILM03.0	Selenium	100		1.60E+00	2.50E+00	1.99E+00	2.50E+00	1.85E+00	1.83E+00	No(5)
ILM03.0	Silver	50	1.30E+00	1.40E+00	1.50E+00	9.81E-01	1.50E+00		8.61E-01	No(5)
ILM03.0	Sodium	100		2.55E+03	2.95E+03	2.75E+03	2.95E+03		2.68E+03	No(3)
STIII213	Thallium	75	2.40E-02	2.50E-02	3.00E-02	2.26E-02	3.00E-02	3.90E-02		No(6)
STIII213	Tin	100		3.30E-01	2.23E+00	7.72E-01	2.23E+00			YES
ILM03.0	Vanadium	100		3.10E+00	4.10E+00	3.41E+00	4.06E+00	4.44E+01	1.58E+00	No(6)
ILM03.0	Zinc	100		1.00E+01	1.18E+02	3.75E+01	1.18E+02	1.11E+01	2.08E+00	YES
#N/A	**Organic**									
STIV141E	2,4'-DDD	50	1.80E-05	2.80E-03	1.60E-02	2.90E-04	1.60E-02	1.58E-03		YES
STIV141E	2,4'-DDE	25	2.10E-05	4.10E-03	4.10E-03	5.58E-05	3.66E-03	1.58E-03		YES
STIV141E	2,4'-DDT	100		7.30E-04	2.40E-01	6.40E-03	2.12E-01	1.58E-03		YES
STIV141E	4,4'-DDD	100		2.30E-04	1.30E-02	1.60E-03	1.30E-02	1.58E-03		YES
OLM01.0P	4,4'-DDE	75	3.60E-03	2.30E-02	1.10E+00	4.07E-02	1.10E+00	1.58E-03		YES
OLM01.0P	4,4'-DDT	75	3.60E-03	1.70E-02	1.30E+00	4.25E-02	1.30E+00	1.58E-03		YES
STIV141A	Acenaphthene	25	2.00E-04	2.00E-04	2.00E-04	1.69E-04	2.00E-04	2.30E+00		No(6)
OLM01.0	Acenaphthylene	25	3.50E-01	3.80E-02	3.80E-02	1.22E-01	3.80E-02	2.30E+00		No(6)
OLM01.0P	alpha-Chlordane	50	1.80E-03	4.40E-02	1.60E-01	8.69E-03	1.60E-01	3.20E+00		No(6)
STIV141A	Anthracene	100		3.30E-04	1.40E-02	2.28E-03	1.40E-02	2.30E+00		No(6)
OLM01.0	Benzo(a)Anthracene	75	3.50E-01	3.10E-02	9.90E-02	8.38E-02	9.90E-02	2.30E+00		No(6)
OLM01.0	Benzo(a)Pyrene	50	3.50E-01	4.90E-02	2.20E-01	1.37E-01	2.20E-01	2.30E+00		No(6)
OLM01.0	Benzo(b)Fluoranthene	75	3.50E-01	3.80E-02	3.50E-01	1.20E-01	3.50E-01	2.30E+00		No(6)
STIV141A	Benzo(e)pyrene	100		1.40E-03	7.90E-02	1.15E-02	7.90E-02	2.30E+00		No(6)
OLM01.0	Benzo(g,h,i)perylene	25	3.50E-01	2.30E-01	2.30E-01	1.91E-01	2.28E-01	2.30E+00		No(6)

Table 18.6-2
Subsurface soil CPEC Selection - Site 34

METHOD	Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
OLM01.0	Benzo(k)Fluoranthene	25	3.50E-01	1.20E-01	1.20E-01	1.63E-01	1.20E-01	2.30E+00		No(6)
STIV141A	Biphenyl	50	2.20E-04	8.50E-05	1.20E-04	1.24E-04	1.20E-04	2.30E+00		No(6)
OLM01.0	bis(2-Ethylhexyl)phthalate	25	3.50E-01	2.50E-02	2.50E-02	1.10E-01	2.50E-02	2.22E+00		No(1)
OLM01.0	Chrysene	50	3.50E-01	1.30E-01	1.40E-01	1.56E-01	1.40E-01	2.30E+00		No(6)
STIV141A	Chrysenes, C1-alky	100		8.40E-04	4.80E-02	8.25E-03	4.80E-02	2.30E+00		No(6)
STIV141A	Chrysenes, C2-alky	75	3.20E-04	3.60E-03	2.60E-02	4.05E-03	2.60E-02	2.30E+00		No(6)
STIV141A	Chrysenes, C3-alky	75	3.20E-04	3.10E-03	1.70E-02	3.41E-03	1.70E-02	2.30E+00		No(6)
STIV141A	Chrysenes, C4-alky	75	3.20E-04	2.10E-03	1.70E-02	2.66E-03	1.70E-02	2.30E+00		No(6)
OLM01.0	Dibenzo(a,h)Anthracene	25	3.50E-01	7.90E-02	7.90E-02	1.46E-01	7.90E-02	2.30E+00		No(6)
STIV141A	Dibenzothiophene	75	2.00E-04	1.50E-04	4.00E-04	2.20E-04	4.00E-04	2.30E+00		No(6)
STIV141A	Dibenzothiophenes, C1-alky	75	2.00E-04	1.20E-03	1.40E-03	6.70E-04	1.40E-03	2.30E+00		No(6)
STIV141A	Dibenzothiophenes, C2-alky	75	2.00E-04	9.00E-04	2.90E-03	8.80E-04	2.90E-03	2.30E+00		No(6)
STIV141A	Dibenzothiophenes, C3-alky	75	2.00E-04	1.10E-03	3.90E-03	1.10E-03	3.90E-03	2.30E+00		No(6)
OLM01.0P	Dieldrin	25	3.40E-03	1.90E-01	1.90E-01	6.69E-03	1.54E-01	2.22E-01		No(6)
STIV141E	Endrin	25	6.40E-06	3.50E-03	3.50E-03	2.21E-05	3.14E-03	1.17E+00		No(6)
STIV141E	Endrin ketone	50	1.60E-05	5.10E-06	4.60E-04	2.30E-05	4.30E-04	1.17E+00		No(6)
OLM01.0	Fluoranthene	50	3.50E-01	1.00E-01	1.00E-01	1.34E-01	1.00E-01	2.30E+00		No(6)
STIV141A	Fluoranth+Pyr, C1-alky	75	2.40E-04	6.40E-03	5.50E-02	6.02E-03	5.50E-02	2.30E+00		No(6)
STIV141A	Fluoranth+Pyr, C2-alky	100		1.30E-04	4.60E-02	5.09E-03	4.60E-02	2.30E+00		No(6)
STIV141A	Fluoranth+Pyr, C3-alky	75	2.40E-04	3.20E-03	2.20E-02	3.30E-03	2.20E-02	2.30E+00		No(6)
STIV141A	Fluorene	75	2.70E-04	1.80E-04	4.90E-04	2.59E-04	4.90E-04	2.30E+00		No(6)
STIV141A	Fluorenes, C1-alky	50	2.60E-04	3.10E-04	6.30E-04	2.42E-04	6.30E-04	2.30E+00		No(6)
STIV141A	Fluorenes, C2-alky	50	2.60E-04	7.30E-04	1.50E-03	3.72E-04	1.50E-03	2.30E+00		No(6)
STIV141A	Fluorenes, C3-alky	25	2.60E-04	7.80E-03	7.80E-03	4.42E-04	6.88E-03	2.30E+00		No(6)
OLM01.0P	gamma-Chlordane	50	1.80E-03	5.60E-02	1.50E-01	9.08E-03	1.50E-01	3.20E+00		No(6)
STIV141E	Heptachlor	75	4.00E-05	7.10E-05	1.60E-02	6.20E-04	1.60E-02	4.13E+00		No(6)
STIV141E	Heptachlor epoxide	75	4.70E-05	2.20E-04	1.50E-02	8.87E-04	1.50E-02	4.13E+00		No(6)
STIV141E	Hexachlorobenzene	25	2.20E-05	1.50E-03	1.50E-03	5.22E-05	1.38E-03			YES
OLM01.0	Indeno(1,2,3-cd)pyrene	25	3.50E-01	2.10E-01	2.10E-01	1.87E-01	2.09E-01	2.30E+00		No(6)
STIV141E	Methoxychlor	75	9.30E-05	5.10E-05	2.50E-04	9.71E-05	2.50E-04	2.06E+01		No(6)
STIV141E	Mirex	100		2.60E-05	6.90E-03	2.60E-04	6.10E-03			YES
STIV141A	Naphthalenes, C1-alky	100		2.70E-04	6.10E-04	4.12E-04	6.10E-04	2.30E+00		No(6)
STIV141A	Naphthalenes, C2-alky	50	2.80E-04	3.70E-04	1.00E-03	3.50E-04	9.83E-04	2.30E+00		No(6)
STIV141A	Naphthalenes, C3-alky	25	2.70E-04	1.20E-03	1.20E-03	2.85E-04	1.14E-03	2.30E+00		No(6)
STIV141A	Naphthalenes, C4-alky	25	2.70E-04	3.70E-03	3.70E-03	3.77E-04	3.37E-03	2.30E+00		No(6)
STIV141E	Oxychlorostyrene	25	1.90E-05	8.10E-04	8.10E-04	4.05E-05	7.52E-04			YES
STIV141C	PCB-28	50	3.20E-05	7.90E-05	1.90E-04	5.20E-05	1.89E-04	1.24E-01		No(6)
STIV141C	PCB-44	25	1.60E-05	3.30E-03	3.30E-03	5.02E-05	2.97E-03	1.24E-01		No(6)

Table 18.6-2
Subsurface soil CPEC Selection - Site 34

METHOD	Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
STIV141C	PCB-101	75	2.50E-05	3.30E-04	1.30E-02	7.86E-04	1.30E-02	1.24E-01		No(6)
STIV141C	PCB-105	50	1.50E-05	1.00E-04	3.70E-04	4.55E-05	3.60E-04	1.24E-01		No(6)
STIV141C	PCB-126	25	3.90E-05	1.10E-04	1.10E-04	3.65E-05	1.07E-04	1.24E-01		No(6)
STIV141C	PCB-128	75	3.40E-05	1.20E-04	8.10E-04	1.82E-04	8.10E-04	1.24E-01		No(6)
STIV141C	PCB-138	100		3.20E-04	5.40E-03	1.22E-03	5.40E-03	1.24E-01		No(6)
STIV141C	PCB-153	100		2.30E-04	2.80E-03	7.64E-04	2.80E-03	1.24E-01		No(6)
STIV141C	PCB-170	100		2.60E-04	2.20E-03	7.65E-04	2.20E-03	1.24E-01		No(6)
STIV141C	PCB-180	100		4.50E-04	8.90E-03	1.81E-03	8.90E-03	1.24E-01		No(6)
STIV141C	PCB-187	100		3.60E-04	2.00E-03	1.30E-03	2.00E-03	1.24E-01		No(6)
STIV141C	PCB-195	100		5.80E-05	8.80E-04	3.13E-04	8.80E-04	1.24E-01		No(6)
STIV141C	PCB-206	100		7.30E-05	7.90E-04	2.38E-04	7.90E-04	1.24E-01		No(6)
STIV141C	PCB-209	100		2.20E-04	7.40E-04	4.98E-04	7.40E-04	1.24E-01		No(6)
STIV141A	Perylene	75	1.10E-04	1.20E-03	2.80E-02	2.05E-03	2.80E-02	2.30E+00		No(6)
STIV141A	Phenanthrene	100		8.70E-04	9.40E-03	3.83E-03	9.40E-03	2.30E+00		No(6)
STIV141A	Phenanth+Anthra., C1-alky	100		1.60E-04	1.40E-02	2.61E-03	1.40E-02	2.30E+00		No(6)
STIV141A	Phenanth+Anthra., C2-alky	100		2.20E-04	1.70E-02	3.11E-03	1.70E-02	2.30E+00		No(6)
STIV141A	Phenanth+Anthra., C3-alky	75	3.30E-04	2.10E-03	1.20E-02	2.54E-03	1.20E-02	2.30E+00		No(6)
STIV141A	Phenanth+Anthra., C4-alky	75	3.30E-04	3.40E-03	2.20E-02	3.86E-03	2.20E-02	2.30E+00		No(6)
STIV141E	Photomirex	25	2.90E-05	1.50E-04	1.50E-04	3.68E-05	1.43E-04			YES
OLM01.0	Pyrene	75	3.50E-01	4.80E-02	1.40E-01	1.07E-01	1.40E-01	2.30E+00		No(6)
STIV141E	trans-Nonachlor	100		3.60E-04	8.80E-02	7.90E-03	8.80E-02			YES

*TBC values are NOAEL dietary concentrations assuming a diet of 100% soil, from Opresko et. al. (1994) ; values for B(a)P were substituted for PAHs without a dose in Opresko, and the value for Arochlor 1248 was substituted for all the PCB congeners.
**Mean value of background subsurface soil samples taken on Sand Island.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 18.6-3
CPEC Environmental Concentrations in all Abiotic Media - Site 34

Analyte	EC (mg/kg) Surface Soil	EC (mg/kg) Subsurface Soil
Inorganic		
Antimony	7.51E+00	
Arsenic	2.43E+01	
Chromium	2.28E+02	
Cobalt	2.42E+01	
Copper	2.35E+02	
Lead	1.09E+03	1.05E+02
Manganese	8.83E+02	
Mercury	7.91E+00	7.68E-02
Thallium	1.05E-01	
Tin	7.30E+00	2.23E+00
Vanadium	1.11E+02	
Zinc	7.72E+02	1.18E+02
Organic		
2,4'-DDD	1.71E-01	1.60E-02
2,4'-DDE	6.33E-02	3.66E-03
2,4'-DDT	1.12E+00	2.12E-01
4,4'-DDD	6.30E-01	1.30E-02
4,4'-DDE	5.60E+00	1.10E+00
4,4'-DDT	5.61E+00	1.30E+00
Aroclor-1260	1.50E-01	
Chlorpyrifos	3.30E-01	
Hexachlorobenzene	4.10E-03	1.38E-03
Mirex	6.90E-03	6.10E-03
Oxychlorostyrene		7.52E-04
Pentachlorophenol	3.20E-03	
Photomirex	5.50E-04	1.43E-04
trans-Nonachlor	1.96E+00	8.80E-02

Table 18.6-4
Target Receptor Exposure Point Values - Site 34

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Ground-nesting Bird (Laysan albatross)		
	dermal (mg/kg-d)	ingestion (mg/kg-d)	EPV_{gn} (mg/kg-d)
Inorganic			
Antimony	7.77E-03	2.42E-03	1.02E-02
Arsenic	2.51E-02	7.81E-03	3.29E-02
Chromium	2.36E-01	7.33E-02	3.09E-01
Cobalt	2.50E-02	7.78E-03	3.28E-02
Copper	2.43E-01	7.56E-02	3.19E-01
Lead	1.13E+00	3.51E-01	1.48E+00
Manganese	9.13E-01	2.84E-01	1.20E+00
Mercury	8.18E-03	2.54E-03	1.07E-02
Thallium	1.09E-04	3.38E-05	1.42E-04
Tin	7.55E-03	2.35E-03	9.90E-03
Vanadium	1.15E-01	3.57E-02	1.50E-01
Zinc	7.98E-01	2.48E-01	1.05E+00
Organic			
2,4'-DDD	1.77E-03	5.50E-05	1.82E-03
2,4'-DDE	6.55E-04	2.04E-05	6.75E-04
2,4'-DDT	1.16E-02	3.60E-04	1.19E-02
4,4'-DDD	6.51E-03	2.03E-04	6.72E-03
4,4'-DDE	5.79E-02	1.80E-03	5.97E-02
4,4'-DDT	5.80E-02	1.80E-03	5.98E-02
Aroclor-1260	7.76E-03	4.82E-05	7.80E-03
Chlorpyrifos	1.71E-02	1.06E-04	1.72E-02
Hexachlorobenzene	2.12E-04	1.32E-06	2.13E-04
Mirex	3.57E-04	2.22E-06	3.59E-04
Oxychlorostyrene	ND	ND	ND
Pentachlorophenol	1.65E-04	1.03E-06	1.66E-04
Photomirex	2.84E-05	1.77E-07	2.86E-05
trans-Nonachlor	1.01E-01	6.30E-04	1.02E-01

ND = not detected/not selected as CPEC
DG = data gap; no parameter available for exposure calculation

Table 18.6-5
Toxicity Quotients for Target Receptors - Site 34

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Ground-nesting Bird (Laysan albatross)		
	EPV	TRV	TQ*
Inorganic			
Antimony	1.02E-02	3.50E-03	0.46
Arsenic	3.29E-02	1.02E+00	
Chromium	3.09E-01	2.00E-01	0.19
Cobalt	3.28E-02	5.40E-02	
Copper	3.19E-01	8.40E+00	
Lead	1.48E+00	8.40E-01	0.25
Manganese	1.20E+00	3.60E+00	
Mercury	1.07E-02	8.62E+01	
Thallium	1.42E-04	2.40E+00	
Tin	9.90E-03	5.00E-01	
Vanadium	1.50E-01	1.14E+01	
Zinc	1.05E+00	1.18E+02	
Organic			
2,4'-DDD	1.82E-03	4.10E+00	
2,4'-DDE	6.75E-04	3.00E-02	
2,4'-DDT	1.19E-02	1.10E-01	
4,4'-DDD	6.72E-03	4.10E+00	
4,4'-DDE	5.97E-02	3.00E-02	0.30
4,4'-DDT	5.98E-02	1.10E-01	
Aroclor-1260	7.80E-03	8.40E-02	
Chlorpyrifos	1.72E-02	1.52E+00	
Hexachlorobenzene	2.13E-04	1.00E+00	
Mirex	3.59E-04	5.10E-01	
Oxychlorostyrene	ND	DG	
Pentachlorophenol	1.66E-04	7.60E+00	
Photomirex	2.86E-05	5.10E-01	
trans-Nonachlor	1.02E-01	1.20E+00	

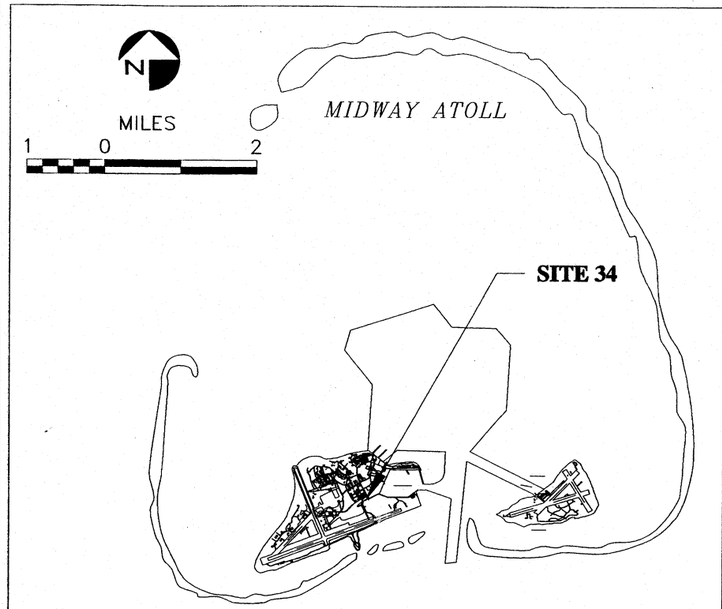
* TQ = log(EPV/TRV); only data gaps (DG) and TQ values greater than or equal to 0 are shown

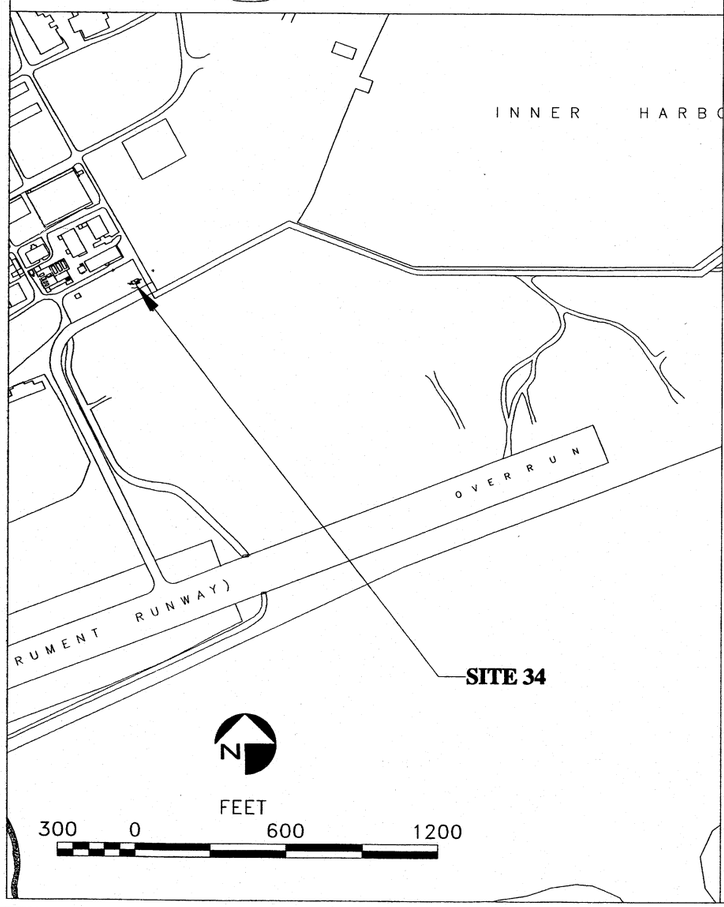
DG = data gap; no parameter available for exposure calculation

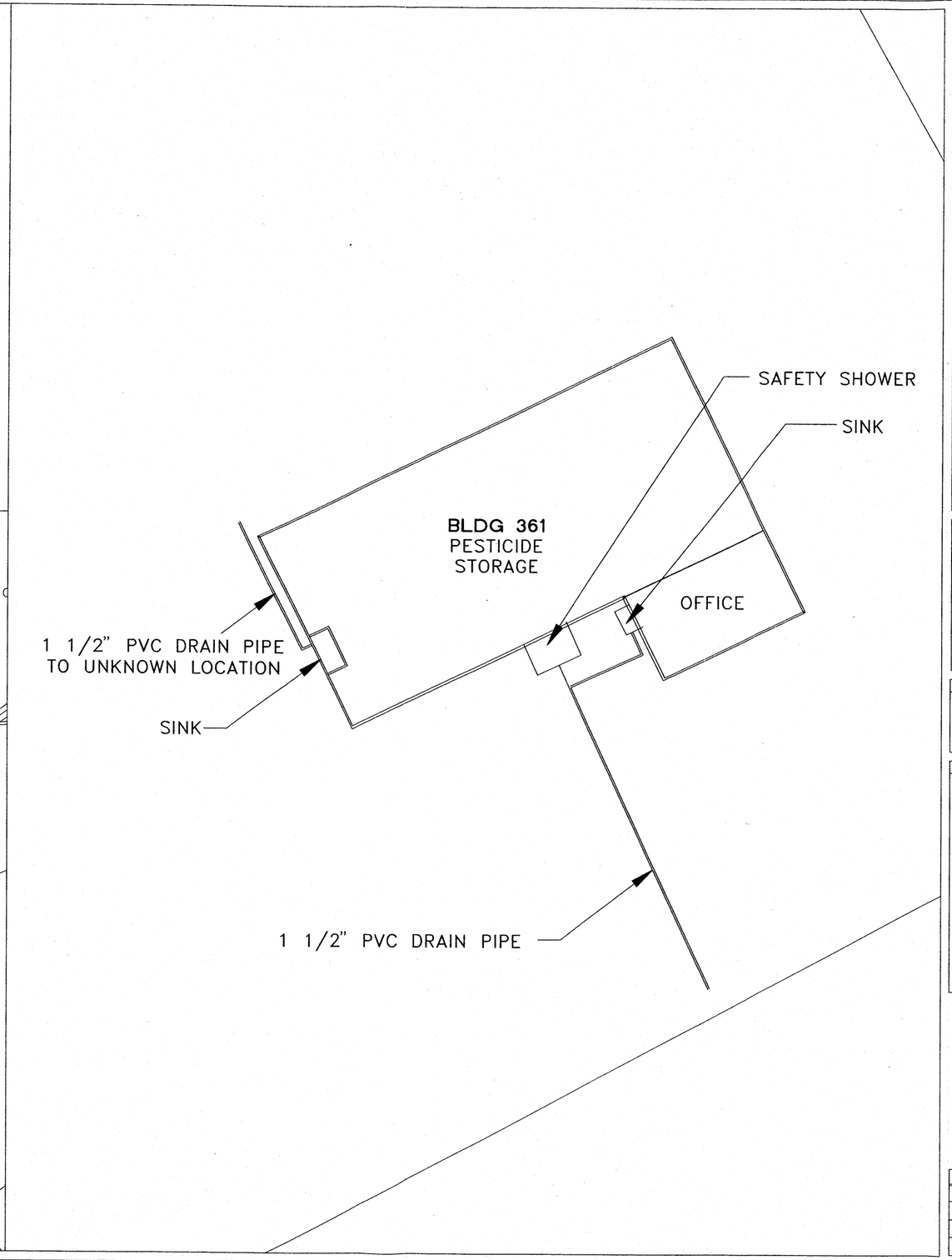
Table 18.6-6
Risk Description (Weight-of-Evidence) Summary - Site 34

ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
• Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
No probability for acute or chronic adverse affects in any individuals of special status bird species from direct and/or secondary exposure to site-related CPEC.							NO
• Impairment of reproduction in ground-nesting birds	CPEC present in surface and subsurface soils		Several TQ > 0 DDT key contaminant				
• Impairment of reproduction in burrowing birds							
• Impairment of reproduction in shorebirds							

Figures
Section 18







LEGEND

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE34\05169592.DWG DATE: 5-16-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

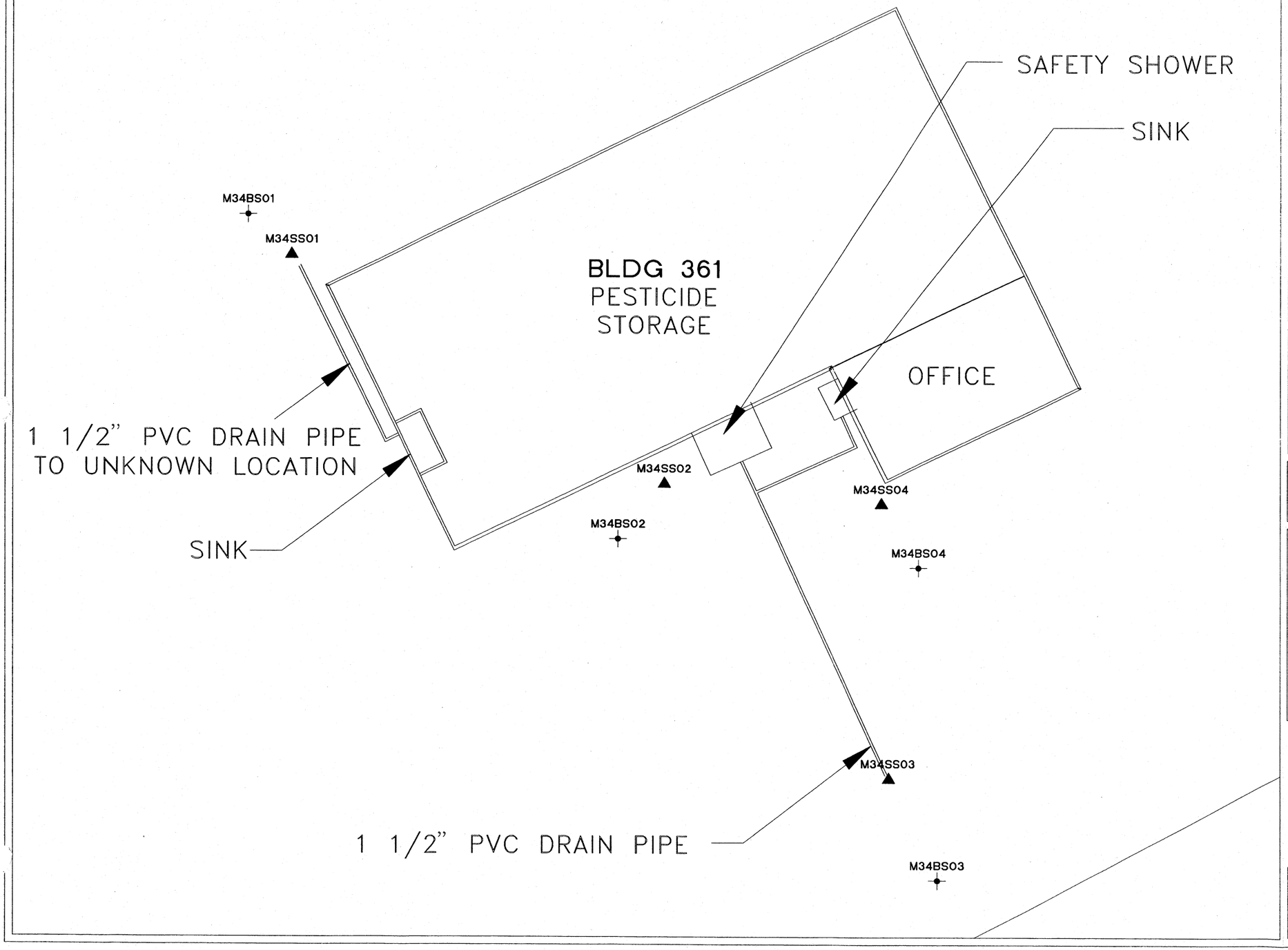
TITLE

PESTICIDE SHOP, BLDG 361
(SITE 34)
SAND ISLAND

N
FEET
5 0 10 20

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
18.1-1



LEGEND

M##SS## ▲ SURFACE SOIL SAMPLE LOCATION AND IDENTIFICATION NUMBER

M##BS## ✦ HAND AUGER SAMPLE LOCATION AND IDENTIFICATION NUMBER

NOTES

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5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE34\05169593.DWG DATE: 6-11-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

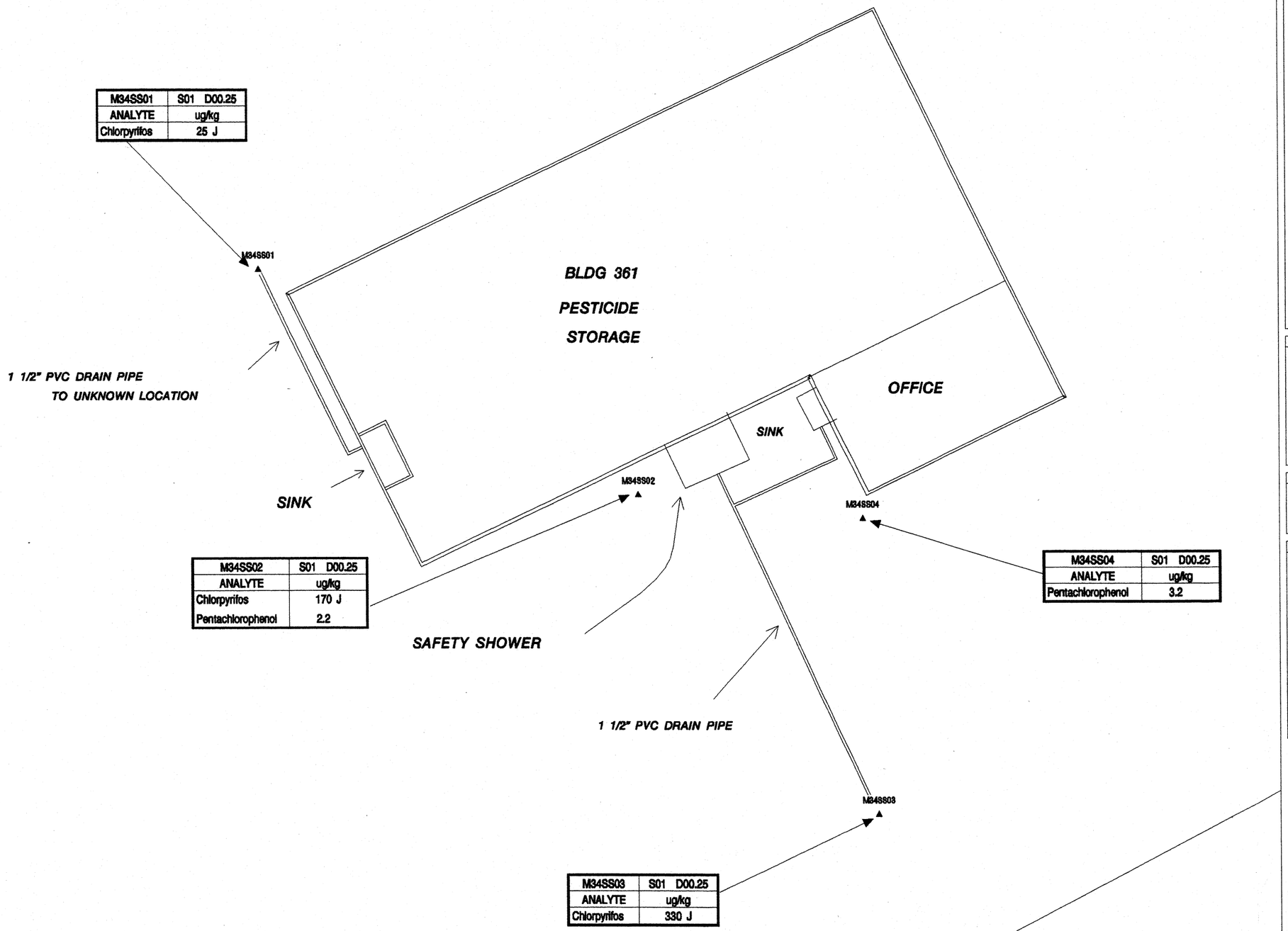
SURFACE SOIL AND HAND AUGER SAMPLE LOCATIONS (SITE 34) SAND ISLAND

N

FEET
3 0 6 12

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
18.2-1



M34SS01	S01 D00.25
ANALYTE	ug/kg
Chlorpyrifos	25 J

M34SS02	S01 D00.25
ANALYTE	ug/kg
Chlorpyrifos	170 J
Pentachlorophenol	2.2

M34SS04	S01 D00.25
ANALYTE	ug/kg
Pentachlorophenol	3.2

M34SS03	S01 D00.25
ANALYTE	ug/kg
Chlorpyrifos	330 J

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M34SS02	OGDEN SAMPLE ID
330	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appe/hm/cto138/mape/m5169595

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

HERBICIDES AND PESTICIDES BY EPA METHODS DETECTED IN SURFACE SOIL SAMPLES (SITE 34) SAND ISLAND

N

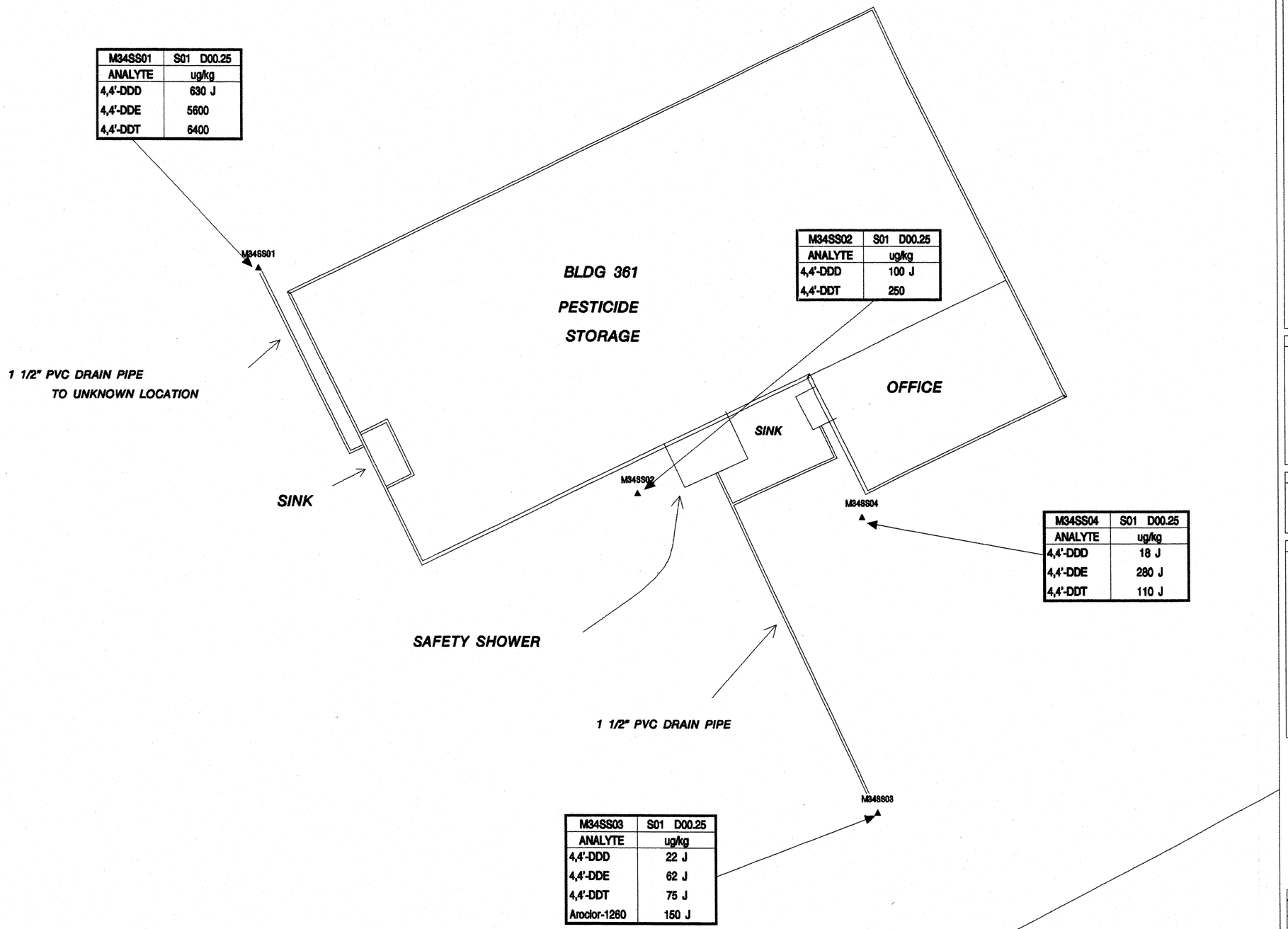
FEET

0 3 6 12 18

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

18.5-1



M34SS01	S01 D00.25
ANALYTE	ug/kg
4,4'-DDD	630 J
4,4'-DDE	5600
4,4'-DDT	6400

M34SS02	S01 D00.25
ANALYTE	ug/kg
4,4'-DDD	100 J
4,4'-DDT	250

M34SS04	S01 D00.25
ANALYTE	ug/kg
4,4'-DDD	18 J
4,4'-DDE	280 J
4,4'-DDT	110 J

M34SS03	S01 D00.25
ANALYTE	ug/kg
4,4'-DDD	22 J
4,4'-DDE	62 J
4,4'-DDT	75 J
Aroclor-1260	150 J

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M34SS02	OGDEN SAMPLE ID
630	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/hm/cto135/mapa/m6169597

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 1038856 & 1038857

TITLE

PESTICIDES AND PCB'S DETECTED IN SURFACE SOIL SAMPLES (SITE 34) SAND ISLAND

N

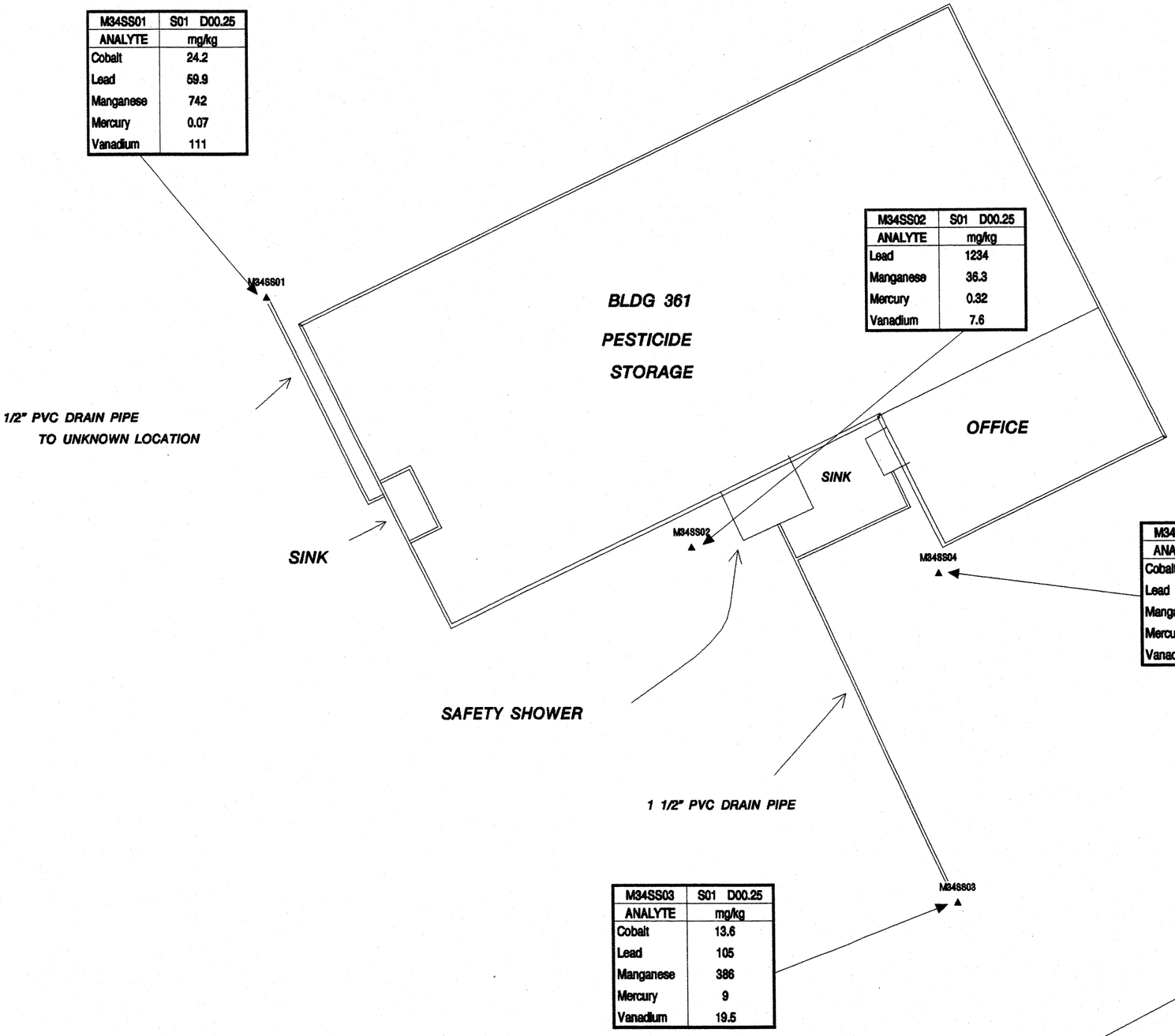
FEET

0 3 6 12 18

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

18.5-2



M34SS01	S01 D00.25
ANALYTE	mg/kg
Cobalt	24.2
Lead	59.9
Manganese	742
Mercury	0.07
Vanadium	111

M34SS02	S01 D00.25
ANALYTE	mg/kg
Lead	1234
Manganese	36.3
Mercury	0.32
Vanadium	7.6

M34SS04	S01 D00.25
ANALYTE	mg/kg
Cobalt	5.1 J
Lead	88.2
Manganese	140
Mercury	0.1
Vanadium	21.1

M34SS03	S01 D00.25
ANALYTE	mg/kg
Cobalt	13.6
Lead	105
Manganese	386
Mercury	9
Vanadium	19.5

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M34SS02	OGDEN SAMPLE ID
24.2	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-5, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/hm/cto136/mapa/m5169598

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

METAL CONCENTRATIONS DETECTED IN SURFACE SOIL SAMPLES (SITE 34) SAND ISLAND

N

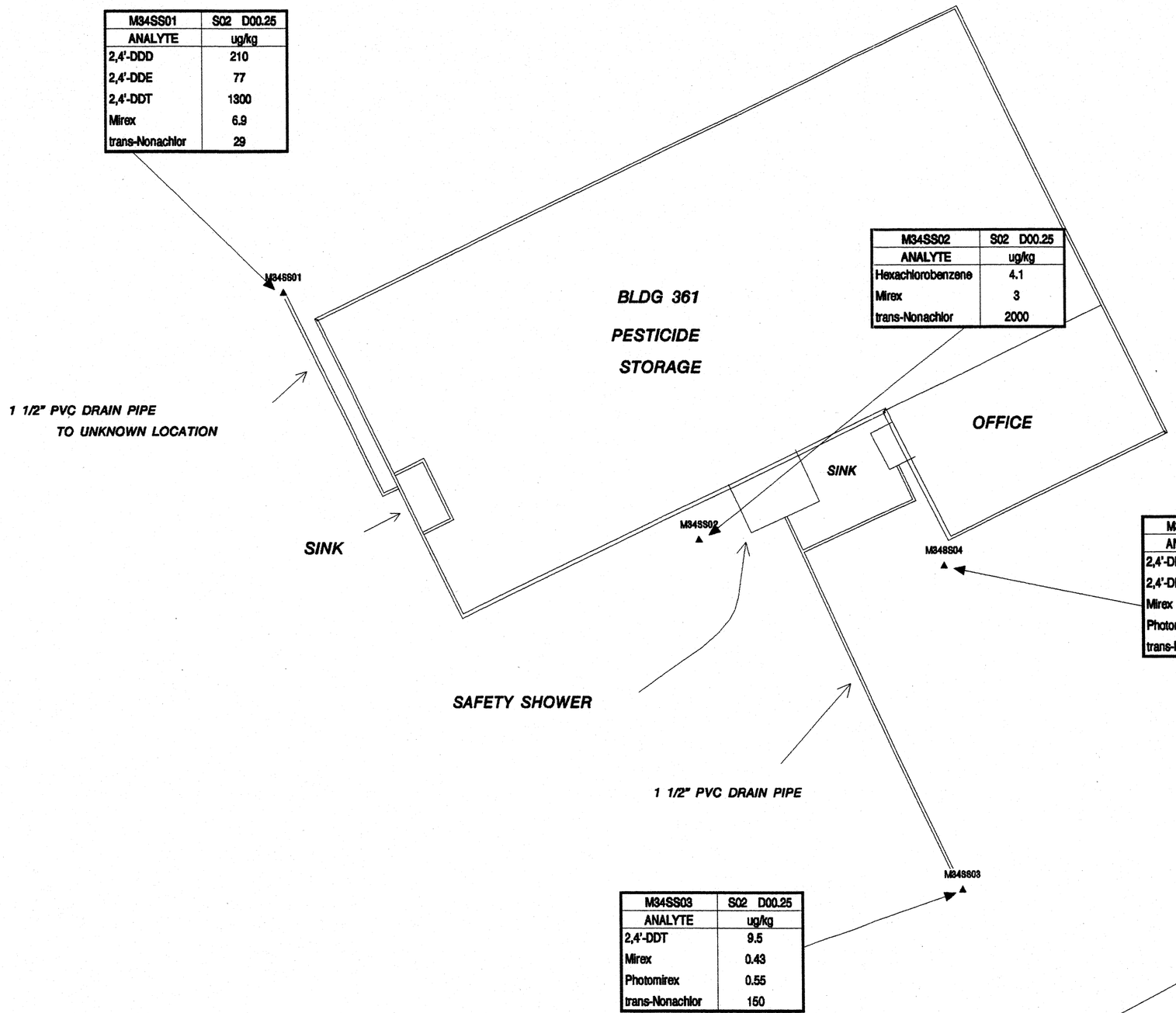
FEET

0 3 6 12 18

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

18.5-3



M34SS01	S02 D00.25
ANALYTE	ug/kg
2,4'-DDD	210
2,4'-DDE	77
2,4'-DDT	1300
Mirex	6.9
trans-Nonachlor	29

M34SS02	S02 D00.25
ANALYTE	ug/kg
Hexachlorobenzene	4.1
Mirex	3
trans-Nonachlor	2000

M34SS04	S02 D00.25
ANALYTE	ug/kg
2,4'-DDD	2.2
2,4'-DDT	12
Mirex	0.65
Photomirex	0.014 J
trans-Nonachlor	60

M34SS03	S02 D00.25
ANALYTE	ug/kg
2,4'-DDT	9.5
Mirex	0.43
Photomirex	0.55
trans-Nonachlor	150

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M34SS02	OGDEN SAMPLE ID
210	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appe/hmv/cto138/maps/m6179501

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

LOW LEVEL PESTICIDES AND PCB'S DETECTED IN SURFACE SOIL SAMPLES (SITE 34) SAND ISLAND

N

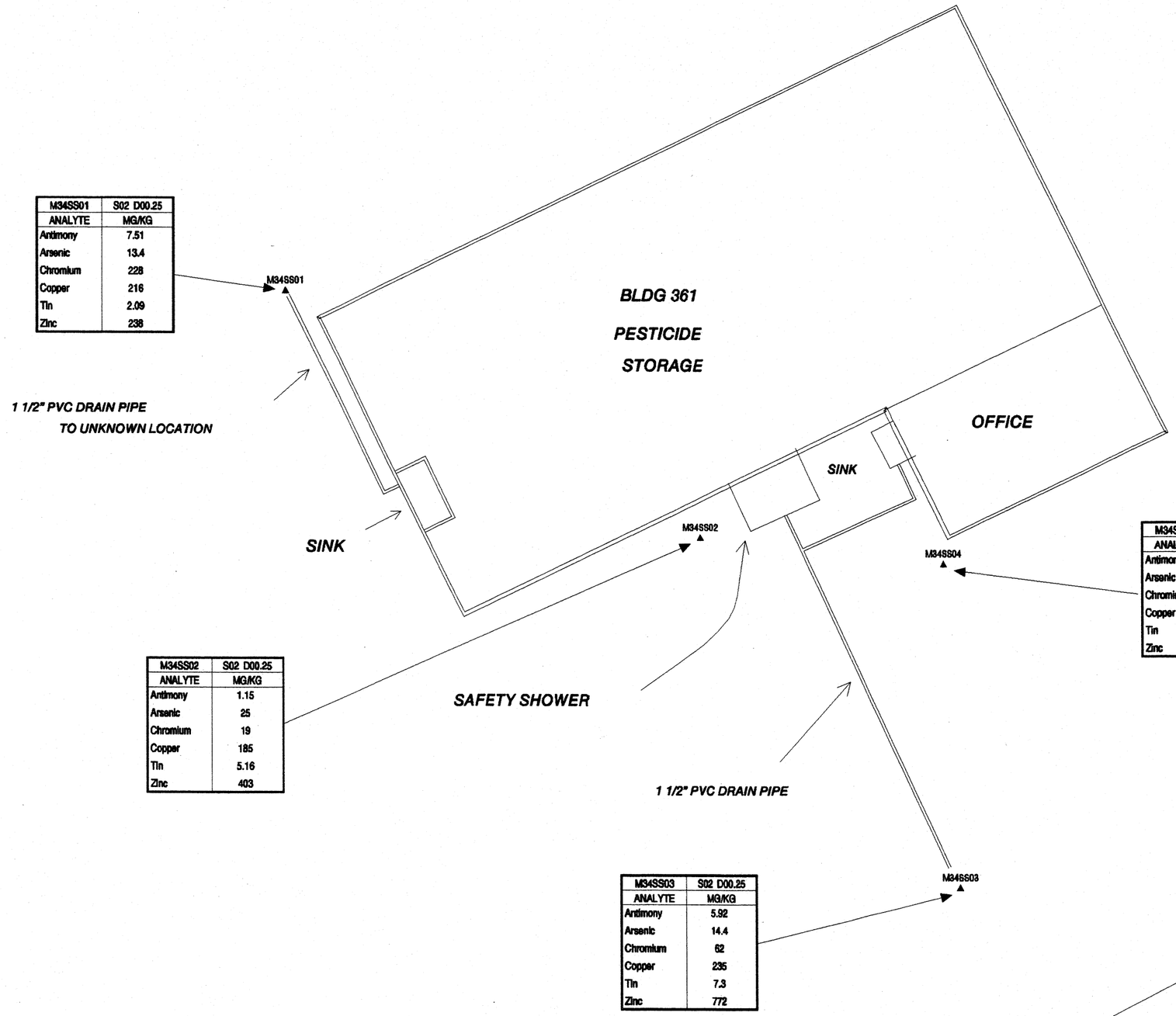
FEET

0 3 6 12 18

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

18.5-4



M34SS01	S02 D00.25
ANALYTE	MG/KG
Antimony	7.51
Arsenic	13.4
Chromium	228
Copper	216
Tin	2.09
Zinc	238

M34SS02	S02 D00.25
ANALYTE	MG/KG
Antimony	1.15
Arsenic	25
Chromium	19
Copper	185
Tin	5.16
Zinc	403

M34SS03	S02 D00.25
ANALYTE	MG/KG
Antimony	5.92
Arsenic	14.4
Chromium	62
Copper	235
Tin	7.3
Zinc	772

M34SS04	S02 D00.25
ANALYTE	MG/KG
Antimony	1.81
Arsenic	12.4
Chromium	59
Copper	178
Tin	2.07
Zinc	178

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M34SS02	OGDEN SAMPLE ID
7.51	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-8, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/hm/cto136/mapa/m5179502

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

LOW LEVEL METAL CONCENTRATIONS DETECTED IN SURFACE SOIL SAMPLES (SITE 34) SAND ISLAND

N

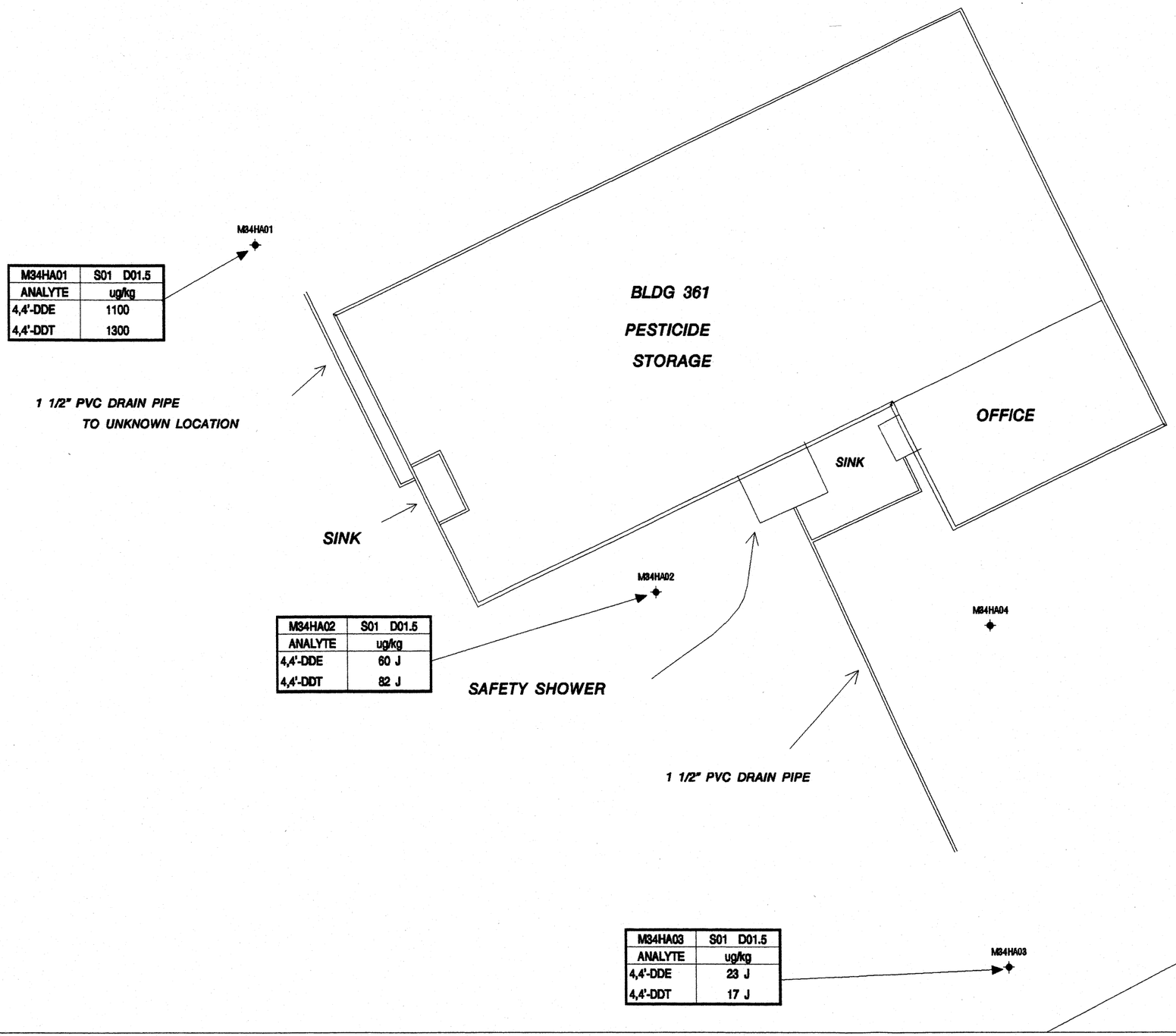
FEET

0 3 6 12 18

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
12/20/95	1	CMF		HFP		JMC	

FIGURE

18.5-5



M34HA01	S01 D01.5
ANALYTE	ug/kg
4,4'-DDE	1100
4,4'-DDT	1300

M34HA02	S01 D01.5
ANALYTE	ug/kg
4,4'-DDE	60 J
4,4'-DDT	82 J

M34HA03	S01 D01.5
ANALYTE	ug/kg
4,4'-DDE	23 J
4,4'-DDT	17 J

LEGEND

✦	HAND AUGER SAMPLE LOCATION
M34HA02	OGDEN SAMPLE ID
1100	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/hm/cto136/mapa/m6149583

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038657

TITLE

PESTICIDES AND PCB'S DETECTED IN SUBSURFACE SOIL SAMPLES (SITE 34) SAND ISLAND

N

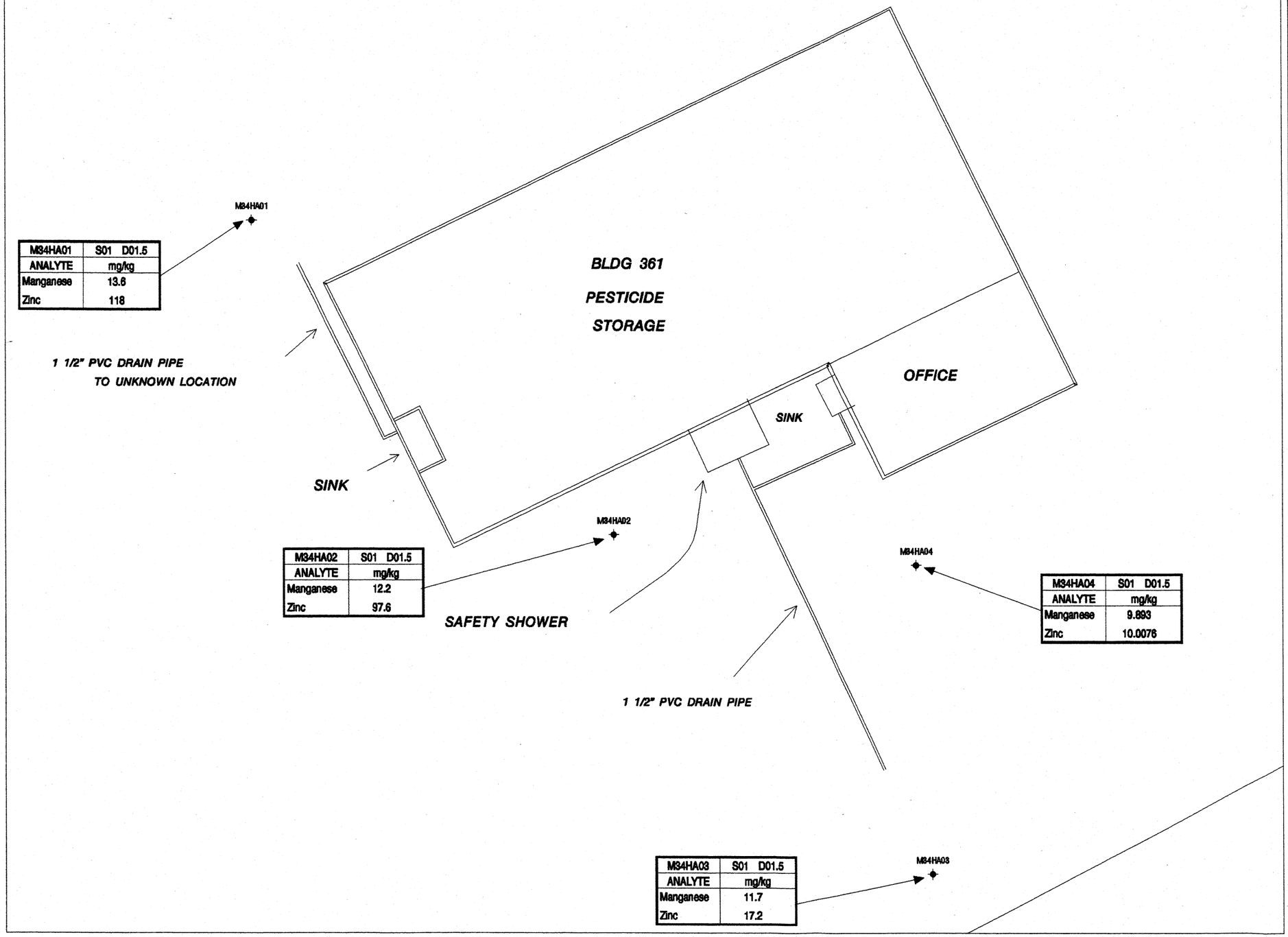
FEET

0 3 6 12 18

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/93	1	CMF	CMF	HFP	HFP	JMC	BH

FIGURE

18.5-6



M34HA01	S01 D01.5
ANALYTE	mg/kg
Manganese	13.6
Zinc	118

M34HA02	S01 D01.5
ANALYTE	mg/kg
Manganese	12.2
Zinc	97.6

M34HA04	S01 D01.5
ANALYTE	mg/kg
Manganese	9.893
Zinc	10.0076

M34HA03	S01 D01.5
ANALYTE	mg/kg
Manganese	11.7
Zinc	17.2

LEGEND

✦	HAND AUGER SAMPLE LOCATION
M34HA02	OGDEN SAMPLE ID
13.6	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-8, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190138
4. FILE: /appe/hm/cto138/maps/m6149584

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

METAL CONCENTRATIONS DETECTED IN SUBSURFACE SOIL SAMPLES (SITE 34) SAND ISLAND

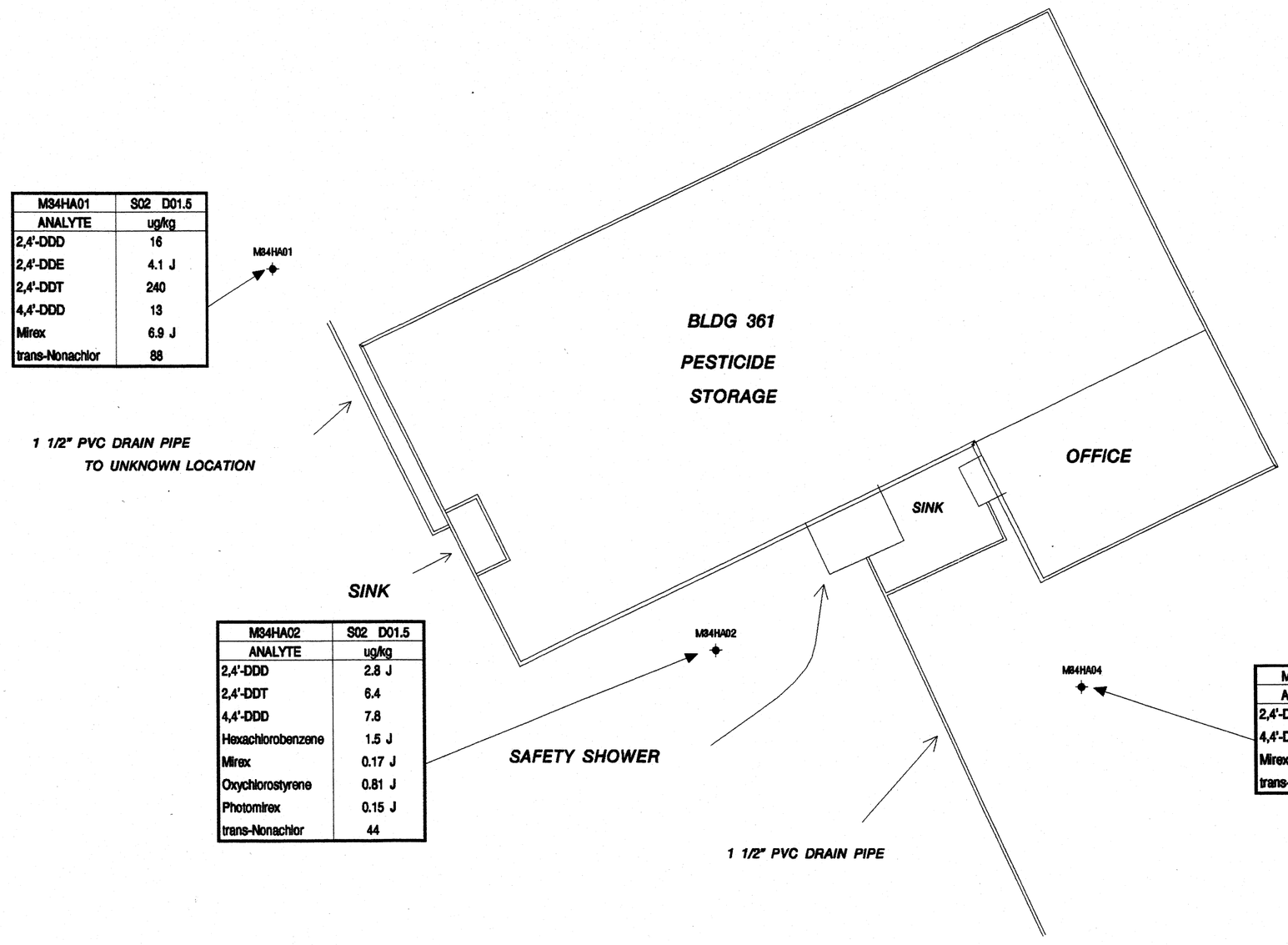
FEET

0 3 6 12 18

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JH

FIGURE

18.5-7



M34HA01	S02 D01.5
ANALYTE	ug/kg
2,4'-DDD	16
2,4'-DDE	4.1 J
2,4'-DDT	240
4,4'-DDD	13
Mirex	6.9 J
trans-Nonachlor	88

M34HA02	S02 D01.5
ANALYTE	ug/kg
2,4'-DDD	2.8 J
2,4'-DDT	6.4
4,4'-DDD	7.8
Hexachlorobenzene	1.5 J
Mirex	0.17 J
Oxychlorostyrene	0.81 J
Photomirex	0.15 J
trans-Nonachlor	44

M34HA04	S02 D01.5
ANALYTE	ug/kg
2,4'-DDT	0.73
4,4'-DDD	0.23
Mirex	0.026
trans-Nonachlor	2.8

M34HA03	S02 D01.5
ANALYTE	ug/kg
2,4'-DDT	1.5
4,4'-DDD	0.28
Mirex	0.15
trans-Nonachlor	0.36

LEGEND

✦	HAND AUGER SAMPLE LOCATION
M34HA02	OGDEN SAMPLE ID
16	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/hnv/cto136/mapa/m6149536

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

LOW LEVEL PESTICIDES AND PCB'S DETECTED IN SUBSURFACE SOIL SAMPLES (SITE 34) SAND ISLAND

N

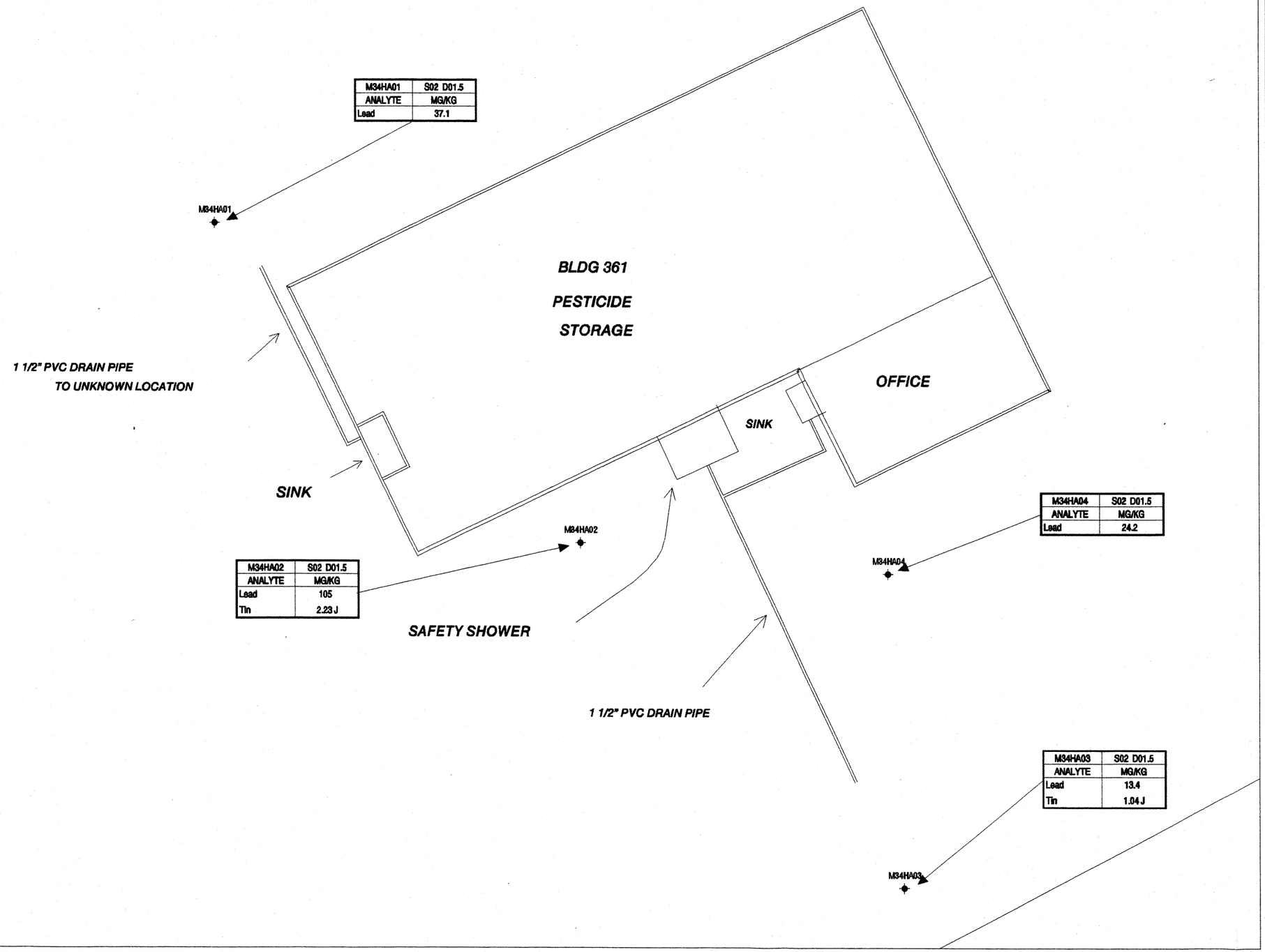
FEET

0 3 6 12 18

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HPP	HPP	JMC	JMC

FIGURE

18.5-8



LEGEND

✦	HAND AUGER SAMPLE LOCATION
M34HA02	OGDEN SAMPLE ID
105	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-8, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/hm/cto136/maps/m6149537

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038657

TITLE

LOW LEVEL METAL CONCENTRATIONS DETECTED IN SUBSURFACE SOIL SAMPLES (SITE 34) SAND ISLAND

N

FEET

0 3 6 12 18

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
12/20/95	1	CMF		HFP		JMC	

FIGURE

18.5-9

Section 19

SECTION 19
ABANDONED TACAN, BUILDING 6395 (SITE 44)

This report describes the results of the SI field work conducted intermittently from August through November 1994 at the Abandoned TACAN, Building 6395 (Site 44). The purpose of the review was to determine whether Site 44 received hazardous substances, whether leaks from transformers and oil-filled switches may have occurred, and to assess the likelihood for soil and ground-water contamination at the Site. A discussion of the work conducted during the SI, along with findings, conclusions, and recommendations, is presented below.

This report is organized as follows: Site background information is documented in Section 19.1; a description of SI field sampling activities is presented in Section 19.2; methods used for sample analysis are summarized in Section 19.3; physical characteristics of the Site observed during the investigation activities are discussed in Section 19.4; a summary of analytical results, is presented in Section 19.5; the SERA is described in Section 19.6; and conclusions and recommendations for the Site are presented in Section 19.7.

19.1 BACKGROUND INFORMATION

Building 6395, located in the center of the abandoned enlisted-housing area on Sand Island (Figure 19.1-1), once contained a tactical aid for aircraft navigation (TACAN) facility. The building, which currently houses three electrical switches and is believed to have formerly contained a transformer, is in disrepair and is no longer used by the Navy. The concrete floor within the building and the soil adjacent to doorways may have been impacted by PCB-dielectric oil leaking from the electrical equipment. Table 19.1-1 lists the potential chemical contaminants and associated analytical categories.

Table 19.1-1

POTENTIAL CHEMICAL CONTAMINANTS, ABANDONED TACAN, BUILDING 6395 SITE 44

Waste Type	Years of Disposal	Potential Chemical Constituents	Analytical Category
Dielectric Fluid	Unknown	Heavy-end Hydrocarbons, PCBs	Total Fuel Hydrocarbons, PCBs

19.2 Sampling Methods and Locations

Surface Soil

Surface soil samples were collected at four locations (Figure 19.2-1). One QC duplicate sample was collected at location 04. Sampling locations were selected in areas outside of doorways, in areas where equipment had been stored or discarded, and in areas where spills or disposal of hazardous substances were likely to occur.

PCB Wipe Sampling

Six wipe samples and one QC duplicate sample were collected at six locations within Building 6395 to screen for PCBs (Figure 19.2-1).

19.3 Analytical Methods

Surface Soil

Surface soil samples were submitted to an offsite laboratory for analysis of PCBs and pesticides by EPA method 8080 and analysis of fuels by method 8015 M/OG (Table 19.3-1).

Wipe Sampling

PCB wipe samples were submitted to an offsite laboratory for analysis by EPA Method 8080 (Table 19.3-1).

19.4 PHYSICAL CHARACTERISTICS

Site 44 is located approximately 50 feet east of Hazelwood Avenue, between Henderson Drive and Bauer Road. The remaining TACAN components are located within Building 6395, in the abandoned enlisted men's housing area.

19.4.1 Topography

The Site is generally level in the area behind the building and surface rainfall drainage is believed to be multi-directional over the ground surface. The ground surface slopes from the front of the TACAN facility towards Hazelwood Avenue.

19.4.2 Geology and Soils

Samples recovered from four locations indicate that surface soils (0 to 6 inches) consist of a brown, dry, loose, poorly sorted soil containing fine- to medium-grained, sub-angular to rounded sand, and minor quantities of organic material. The sandy nature of the surface soils has resulted in a generally porous feature through which surface waters percolate freely down to the water table.

19.4.3 Hydrogeology

The hydrogeologic characteristics of this Site were not investigated.

19.5 SUMMARY OF ANALYTICAL RESULTS

The sections and tables below summarize the results of laboratory analyses performed on Site 44 samples. Analytical results are shown in Table 19.5-1.

The table shows the analytical methods, the number of detects, the total number of samples, the number of samples rejected during data validation, the minimum undetected concentration, the maximum undetected concentration, the minimum detected concentration, the maximum detected concentration, and the sample with the maximum concentration. In addition, the concentrations of compounds detected at Site 44 are compared to Sand Island background levels. Analytical results for all samples and

analytes are contained in Appendix L. Complete CLP and low-level analytical data are available at PACNAVFACENGCOM offices at Pearl Harbor, Hawaii.

19.5.1 Surface Soil

The highest PCB concentration detected in a surface soil sample was 1,200 µg/kg of Aroclor-1260 (Figure 19.5-1). Maximum concentrations of 4,4'-DDE and 4,4'-DDT onsite were 98 µg/kg and 160 µg/kg, respectively. The maximum fuels concentration was 1,100 mg/kg of lubricant oil range (C20-C30) hydrocarbons.

19.5.2 PCB Wipe

The maximum PCB concentration detected among the wipe samples was 1.50 µg/100 cm^2 (Figure 19.5-2).

19.6 SCREENING ECOLOGICAL RISK ASSESSMENT

19.6.1 Problem Formulation

Tasks to be accomplished during Problem Formulation include (a) developing a Site description based on current Site investigations, existing literature, any prior preliminary assessments, and Site history; (b) identifying potential stressors, exposure pathways, and ecological receptors (habitats and species); (c) discussing the nature of adverse effects associated with a given stressor; (d) defining ecologically appropriate assessment and measurement endpoints; and (e) making an initial evaluation of risks posed by the Site.

For a Site to present the potential for risk, it must exhibit the following three criteria: contain stressors in abiotic media at detectable and biologically significant concentrations, provide exposure pathways linking stressors to ecological receptors, and have ecological receptors (those associated with assessment endpoints) that either utilize the Site, are present nearby, or are in range of stressors migrating from the Site. If Problem Formulation determines that one or more of these criteria are absent, the Site is recommended for NFA and the risk assessment is concluded at this point. If all criteria are met, then completion of the SERA process is required.

19.6.1.1 Site Description

Building 6395 is an abandoned TACAN, measuring approximately 15 feet by 19 feet, located in the center of the abandoned enlisted housing area on Sand Island. The area around the building is vegetated with non-native herb species and ironwood trees. The patchy vegetation grows in between the buildings and roads in the housing area. The Site is located approximately 1,650 feet from the north shore of Sand Island.

19.6.1.2 Stressor Identification

ECs were calculated from the results of chemical analyses run on surficial soil samples and PCB wipe samples taken at the Site. CPECs were identified as described in Sections 4.3.1.1.1 and 4.3.1.1.2. The CPECs identified at Site 44 are Aroclor-1260, 4,4'-DDE, and 4,4'-DDT detected in the surrounding surface soils with ECs of 1.2 mg/kg, 0.098 mg/kg, and 0.16 mg/kg, respectively.

19.6.1.3 Potential Ecological Effects

Aroclor-1260, DDE and DDT may have adverse effects on ecological receptors. CPEC physicochemical properties and toxicology, as they relate to potential exposure routes and sensitive ecological receptors, are summarized in Section 4.2.3 and described in detail in Appendix J.

19.6.1.4 Ecological Receptor Identification

Ecological receptors for contaminants associated with the Site include the Laysan albatross, red-tailed tropicbird, and white tern (Section 4.2.4). These species were only observed outside the structure. They are not expected to nest within the building, although the bird species do have minor access to the structure.

19.6.1.5 Exposure Pathway Identification

Potential exposure routes of Site-related CPECs to ecological receptors are displayed in the CSM for Site 44 (Figure 4.2-2). Potentially complete terrestrial exposure routes for Site 44 include direct exposure to CPECs through dermal contact and incidental ingestion

of contaminated surface soil. These exposure routes are of primary concern for the albatross and tropicbird.

19.6.1.6 Endpoints

Assessment endpoint #1 in Section 4.2.6.1 is the only appropriate endpoint for this Site, since only terrestrial species are associated with the Abandoned TACAN. Likewise, only testable hypothesis #1 in Section 4.2.6.2 is applicable to the transformer pad Site. The measurement endpoint selected for this Site corresponds with endpoint #2, as presented in Section 4.2.6.3.

19.6.1.7 Summary

Based on the preceding information it was concluded that this Site met the three criteria that indicate the potential for risk and that completion of the SERA process was required.

19.6.2 Exposure Analysis

The seabird species that occur in the vicinity of Building 6395 comprise the target receptors for Site 44. The Laysan albatross was abundant at the Site, and was selected as representative of all ground-nesting birds onsite. Laysan albatross exposure was estimated for incidental ingestion and dermal absorption of contaminants in surface soils. The EPV for Aroclor-1260 was determined to be 0.0624 mg/kg-d. EPVs for 4,4'-DDE and 4,4'-DDT were 0.001 mg/kg-d and 0.0017 mg/kg-d, respectively. Section 4.3.1.4 presents the equations used for calculating EPVs for the Laysan albatross.

19.6.3 Ecological Effects Analysis

The potential for adverse ecological effects was evaluated using literature-derived data on CPEC toxicity with respect to specific target receptors, and when such data were not available, to appropriate surrogate test species. The TRVs associated with Aroclor-1260, DDE, and DDT were determined to be 0.084 mg/kg-d, 0.03 mg/kg, and 0.11 mg/kg-d, respectively, for birds. Toxicity profiles for these compounds are provided in Appendix J.

19.6.4 Risk Characterization

Risk was estimated using a quotient methodology described in Section 4.3.3.1. Results of these calculations and of the risk description process, including a weight-of-evidence analysis, are discussed below. The risk description is summarized in Table 19.6-1.

The TQs for Aroclor-1260, DDE, and DDT were calculated to be less than zero, suggesting PCB and pesticide contamination presents only a negligible potential risk to ground-nesting birds onsite.

19.6.5 Uncertainty Analysis

All uncertainties discussed in Section 4.3.3.3 apply to this Site.

19.6.6 SERA Conclusions

The assessment endpoint for special status bird species has been met. Contaminant doses of Aroclor-1260, DDE, and DDT were estimated at levels not sufficient to induce chronic effects in ground-nesting birds onsite.

19.7 Conclusions and Recommendations

Aroclor-1260 was detected at a maximum concentration of 1.20 ppm in surface soils collected from the area around Bldg. 6395. DDT and DDE concentrations detected onsite were all less than 1 ppm. Based on the results of the SERA, the detected concentrations of PCBs and pesticides in surface soils pose a negligible risk to terrestrial wildlife and seabirds found onsite. No further investigation or action is recommended for Site 44.

Currently, all remaining electrical equipment and transformers on Midway are being tested for PCBs and retrofilled or removed, if necessary, as part of the base closure process. PCB wipe samples collected from interior surfaces of Bldg. 6395 were found to contain a maximum concentration of 1.5 $\mu g/100\ cm^2$ of Aroclor-1260. The PCB concentrations detected in wipe samples taken from concrete surfaces were not at levels that warrant cleanup of, or special handling considerations for electrical equipment and/or

building demolition debris. No further action is recommended regarding the presence of PCBs on the interior surfaces of Bldg. 6395.

TABLE 19.3-1 (Page 1 of 1)
ANALYTICAL METHODS
BUILDING 6395 (SITE 44)

		ROUTINE ANALYTICAL LABORATORY	
	ANALYTICAL METHOD	8015 M/OG	8080
EPA ID	OGDEN ID	FUELS	PCBs
SURFACE SOIL SAMPLES			
MI500	M44SS01S01D0025	X	X
MI501	M44SS02S01D000	X	X
MI502	M44SS03S01D000	X	X
MI503	M44SS04S01D000	X	X
MI504	M44SS04D01D000	X	X
PCB WIPES			
MI505	M44WW01S01D000	-	X
MI506	M44WW02S01D000	-	X
MI507	M44WW03S01D000	-	X
MI508	M44WW04S01D000	-	X
MI509	M44WW05S01D000	-	X
MI510	M44WW06S01D000	-	X
MI511	M44WW06D01D000	-	X

"X" = Indicates analytical method performed on sample.

Table 19.5-1
Summary of Analytical Results
Abandoned Tacan Bldg 6395, Sand Island (Site 44)

			Site 44									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETEC	MAX UNDETEC	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETEC	MAX UNDETEC	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL																			
8015B/OG	C06-C11 (Gasoline Range)	MG/KG	3	4	0	6	6	5.6	15	M44SS04S01		0	8	0	5.2	6.1			
8015B/OG	C11-C14 (Kerosene Range)	MG/KG	2	4	0	5.6	6	7.9	17	M44SS04S01		0	8	0	5.2	6.1			
8015B/OG	C14-C20 (Diesel Range)	MG/KG	4	4	0			23	140	M44SS02S01		1	8	0	5.2	5.9	10	10	3.27
8015B/OG	C20-C30 (Lubricant Oil Range	MG/KG	4	4	0			280	1100	M44SS02S01		1	8	0	21	24	44	44	13.3
OLM01.0P	4,4'-DDE	UG/KG	4	7	3			22	98	M44SS04S01	J	4	10	2	3.4	4	5.2	1900	13.1
OLM01.0P	4,4'-DDT	UG/KG	4	7	3			26	160	M44SS04S01	J	2	10	2	3.4	4	200	320	6.3
OLM01.0P	Aroclor-1260	UG/KG	4	7	3			490	1200	M44SS04S01	J	0	10	2	34	160			
PCB Wipe																			
OLM01.0C	Aroclor-1260	UG/KG	1	7	0	0.5	0.5	1.5	1.5	M44WW02S01									

Notes:

8015B/OG = Total Fuel Hydrocarbons
OLM01.0P = CLP Pesticides/PCBs
OLM01.0C = PCB Wipe

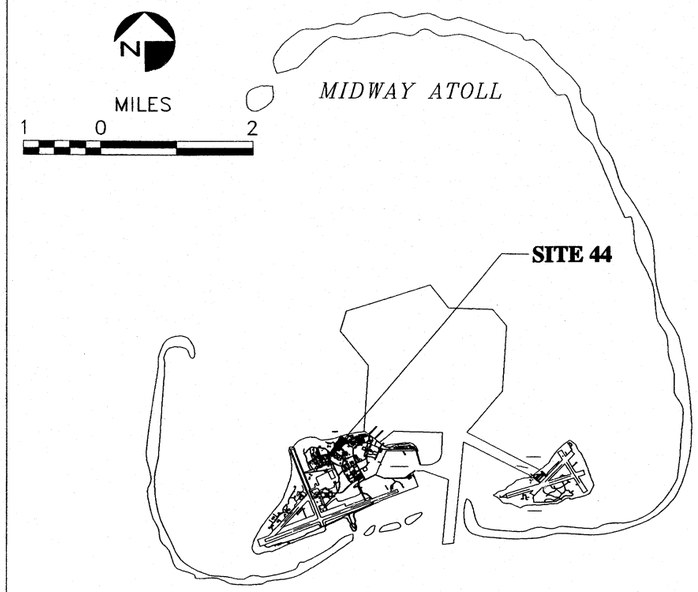
#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

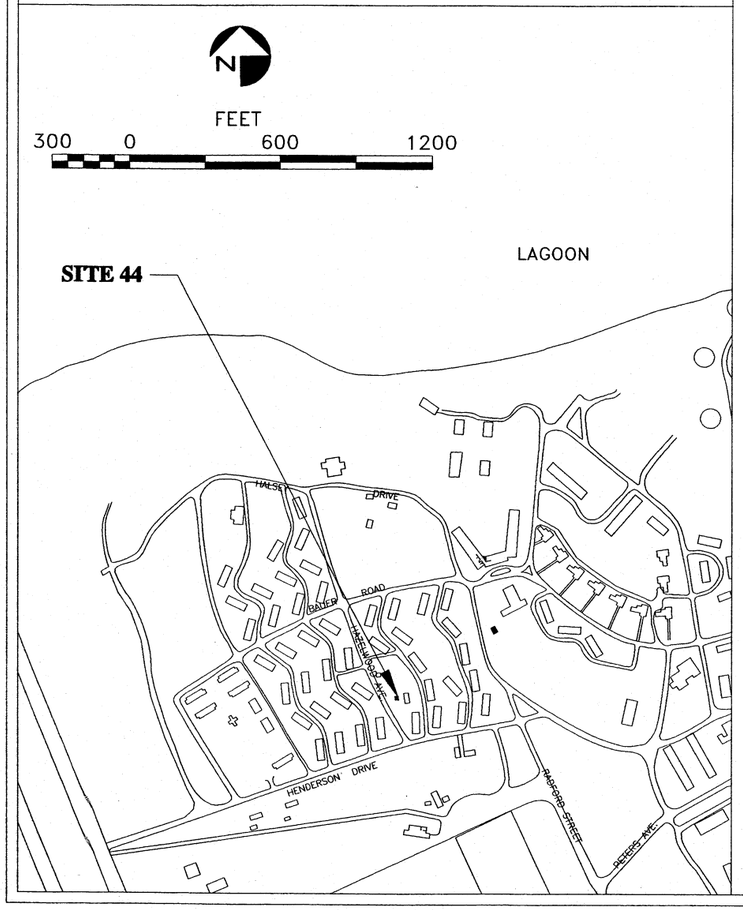
J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
Mean = Geometric Mean

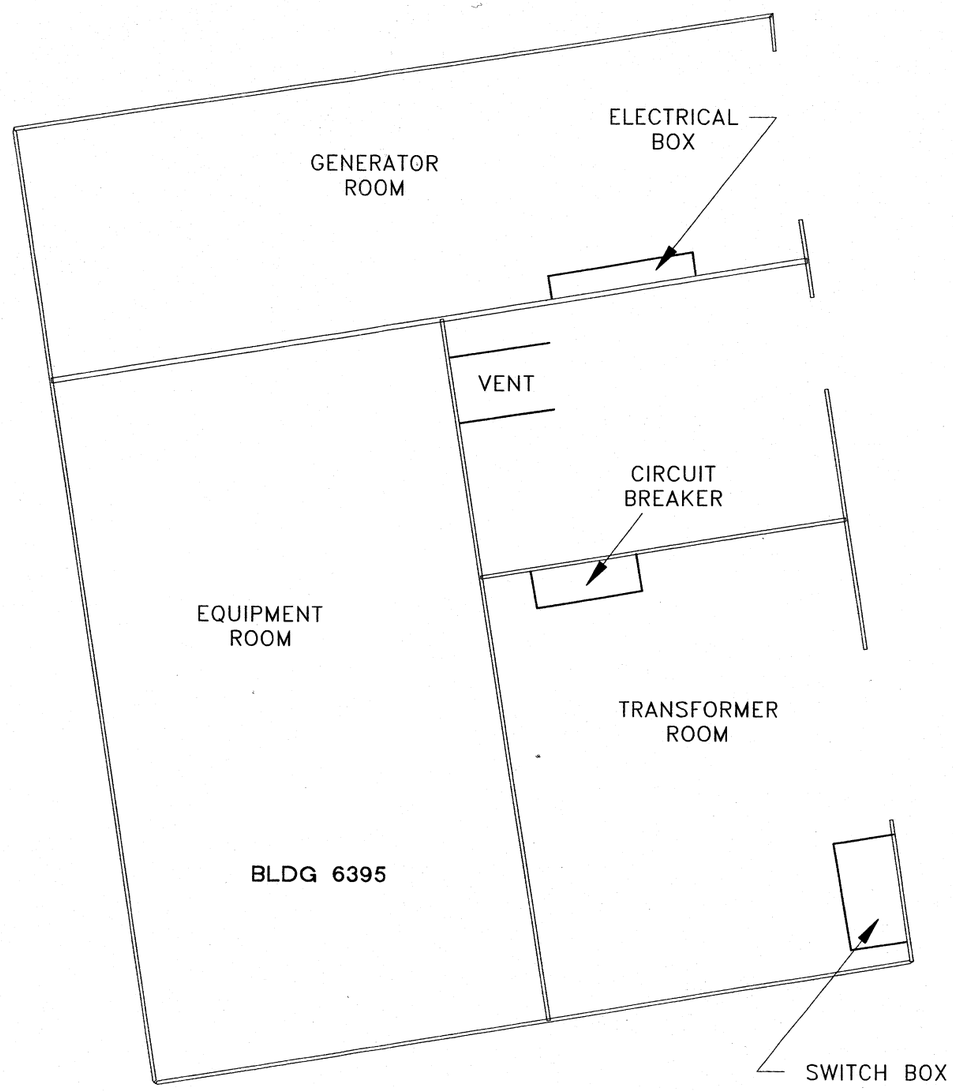
Table 19.6-1
Risk Description (Weight-of-Evidence) Summary - Site 44

ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
• Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
No probability for acute or chronic adverse affects in any individuals of special status bird species from direct and/or secondary exposure to site-related CPEC.							YES
• No ecological receptors in vicinty of site	CPEC present in surface soils		No TQ > 0				

Figures
Section 19







LEGEND

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE44\05179504.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

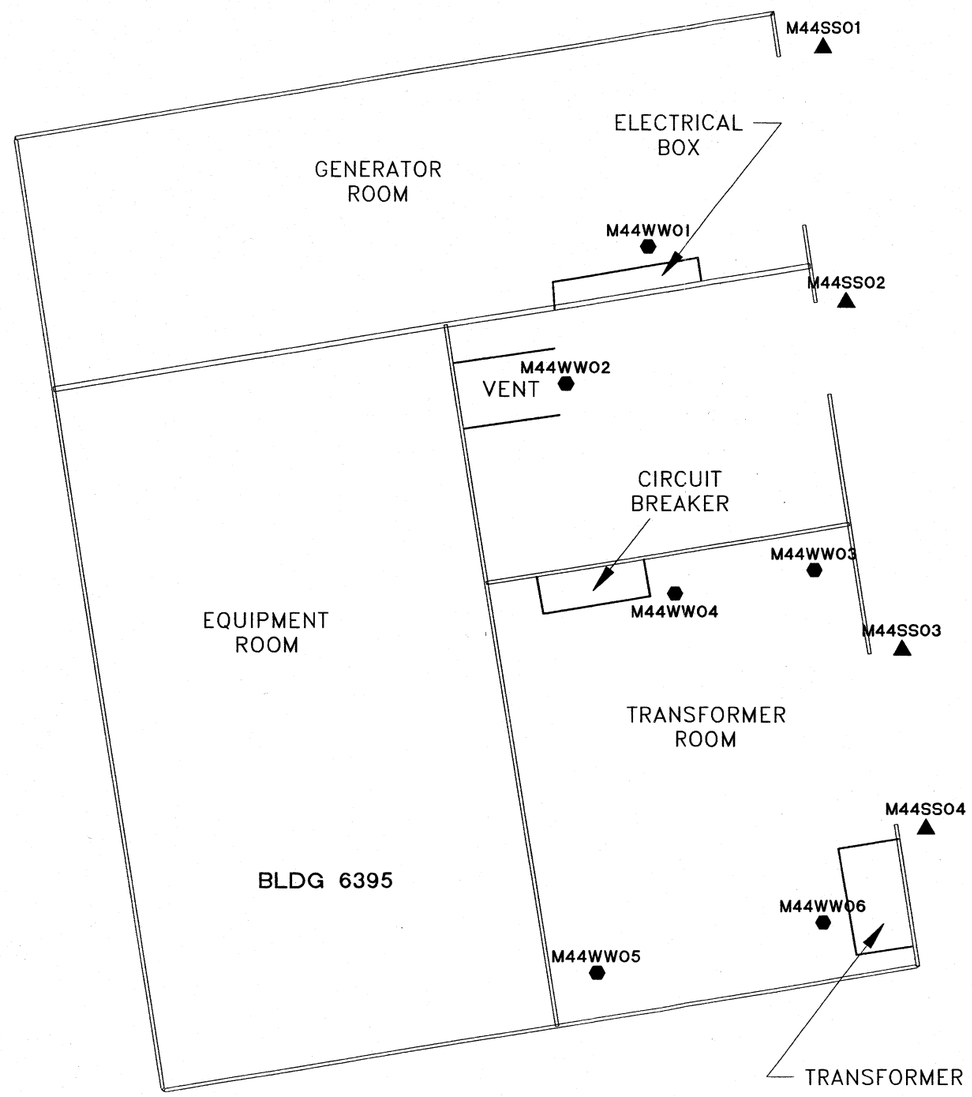
TITLE

ABANDONED TACAN, BLDG 6395
(SITE 44)
SAND ISLAND

N
FEET
1.5 0 3 6

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
19.1-1



LEGEND

M##SS## ▲ SURFACE SOIL SAMPLE LOCATION AND IDENTIFICATION NUMBER

M##WW## ⬢ PCB WIPE SAMPLE LOCATION AND IDENTIFICATION NUMBER

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5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE44\05179505.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

SURFACE SOIL AND PCB WIPE SAMPLE LOCATIONS (SITE 44) SAND ISLAND

N

FEET
1.5 0 3 6

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE 19.2-1

M44SS01	S01 D00.25
ANALYTE	UG/KG
4,4'-DDE	69
4,4'-DDT	140 J
Aroclor-1260	580 J

M44SS02	S01 D00.25
ANALYTE	UG/KG
4,4'-DDE	25 J
4,4'-DDT	96 J
Aroclor-1260	930 J

M44SS03	S01 D00.25
ANALYTE	UG/KG
4,4'-DDE	22 J
4,4'-DDT	26 NJ
Aroclor-1260	490 J

M44SS04	S01 D00.25
ANALYTE	UG/KG
4,4'-DDE	98 J
4,4'-DDT	160 J
Aroclor-1260	1200 J

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M44SS02	OGDEN SAMPLE ID
98	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY
NJ	PRESUMPTIVE ESTIMATE

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3. PROJECT NUMBER 110190138
4. FILE: /appe/hm/cto138/maps/m5179511

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

PESTICIDES AND PCBs DETECTED IN SURFACE SOIL SAMPLES (SITE 44) SAND ISLAND

N

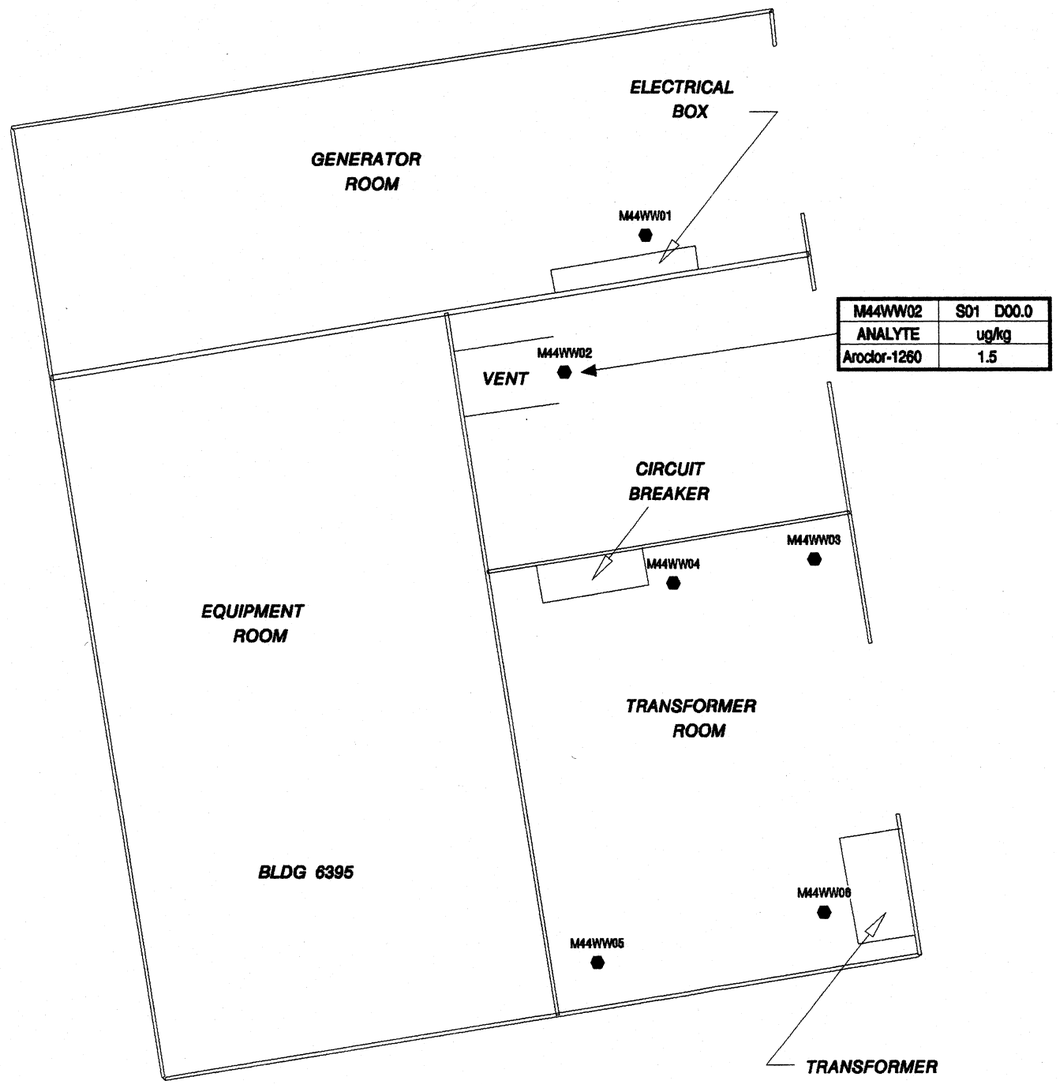
FEET

0 1.5 3 6 9

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
12/20/95	1	CMF		HPP		JMC	

FIGURE

19.5-1



M44WW02	S01 D00.0
ANALYTE	ug/kg
Aroclor-1260	1.5

LEGEND

⬢	PCB WIPE SAMPLE LOCATION
M44WW02	OGDEN SAMPLE ID
1.5	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET

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3. PROJECT NUMBER 110190198
4. FILE: /appa/hm/cto198/maps/m6179508

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 109856 & 1038657

TITLE

PCB CONCENTRATIONS DETECTED FOR PCB WIPE SAMPLES (SITE 44) SAND ISLAND

N

FEET

0 1.5 3 6 9

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HPF	HPF	JMC	BH

FIGURE

19.5-2

Section 20

SECTION 20
HAZARDOUS MATERIALS STORAGE, AREA 7 (SITE 45)

This report describes the results of the SI field work conducted at the Hazardous Materials Storage Area, Sand Island (Site 45) intermittently from August 1994 through November, 1994. The purpose of the review was to assess the likelihood for soil and ground-water contamination at Site 45. A discussion of the work conducted during the SI, along with findings, conclusions, and recommendations, is presented below.

This report is organized as follows: Site background information is documented in Section 20.1; a description of SI field sampling activities is presented in Section 20.2; methods used for sample analysis are summarized in Section 20.3; physical characteristics of the Site observed during the investigation activities are discussed in Section 20.4; a summary of analytical results is presented in Section 20.5; the SERA is described in Section 20.6; and conclusions and recommendations for the Site are presented in Section 20.7.

20.1 Background Information

Site 45 (Figure 20.1-1), a former weapons storage and maintenance compound, currently serves as the NAF Midway Island hazardous waste and materials storage area. Three buildings exist on the Site: Buildings 8107, 8108, and 8109. Wastes are temporarily stockpiled in Buildings 8107 and 8108 then shipped to licensed hazardous waste disposal facilities (e.g., DRMO, Hawaii). Building 8109 is a guard shack. During the initial Site visit, it was observed that hazardous wastes and other materials were arranged on covered pallets for protection, appropriately labeled for identification, and stored on bermed concrete floors. No visible evidence of spills or leakage was identified. A 1,000-gallon UST located outside building 8108 has been removed from the Site. During the SI field operations, the fence and locked gate were removed from the compound by PMC employees as part of the base closure activities.

Special Weapons storage and handling facilities were constructed at this Site; however, a records search conducted by the Navy indicated that this area was never used for the storage of Special Weapons. No evidence of former disposal areas was detected at the

Site. Table 20.1-1 lists the chemical contaminants that may exist at Site 45 and the analytical tests that were implemented to characterize the Site.

Table 20.1-1

POTENTIAL CHEMICAL CONTAMINANTS, HAZARDOUS MATERIALS STORAGE, AREA 7 SITE 45

Waste Type	Years of Disposal	Potential Chemical Constituents	Analytical Category
Unknown, including: Solvents, Waste oil, Pesticides, Dielectric fluid, Batteries	1981-Present	Solvents, Heavy-end Hydrocarbons, Metals, Pesticides, PCBs, Acids	Total Fuel Hydrocarbons, Volatile Organic Compounds, Semi Volatile Organic Compounds, Organochlorine Pesticides, PCBs, Dioxins, Furans, Metals,

20.2 Sampling Methods and Locations

Soil Vapor

A soil vapor survey was conducted to detect and delineate petroleum hydrocarbons and VOCs in subsurface soils and ground water (Figure 20.2-1). The survey utilized 12 sampling points, located in the storage yard around the three buildings, and at the edges of the paved area down-gradient from the materials storage building (Building 8107). Vapors were sampled at depths of 5 to 6 fbgs. TEG and Ogden personnel conducted the survey on September 23, 1994.

Direct-push

To screen for subsurface soil and ground-water contamination, PRC and Ogden personnel sampled soil at 12 locations, and sampled ground water at 6 locations on October 10-11, 1994. Samples were collected near the buildings and close to paved areas down-gradient from Building 8107 (Figure 20.2-2). Depth to ground water at the direct-push sampling locations varied between 10.0 and 13.2 fbgs across the Site.

Surface Soil

The area surrounding the buildings at this Site is paved. In the vicinity of building 8108, the pavement is covered with sediment and detritus, probably deposited due to the ponding of surface runoff. Six surface soil samples and one QC duplicate sample were collected from these sediment deposits (Figure 20.2-3). Sampling points were located outside the doors to the transformer and furnace rooms and near the doorway to a room in which drums of waste oil, transformers, and electrical parts are stored. Samples were not collected from the area surrounding Building 8107.

Wipe Sampling

Eight PCB wipe samples and one QC duplicate sample were collected from five locations within Building 8108, and three locations within Building 8107 (Figure 20.2-4).

20.3 ANALYTICAL METHODS

Soil Vapor

Soil vapor samples were analyzed immediately after collection, for TPH, VOCs, and biogenic percent CO_2/percent O_2, with a portable GC (Table 20.3-1).

Direct-push

The direct-push soil and water samples were analyzed at the offsite analytical laboratory for fuels, CLP VOCs, CLP SVOCs, CLP pesticides/PCBs, CLP metals and dioxin (Table 20.3-1).

Surface Soil

Surface soil samples were analyzed by low-level methods for SVOCs, PCBs, metals, and pesticides. Total organic carbon concentrations were also quantified (Table 20.3-1).

Wipe Sampling

PCB wipe samples were submitted to an offsite laboratory for analysis by EPA Method 8080 (Table 20.3-1).

20.4 PHYSICAL CHARACTERISTICS

Site 45 is located near the western end of Sand Island. The complex consists of three buildings: Building 8107, the hazardous materials storage building; Building 8108, which has been used for drum storage; and Building 8109, the guard shack.

20.4.1 Topography

The level, paved area surrounding the buildings is approximately 300 feet wide and 400 feet long and lies at an elevation of about 10 feet above MLLW.

20.4.2 Geology and Soils

Surface soils at Site 45 are pale yellow, damp, fine- to medium-grained, subangular to rounded sands (USCS classifications SP and SM) with some organics.

20.4.3 Hydrogeology

In the northern part of the Site, the ground-water level on October 10, 1994 was at 10.0 fbgs (M45DP11). Across the Site, the ground-water level was 13.2 fbgs at Building 8107 (M45DP09), 12.0 fbgs on the northeastern side of Building 8108 (M45DP04), and 13.0 fbgs on the southwestern side of Building 8108. In the vicinity of Building 8109 (M45DP01) the ground-water level was measured at 13.0 fbgs.

20.5 SUMMARY OF ANALYTICAL RESULTS

The sections and tables below summarize the results of laboratory analyses performed on Site 45 samples. For soil samples, analytical results for organic and inorganic compounds are summarized in Tables 20.5-1 and 20.5-2, respectively. Analytical results for ground-water and PCB wipe samples are presented in Tables 20.5-3 and 20.5-4 respectively.

The tables list the analytical methods, the number of detects, the total number of samples, the number of samples rejected during data validation, the minimum undetected

concentration, the maximum undetected concentration, the minimum detected concentration, the maximum detected concentration, and the sample with the maximum concentration. In addition, the concentrations of compounds detected at Site 45 are compared to Sand Island background levels. Analytical results for all samples and analytes are contained in Appendix L. Complete CLP and low-level analytical data are filed at PACNAVFACENGCOM offices at Pearl Harbor, Hawaii.

20.5.1 Soil Vapor

All 12 soil vapor samples were non-detects. The complete TEG soil vapor survey report is included in Appendix C.

20.5.2 Surface soil

Among the surface soil samples, concentrations of all 14 of the pesticides detected by low level methods and 15 of the 16 metals detected, were above mean Sand Island background levels. The maximum pesticide concentration was 350 µg/kg of 4,4'-DDT. Fluoranthene was the SVOC with the highest concentration, 920 µg/kg. The highest concentration of lead detected in a surface soil sample was 5,190 mg/kg. Figures 20.5-1 and 20.5-2 depict the sampling locations and selected concentration values.

20.5.3 Subsurface soil

In all 14 direct-push subsurface soil samples analyzed by CLP methods pesticide/PCB concentrations were below detection limits. Among this group of samples 13 of the 17 metal analytes detected were above mean Sand Island background levels. The only SVOC detected was the common laboratory artifact bis(2-ethylhexyl)phthalate, at 160 µg/kg. The VOC with the maximum detected concentration was 2-butanone (another common laboratory artifact) at 110 µg/kg.

20.5.4 Ground Water

In all direct-push ground water samples analyzed by CLP methods, concentrations of all organic analytes were below detection limits. Maximum concentrations of 10 of the 13

water sample collected at DP-1 had a PID headspace reading of 9.2 ppm. Headspace readings at all other direct-push locations were zero. Sampling location DP-1 is adjacent to the guard shack (Building 8109). No visible POL was observed in the sample.

20.5.5 PCB Wipe Samples

The maximum PCB concentration detected among the wipe samples was 87 $\mu g/100\ cm^2$ of Aroclor-1254 (Figure 20.5-3).

20.6 SCREENING ECOLOGICAL RISK ASSESSMENT

20.6.1 Problem Formulation

Tasks to be accomplished during Problem Formulation include (a) developing a Site description based on current Site investigations, existing literature, any prior preliminary assessments, and Site history; (b) identifying potential stressors, exposure pathways, and ecological receptors (habitats and species); (c) discussing the nature of adverse effects associated with a given stressor; (d) defining ecologically appropriate assessment and measurement endpoints; and (e) making an initial evaluation of risks posed by the Site.

For a Site to present the potential for risk, it must exhibit the following three criteria: contain stressors in abiotic media at detectable and biologically significant concentrations, provide exposure pathways linking stressors to ecological receptors, and have ecological receptors (those associated with assessment endpoints) that either utilize the Site, are present nearby, or are in range of stressors migrating from the Site. If Problem Formulation determines that one or more of these criteria are absent, the Site is recommended for NFA and the risk assessment is concluded at this point. If all criteria are met, then completion of the SERA process is required.

20.6.1.1 Site Description

Site 45 is a former weapons storage and maintenance area located along the western shore of Sand Island. It is currently used by PMC for storing hazardous waste and was reportedly utilized for PCB transformer retrofilling operations. The Site is

was reportedly utilized for PCB transformer retrofilling operations. The Site is currently being used as a hazardous materials storage area for wastes of all types (Table 20.1-1). The Site is mostly on developed ground with some ironwoods and non-native herbs surrounding the Site.

20.6.1.2 Stressor Identification

Because of the early availability of chemical analysis data, ECs were computed and CPECs were identified at this point in the SERA process by the methods previously described in Sections 4.3.1.1.1 and 4.3.1.1.2. Data obtained from the chemical analysis of field samples were used to calculate ECs, as described in Section 4.3.1.1.1. CPECs were then identified following the methods described in Section 4.3.1.1.2. CPECs detected in surface soils are presented in Table 20.6-1. CPECs in subsurface soils (> 3.5 fbgs) are listed in Table 20.6-2. Ground water CPECs are listed in Table 20.6-3. Table 20.6-4 summarizes CPEC Environmental Concentrations (EC) for all abiotic media. Principal CPECs include various inorganic elements (such as lead and mercury), pesticides (mostly DDT and its metabolites), and PCBs.

20.6.1.3 Potential Ecological Effects

CPECs onsite that may have effects on ecological receptors include metals, pesticides, hexachlorobenzene, and PCBs. CPEC physicochemical and toxicological properties, as they relate to potential exposure routes and sensitive ecological receptors, are summarized in Section 4.2.3 and described in detail in Appendix J.

20.6.1.4 Ecological Receptor Identification

There are several potential ecological receptors associated with Site 45 including the Laysan albatross, white tern, red-tailed tropicbird, brown noddy, and ruddy turnstone (Section 4.2.4). It was observed that low to moderate numbers of the albatross, noddy, tropicbird, and tern nest in the onsite vegetated areas. No burrowing birds were observed onsite.

20.6.1.5 Exposure Pathway Identification

The CSM for Site 45 is shown in Figure 4.2-1, and shows potential exposure routes of CPECs to onsite ecological receptors. Potentially complete terrestrial exposure routes include direct exposure to contaminated surface soil through dermal contact, incidental ingestion of contaminated surface soil, and ingestion of contaminated prey items. Incidental ingestion and dermal contact with contaminated soils are of primary concern for the albatross, tropicbird, and noddy. Direct ingestion of contaminated prey items (terrestrial insects) by the turnstone would be the principle route of concern for this species.

20.6.1.6 Endpoints

Potential receptors onsite are comprised of terrestrial seabird and shorebird species; therefore, assessment endpoint #1 in Section 4.2.6.1 and testable hypotheses #1 and #2 in Section 4.2.6.2 are appropriate for this Site. Measurement endpoints #2 and #3 in Section 4.2.6.3 were selected for this Site.

20.6.1.7 Summary

Based on the preceding information, it was concluded that this Site met all three of the criteria that indicate the potential for ecological risk and that completion of the SERA process was required.

20.6.2 Exposure Analysis

Terrestrial target receptors for Site 45 include seabird and shorebird species that occupy the Site. Exposure pathway models (c.f., Section 4.3.1.3) applicable to ground-nesting birds (#2) and shorebirds (#3) were used for the various types of bird species that occur onsite. The Laysan albatross was evaluated for incidental ingestion and dermal absorption of contaminants from surface soils. Another terrestrial target receptor identified onsite is the ruddy turnstone, a shorebird. The primary exposure pathway to shorebirds was via ingestion of invertebrates (arthropods) onsite that have been exposed to contaminants from surface soils. Equations for calculating EPVs are given in Section

4.3.1.4. Exposure doses via each pathway and EPVs for each receptor are listed in Table 20.6-5.

20.6.3 Ecological Effects Analysis

The potential for adverse ecological effects was evaluated using literature-derived data on CPEC toxicity with respect to specific target receptors, the Laysan albatross and golden-plover. Toxicity reference values were calculated, as described in Section 4.3.2.2, and appear in Table 20.6-6. Toxicity profiles are provided in Appendix J.

20.6.4 Risk Characterization

Risk was estimated using a quotient methodology described in Section 4.3.3.1. Results of these calculations are shown in Table 20.6-6. Results of the risk description weight-of-evidence analyses are summarized in Table 20.6-7 and discussed below.

Two CPECs, antimony and lead, had toxicity quotients greater than zero for the birds evaluated at Site 45. Toxicity quotient analysis of Mirex and Photomirex effects to shorebirds could not be performed due to data gaps.

The TQs for antimony (0.07) and lead (0.21) were relatively low and indicated a low potential for risk at Site 45. Dermal absorption (75 percent) and ingestion (25 percent) contributed to the EPV for ground-nesting birds.

20.6.5 Uncertainty Analysis

Section 4.3.3.3 describes all of the uncertainties that apply to this Site.

20.6.6 SERA Conclusions

The assessment endpoint for special status bird species is not expected to be met because of the potential risk to ground-nesting bird species from lead concentrations in surface soils at Site 45 (Table 20.6-4). Lead is the only metal CPEC onsite known to adversely impact bird species. Lead-based paint from buildings and use of leaded gasoline may

also have contributed to lead concentration in soils at this Site.

20.7 CONCLUSIONS AND RECOMMENDATIONS

Low levels of PAHs, pesticides, and PCBs were detected in surface soil samples collected in the vicinity of Building 8108. Organic compounds were not detected at levels exceeding background in either subsurface soils or ground-water samples collected at the Site. Metals were detected in surface soil, subsurface soil, and ground water samples collected at the Site. Aroclor 1254 was detected at a maximum concentration of 87 $\mu g/100\ cm^2$ among the wipe samples collected within Building 8108.

Based on the results of the SERA, the detected levels of organic compounds in surface soils appear to present a negligible risk to terrestrial wildlife. Elevated lead concentrations found in surface soils adjacent to Building 8108 appear to present a low to moderate risk to bird species.

Because the surface soil samples were collected in close proximity to Building 8108, and because of the high concentrations of lead detected in two samples, the elevated lead levels do not appear to be the result of Site-related disposal of lead-containing wastes. The data indicate that the high lead concentrations are likely related to lead-based paint dust or chips contained in the surface soil samples. No further investigation or remedial action for Site 45 under the Navy IR program is recommended. Cleanup of lead-based paint during building demolition and lead-based paint abatement is currently being implemented and this remedial action should reduce risk to birds to negligible levels.

Currently, all remaining electrical equipment and transformers on Midway are being tested for PCBs and retrofilled or removed, if necessary, as part of the base closure process. The PCB concentrations detected in wipe samples (87 $\mu g/100\ cm^2$ maximum) taken from concrete surfaces were not at levels that warrant special handling considerations for electrical equipment or building demolition debris. No further action is recommended regarding the presence of PCBs on the interior surfaces of Building 8108.

Tables
Section 20

TABLE 20.3-1 (Page 1 of 3)
ANALYTICAL METHODS
AREA 7 (SITE 45)

		FIELD SCREENING LABORATORY				ROUTINE ANALYTICAL LABORATORY						SPECIAL ANALYTICAL LABORATORY				
	ANALYTICAL METHOD	8021	8015 B	8080	8100	8015 M/OG	OLM01.8V	OLM01.8B	OLM01.8P	ILM03.OX	8280	STIV141A	STIV141C	STIII213	STIV141E	9060 M
EPA ID	OGDEN ID	VOL	TPH	PEST/ PCB	PAH	FUELS	VOC	SVOC	OC PEST/PCB	METALS	DIOXIN	LL SVOC	LL PCB	LL METAL	LL PEST	TOC
SURFACE SOIL SAMPLES																
MT541	M45SS01S01D0025	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X
MT542	M45SS02S01D0025	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X
MT543	M45SS03S01D0025	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X
MT544	M45SS04S01D0025	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X
MT545	M45SS05S01D0025	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X
MT546	M45SS06S01D0025	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X
MT547	M45SS06D01D0025	-	-	-	-	-	-	-	-	-	-	X	X	X	X	X
DIRECT PUSH SOIL SAMPLES																
MT501	M45PS01S01D130	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
MT503	M45PS02S01D130	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
MT505	M45PS02S02D130	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
MT506	M45PS03S01D125	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
MT509	M45PS04S01D120	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
MT510	M45PS04D01D120	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
MT511	M45PS05S01D120	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
MT512	M45PS06S01D120	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
MT514	M45PS07S01D130	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
MT515	M45PS08S01D130	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-

"X" = Indicates analytical method performed on sample.

TABLE 20.3-1 (Page 2 of 3)
ANALYTICAL METHODS
AREA 7 (SITE 45)

			FIELD SCREENING LABORATORY					ROUTINE ANALYTICAL LABORATORY					SPECIAL ANALYTICAL LABORATORY				
	ANALYTICAL METHOD	8021	8015 B	8080	8100	8015 M/OG	OLM01.8V	OLM01.8B	OLM01.8P	ILM03.OX	8280	STIV141A	STIV141C	STIII213	STIV141E	9060 M
EPA ID	OGDEN ID	VOL	TPH	PEST/ PCB	PAH	FUELS	VOC	SVOC	OC PEST/PCB	METALS	DIOXIN	LL SVOC	LL PCB	LL METAL	LL PEST	TOC
MT517	M45PS09S01D132	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
MT518	M45PS10S01D130	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-
MT519	M45PS10S02D130	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
MT521	M45PS11S01D100	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
MT522	M45PS12S01D120	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
DIRECT PUSH WATER SAMPLES																
MT500	M45PW01S01D130	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
MT502	M45PW02S01D130	X	X	X	X	-	-	-	-	-	-	-	-	-	-	-
MT504	M45PW02S02D130	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
MT507	M45PW04S01D120	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
MT508	M45PW04D01D120	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
MT513	M45PW07S01D130	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
MT516	M45PW09S01D132	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
MT520	M45PW11S01D100	-	-	-	-	X	X	X	X	X	X	-	-	-	-	-
PCB WIPE SAMPLES																
MM528	M45WW01S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-
MM529	M45WW02S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-
MM530	M45WW02D01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-
MM531	M45WW03S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-

"X" = Indicates analytical method performed on sample.

TABLE 20.3-1 (Page 3 of 3)
ANALYTICAL METHODS
AREA 7 (SITE 45)

			FIELD SCREENING LABORATORY					ROUTINE ANALYTICAL LABORATORY					SPECIAL ANALYTICAL LABORATORY				
	ANALYTICAL METHOD	8021	8015 B	8080	8100	8015 M/OG	OLM01.8V	OLM01.8B	OLM01.8P	ILM03.OX	8280	STIV141A	STIV141C	STIII213	STIV141E	9060 M
EPA ID	OGDEN ID	VOL	TPH	PEST/ PCB	PAH	FUELS	VOC	SVOC	OC PEST/PCB	METALS	DIOXIN	LL SVOC	LL PCB	LL METAL	LL PEST	TOC
MM532	M45WW04S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-
MM533	M45WW05S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-
MM534	M45WW06S01D000	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-
TRIP BLANK SAMPLES																
MT523	M45XW00TW00D000	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
MT524	M45XW00TW00D000	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
MT525	M45XW00TW00D000	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
MT526	M45XW00TW00D000	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
MT528	M45XW00TW00D000	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
MT529	M45XW00TW00D000	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
MT530	M45XW00TW00D000	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-
MT531	M45XW00TW00D000	-	-	-	-	-	X	-	-	-	-	-	-	-	-	-

"X" = Indicates analytical method performed on sample.

Table 20.5-1
Summary of Soil Results for Organics
Area 7 Hazmat, Sand Island (Site 45)

			Site 45									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL																			
9060M	Total Organic Carbon	UG/G	6	6	0			8300	51600	M45SS06S01	J								
STIV141A	Acenaphthene	UG/KG	3	8	2	0.83	1.7	0.65	11	M45SS01S01		3	9	1	0.17	0.18	0.072	5.2	0.154
STIV141A	Acenaphthylene	UG/KG	4	8	2	0.82	1.6	0.62	1.4	M45SS04S01		4	9	1	0.16	0.17	0.35	3.1	0.267
STIV141A	Anthracene	UG/KG	6	8	2			0.88	78	M45SS01S01		8	9	1			0.086	24	0.531
STIV141A	Benzo(a)Anthracene	UG/KG	6	8	2			9.8	640	M45SS01S01		8	9	1			1	260	4.1
STIV141A	Benzo(a)Pyrene	UG/KG	6	8	2			9.4	400	M45SS01S01		8	9	1			0.84	270	3.89
STIV141A	Benzo(b)Fluoranthene	UG/KG	6	8	2			17	810	M45SS01S01		8	9	1			0.94	300	6.13
STIV141A	Benzo(e)pyrene	UG/KG	6	8	2			18	290	M45SS01S01		8	9	1			0.83	160	3.97
STIV141A	Benzo(g,h,i)perylene	UG/KG	5	8	2	1.4	1.4	26	240	M45SS01S01		8	9	1			0.79	55	3.27
STIV141A	Benzo(k)Fluoranthene	UG/KG	6	8	2			4.8	180	M45SS01S01		8	9	1			0.55	130	2.75
STIV141A	Biphenyl	UG/KG	1	8	2	0.87	1.8	0.56	0.56	M45SS02S01	J	0	8	0	0.049	0.2			
STIV141A	Chrysene	UG/KG	6	8	2			17	630	M45SS01S01		8	9	1			1.6	300	6.46
STIV141A	Chrysenes, C1-alkyl-substitute	UG/KG	6	8	2			21	280	M45SS01S01		8	9	1			0.57	180	2.97
STIV141A	Chrysenes, C2-alkyl-substitute	UG/KG	6	8	2			42	190	M45SS06S01		6	9	1	0.26	0.26	0.84	59	1.58
STIV141A	Chrysenes, C3-alkyl-substitute	UG/KG	6	8	2			63	360	M45SS06S01		3	9	1	0.26	0.28	7.1	22	0.731
STIV141A	Chrysenes, C4-alkyl-substitute	UG/KG	6	8	2			33	580	M45SS06S01		3	9	1	0.26	0.28	5	11	0.608
STIV141A	Dibenzo(a,h)Anthracene	UG/KG	6	8	2			3.8	73	M45SS01S01		8	9	1			0.15	20	0.676
STIV141A	Dibenzothiophene	UG/KG	6	8	2			0.32	12	M45SS01S01		4	9	1	0.16	0.17	0.097	4	0.149
STIV141A	Dibenzothiophenes, C1-alkyl-su	UG/KG	4	8	2	1.6	1.6	0.4	8.9	M45SS01S01		4	9	1	0.16	0.17	0.08	3.5	0.147
STIV141A	Dibenzothiophenes, C2-alkyl-su	UG/KG	4	8	2	1.6	1.6	1.5	19	M45SS02S01		4	9	1	0.16	0.17	0.2	6.5	0.243
STIV141A	Dibenzothiophenes, C3-alkyl-su	UG/KG	4	8	2	1.6	1.6	2.9	33	M45SS02S01		3	9	1	0.16	0.18	0.29	5.2	0.225
STIV141A	Fluoranthene	UG/KG	6	8	2			13	920	M45SS01S01		8	9	1			2	370	8.68
STIV141A	Fluoranthenes+Pyrenes, C1-alk	UG/KG	6	8	2			13	510	M45SS01S01		8	9	1			1.1	200	3.98
STIV141A	Fluoranthenes+Pyrenes, C2-alk	UG/KG	6	8	2			26	300	M45SS01S01		7	9	1	0.2	0.2	0.97	140	3
STIV141A	Fluoranthenes+Pyrenes, C3-alk	UG/KG	6	8	2			40	240	M45SS06S01		5	9	1	0.2	0.2	0.71	38	0.976
STIV141A	Fluorene	UG/KG	3	8	2	1.1	2.2	0.48	16	M45SS01S01		4	9	1	0.22	0.22	0.064	3	0.146
STIV141A	Fluorenes, C1-alkyl-substitute	UG/KG	2	8	2	1.1	2.2	4.4	8.2	M45SS01S01		1	9	1	0.22	0.25	2	2	0.164
STIV141A	Fluorenes, C2-alkyl-substitute	UG/KG	2	8	2	1.1	2.2	7.7	9.2	M45SS02S01		1	8	0	0.22	0.25	3	3	0.173
STIV141A	Fluorenes, C3-alkyl-substitute	UG/KG	2	8	2	1.1	2.2	28	32	M45SS02S01		0	8	0	0.22	0.25			

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 20.5-1
Summary of Soil Results for Organics
Area 7 Hazmat, Sand Island (Site 45)

			Site 45									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL - continued																			
STIV141A	Indeno(1,2,3-cd)pyrene	UG/KG	6	8	2			8	250	M45SS01S01		8	9	1			0.67	180	3.2
STIV141A	Naphthalene	UG/KG	1	8	2	1.1	2.3	1.8	1.8	M45SS02S01	J	0	9	1	0.23	0.26			
STIV141A	Naphthalenes, C1-alkyl-substit	UG/KG	5	8	2	2.3	2.3	0.77	5	M45SS06S01		1	8	0	0.23	0.26	0.29	0.29	0.133
STIV141A	Naphthalenes, C2-alkyl-substit	UG/KG	5	8	2	2.3	2.3	1.4	16	M45SS06S01		1	8	0	0.23	0.26	0.58	0.58	0.146
STIV141A	Naphthalenes, C3-alkyl-substit	UG/KG	4	8	2	1.2	2.3	2.3	15	M45SS06S01		1	8	0	0.23	0.26	1.1	1.1	0.158
STIV141A	Naphthalenes, C4-alkyl-substit	UG/KG	3	8	2	1.2	2.3	3.2	9.4	M45SS02S01		1	8	0	0.23	0.26	1.6	1.6	0.166
STIV141A	Perylene	UG/KG	6	8	2			9.2	100	M45SS01S01		8	9	1			0.22	51	1.38
STIV141A	Phenanthrene	UG/KG	6	8	2			3.1	270	M45SS01S01		8	9	1			0.33	89	1.78
STIV141A	Phenanthrenes+Anthra., C1-alk	UG/KG	6	8	2			3.7	140	M45SS01S01		8	9	1			0.44	59	1.46
STIV141A	Phenanthrenes+Anthra., C2-alk	UG/KG	6	8	2			6.7	97	M45SS01S01		7	9	1	0.28	0.28	0.5	43	1.16
STIV141A	Phenanthrenes+Anthra., C3-alk	UG/KG	6	8	2			11	93	M45SS02S01		4	9	1	0.27	0.29	0.43	21	0.54
STIV141A	Phenanthrenes+Anthra., C4-alk	UG/KG	6	8	2			28	220	M45SS01S01		5	8	0	0.27	0.29	1.4	75	1.19
STIV141A	Pyrene	UG/KG	6	8	2			16	810	M45SS01S01		8	9	1			2.1	390	8.67
STIV141C	PCB-101 (2,2',3,5,5')	UG/KG	6	11	5			2.1	110	M45SS06S01	J	4	8	0	0.011	0.012	0.1	1.7	0.054
STIV141C	PCB-105 (2,3,3',4,4')	UG/KG	5	11	5	0.06	0.06	18	100	M45SS06S01	J	5	8	0	0.012	0.014	0.11	1.2	0.0884
STIV141C	PCB-118 (2,3',4,4',5)	UG/KG	6	11	5			5.1	210	M45SS06S01	J	8	8	0			0.085	2.8	0.506
STIV141C	PCB-126 (3,3',4,4',5)	UG/KG	2	11	5	0.16	0.18	1.2	1.4	M45SS03S01		0	8	0	0.033	0.037			
STIV141C	PCB-128 (2,2',3,3',4,4')	UG/KG	5	11	5	0.071	0.071	13	79	M45SS06S01	J	7	8	0	0.014	0.014	0.048	1.2	0.16
STIV141C	PCB-138 (2,2',3,4,4',5')	UG/KG	6	11	5			7.4	280	M45SS06S01	J	8	8	0			0.27	5.5	1.24
STIV141C	PCB-153 (2,2',4,4',5,5')	UG/KG	6	11	5			4.2	180	M45SS06S01	J	8	9	1			0.46	5.9	1.64
STIV141C	PCB-170 (2,2',3,3',4,4',5)	UG/KG	6	11	5			1.1	50	M45SS06S01	J	7	8	0	0.059	0.059	0.14	1.4	0.293
STIV141C	PCB-18 (2,2',5)	UG/KG	2	11	5	0.19	0.38	0.029	1.1	M45SS01S01	J	0	8	0	0.038	0.043			
STIV141C	PCB-180 (2,2',3,4,4',5,5')	UG/KG	6	11	5			2	82	M45SS06S01	J	8	8	0			0.23	2	0.846
STIV141C	PCB-187 (2,2',3,4',5,5',6)	UG/KG	6	11	5			5.6	20	M45SS06S01	J	6	8	0	0.027	0.027	0.14	1.4	0.238
STIV141C	PCB-195 (2,2',3,3',4,4',5,6)	UG/KG	5	11	5	0.06	0.06	0.59	3.4	M45SS06S01	J	8	8	0			0.032	0.38	0.127
STIV141C	PCB-206 (2,2',3,3',4,4',5,5',6	UG/KG	6	11	5			0.28	4.4	M45SS06S01	J	7	8	0	0.011	0.011	0.036	0.76	0.0866
STIV141C	PCB-209 (2,2',3,3',4,4',5,5',6	UG/KG	5	11	5	0.058	0.058	1.2	6.3	M45SS06S01	J	7	8	0	0.013	0.013	0.037	0.94	0.0931
STIV141C	PCB-44 (2,2',3,5')	UG/KG	5	11	5	0.064	0.064	0.96	7.1	M45SS06S01	J	1	8	0	0.013	0.014	0.27	0.27	0.0106
STIV141C	PCB-52 (2,2',5,5')	UG/KG	6	11	5			0.11	14	M45SS06S01	J	1	8	0	0.011	0.013	0.41	0.41	0.00984

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles
STIV141C = NOAA Status and Trends PCBs
STIV141E = NOAA Status and Trends Pesticides

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

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Table 20.5-1
Summary of Soil Results for Organics
Area 7 Hazmat, Sand Island (Site 45)

			Site 45									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL - continued																			
STIV141E	2,4'-DDD	UG/KG	4	6	0	0.074	0.15	1.9	11	M45SS06S01	J	6	8	0	0.015	0.016	0.045	8.7	0.21
STIV141E	2,4'-DDT	UG/KG	6	7	1			1.4	110	M45SS06S01	J	7	10	2	0.024	0.024	0.19	62	0.931
STIV141E	4,4'-DDD	UG/KG	4	6	0	0.13	0.25	0.25	25	M45SS06S01	J	5	8	0	0.026	0.029	0.063	8.3	0.169
STIV141E	4,4'-DDE	UG/KG	3	8	2	0.071	0.14	12	230	M45SS06S01	J	8	12	4			0.6	1300	13.2
STIV141E	4,4'-DDT	UG/KG	6	8	1	0.1	0.1	1.6	350	M45SS06S01	J	8	10	2			0.091	260	3.57
STIV141E	alpha-BHC	UG/KG	1	6	0	0.058	0.12	0.17	0.17	M45SS01S01	J	4	8	0	0.012	0.013	0.0035	0.045	0.00982
STIV141E	alpha-Chlordane	UG/KG	1	6	0	0.072	0.14	0.45	0.45	M45SS05S01		6	8	0	0.014	0.015	0.03	4.1	0.107
STIV141E	Dieldrin	UG/KG	2	6	0	0.096	0.19	6.2	13	M45SS06S01	J	2	8	0	0.019	0.022	0.059	0.15	0.0177
STIV141E	Endrin ketone	UG/KG	2	6	0	0.063	0.13	0.13	0.19	M45SS02S01		1	8	0	0.013	0.014	0.69	0.69	0.012
STIV141E	gamma-BHC (Lindane)	UG/KG	2	6	0	0.075	0.15	0.023	0.19	M45SS04S01		2	8	0	0.015	0.017	0.073	0.11	0.0145
STIV141E	gamma-Chlordane	UG/KG	2	6	0	0.078	0.16	0.23	0.57	M45SS06S01	J	4	8	0	0.016	0.018	0.029	1.8	0.0345
STIV141E	Hexachlorobenzene	UG/KG	4	6	0	0.087	0.087	0.049	0.24	M45SS06S01	J	6	8	0	0.018	0.019	0.0089	0.027	0.0121
STIV141E	Mirex	UG/KG	3	6	0	0.087	0.17	0.094	1.4	M45SS02S01		8	8	0			0.13	2.8	0.609
STIV141E	Photomirex	UG/KG	1	6	0	0.12	0.24	1.3	1.3	M45SS06S01	J	1	8	0	0.024	0.027	0.45	0.45	0.0197
SUBSURFACE SOIL																			
OLM01.0B	bis(2-Ethylhexyl)phthalate	UG/KG	1	13	0	370	430	160	160	M45PS11S01	J	3	12	0	370	580	60	95	155
OLM01.0V	2-Butanone	UG/KG	2	13	0	11	12	27	110	M45PS03S01	J	0	12	0	11	13			
OLM01.0V	Acetone	UG/KG	1	13	0	11	12	47	47	M45PS12S01	J	12	12	0			16	200	39.1
OLM01.0V	Methylene Chloride	UG/KG	11	13	0	6	6	1	5	M45PS08S01	J	2	12	0	5	7	1	2	2.6
OLM01.0V	Toluene	UG/KG	1	13	0	2	2	1	1	M45PS10S02	J	0	12	0	2	3			

Notes:

STIV141E = NOAA Status and Trends Pesticides
OLM01.0B = CLP Semi Volatiles
OLM01.0V = CLP Volatiles

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 20.5-2
Summary of Soil Results for Inorganics
Area 7 Hazmat, Sand Island (Site 45)

			Site 45									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL																			
STIII213	Aluminum	MG/KG	4	6	0	7700	11000	9700	54900	M45SS05S01		0	8	0	7000	8400			
STIII213	Antimony	MG/KG	2	6	4			3.24	4.03	M45SS06S01	J	8	8	0			0.288	1.06	0.537
STIII213	Arsenic	MG/KG	4	6	0	3.2	4.1	3.2	202	M45SS06S01		3	8	0	1.6	1.6	1.62	2	1.09
STIII213	Cadmium	MG/KG	6	6	0			0.967	91.1	M45SS02S01	J	8	8	0			0.53	1.44	0.946
STIII213	Chromium	MG/KG	4	6	0	12	14	15.5	153	M45SS05S01		1	8	0	7.66	10	12.4	12.4	4.74
STIII213	Copper	MG/KG	6	6	0			12.1	464	M45SS04S01		5	8	0	3.32	3.32	5.6	7.8	3.83
STIII213	Iron	MG/KG	6	6	0			1380	57300	M45SS05S01		8	8	0			64.2	2060	334
STIII213	Lead	MG/KG	6	6	0			6.6	5190	M45SS06S01		5	8	0	4.37	4.37	5.8	9.7	4.61
STIII213	Manganese	MG/KG	3	6	0	29	45	92	798	M45SS05S01		3	8	0	14	17	21	37.6	12.6
STIII213	Mercury	MG/KG	1	6	0	0.025	0.037	0.219	0.219	M45SS06S01		3	8	0	0.025	0.025	0.029	0.062	0.0203
STIII213	Nickel	MG/KG	1	6	0	3.8	15	76.8	76.8	M45SS05S01		2	8	0	5.7	7.3	5.9	9.8	3.84
STIII213	Silicon	MG/KG	3	6	0	3600	6200	12300	149000	M45SS05S01		2	8	0	2200	2400	2900	5600	1560
STIII213	Silver	MG/KG	5	6	0	0.04	0.04	0.042	0.173	M45SS04S01		7	8	0	0.04	0.04	0.0413	0.741	0.073
STIII213	Thallium	MG/KG	4	6	0	0.024	0.024	0.025	0.073	M45SS06S01		6	8	0	0.024	0.024	0.026	0.036	0.0238
STIII213	Tin	MG/KG	5	6	0	0.377	0.377	0.571	3.5	M45SS04S01	J	2	8	0	0.072	0.197	5	6.06	0.186
STIII213	Zinc	MG/KG	6	6	0			21.1	907	M45SS04S01		8	8	0			7.8	75.8	19.6
SUBSURFACE SOIL																			
ILM03.0	Barium	MG/KG	13	13	0			4.5	6.1	M45PS03S01	J	12	12	0			4.3	92.3	8.19
ILM03.0	Cadmium	MG/KG	11	13	0	0.05	0.05	0.06	0.14	M45PS06S01		7	12	0	0.04	0.06	0.04	0.35	0.0615
ILM03.0	Calcium	MG/KG	13	13	0			71600	380000	M45PS03S01		12	12	0			34100	350000	276000
ILM03.0	Chromium	MG/KG	9	13	0	6.3	6.5	4.4	7	M45PS07S01		12	12	0			4.1	19	6.09
ILM03.0	Copper	MG/KG	1	13	0	0.59	2	1.1	1.1	M45PS12S01	J	1	12	0	0.56	6.2	26.8	26.8	0.767
ILM03.0	Iron	MG/KG	9	13	0	2.1	9.5	6.9	33.4	M45PS02S01	J	11	12	0	2.7	2.7	2	6910	33.6
ILM03.0	Magnesium	MG/KG	13	13	0			10400	20100	M45PS04S01		12	12	0			14900	20800	17200
ILM03.0	Manganese	MG/KG	4	13	0	2.7	3.8	3.4	4	M45PS02S01		12	12	0			3.2	124	7.21
ILM03.0	Nickel	MG/KG	1	13	0	1.5	1.7	1.6	1.6	M45PS04S01		1	12	0	1.4	4.73	13.6	13.6	1.09
ILM03.0	Potassium	MG/KG	13	13	0			30.8	68.8	M45PS12S01	J	12	12	0			44.9	248	65.2
ILM03.0	Selenium	MG/KG	7	13	0	1.5	2.1	1.4	1.9	M45PS01S01		12	12	0			1.3	2.2	1.83
ILM03.0	Silver	MG/KG	6	13	0	1.4	1.6	1.6	2.6	M45PS12S01		2	12	0	1.4	2	1.4	2.2	0.861
ILM03.0	Sodium	MG/KG	13	13	0			2390	3410	M45PS03S01	J	12	12	0			2250	4110	2680
ILM03.0	Vanadium	MG/KG	11	13	0	0.73	0.78	0.79	1.7	M45PS01S01		11	12	0	0.76	0.76	0.9	12.5	1.58

Notes:

STIII213 = NOAA Status and Trends Low Level Metals

ILM03.0 = CLP Metals

#D = No. of Detects

#S = Total No. of Samples

#R = No. of Samples Rejected During Data Valiidation

FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)

Mean = Geometric Mean

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Table 20.5-3
Summary of Groundwater Results for Inorganics
Area 7 Hazmat, Sand Island (Site 45)

			Site 45									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
ILM03.0	Arsenic	UG/L	6	6	0			2.1	7.9	M45PW01S01	J	2	4	0	1.5	2.2	14.7	19	3.9
ILM03.0	Barium	UG/L	6	6	0			2.6	3.9	M45PW11S01	J	4	4	0			2.2	16.1	6.01
ILM03.0	Calcium	UG/L	6	6	0			172000	239000	M45PW11S01		4	4	0			150000	351000	208000
ILM03.0	Iron	UG/L	6	6	0			442	1220	M45PW01S01		4	4	0			298	836	474
ILM03.0	Magnesium	UG/L	6	6	0			131000	273000	M45PW11S01		4	4	0			49300	522000	110000
ILM03.0	Potassium	UG/L	6	6	0			22800	59300	M45PW01S01		4	4	0			12000	142000	25000
ILM03.0	Sodium	UG/L	6	6	0			486000	1400000	M45PW01S01		3	4	0	15	15	167000	223000	15700
ILM03.0	Vanadium	UG/L	4	6	0	3.2	3.2	4.1	5.3	M45PW04S01		3	4	0	3.2	3.2	7.2	13.7	6.24

Notes:

ILM03.0 = CLP Metals

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
Mean = Geometric Mean

Table 20.5-4
Summary of PCB Wipe Results
Area 7 Hazmat, Sand Island (Site 45)

Site 45											
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL
OLM01.0C	Aroclor-1254	UG/KG	5	8	0	0.5	0.5	8.6	87	M45WW08S01	

Notes:

OLM01.0C = PCB Wipe

#D = No. of Detects

#S = Total No. of Samples

#R = No. of Samples Rejected During Data Validation

FL = Data Validation Qualifier (Flag)

Table 20.6-1
Surface Soil CPEC Selection - Site 45

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic									
Aluminum	66.7	7.70E+03	9.70E+03	5.49E+04	1.19E+04	3.03E+04	2.23E+02	2.52E+01	No(p)
Antimony	100		3.24E+00	4.03E+00	3.61E+00	4.03E+00	2.87E-01	5.37E-01	YES
Arsenic	66.7	3.20E+00	3.20E+00	2.02E+02	9.12E+00	5.75E+01	1.90E+01	1.09E+00	YES
Cadmium	100		9.67E-01	9.11E+01	5.84E+00	3.15E+01	5.63E+00	9.46E-01	YES
Chromium	66.7	1.20E+01	1.55E+01	1.53E+02	2.27E+01	7.78E+01	3.99E+00	5.48E+00	YES
Copper	100		1.21E+01	4.64E+02	8.13E+01	3.02E+02	1.00E+02	3.83E+00	YES
Iron	100		1.38E+03	5.73E+04	7.88E+03	3.53E+04		3.34E+02	No(p)
Lead	100		6.60E+00	5.19E+03	1.06E+02	9.95E+02	7.28E+00	6.28E+00	YES
Manganese	50	2.90E+01	9.20E+01	7.98E+02	7.12E+01	3.67E+02	4.54E+02	1.26E+01	No(6)
Mercury	16.7	2.50E-02	2.19E-01	2.19E-01	2.15E-02	1.27E-01	2.40E-02	3.90E-02	YES
Nickel	16.7	3.80E+00	7.68E+01	7.68E+01	6.37E+00	2.45E+01	2.65E+02	3.84E+00	No(6)
Silicon	50	3.60E+03	1.23E+04	1.49E+05	9.91E+03	5.58E+04		1.56E+03	No(3)
Silver	83.3	4.00E-02	4.20E-02	1.73E-01	6.19E-02	1.29E-01		8.14E-01	No(5)
Thallium	66.7	2.40E-02	2.50E-02	7.30E-02	2.55E-02	5.36E-02	3.90E-02	2.38E-02	YES
Tin	83.3	0.377	5.71E-01	3.50E+00	1.07E+00	3.11E+00		1.86E-01	YES
Zinc	100		2.11E+01	9.07E+02	1.96E+02	7.11E+02	1.11E+01	2.21E+01	YES
Organic									
2,4'-DDD	66.7	7.40E-05	1.90E-03	1.10E-02	9.44E-04	6.89E-03	1.58E-02		No(6)
2,4'-DDT	100		1.40E-03	1.10E-01	7.02E-03	3.45E-02	1.58E-02		YES
4,4'-DDD	66.7	1.30E-04	2.50E-04	2.50E-02	8.53E-04	8.90E-03	1.58E-02		No(6)
4,4'-DDE	50	7.10E-05	1.20E-02	2.30E-01	1.55E-03	8.03E-02	1.58E-02		YES
4,4'-DDT	85.7	1.00E-04	1.60E-03	3.50E-01	1.04E-02	1.32E-01	1.58E-02		YES
Acenaphthene	50	8.30E-04	6.50E-04	1.10E-02	1.60E-03	6.90E-03	2.30E+00		No(6)
Acenaphthylene	66.7	8.20E-04	6.20E-04	1.40E-03	8.73E-04	1.38E-03	2.30E+00		No(6)
alpha-BHC	16.7	5.80E-05	1.70E-04	1.70E-04	5.03E-05	1.16E-04	1.12E+00		No(6)
alpha-Chlordane	16.7	7.20E-05	4.50E-04	4.50E-04	6.94E-05	2.65E-04	3.20E+00		No(6)
Anthracene	100		8.80E-04	7.80E-02	6.48E-03	3.70E-02	2.30E+00		No(6)
Benzo(a)anthracene	100		9.80E-03	6.40E-01	5.92E-02	3.19E-01	2.30E+00		No(6)
Benzo(a)pyrene	100		9.40E-03	4.00E-01	5.39E-02	2.53E-01	2.30E+00		No(6)
Benzo(b)fluoranthene	100		1.70E-02	8.10E-01	9.66E-02	4.40E-01	2.30E+00		No(6)
Benzo(e)pyrene	100		1.80E-02	2.90E-01	7.73E-02	2.20E-01	2.30E+00		No(6)
Benzo(g,h,i)perylene	83.3	1.40E-03	2.60E-02	2.40E-01	4.24E-02	2.40E-01	2.30E+00		No(6)
Benzo(k)fluoranthene	100		4.80E-03	1.80E-01	2.75E-02	1.18E-01	2.30E+00		No(6)
Biphenyl	16.7	8.70E-04	5.60E-04	5.60E-04	5.88E-04	5.60E-04	2.30E+00		No(6)

Table 20.6-1
Surface Soil CPEC Selection - Site 45

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Chrysene	100		1.70E-02	6.30E-01	8.71E-02	3.66E-01	2.30E+00		No(6)
Chrysenes, C1-alky	100		2.10E-02	2.80E-01	7.22E-02	2.21E-01	2.30E+00		No(6)
Chrysenes, C2-alky	100		4.20E-02	1.90E-01	8.81E-02	1.57E-01	2.30E+00		No(6)
Chrysenes, C3-alky	100		6.30E-02	3.60E-01	9.71E-02	1.89E-01	2.30E+00		No(6)
Chrysenes, C4-alky	100		3.30E-02	5.80E-01	1.02E-01	2.72E-01	2.30E+00		No(6)
Dibenzo(a,h)anthracene	100		3.80E-03	7.30E-02	1.75E-02	5.22E-02	2.30E+00		No(6)
Dibenzothiophene	100		3.20E-04	1.20E-02	1.43E-03	6.21E-03	2.30E+00		No(6)
Dibenzothiophenes, C1-alky	66.7	1.60E-03	4.00E-04	8.90E-03	1.51E-03	6.00E-03	2.30E+00		No(6)
Dibenzothiophenes, C2-alky	66.7	1.60E-03	1.50E-03	1.90E-02	2.62E-03	1.08E-02	2.30E+00		No(6)
Dibenzothiophenes, C3-alky	66.7	1.60E-03	2.90E-03	3.30E-02	3.61E-03	1.54E-02	2.30E+00		No(6)
Dieldrin	33.3	9.60E-05	6.20E-03	1.30E-02	3.08E-04	6.29E-03	2.22E-01		No(6)
Endrin ketone	33.3	6.30E-05	1.30E-04	1.90E-04	6.76E-05	1.47E-04	1.17E+00		No(6)
Fluoranthene	100		1.30E-02	9.20E-01	8.41E-02	4.45E-01	2.30E+00		No(6)
Fluoranth+Pyr, C1-alky	100		1.30E-02	5.10E-01	5.81E-02	2.65E-01	2.30E+00		No(6)
Fluoranth+Pyr, C2-alky	100		2.60E-02	3.00E-01	7.95E-02	2.32E-01	2.30E+00		No(6)
Fluoranth+Pyr, C3-alky	100		4.00E-02	2.40E-01	8.01E-02	1.61E-01	2.30E+00		No(6)
Fluorene	50	1.10E-03	4.80E-04	1.60E-02	1.77E-03	7.79E-03	2.30E+00		No(6)
Fluorenes, C1-alky	33.3	1.10E-03	4.40E-03	8.20E-03	1.56E-03	4.93E-03	2.30E+00		No(6)
Fluorenes, C2-alky	33.3	1.10E-03	7.70E-03	9.20E-03	1.75E-03	6.43E-03	2.30E+00		No(6)
Fluorenes, C3-alky	33.3	1.10E-03	2.80E-02	3.20E-02	2.66E-03	1.93E-02	2.30E+00		No(6)
gamma-BHC (Lindane)	33.3	7.50E-05	2.30E-05	1.90E-04	5.72E-05	1.32E-04	7.41E+00		No(6)
gamma-Chlordane	33.3	7.80E-05	2.30E-04	5.70E-04	9.35E-05	3.59E-04	3.20E+00		No(6)
Hexachlorobenzene	66.7	8.70E-05	4.90E-05	2.40E-04	6.38E-05	1.55E-04			YES
Indeno(1,2,3-cd)pyrene	100		8.00E-03	2.50E-01	4.53E-02	1.76E-01	2.30E+00		No(6)
Mirex	50	8.70E-05	9.40E-05	1.40E-03	1.57E-04	8.68E-04			YES
Naphthalene	16.7	1.10E-03	1.80E-03	1.80E-03	8.69E-04	1.44E-03	2.30E+00		No(6)
Naphthalenes, C1-alky	83.3	2.30E-03	7.70E-04	5.00E-03	1.38E-03	2.90E-03	2.30E+00		No(6)
Naphthalenes, C2-alky	83.3	2.30E-03	1.40E-03	1.60E-02	2.63E-03	7.26E-03	2.30E+00		No(6)
Naphthalenes, C3-alky	66.7	1.20E-03	2.30E-03	1.50E-02	2.67E-03	8.15E-03	2.30E+00		No(6)
Naphthalenes, C4-alky	50	1.20E-03	3.20E-03	9.40E-03	2.08E-03	5.65E-03	2.30E+00		No(6)
PCB-18	33.3	1.90E-04	2.90E-05	1.10E-03	1.34E-04	6.02E-04	1.24E-01		No(6)
PCB-44	83.3	6.40E-05	9.60E-04	7.10E-03	9.90E-04	4.04E-03	1.24E-01		No(6)
PCB-52	100		1.10E-04	1.40E-02	2.15E-03	8.01E-03	1.24E-01		No(6)
PCB-101	100		2.10E-03	1.10E-01	1.77E-02	6.15E-02	1.24E-01		No(6)
PCB-105	83.3	6.00E-05	1.80E-02	1.00E-01	9.63E-03	8.12E-02	1.24E-01		No(6)

Table 20.6-1
Surface Soil CPEC Selection - Site 45

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
PCB-118	100		5.10E-03	2.10E-01	3.98E-02	1.30E-01	1.24E-01		YES
PCB-126	33.3	1.60E-04	1.20E-03	1.40E-03	2.06E-04	1.05E-03	1.24E-01		No(6)
PCB-128	83.3	7.10E-05	1.30E-02	7.90E-02	8.31E-03	6.39E-02	1.24E-01		No(6)
PCB-138	100		7.40E-03	2.80E-01	5.44E-02	1.76E-01	1.24E-01		YES
PCB-153	100		4.20E-03	1.80E-01	3.27E-02	1.08E-01	1.24E-01		No(6)
PCB-170	100		1.10E-03	5.00E-02	9.92E-03	3.34E-02	1.24E-01		No(6)
PCB-180	100		2.00E-03	8.20E-02	1.53E-02	5.01E-02	1.24E-01		No(6)
PCB-187	100		5.60E-03	2.00E-02	9.45E-03	1.54E-02	1.24E-01		No(6)
PCB-195	83.3	6.00E-05	5.90E-04	3.40E-03	8.15E-04	2.88E-03	1.24E-01		No(6)
PCB-206	100		2.80E-04	4.40E-03	7.78E-04	2.33E-03	1.24E-01		No(6)
PCB-209	83.3	5.80E-05	1.20E-03	6.30E-03	1.50E-03	6.07E-03	1.24E-01		No(6)
Perylene	100		9.20E-03	1.00E-01	3.76E-02	9.35E-02	2.30E+00		No(6)
Phenanthrene	100		3.10E-03	2.70E-01	2.14E-02	1.19E-01	2.30E+00		No(6)
Phenanth+Anthra., C1-alky	100		3.70E-03	1.40E-01	1.66E-02	7.39E-02	2.30E+00		No(6)
Phenanth+Anthra., C2-alky	100		6.70E-03	9.70E-02	2.03E-02	7.11E-02	2.30E+00		No(6)
Phenanth+Anthra., C3-alky	100		1.10E-02	9.30E-02	2.79E-02	6.46E-02	2.30E+00		No(6)
Phenanth+Anthra., C4-alky	100		2.80E-02	2.20E-01	7.50E-02	1.73E-01	2.30E+00		No(6)
Photomirex	16.7	1.20E-04	1.30E-03	1.30E-03	1.14E-04	6.64E-04			YES
Pyrene	100		1.60E-02	8.10E-01	9.40E-02	4.87E-01	2.30E+00		No(6)

*TBC values are NOAEL dietary concentrations assuming a diet of 100% soil, from Opresko et. al. (1994) ; values for B(a)P were substituted for PAHs without a dose in Opresko, and the value for Arochlor 1248 was substituted for all the PCB congeners.
**Mean value of background surface soil samples taken on Sand Island.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 20.6-2
Subsurface Soil CPEC Selection - Site 45

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic									
Barium	100		4.50E+00	6.10E+00	5.12E+00	5.41E+00	3.85E+01	8.19E+00	No(5)
Cadmium	84.6	5.00E-02	6.00E-02	1.40E-01	8.14E-02	1.15E-01	5.63E+00	6.15E-02	No(5)
Calcium	100		7.16E+04	3.80E+05	2.95E+05	3.80E+05		2.76E+05	No(3)
Chromium	69.2	6.3	4.40E+00	7.00E+00	4.48E+00	5.24E+00	3.99E+00	6.09E+00	No(5)
Copper	7.7	5.90E-01	1.10E+00	1.10E+00	3.93E-01	5.78E-01	1.00E+02	7.67E-01	No(5)
Iron	69.2	2.10E+00	6.90E+00	3.34E+01	7.04E+00	1.13E+01		3.36E+01	No(5)
Magnesium	100		1.04E+04	2.01E+04	1.65E+04	1.84E+04		1.72E+04	No(3)
Manganese	30.8	2.7	3.40E+00	4.00E+00	2.10E+00	2.74E+00	4.54E+02	7.21E+00	No(5)
Nickel	7.7	1.50E+00	1.60E+00	1.60E+00	8.15E-01	9.46E-01	2.65E+02	1.09E+00	No(5)
Potassium	100		3.08E+01	6.88E+01	5.03E+01	5.67E+01		6.52E+01	No(3)
Selenium	53.8	1.5	1.40E+00	1.90E+00	1.28E+00	1.58E+00	1.85E+00	1.83E+00	No(5)
Silver	46.2	1.40E+00	1.60E+00	2.60E+00	1.13E+00	1.57E+00		8.61E-01	No(5)
Sodium	100		2.39E+03	3.41E+03	2.75E+03	2.92E+03		2.68E+03	No(3)
Vanadium	84.6	7.30E-01	7.90E-01	1.70E+00	9.07E-01	1.18E+00	4.44E+01	1.58E+00	No(5)
Organic									
2-Butanone	15.4	1.10E-02	2.70E-02	1.10E-01	8.09E-03	1.44E-02			No(1)
Acetone	7.7	1.10E-02	4.70E-02	4.70E-02	6.75E-03	9.88E-03	5.16E+01		No(1)
bis(2-Ethylhexyl)phthalate	7.7	3.70E-01	1.60E-01	1.60E-01	1.92E-01	1.60E-01	2.22E+00		No(1)
Methylene Chloride	84.6	6.00E-03	1.00E-03	5.00E-03	2.61E-03	3.27E-03	3.02E+01		No(1)
Toluene	7.7	2.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	5.96E+01		No(1)

*TBC values are NOAEL dietary concentrations assuming a diet of 100% soil, from Opresko et. al. (1994) ; values for B(a)P were substituted for PAHs without a dose in Opresko, and the value for Arochlor 1248 was substituted for all the PCB congeners.
**Mean value of background subsurface soil samples taken on Sand Island.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 20.6-3
Groundwater CPEC Selection - Site 45

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (ug/l)	Range of detected Concentrations Minimum (ug/l)	Range of detected Concentrations Maximum (ug/l)	Mean Concentration (ug/l)	Environmental Concentration (EC) (ug/l)	ARAR Values* (ug/l)	Background Concentration** (ug/l)	CPEC?
Inorganic									
Arsenic	100		2.10E+00	7.90E+00	4.30E+00	6.99E+00	3.60E+01	3.90E+00	No(5)
Barium	100		2.60E+00	3.90E+00	3.13E+00	3.68E+00	1.09E+02	6.01E+00	No(5)
Calcium	100		1.72E+05	2.39E+05	1.93E+05	2.18E+05		2.08E+05	No(5)
Iron	100		4.42E+02	1.22E+03	6.69E+02	9.38E+02	1.00E+03	4.74E+02	No(5)
Magnesium	100		1.31E+05	2.73E+05	1.91E+05	2.58E+05		1.10E+05	No(3)
Potassium	100		2.28E+04	5.93E+04	3.48E+04	5.24E+04		2.50E+04	No(3)
Sodium	100		4.86E+05	1.40E+06	7.33E+05	1.10E+06		1.57E+04	No(3)
Vanadium	66.7	3.20E+00	4.10E+00	5.30E+00	3.26E+00	5.30E+00	3.00E+01	6.24E+00	No(5)

*The lowest marine chronic value from the NAWQC and HWQC was used when available, then freshwater chronic and freshwater and marine acute values were used if no chronic numbers were listed. For PAHs with no NAWQC or HWQC the value for Fluoranthene (16 ug/L) was used.
**Mean value of background ground water samples taken on Sand Island.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 20.6-4
CPEC Environmental Concentrations in all Abiotic Media - Site 45

Analyte	EC (mg/kg) Surface Soil	EC (mg/kg) Subsurface Soil	EC (mg/l) Groundwater
Inorganic			
Antimony	4.03E+00		
Arsenic	5.75E+01		
Cadmium	3.15E+01		
Chromium	7.78E+01		
Copper	3.02E+02		
Lead	9.95E+02		
Mercury	1.27E-01		
Thallium	5.36E-02		
Tin	3.11E+00		
Zinc	7.11E+02		
Organic			
2,4'-DDD			
2,4'-DDT	3.45E-02		
4,4'-DDD			
4,4'-DDE	8.03E-02		
4,4'-DDT	1.32E-01		
Hexachlorobenzene	1.55E-04		
Mirex	8.68E-04		
PCB-118	1.30E-01		
PCB-138	1.76E-01		
Photomirex	6.64E-04		

Blanks indicate that the analyte was not chosen as a CPEC for that medium

Table 20.6-5
Target Receptor Exposure Point Values - Site 45

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Ground-nesting Bird (Laysan albatross)			Shorebird (golden-plover)	
	dermal (mg/kg-d)	ingestion (mg/kg-d)	EPV_{gn} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{sb} (mg/kg-d)
Inorganic					
Antimony	4.17E-03	1.30E-03	5.46E-03	4.72E-09	4.72E-09
Arsenic	5.95E-02	1.85E-02	7.80E-02	1.35E-07	1.35E-07
Cadmium	3.26E-02	1.01E-02	4.27E-02	2.03E-08	2.03E-08
Chromium	8.05E-02	2.50E-02	1.05E-01	5.01E-07	5.01E-07
Copper	3.12E-01	9.71E-02	4.09E-01	3.53E-06	3.53E-06
Lead	1.03E+00	3.20E-01	1.35E+00	3.49E-07	3.49E-07
Mercury	1.31E-04	4.08E-05	1.72E-04	3.72E-08	3.72E-08
Thallium	5.54E-05	1.72E-05	7.27E-05	2.51E-09	2.51E-09
Tin	3.22E-03	1.00E-03	4.22E-03	2.91E-07	2.91E-07
Zinc	7.35E-01	2.29E-01	9.64E-01	8.32E-05	8.32E-05
Organic					
2,4'-DDT	3.57E-04	1.11E-05	3.68E-04	1.55E-03	1.55E-03
4,4'-DDE	8.30E-04	2.58E-05	8.56E-04	2.57E-03	2.57E-03
4,4'-DDT	1.37E-03	4.24E-05	1.41E-03	5.95E-03	5.95E-03
Hexachlorobenzene	8.01E-06	4.98E-08	8.06E-06	9.28E-06	9.28E-06
Mirex	4.49E-05	2.79E-07	4.52E-05	DG	DG
PCB-118	6.72E-03	4.18E-05	6.76E-03	1.46E-03	1.46E-03
PCB-138	9.10E-03	5.66E-05	9.16E-03	2.17E-02	2.17E-02
Photomirex	3.43E-05	2.14E-07	3.45E-05	DG	DG

DG = data gap; no parameter available for exposure calculation

Table 20.6-6
Toxicity Quotients for Target Receptors - Site 45

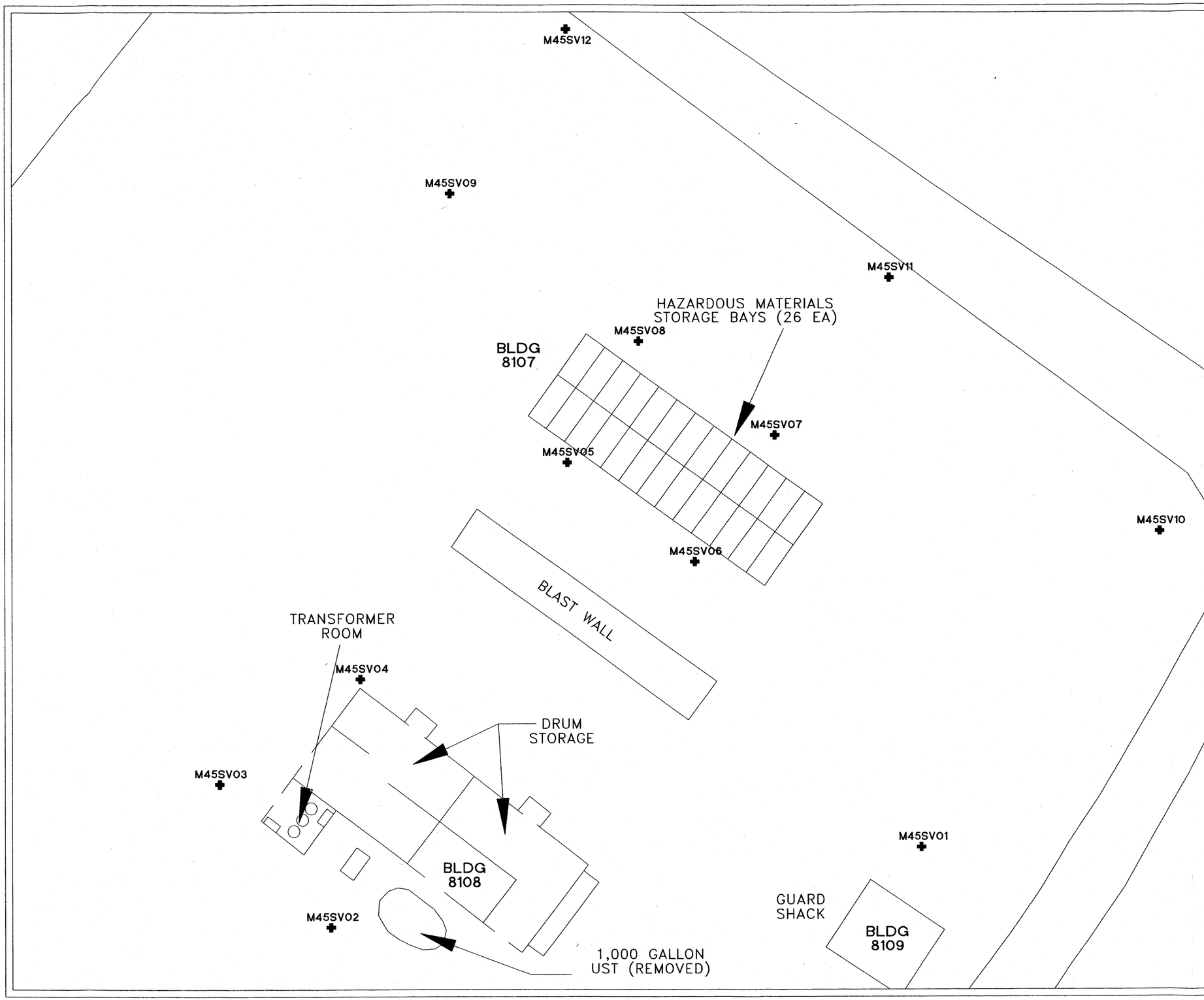
CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Ground-nesting Bird (Laysan albatross)			Shorebird (golden-plover)		
	EPV	TRV	TQ*	EPV	TRV	TQ*
Inorganic						
Antimony	5.46E-03	3.50E-03	1.93E-01	4.72E-09	3.50E-03	
Arsenic	7.80E-02	1.02E+00		1.35E-07	1.02E+00	
Cadmium	4.27E-02	5.60E+01		2.03E-08	5.60E+01	
Chromium	1.05E-01	2.00E-01		5.01E-07	2.00E-01	
Copper	4.09E-01	8.40E+00		3.53E-06	8.40E+00	
Lead	1.35E+00	8.40E-01	2.06E-01	3.49E-07	8.40E-01	
Mercury	1.72E-04	8.62E+01		3.72E-08	8.62E+01	
Thallium	7.27E-05	2.40E+00		2.51E-09	2.40E+00	
Tin	4.22E-03	5.00E-01		2.91E-07	5.00E-01	
Zinc	9.64E-01	1.18E+02		8.32E-05	1.18E+02	
Organic						
2,4'-DDD	ND	4.10E+00		ND	4.10E+00	
2,4'-DDT	3.68E-04	1.10E-01		1.55E-03	1.10E-01	
4,4'-DDD	ND	4.10E+00		ND	4.10E+00	
4,4'-DDE	8.56E-04	3.00E-02		2.57E-03	3.00E-02	
4,4'-DDT	1.41E-03	1.10E-01		5.95E-03	1.10E-01	
Hexachlorobenzene	8.06E-06	1.00E+00		9.28E-06	1.00E+00	
Mirex	4.52E-05	5.10E-01		DG	5.10E-01	DG
PCB-118	6.76E-03	2.56E+01		1.46E-03	2.56E+01	
PCB-138	9.16E-03	1.47E+02		2.17E-02	1.47E+02	
Photomirex	3.45E-05	5.10E-01		DG	5.10E-01	DG

* TQ = log(EPV/TRV); only data gaps (DG) and TQ values greater than or equal to 0 are shown
ND = not detected/not selected as CPEC
DG = data gap; no parameter available for exposure calculation

Table 20.6-7
Risk Description (Weight-of-Evidence) Summary - Site 45

ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
• Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
No probability for acute or chronic adverse affects in any individuals of special status bird species from direct and/or secondary exposure to site-related CPEC.							NO
• Impairment of reproduction in ground-nesting birds	CPEC present in surface soils		TQ Lead = 0.21				
• Impairment of reproduction in burrowing birds							
• Impairment of reproduction in shorebirds							

Figures
Section 20



LEGEND

M##SV## SOIL VAPOR SAMPLE LOCATION AND IDENTIFICATION NUMBER

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE45\05179513.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

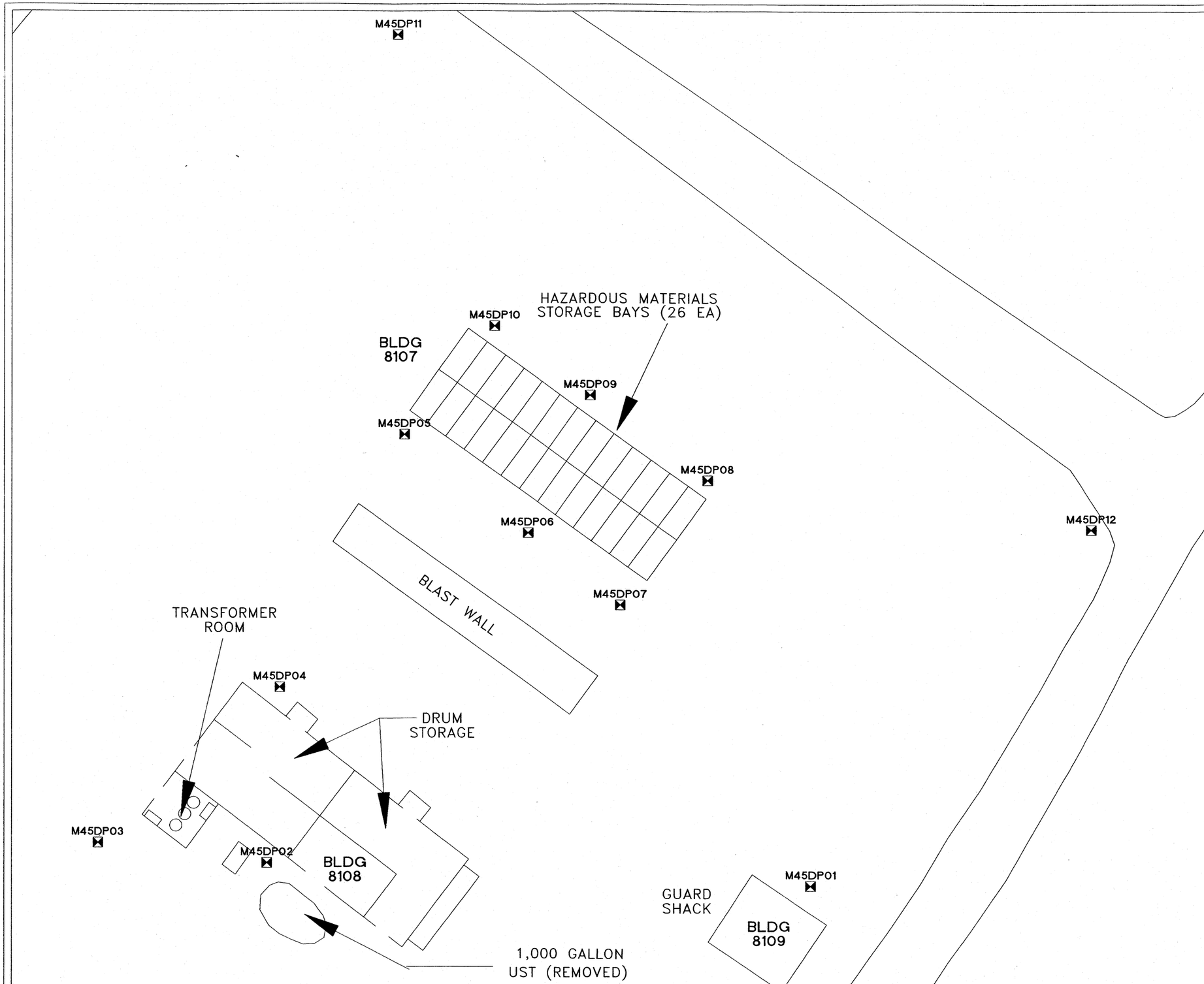
SOIL VAPOR SAMPLE LOCATIONS
(SITE 45)
SAND ISLAND

N

FEET
20 0 40 80

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
20.2-1



LEGEND

M##DP## DIRECT PUSH SAMPLE LOCATION AND IDENTIFICATION NUMBER

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE45\05179515.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

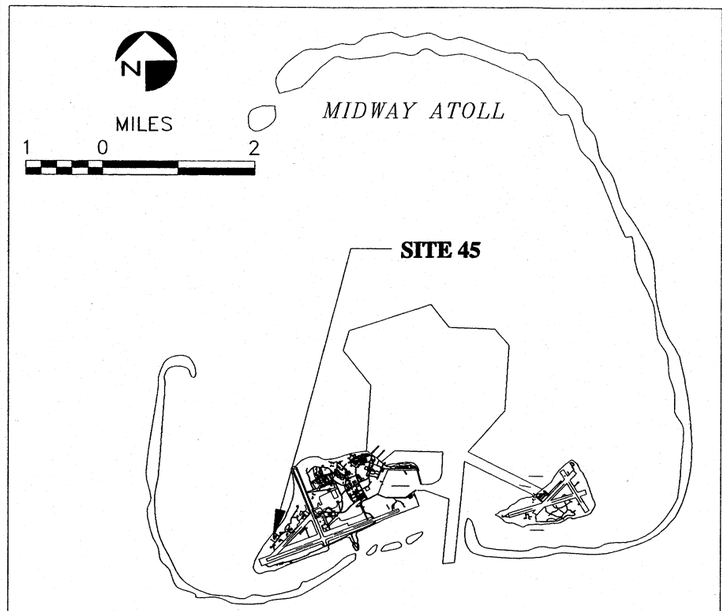
DIRECT PUSH SAMPLE LOCATIONS
(SITE 45)
SAND ISLAND

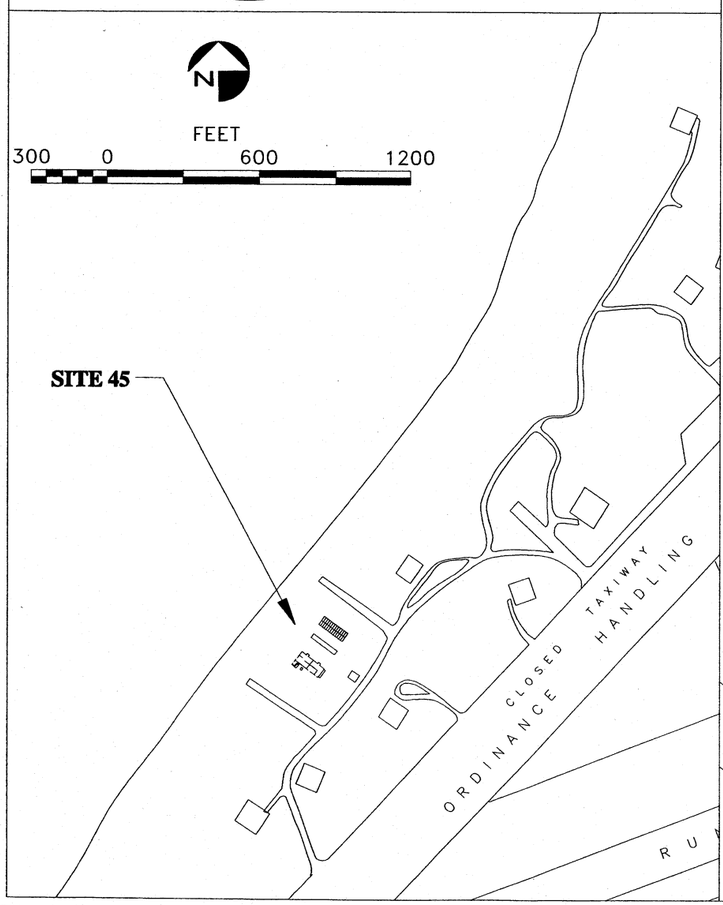
N

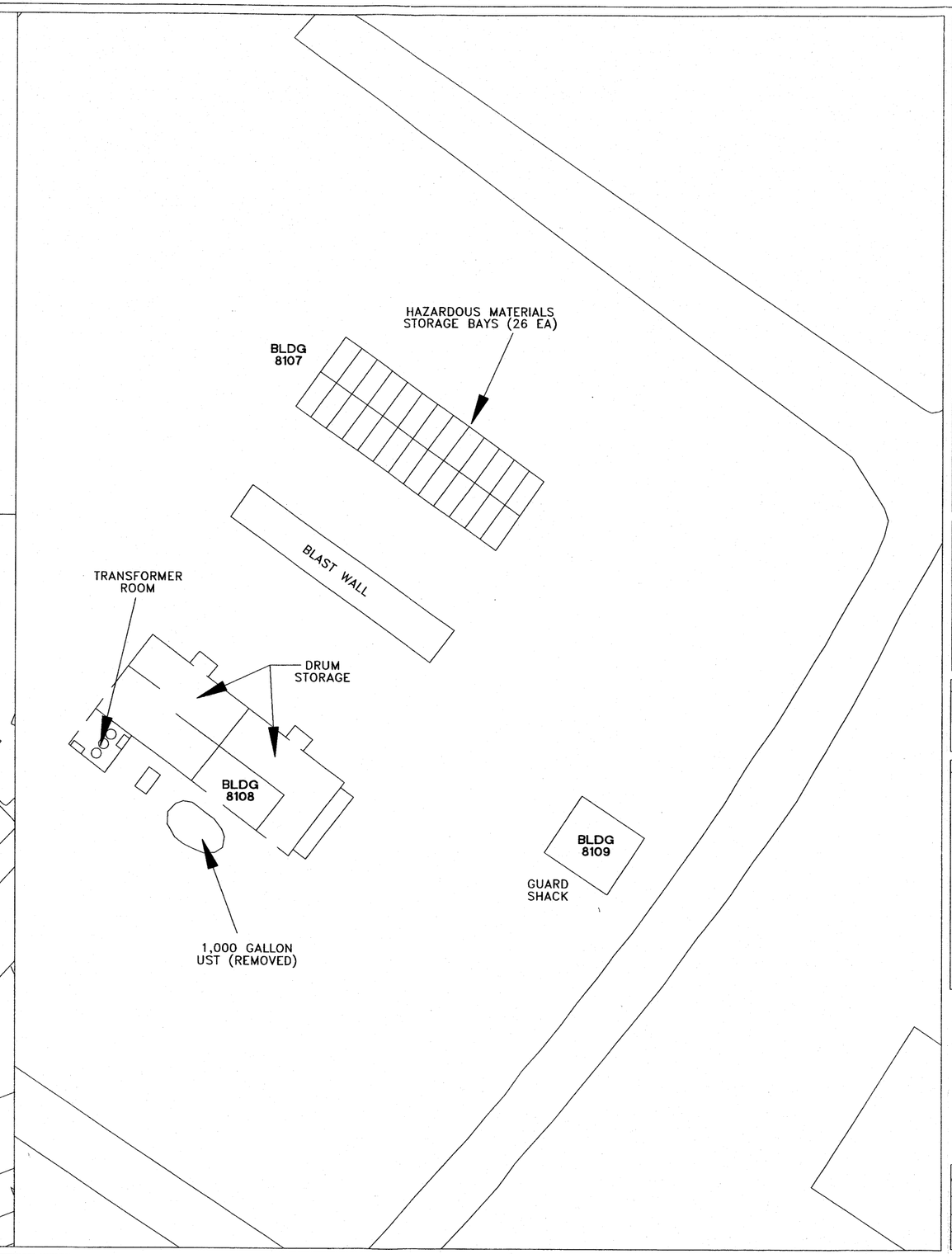
FEET
20 0 40 80

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
20.2-2







LEGEND

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE45\05179512.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

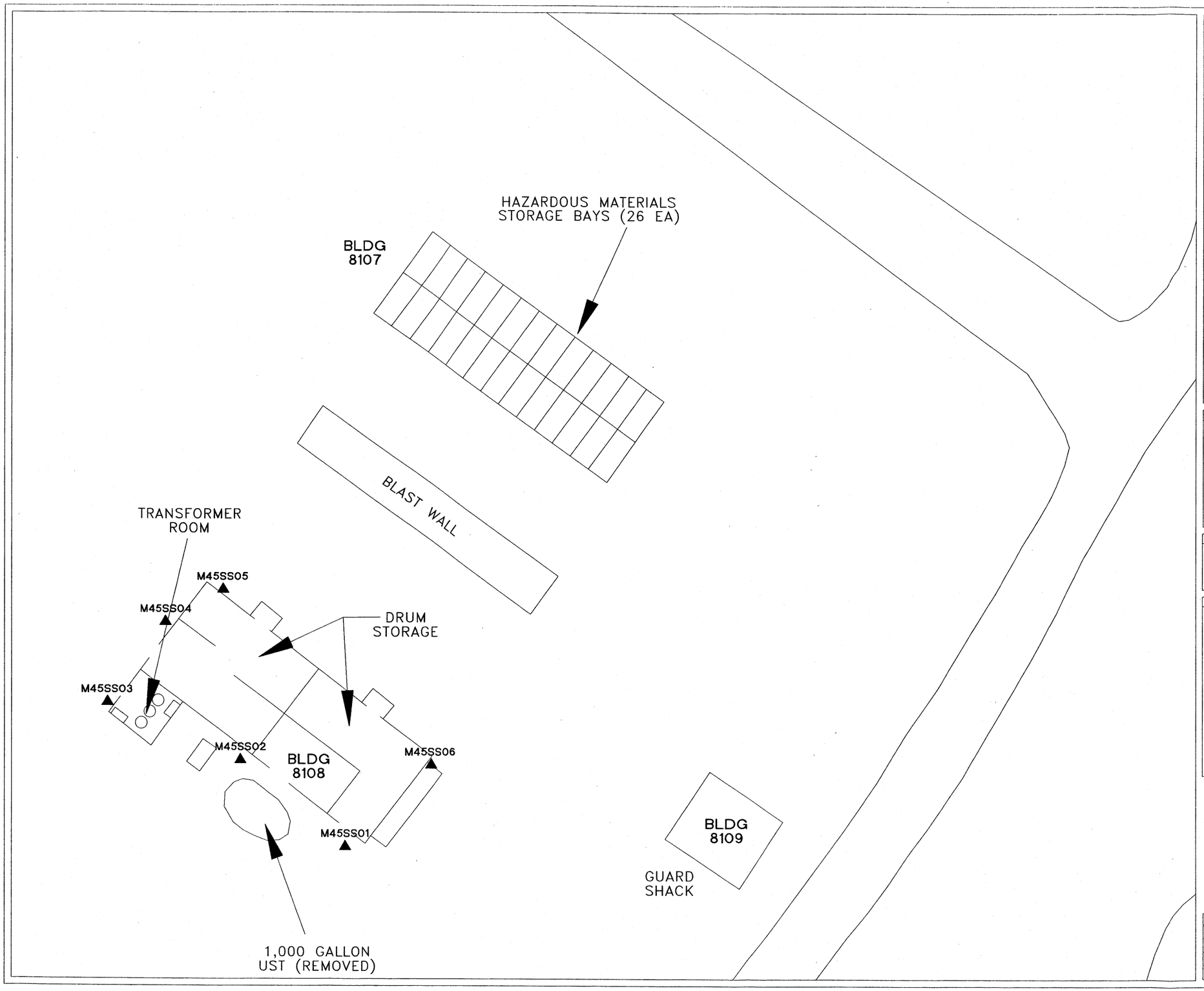
TITLE

HAZARDOUS MATERIALS STORAGE
AREA 7 (SITE 45)
SAND ISLAND

FEET
30 0 60 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
20.1-1



LEGEND

M##SS## ▲ SURFACE SOIL SAMPLE LOCATION AND IDENTIFICATION NUMBER

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE45\05179514.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

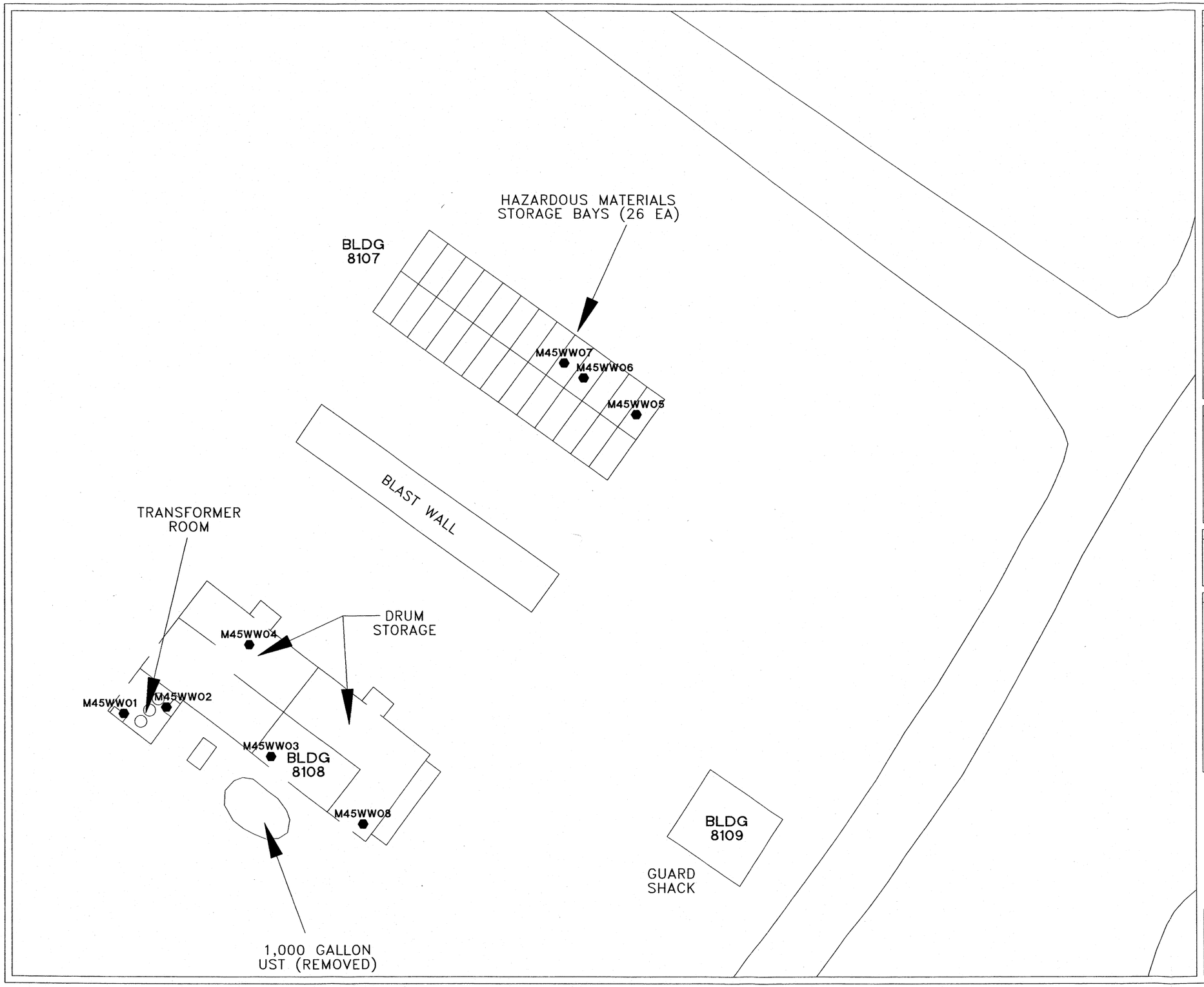
SURFACE SOIL SAMPLE LOCATIONS
(SITE 45)
SAND ISLAND

N

FEET
20 0 40 80

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
20.2-3



LEGEND

M##WW## PCB WIPE SAMPLE LOCATION AND IDENTIFICATION NUMBER

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE45\05179516.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

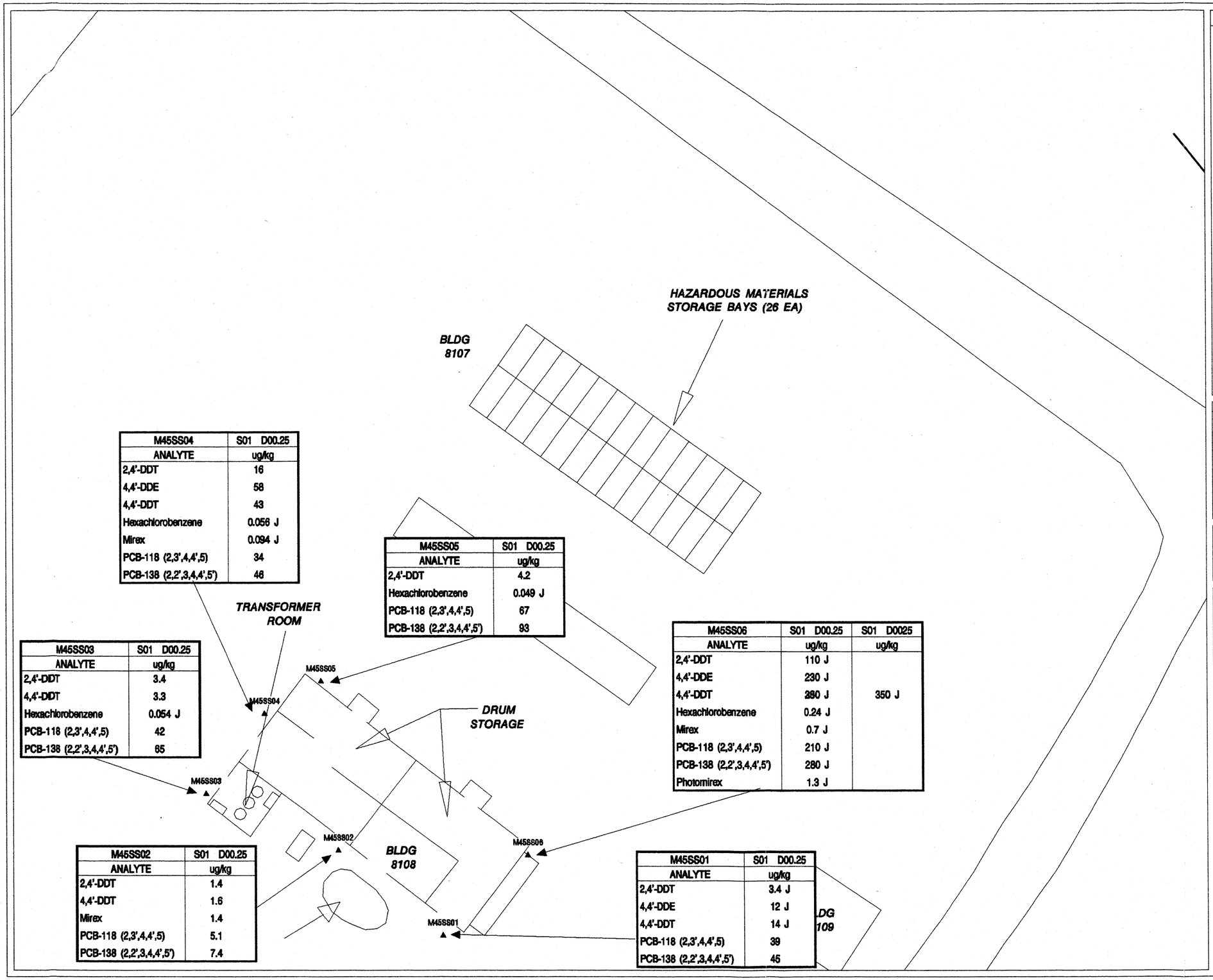
PCB WIPE SAMPLE LOCATIONS
(SITE 45)
SAND ISLAND

N

FEET
20 0 40 80

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
20.2-4



M45SS04	S01 D00.25
ANALYTE	ug/kg
2,4'-DDT	16
4,4'-DDE	58
4,4'-DDT	43
Hexachlorobenzene	0.056 J
Mirex	0.094 J
PCB-118 (2,3',4,4',5)	34
PCB-138 (2,2',3,4,4',5')	46

M45SS05	S01 D00.25
ANALYTE	ug/kg
2,4'-DDT	4.2
Hexachlorobenzene	0.049 J
PCB-118 (2,3',4,4',5)	67
PCB-138 (2,2',3,4,4',5')	93

M45SS03	S01 D00.25
ANALYTE	ug/kg
2,4'-DDT	3.4
4,4'-DDT	3.3
Hexachlorobenzene	0.054 J
PCB-118 (2,3',4,4',5)	42
PCB-138 (2,2',3,4,4',5')	65

M45SS06	S01 D00.25	S01 D0025
ANALYTE	ug/kg	ug/kg
2,4'-DDT	110 J	
4,4'-DDE	230 J	
4,4'-DDT	280 J	350 J
Hexachlorobenzene	0.24 J	
Mirex	0.7 J	
PCB-118 (2,3',4,4',5)	210 J	
PCB-138 (2,2',3,4,4',5')	280 J	
Photomirex	1.3 J	

M45SS02	S01 D00.25
ANALYTE	ug/kg
2,4'-DDT	1.4
4,4'-DDT	1.6
Mirex	1.4
PCB-118 (2,3',4,4',5)	5.1
PCB-138 (2,2',3,4,4',5')	7.4

M45SS01	S01 D00.25
ANALYTE	ug/kg
2,4'-DDT	3.4 J
4,4'-DDE	12 J
4,4'-DDT	14 J
PCB-118 (2,3',4,4',5)	39
PCB-138 (2,2',3,4,4',5')	45

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M45SS02	OGDEN SAMPLE ID
110	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190198
4. FILE: /appe/hm/cto198/maps/m5179518

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 108856 & 1088857

TITLE

LOW LEVEL PESTICIDES AND PCB'S DETECTED IN SURFACE SOIL SAMPLES (SITE 45) SAND ISLAND

N

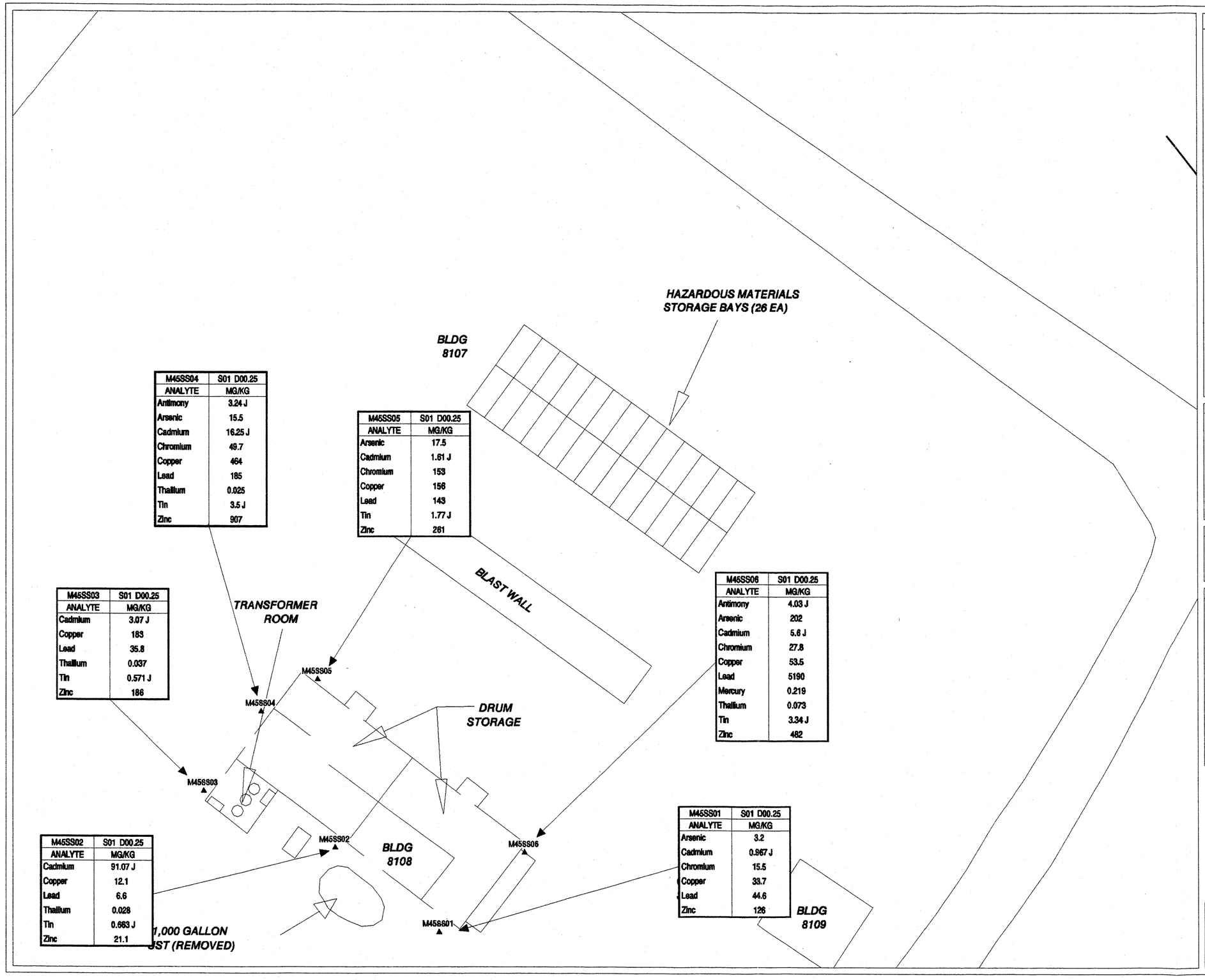
FEET

0 20 40 80 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

20.5-1



M45SS04	S01 D00.25
ANALYTE	MG/KG
Antimony	3.24 J
Arsenic	15.5
Cadmium	16.25 J
Chromium	49.7
Copper	464
Lead	185
Thallium	0.025
Tin	3.5 J
Zinc	907

M45SS05	S01 D00.25
ANALYTE	MG/KG
Arsenic	17.5
Cadmium	1.61 J
Chromium	153
Copper	156
Lead	143
Tin	1.77 J
Zinc	261

M45SS03	S01 D00.25
ANALYTE	MG/KG
Cadmium	3.07 J
Copper	183
Lead	35.8
Thallium	0.037
Tin	0.571 J
Zinc	186

M45SS06	S01 D00.25
ANALYTE	MG/KG
Antimony	4.03 J
Arsenic	202
Cadmium	5.6 J
Chromium	27.8
Copper	53.5
Lead	5190
Mercury	0.219
Thallium	0.073
Tin	3.34 J
Zinc	482

M45SS02	S01 D00.25
ANALYTE	MG/KG
Cadmium	91.07 J
Copper	12.1
Lead	6.6
Thallium	0.028
Tin	0.663 J
Zinc	21.1

M45SS01	S01 D00.25
ANALYTE	MG/KG
Arsenic	3.2
Cadmium	0.967 J
Chromium	15.5
Copper	33.7
Lead	44.6
Zinc	126

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M45SS02	OGDEN SAMPLE ID
4.03	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-8, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190138
4. FILE: /apps/hm/cto138/maps/m5179519

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

LOW LEVEL METAL CONCENTRATIONS DETECTED IN SURFACE SOIL SAMPLES (SITE 45) SAND ISLAND

N

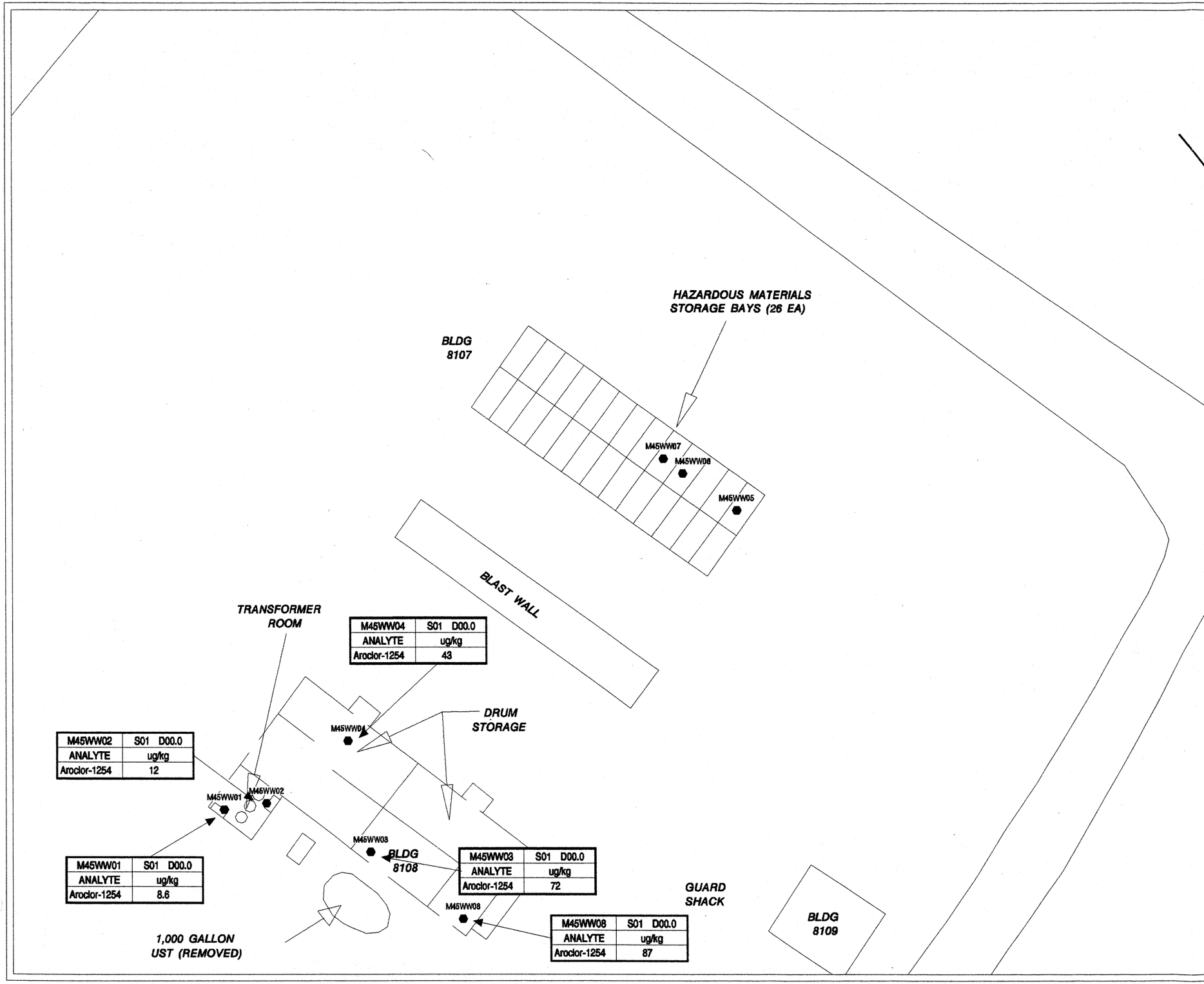
FEET

0 20 40 80 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
12/20/95	1	CMF		HFP		JMC	

FIGURE

20.5-2



LEGEND

⬢	PCB WIPE SAMPLE LOCATION
M45WW02	OGDEN SAMPLE ID
87	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-8, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/hm/cto136/maps/m5179523

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 1038856 & 1038857

TITLE

PCB CONCENTRATIONS DETECTED FOR PCB WIPE SAMPLES (SITE 45) SAND ISLAND

N

FEET

0 20 40 80 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/11/95	1	CMF	CMF	HPP	HPP	JMC	BH

FIGURE

20.5-3

Section 21

SECTION 21
NAVFAC BUILDING 964 (SITE 47)

This report describes the results of the SI field work conducted intermittently from August through November 1994 at the NAVFAC Building 964, Sand Island (Site 47). The purpose of the review was to determine whether Site 47 received hazardous substances, and to assess the likelihood for soil and ground-water contamination at the Site. A discussion of the work conducted during the SI, along with findings, conclusions, and recommendations, is presented below.

This report is organized as follows: Site background information is documented in Section 21.1; a description of SI field sampling activities is presented in Section 21.2; methods used for sample analysis are summarized in Section 21.3; physical characteristics of the Site observed during the investigation activities are discussed in Section 21.4; a summary of the analytical results is presented in Section 21.5; the SERA is described in Section 21.6; and conclusions and recommendations for the Site are presented in Section 21.7.

21.1 Background Information

Building 964 is in the NAVFAC complex located on the south shore of Sand Island (Figure 21.1-1). The building formerly contained a transformer, two dielectric fluid-filled electrical switches, and a UST. Although the transformer and switches have been removed, staining observed on the concrete floor may indicate leakage of dielectric fluid has occurred. The UST was removed in 1994. Table 21.1-1 lists the potential contaminants (PCBs) and the associated analytical categories.

Table 21.1-1

POTENTIAL CHEMICAL CONTAMINANTS
NAVFAC BUILDING 964
SITE 47

Waste Type	Years of Disposal	Potential Chemical Constituents	Analytical Category
Dielectric Fluid	Unknown	Heavy-end Hydrocarbons, PCBs	Total Fuel Hydrocarbons, PCBs

21.2 Sampling Methods and Locations

Wipe Sampling

Six PCB wipe samples and one QC duplicate sample were collected at six locations within the transformer room in Building 964 (Figure 21.2-1).

21.3 Analytical Methods

Wipe Sampling

Six PCB wipe samples and a QC duplicate sample were submitted to the offsite laboratory for analysis by EPA Method 8080 (Table 21.3-1).

21.4 Physical Characteristics

Building 964 is located near the southwest tip of Sand Island between runway 6-24 and the Pacific Ocean. Access to the Site is provided by Waldron Blvd. The Site is a level area with elevations estimated to range from 12 to 15 feet MSL. The area surrounding the building is covered by ironwood trees, grasses, and beach strand vegetation.

21.5 Summary of Analytical Data

Wipe sample M47WW03S01 contained 3.3 $\mu g/100\ cm^2$ of Aroclor-1260 (Table 21.5-1 and Figure 21.5-1). PCB concentrations in all other six wipe samples were below the lower detection limit of the analytical method (0.50 $\mu g/100\ cm^2$).

21.6 SCREENING ECOLOGICAL RISK ASSESSMENT

21.6.1 Problem Formulation

Tasks to be accomplished during Problem Formulation include (a) developing a Site description based on current Site investigations, existing literature, any prior preliminary assessments, and Site history; (b) identifying potential stressors, exposure pathways, and ecological receptors (habitats and species); (c) discussing the nature of adverse effects associated with a given stressor; (d) defining ecologically appropriate assessment and measurement endpoints; and (e) making an initial evaluation of risks posed by the Site.

For a Site to present the potential for risk, it must exhibit the following three criteria: contain stressors in abiotic media at detectable and biologically significant concentrations, provide exposure pathways linking stressors to ecological receptors, and have ecological receptors (those associated with assessment endpoints) that either utilize the Site, are present nearby, or are in range of stressors migrating from the Site. If Problem Formulation determines that one or more of these criteria are absent, the Site is recommended for NFA and the risk assessment is concluded at this point. If all criteria are met, then completion of the SERA process is required.

21.6.1.1 Site Description

Building 964 is in the NAVFAC complex located along the south shore of Sand Island (Figure 21.1-1). The Site consists of only the building, measuring 25 feet by 35 feet. The structure is completely boarded up and all potential entry points have been secured. Building 964 is bordered on three sides by paved driveways and roads, while weedy ruderal habitat occurs to the south. The Site is located approximately 200 feet from the south shore of Sand Island.

21.6.1.2 Stressor Identification

PCBs were the only potential stressor assessed at this site. Potential sources of PCB contamination at this Site include two electrical switches filled with dielectric oil that

were observed within Building 946 at the time of the SI investigation. The building formerly housed a transformer that may also have contained PCB dielectric oil. To determine whether PCBs may have leaked onto the concrete floor of the building, wipe sampling was conducted inside the building as described in Section 21.2. Only one of the six wipe samples had a detectable PCB concentration, 3.30 μg/100 cm^2. Because this sample was collected inside the building, from an area that is inaccessible to birds, the results of the PCB wipe sampling program were not considered in the CPEC selection process.

21.6.1.3 Potential Ecological Effects

There are no ecological effects to receptors because no CPECs were identified onsite.

21.6.1.4 Ecological Receptor Identification

The Site was devoid of any potential ecological receptors during all reconnaissance and sampling visits. No seabirds or shorebirds were observed in the vicinity of the Site, and no burrows were detected in the vegetated area adjacent to the building. It is believed that there are no ecological receptors currently using this Site. No marine receptors are associated with this Site.

21.6.1.5 Exposure Pathway Identification

Potential pathways for exposure to PCBs to ecological receptors are displayed in the CSM for Site 47, and include direct dermal exposure and ingestion of any contaminated media or prey items (Figure 4.2-1). These exposure routes are believed to be incomplete because the entire building is sealed and closed to entry. It is unlikely that any potential ecological receptor outside the building would be able to come into contact with contamination inside the structure. Any PCB contamination would likely remain within Building 964, since there are no transport mechanisms available to move the PCBs.

21.6.1.6 Summary

Based on the preceding information, it was concluded that this Site did not meet the three criteria that indicate the potential for risk. Although PCBs were detected within the building, there are currently no ecological receptors associated with the Site and the structure is inaccessible to potential ecological receptors. Based on this information, SERA analysis was not required.

21.7 Conclusions and Recommendations

Aroclor-1260 was detected in only one of the six wipe samples (3.30 μg/100 cm^2). Due to the low concentrations of PCB compounds detected on interior surfaces, additional investigation, cleanup, or special handling of building demolition debris is not warranted. No further investigation or action is recommended for this Site.

Tables
Section 21

TABLE 21.3-1 (Page 1 of 1)
ANALYTICAL METHODS
BUILDING 964 (SITE 47)

		ROUTINE ANALYTICAL LABORATORY
	ANALYTICAL METHOD	8080
EPA ID	OGDEN ID	PCBs
PCB WIPES		
MJ001	M47WW01S01D000	X
MJ002	M47WW02S01D000	X
MJ003	M47WW03S01D000	X
MJ004	M47WW04S01D000	X
MJ005	M47WW04D01D000	X
MJ006	M47WW05S01D000	X
MJ007	M47WW06S01D000	X

"X" = Indicates analytical method performed on sample.

Table 21.5-1
Summary of PCB Wipe Results
NAVFAC Building 964, Sand Island (Site 47)
Page 1 of 1

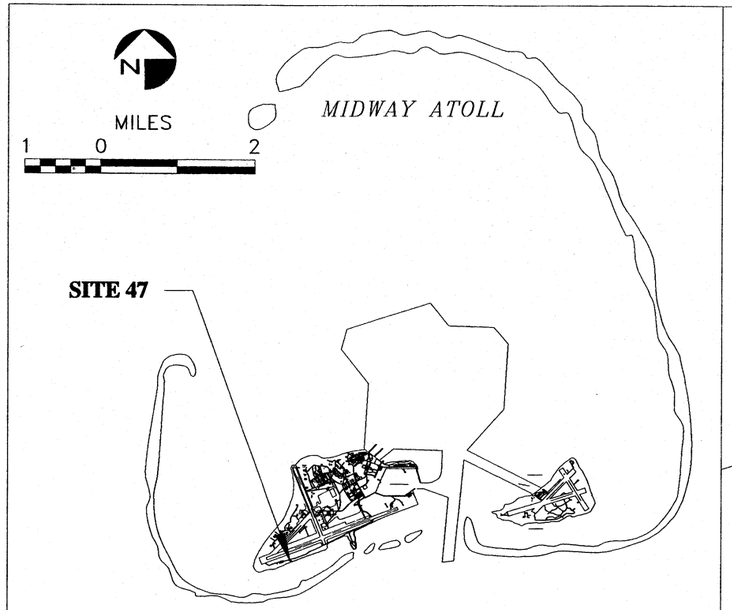
Site 47											
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL
OLM01.0C	Aroclor-1260	UG/KG	1	6	0	0.5	0.5	3.3	3.3	M47WW03S01	J

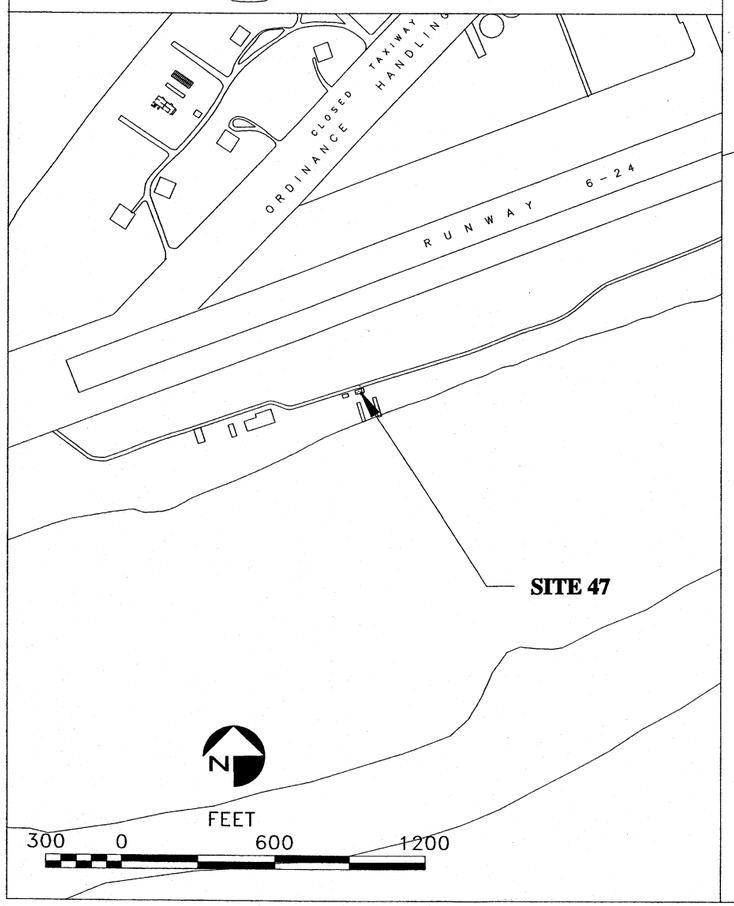
Notes:

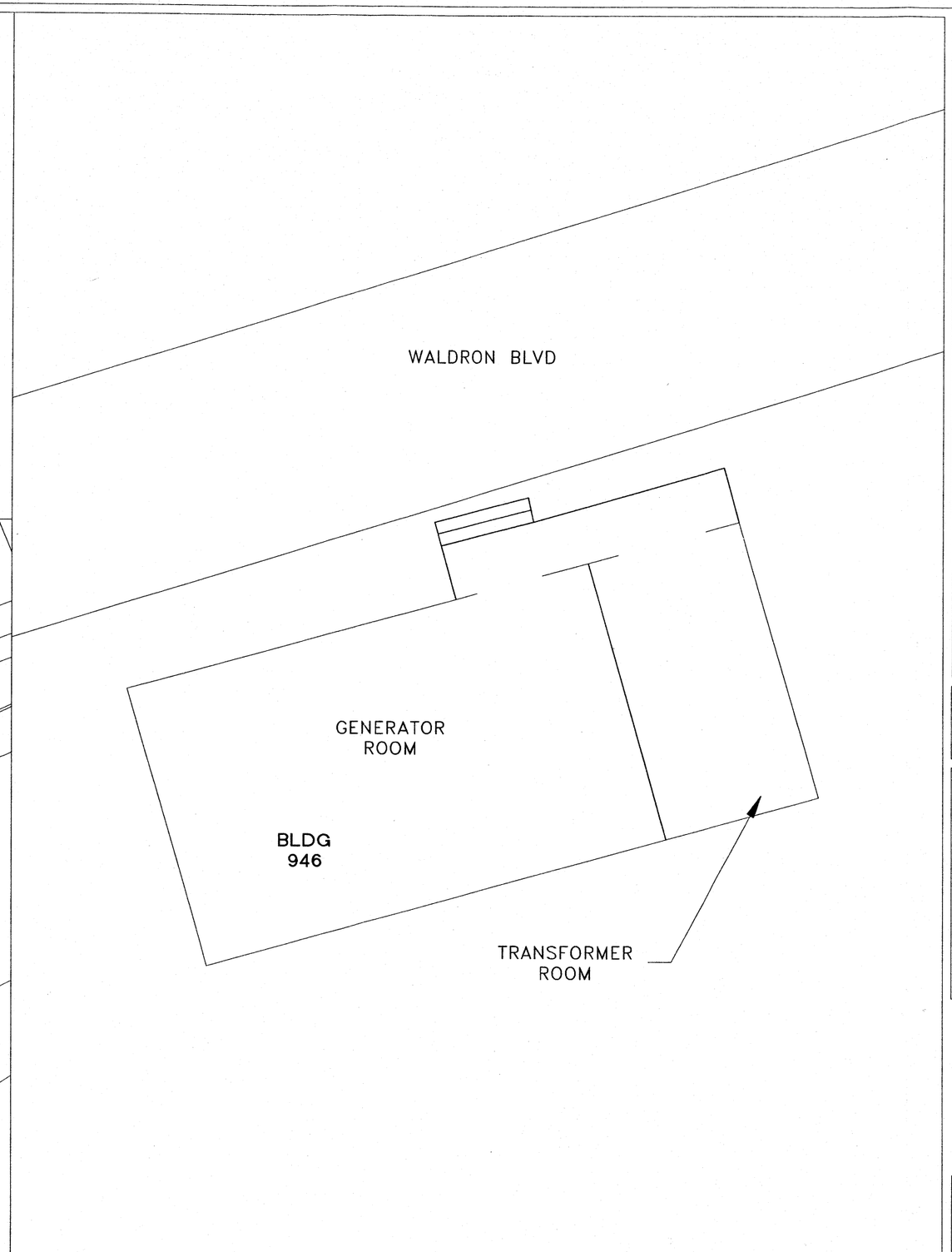
OLM01.0C = PCB Wipe

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

Figures
Section 21







LEGEND

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5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE47\05179530.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

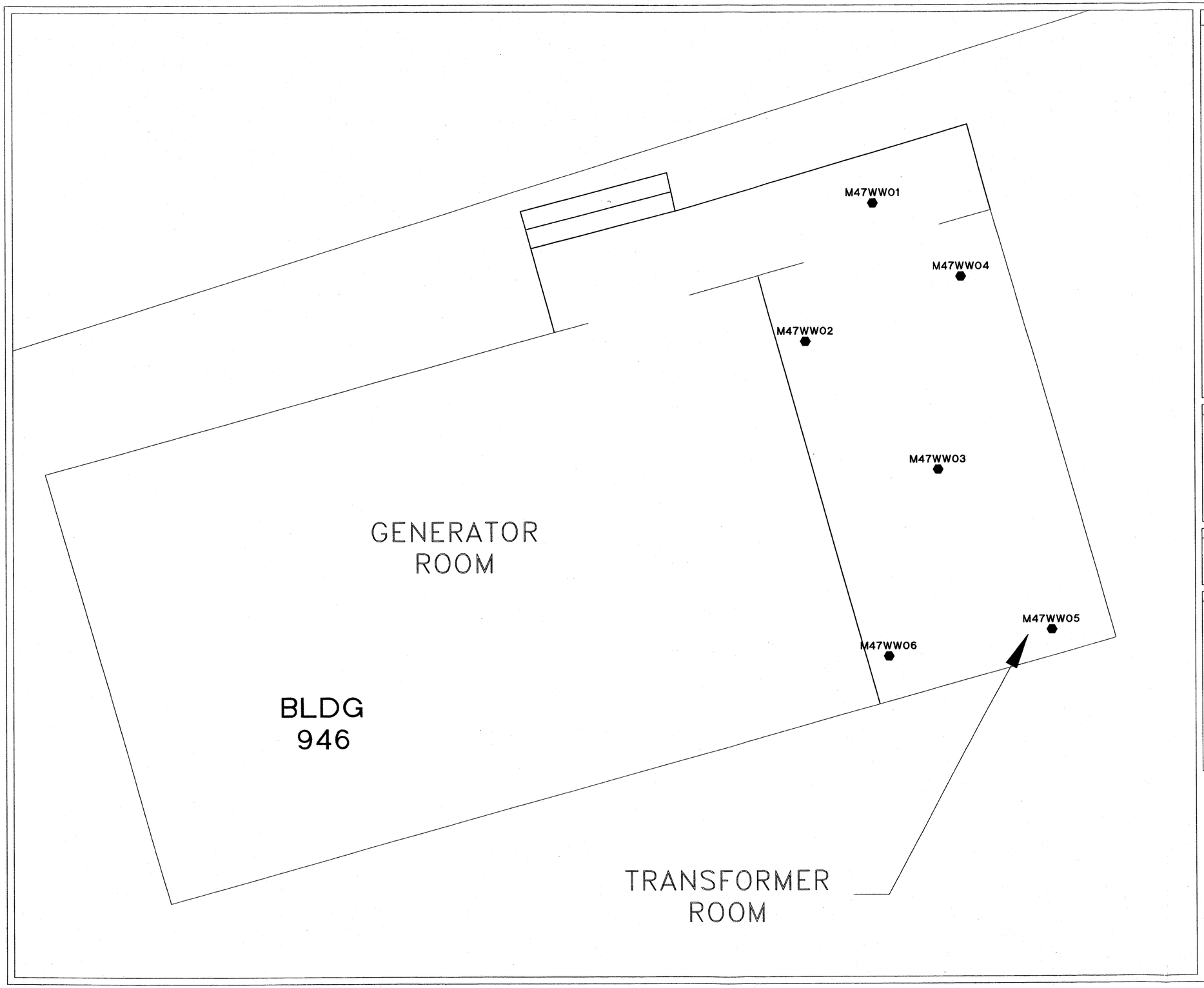
TITLE

NAVFAC BLDG 964
(SITE 47)
SAND ISLAND

N
FEET
5 0 10 20

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
21.1-1



LEGEND

M##WW## PCB WIPE SAMPLE LOCATION AND IDENTIFICATION NUMBER

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE47\05179531.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

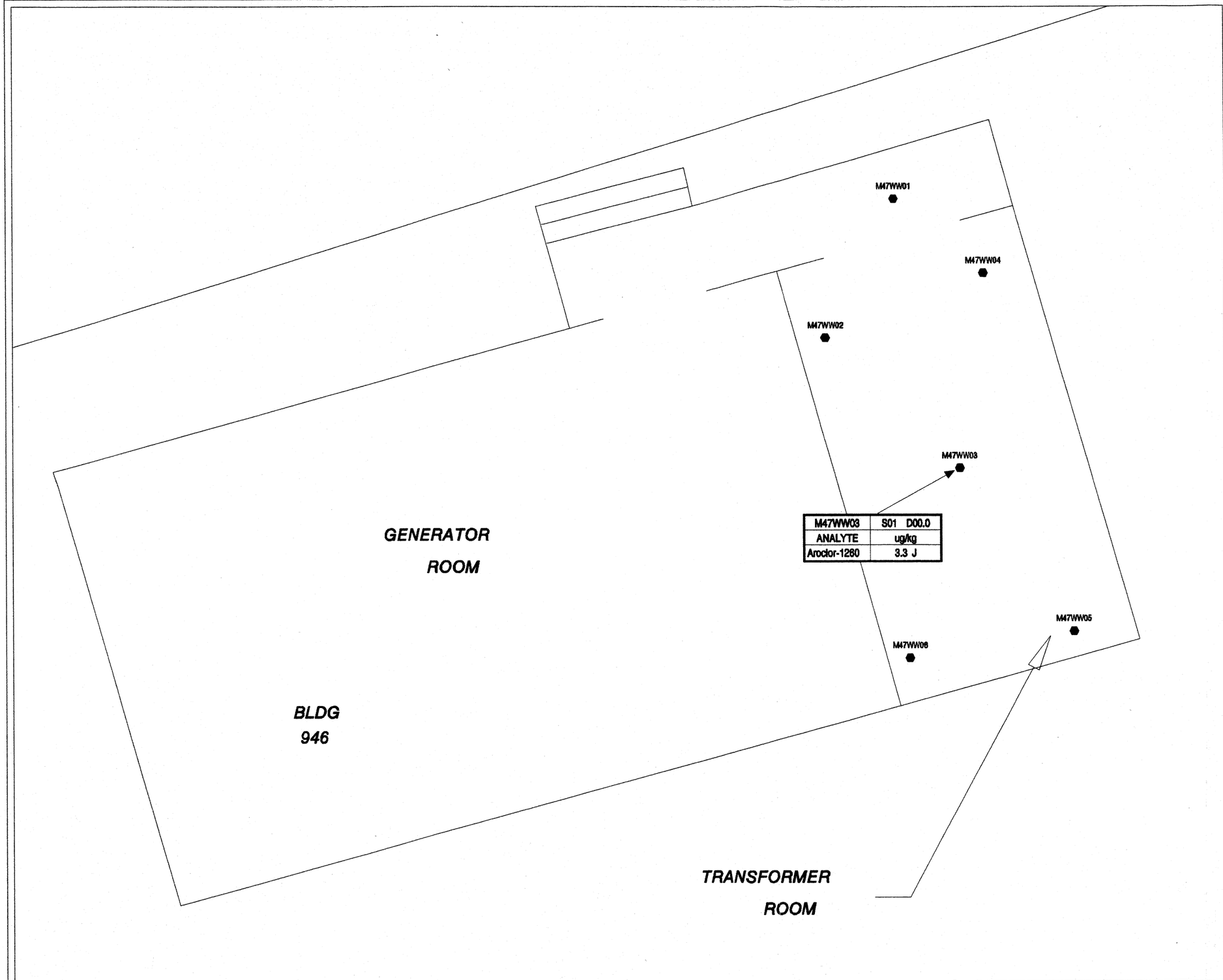
PCB WIPE SAMPLE LOCATIONS
(SITE 47)
SAND ISLAND

N

FEET
2.5 0 5 10

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
21.2-1



M47WW03	S01 D00.0
ANALYTE	ug/kg
Aroclor-1260	3.3 J

LEGEND

⬢	PCB WIPE SAMPLE LOCATION
M47WW02	OGDEN SAMPLE ID
3.3	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

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3. PROJECT NUMBER 110190136
4. FILE: /appe/hmr/cto136/maps/m6179532

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

PCB CONCENTRATIONS DETECTED FOR PCB WIPE SAMPLES (SITE 47) SAND ISLAND

N

FEET

0 2.5 5 10 15

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

21.5-1

Section 22

SECTION 22
NAVFAC BUILDING 971 (SITE 49)

This report describes the results of the SI field work conducted intermittently from August through November 1994 at the NAVFAC Building 971, Sand Island (Site 49). The review was conducted to determine whether the Site received hazardous substances, whether leaks from transformers or oil-filled switches may have occurred, and to assess the likelihood for soil and ground-water contamination at the Site. A discussion of the work conducted during the SI, along with findings, conclusions, and recommendations, is presented below.

This report is organized as follows: Site background information is documented in Section 22.1, sampling activities are discussed in Section 22.2, the SERA process is described in Section 22.3, and conclusions and recommendations are presented in Section 22.4.

22.1 BACKGROUND INFORMATION

Building 971 is in the NAVFAC complex located along the southern shore of Sand Island. During the 1993 EBS this building was locked and was not entered. Reportedly, this building may have contained a potential PCB oil-filled transformer; however, no electrical equipment was found in the building during SI field operations. Table 22.1-1 lists the potential contaminant source and associated analytical categories.

Table 22.1-1

POTENTIAL CHEMICAL CONTAMINANTS
NAVFAC BUILDING 971
SITE 49

Waste Type	Years of Disposal	Potential Chemical Constituents	Analytical Category
Dielectric Fluid	Unknown	Heavy-end Hydrocarbons, PCBs	Total Fuel Hydrocarbons, PCBs

22.2 Sampling Methods and Locations

Samples were not collected at Site 49 because no oil-filled electrical equipment or other potential contaminant sources were found within the building. No evidence of oil leaks or releases was observed. As a result, no further action is planned for this site

22.3 Screening Ecological Risk Assessment

22.3.1 Problem Formulation

Tasks to be accomplished during Problem Formulation include (a) developing a Site description based on current Site investigations, existing literature, any prior preliminary assessments, and Site history; (b) identifying potential stressors, exposure pathways, and ecological receptors (habitats and species); (c) discussing the nature of adverse effects associated with a given stressor; (d) defining ecologically appropriate assessment and measurement endpoints; and (e) making an initial evaluation of risks posed by the Site.

For a Site to present the potential for risk, it must exhibit the following three criteria: contain stressors in abiotic media at detectable and biologically significant concentrations, provide exposure pathways linking stressors to ecological receptors, and have ecological receptors (those associated with assessment endpoints) that either utilize the Site, are present nearby, or are in range of stressors migrating from the Site. If Problem Formulation determines that one or more of these criteria are absent, the Site is recommended for NFA and the risk assessment is concluded at this point. If all criteria are met, then completion of the SERA process is required.

22.3.1.1 Site Description

Building 971 is in the NAVFAC complex located along the south shore of Sand Island. The building is completely boarded up and inaccessible to birds. The building was entered during the field investigation and did not contain any oil-filled electrical equipment. No contaminants are expected onsite and no sampling was performed. Any unidentified PCB contamination at the site would likely remain within the structure.

Since there are no transport mechanisms available to move any PCBs outside the complex, no exposure pathways exist at Site 49. This Site does not meet the three criteria needed to create the potential for risk and completion of the SERA process is not required.

22.4 Conclusions and Recommendations

No evidence of any oil-filled electrical equipment nor any evidence of releases of oil or dielectric fluid was observed within the building. As a result, no further investigation or action is recommended for this site.

Section 23

SECTION 23
ABANDONED COMMAND POST, BUILDING 521 (SITE 50)

This report describes the results of SI field work conducted intermittently from August through November 1994 at the abandoned command post, Building 521, Sand Island (Site 50). The review was conducted to determine whether the Site received hazardous materials, whether dielectric oil leaks may have occurred, and to assess the likelihood for soil and ground-water contamination at the Site. A discussion of SI activities, findings, conclusions, and recommendations is presented below.

This report is organized as follows: Site background information is documented in Section 23.1; a description of SI field sampling activities is presented in Section 23.2; methods used for sample analysis are summarized in Section 23.3; physical characteristics of the Site observed during the investigation activities are discussed in Section 23.4; a summary of analytical results is presented in Section 23.5; the SERA is described in Section 23.6; and conclusions and recommendations for the Site are presented in Section 23.7.

23.1 BACKGROUND INFORMATION

Building 521, an abandoned World-War-II-era command post, is located near the center of Sand Island, adjacent to the aircraft hanger (Building 5306) (Figure 23.1-1). At the time of the EBS Site visit, Building 521 contained three oil-filled transformers and nine oil-filled switches.

The potential contaminant sources for this Site are the dielectric oils in the transformers and electrical switches, which may contain PCBs. Although PCBs may have been released to the concrete floor, the possibility that surface soils at the Site have been impacted appears to be very remote because of the configuration of the building.

The electrical equipment is located on the second floor of the structure above a large porch surrounded by a concrete wall. It is unlikely that leaking oil would exit the building and the porch.

Table 23.1-1 lists the potential chemical contaminants and the analytical tests that were implemented to characterize the Site.

Table 23.1-1

**POTENTIAL CHEMICAL CONTAMINANTS
ABANDONED COMMAND POST, BUILDING 521
SITE 50**

Waste Type	Years of Disposal	Potential Chemical Constituents	Analytical Category
Dielectric Fluid	Unknown	Heavy-end Hydrocarbons, PCBs	Total Fuel Hydrocarbons, PCBs

23.2 Sampling Methods and Locations

Because the only contaminants of concern identified at the Site were PCBs, and the possibility that soils were impacted was considered to be essentially non-existent, PCB wipes were the only samples taken at this Site. Wipe samples, including one QC duplicate sample, were collected from six locations near two opposing walls in the transformer room (Figure 23.2-1).

23.3 Analytical Methods

Wipe Sampling

PCB wipe samples from the six locations and the QC duplicate sample were submitted to an offsite laboratory for analysis by EPA Method 8080 (Table 23.3-1).

23.4 Physical Characteristics

Building 521 is a rectangular structure (50 feet by 125 feet) located in a flat area near the geographic center of Sand Island, just north of the hanger/apron area that once serviced (now closed) Runway 15-33, and immediately south of the abandoned enlisted housing area.

23.5 Summary of Analytical Results

PCB concentrations were below the lower detection limit of the analytical method (0.50 $\mu g/100\ cm^2$) in all wipe samples collected at the Site (Table 23.5-1).

23.6 Screening Ecological Risk Assessment

23.6.1 Problem Formulation

Tasks to be accomplished during Problem Formulation include (a) developing a Site description based on current Site investigations, existing literature, any prior preliminary assessments, and Site history; (b) identifying potential stressors, exposure pathways, and ecological receptors (habitats and species); (c) discussing the nature of adverse effects associated with a given stressor; (d) defining ecologically appropriate assessment and measurement endpoints; and (e) making an initial evaluation of risks posed by the Site.

For a Site to present the potential for risk, it must exhibit the following three criteria: contain stressors in abiotic media at detectable and biologically significant concentrations, provide exposure pathways linking stressors to ecological receptors, and have ecological receptors (those associated with assessment endpoints) that either utilize the Site, are present nearby, or are in range of stressors migrating from the Site. If Problem Formulation determines that one or more of these criteria are absent, the Site is recommended for NFA and the risk assessment is concluded at this point. If all criteria are met, then completion of the SERA process is required.

23.6.1.1 Site Description

Building 521 is an abandoned World-War-II-era command post located adjacent to the aircraft hangar (Building 5306), approximately 2,400 feet from the north shore of Sand Island. The structure is currently intact, and has been completely sealed at all points of entry. The building is surrounded by pavement and ruderal habitat. The Site is adjacent to an active hanger and office with considerable human activity throughout the day.

23.6.1.2 Stressor Identification

Based on the history of the Site, PCBs are the only potential chemical contaminants; therefore only PCB wipe samples were collected. Since PCBs were not detected in the wipe samples, it is believed that PCB contamination is not present at Site 50. No CPECs were identified at the Site.

23.6.1.3 Potential Ecological Effects

There are no ecological effects to receptors because no CPECs were identified onsite.

23.6.1.4 Ecological Receptor Identification

During reconnaissance and sampling visits to the Site, no potential ecological receptors were observed in or near Building 521. No seabirds or shorebirds were observed in the area immediately surrounding the Site, and no burrows were detected. The structure is also completely sealed off from access by any possible ecological receptors of concern that may utilize the Site in the future. No marine receptors are associated with this Site.

23.6.1.5 Exposure Pathway Identification

Due to the configuration of the building, it is not considered possible that PCB oil could have been transported outside the building. Birds do not have access to the building, and all possible routes of contaminant transport out of the building have been completely sealed. Any CPECs would likely remain within Building 521, since there are no transport mechanisms available to move contaminants.

23.6.1.6 Summary

None of the three criteria that indicate the potential for risk are present at the Site. There are no CPECs associated with the Site, and ecological receptors are currently absent from the vicinity of Building 521. Additionally, complete exposure pathways do not exist since the building is completely sealed off from access by potential ecological receptors

that may arrive onsite in the future. Because risks posed by the Site to ecological receptors are considered to be non-existent, SERA analysis was not required.

23.7 Conclusions and Recommendations

Currently, all remaining electrical equipment and transformers on Midway are being tested for PCBs and retrofilled or removed, if necessary, as part of the base closure process. PCBs were not detected in any of the wipe samples collected in Building 521. Risks to ecological receptors due to PCBs are considered to be non-existent at this Site; therefore, no further investigation or action is recommended.

TABLE 23.3-1 (Page 1 of 1)
ANALYTICAL METHODS
ABANDONED COMMAND POST
BUILDING 521 (SITE 50)

		ROUTINE ANALYTICAL LABORATORY
	ANALYTICAL METHOD	8080
EPA ID	OGDEN ID	PCBs
PCB WIPES		
MJ500	M50WW01S01D000	X
MJ501	M50WW02S01D000	X
MJ502	M50WW02D01D000	X
MJ503	M50WW03S01D000	X
MJ504	M50WW04S01D000	X
MJ505	M50WW05S01D000	X
MJ506	M50WW06S01D000	X

"X" = Indicates analytical method performed on sample.

Table 23.5-1
Summary of PCB Wipe Results
Abandoned Command Post, Building 521, Sand Island (Site 50)

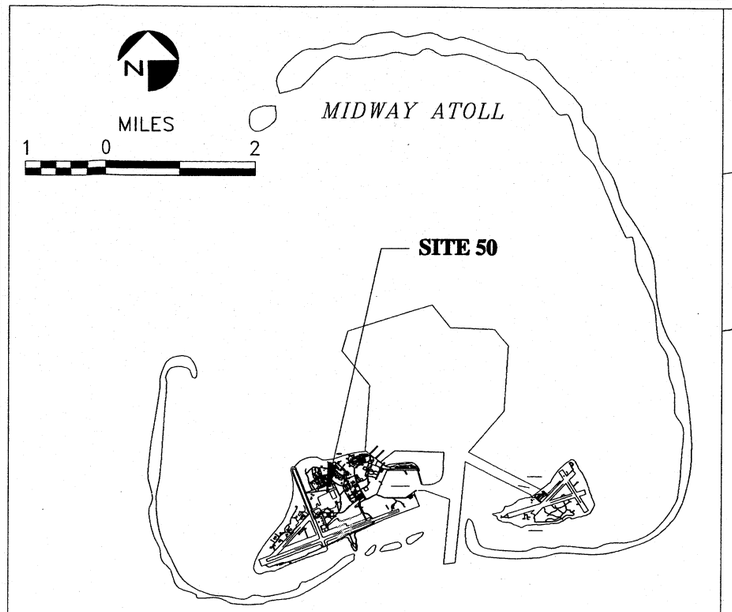
Site 50											
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL
OLM01.0C	All Aroclors	UG/KG	0	6	0	0.5	0.5				

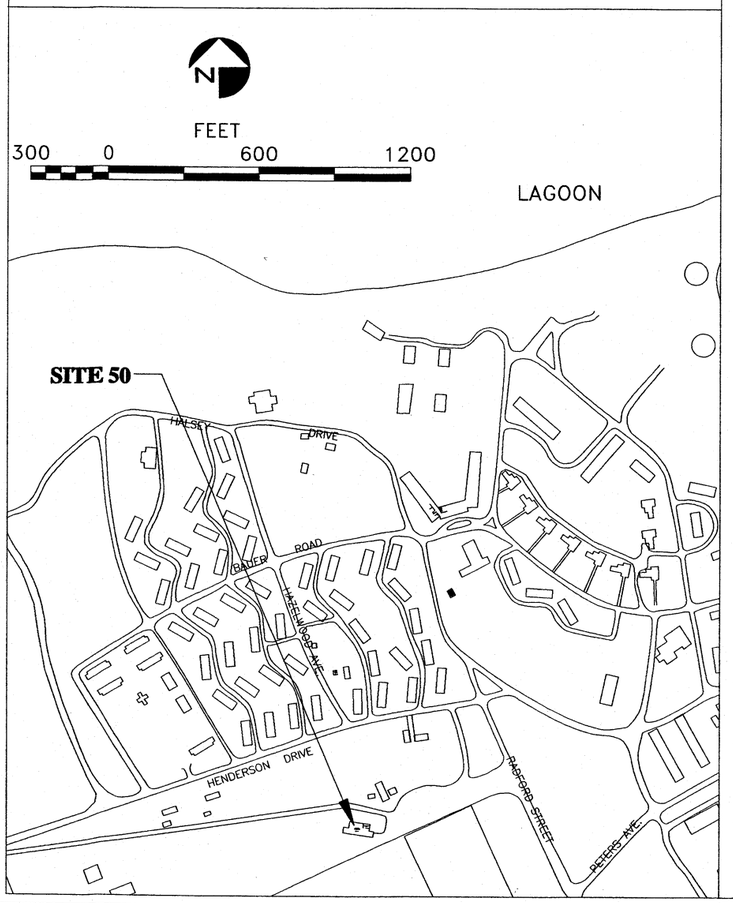
Notes:

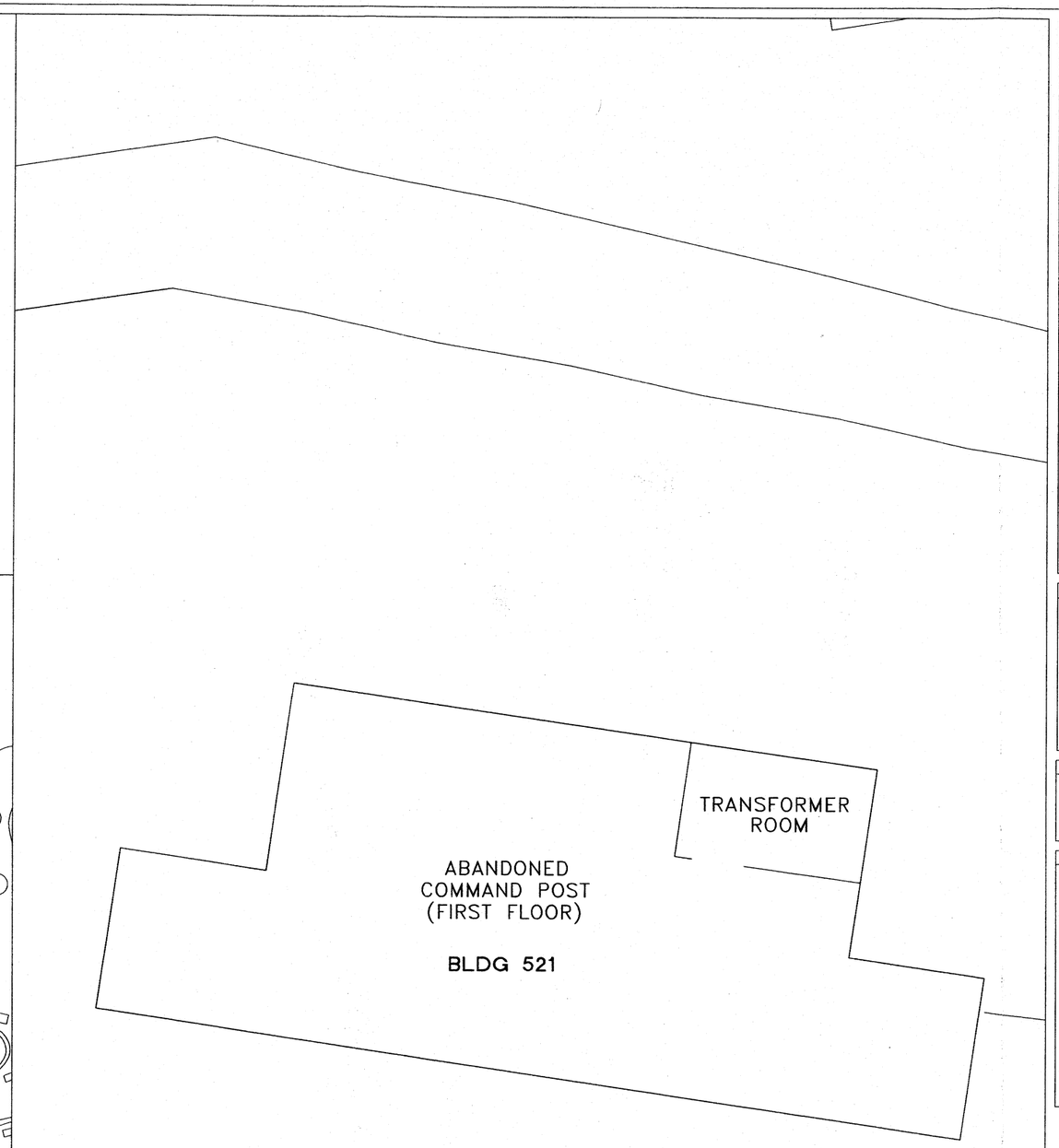
OLM01.0C = PCB Wipe

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

Figures
Section 23







LEGEND

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5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE50\05179533.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

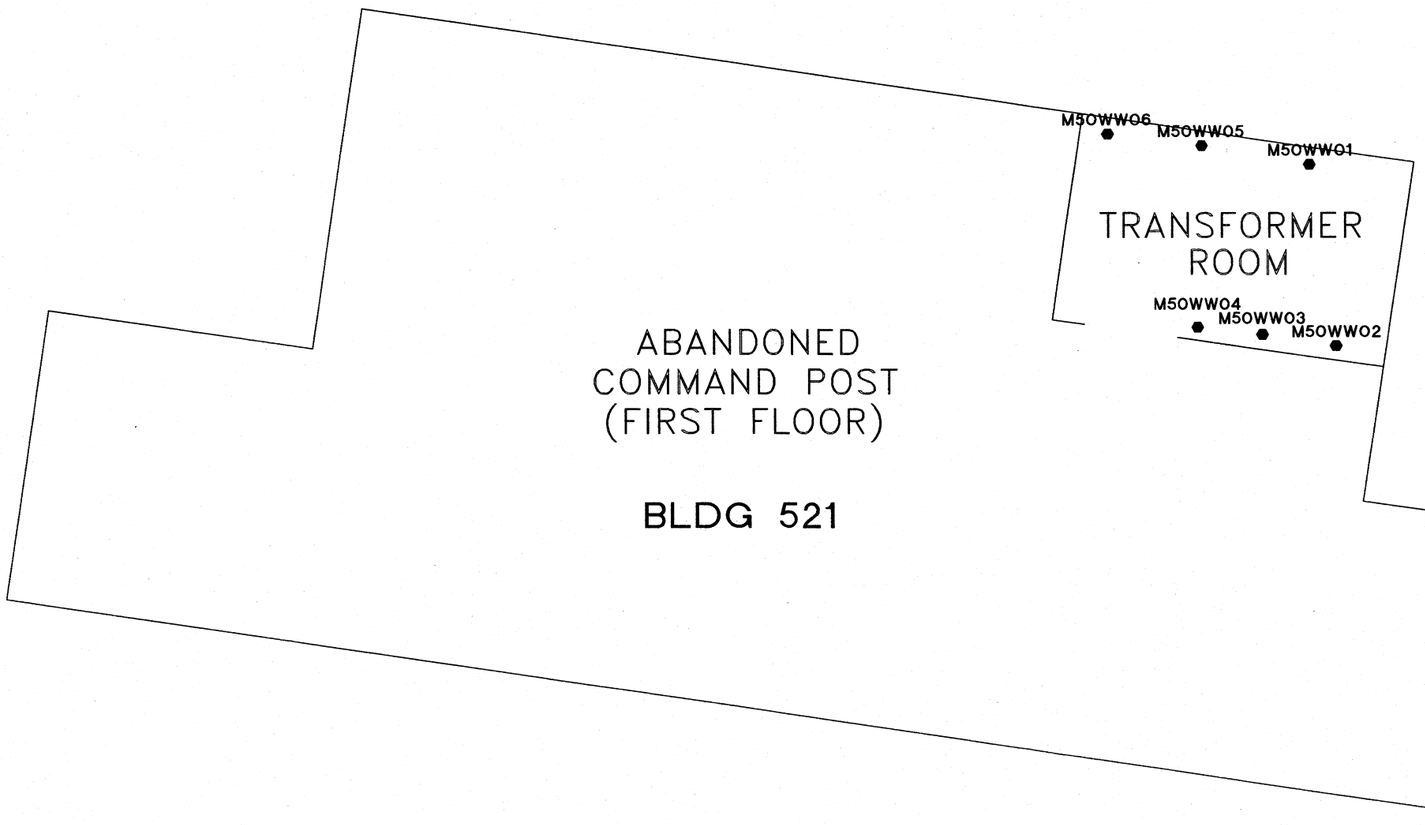
TITLE

ABANDONED COMMAND POST, BLDG 521
(SITE 50)
SAND ISLAND

N
FEET
10 0 20 40

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
23.1-1



LEGEND

M##WW## PCB WIPE SAMPLE LOCATION AND IDENTIFICATION NUMBER

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5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE50\05179534.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

PCB WIPE SAMPLE LOCATIONS
(SITE 50)
SAND ISLAND

N

FEET
6 0 12 24

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
23.2-1

Section 24

SECTION 24
GEORGE CANNON SCHOOL, BUILDING 6346 (SITE 51)

This report describes the results of the SI field work conducted intermittently from August through November 1994 at George Cannon School, Building 6346, Sand Island (Site 51). The review was conducted to determine whether the Site received hazardous materials, whether dielectric oil leaks may have occurred, and to assess the likelihood for soil and groundwater contamination. A discussion of SI activities, findings, conclusions, and recommendations is presented below.

This report is organized as follows: Site background information is documented in Section 24.1; a description of SI field sampling activities is presented in Section 24.2; methods used for sample analysis are summarized in Section 24.3; physical characteristics of the Site observed during the investigation activities are discussed in Section 24.4; a summary of analytical results is presented in Section 24.5; the SERA is described in Section 24.6; and conclusions and recommendations for the Site are presented in Section 24.7.

24.1 BACKGROUND INFORMATION

The George Cannon School, Building 6346, is an abandoned elementary school located near the north shore of Sand Island (Figure 24.1-1). The building contains one oil-filled transformer and three oil-filled electrical switches, all of which may contain PCBs. Table 24.1-1 lists the chemical contaminants that may be present at Site 51, and the analytical tests that were implemented to characterize the Site.

Table 24.1-1

**POTENTIAL CHEMICAL CONTAMINANTS
GEORGE CANNON SCHOOL
SITE 51**

Waste Type	Years of Disposal	Potential Chemical Constituents	Analytical Category
Dielectric Fluid	Unknown	Heavy-end Hydrocarbons, PCBs	Total Fuel Hydrocarbons, PCBs

24.2 Sampling Methods and Locations

Surface Soils

Two surface soil samples and one co-located QC duplicate sample were collected immediately outside the door of the transformer room at the west end of the central wing of the school (Figure 24.2-1). Samples were collected at depths of 2 to 6 inches below grade and placed in glass sample containers using a stainless steel spoon.

PCB Wipe Samples

Six PCB wipe samples and one QC duplicate sample were collected at six locations within the transformer room (Figure 24.2-1).

24.3 Analytical Methods

The following sections summarize the analytical methods used for chemical testing on the samples collected at the Site. Table 24.3-1 lists the samples and analytical methods.

Surface Soil

Surface soil samples were submitted to the offsite laboratory for analysis of PCBs and pestcides by EPA method 8080 and fuels by method 8015 M/OG.

PCB Wipe Sampling

PCB wipe samples were submitted to the offsite laboratory for analysis by EPA Method 8080.

24.4 PHYSICAL CHARACTERISTICS

The George Cannon School, Building 6346, is located in the north-central area of Sand Island, northeast of the intersection of Bauer Road and Halsey Drive. The building consists of the west, central, and east wings. The transformer room is located at the west end of the central wing. The area surrounding the school is level and grass-covered.

24.5 SUMMARY OF ANALYTICAL RESULTS

This section gives the results of the laboratory analyses for Site 51 samples. Analytical results are shown in Table 24.5-1. The table lists analytical methods, the number of detects, the total number of samples, the number of samples rejected during data validation, the minimum undetected concentration, the maximum undetected concentration, the minimum detected concentration, the maximum detected concentration, and the sample with the maximum concentration detected. In addition, the concentrations of compounds detected at Site 51 are compared to Sand Island background levels. Analytical results for all samples and analytes are contained in Appendix L. Complete CLP and low-level analytical data are available at PACNAVFACENGCOM offices at Pearl Harbor, Hawaii.

24.5.1 Surface Soil Samples

Two PCBs, Aroclor-1254 and -1260, were detected among the surface soil samples; maximum detected concentrations were 1,000 and 340 µg/kg, respectively (Figure 24.5-1). Gamma chlordane, 4,4'-DDE and 4,4'-DDT were detected at maximum concentrations of 16, 1,100 and 450 µg/kg, respectively. Maximum diesel range (C14-C20) and lubricant oil range (C20-C30) hydrocarbon concentrations were 14 mg/kg and 170 mg/kg, respectively.

24.5.2 PCB Wipe Samples

The maximum PCB concentration detected in a wipe sample from this Site was 1.40 µg/100 cm^2 of Aroclor-1254 (Figure 24.5-2).

24.6 SCREENING ECOLOGICAL RISK ASSESSMENT

24.6.1 Problem Formulation

Tasks to be accomplished during Problem Formulation include (a) developing a Site description based on current Site investigations, existing literature, any prior preliminary assessments, and Site history; (b) identifying potential stressors, exposure pathways, and ecological receptors (habitats and species); (c) discussing the nature of adverse effects associated with a given stressor; (d) defining ecologically appropriate assessment and measurement endpoints; and (e) making an initial evaluation of risks posed by the Site.

For a Site to present the potential for risk, it must exhibit the following three criteria: (a) contain stressors in abiotic media at detectable and biologically significant concentrations, (b) provide exposure pathways linking stressors to ecological receptors, and (c) have ecological receptors (those associated with assessment endpoints) that either utilize the Site, are present nearby, or are in range of stressors migrating from the Site. If Problem Formulation determines that one or more of these criteria are absent, the Site is recommended for NFA and the risk assessment is concluded at this point. If all criteria are met, then completion of the SERA process is required.

24.6.1.1 Site Description

Site 51 is an abandoned elementary school located near the north shore of Sand Island. Oil in the transformers within the building may contain PCBs, and may have been released to the concrete floor and nearby surface soils. Ruderal habitat of lawn with scattered ironwood trees surrounds the school building.

24.6.1.2 Stressor Identification

Potential stressors identified at the Site 51 were PCBs associated with the transformers found in the building. Because of the early availability of chemical analysis data, ECs were computed and CPECs were identified at this point in the SERA process, using the methods described in Sections 4.3.1.1.1 and 4.3.1.1.2. Only two surface soil samples were collected at this Site; therefore, the maximum detected concentration was used as the EC. CPECs identified in surface soils onsite (<6 inches bgs) are Aroclor-1254 and -1260, 4,4'-DDE and 4,4'-DDT with ECs of 1.0 and 0.34 mg/kg, 1.1 mg/kg, and 0.45 mg/kg, respectively. Aroclor-1254 was also detected in two of the six PCB wipe samples taken from the transformer within the building, at concentrations of 1.4 and 0.91 $\mu g/100\ cm^2$. Since birds have no access to the interior of the building these samples were not considered in the CPEC selection process.

24.6.1.3 Potential Ecological Effects

CPECs identified onsite that may adversely affect receptors onsite are Aroclor-1254 and -1260, DDE and DDT. CPEC physicochemical properties and toxicology, as they relate to potential exposure routes and sensitive ecological receptors, are summarized in Section 4.2.3 and described in detail in Appendix J.

24.6.1.4 Ecological Receptor Identification

Potential ecological receptors for contaminants associated with this Site include the Laysan albatross, Bonin petrel, red-tailed tropicbird, white tern, Pacific golden-plover, and ruddy turnstone (Section 4.2.4). All of these species, with the exception of the plover and turnstone, are expected to nest onsite outside the school building.

24.6.1.5 Exposure Pathway Identification

The CSM appropriate to this Site is shown in Figure 4.2-2. Potentially complete terrestrial exposure routes include direct exposure to contaminated soil through dermal contact, incidental ingestion of contaminated surface soil, ingestion of contaminated prey items, and inhalation of vapors in burrows. Incidental ingestion and dermal contact with

surface soils potentially contaminated with CPECs are of primary concern for the ground-nesting birds onsite (i.e., the Laysan albatross and red-tailed tropicbird). Inhalation of vapors and dermal exposure to contaminants are principal routes for the burrowing Bonin petrel. Direct ingestion of contaminated prey items by the plover and turnstone would be the principle exposure route for these shorebird species.

24.6.1.6 Endpoints

Assessment endpoints and testable hypotheses appropriate for this Site are listed in Sections 4.2.6.1 and 4.2.6.2, respectively. Measurement endpoints selected for this Site include endpoints #1 through #3 listed in Section 4.2.6.3.

24.6.1.7 Summary

Based on the preceding information it was concluded that this Site met the three criteria that indicate the potential for risk and that completion of the SERA process was required.

24.6.2 Exposure Analysis

Target receptors for contaminants in the surface soil onsite include ground nesting seabird species, Laysan albatross and red-tailed tropicbird, burrowing species, Bonin petrel, and shorebirds, Pacific golden-plover and ruddy turnstones. Exposure pathway models (c.f., Section 4.3.1.3) applicable to burrowing birds (#1), ground-nesting birds (#2), and shorebirds (#3) were used for the various types of bird species that occur onsite. The Laysan albatross was evaluated for incidental ingestion and dermal absorption of contaminants in surface soils. The Bonin petrel was evaluated for dermal exposure, incidental ingestion, and inhalation of vapors using surface soil contaminant concentrations due to a lack of data on subsurface soil concentrations. Terrestrial target receptors also identified onsite were the ruddy turnstone and Pacific golden-plover, both shorebirds. The Pacific golden-plover was chosen as a representative shorebird species. The primary exposure route for shorebirds was ingestion of invertebrates (insects) that have been exposed to contaminants in the surface soils. Equations for calculating EPVs are described in Section 4.3.1.4. The EPVs for Aroclor-1254 and -1260 were 0.052 and 0.0177 mg/kg-d for ground-nesting birds, 0.146 and 0.0496 mg/kg-d for burrowing birds,

and 0.0484 and 0.0796 mg/kg-d for shorebirds, respectively. The EPVs for DDE and DDT were 0.0117 and 0.0048 mg/kg-d for ground-nesting birds, 0.0362 and 0.0139 mg/kg-d for burrowing birds, and 0.0352 and 0.0203 mg/kg-d for shorebirds, respectively.

24.6.3 Ecological Effects Analysis

The potential for adverse ecological effects to terrestrial bird species was evaluated by using literature-derived data on CPEC toxicity with respect to specific target receptors and, when such data were not available, to appropriate surrogate test species. The toxicity reference value for Aroclor-1254 and -1260 is 0.084 mg/kg-d. The TRV for DDE is 0.03 mg/kg and for DDT is 0.011 mg/kg-d. The TRV table and toxicological profiles are provided in Appendix J.

24.6.4 Risk Characterization

Risk estimation was performed using a quotient methodology as described in Section 4.3.3.1. Results of the risk description weight-of-evidence analyses are summarized in Table 24.6-1 and discussed below.

The compounds detected onsite exhibiting TQs greater than zero were Aroclor-1254 (0.24), DDE (0.08) for burrowing birds, and DDE (0.07) for shorebirds. These TQs indicate a low potential for adverse effects. However, exposure for burrowing birds was calculated using surface soil concentrations. The burrowing bird would be exposed to concentrations in surface soils for only a short time period when excavating their burrows. There is no data for the concentrations of these PCBs and pesticides in subsurface soils. The shorebirds would be exposed to these surface soil DDE concentrations continuously, with the corresponding low potential for adverse effects.

24.6.5 Uncertainty Analysis

All uncertainties for terrestrial sites discussed in Section 4.3.3.3 apply to this Site. Two data gaps particular to this Site are the limited number of samples collected and a lack of subsurface soil data.

24.6.6 SERA Conclusions

The assessment endpoint for special status bird species is not expected to be met. Assuming that concentrations in subsurface soils (to which burrowing birds are exposed more frequently) are similar to those in surface soils, there is a low potential for risk to burrowing bird species from Aroclor-1254 and DDE. There is also a low potential for risk to shorebirds from DDE. Maximum concentrations of both PCBs and DDE are at, or 0.1 ppm greater than, the suggested cleanup levels for PCBs and DDE, respectively (1.0 ppm).

24.7 CONCLUSIONS AND RECOMMENDATIONS

Aroclor-1260 was detected at a maximum concentration of 0.340 ppm, and Aroclor-1254 was detected at a maximum concentration of 1.0 ppm in surface soils collected from around the transformer room entrance. Based on the results of the SERA, the concentrations of PCBs detected in surface soils pose a minimal risk to terrestrial wildlife and seabirds found onsite. No further investigation or action is recommended for Site 51 related to PCBs in surface soils.

DDE concentrations in surface soils pose a low risk to burrowing birds and shorebirds onsite. The maximum concentration of DDE detected onsite was 1.1 ppm. Although the maximum concentration is only 0.1 ppm greater than the recommended cleanup level of 1.0 ppm, additional sampling is recommended to reduce the risk to birds, to confirm that these two samples are representative of the Site, and to identify any existing hot spots.

Currently, all remaining electrical equipment and transformers on Midway are being tested for PCBs and retrofilled or removed, if necessary, as part of the base closure process. PCB wipe samples collected from interior surfaces of the transformer room were found to contain a maximum concentration of 1.4 $\mu g/100\ cm^2$ Aroclor-1254. The PCB concentrations in wipe samples are not considered to be high enough to warrant cleanup action or to require special handling and disposal procedures for electrical equipment and building demolition debris. No further action is recommended regarding the presence of PCBs on the interior surfaces of the transformer room at the George Cannon school.

Tables
Section 24

TABLE 24.3-1 (Page 1 of 1)
ANALYTICAL METHODS
GEORGE CANNON SCHOOL (SITE 51)

		ROUTINE ANALYTICAL LABORATORY	
	ANALYTICAL METHOD	8015 M/OG	8080
EPA ID	OGDEN ID	FUELS	PCBs
SURFACE SOIL SAMPLES			
MJ750	M51SS01S01D0025	X	X
MJ751	M51SS01D01D0025	X	X
MJ752	M51SS02S01D0025	X	X
PCB WIPES			
MJ753	M51WW01S01D000	-	X
MJ754	M51WW02S01D000	-	X
MJ755	M51WW02D01D000	-	X
MJ756	M51WW03S01D000	-	X
MJ757	M51WW04S01D000	-	X
MJ758	M51WW05S01D000	-	X
MJ759	M51WW06S01D000	-	X

"X" = Indicates analytical method performed on sample.

Table 24.5-1
Summary of Analytical Results
George Cannon School, Sand Island (Site 51)

			Site 51									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL																			
8015B/OG	C14-C20 (Diesel Range)	MG/KG	1	2	0	5.1	5.1	14	14	M51SS02S01		1	8	0	5.2	5.9	10	10	3.27
8015B/OG	C20-C30 (Lubricant Oil Range)	MG/KG	2	2	0			69	170	M51SS02S01		1	8	0	21	24	44	44	13.3
OLM01.0P	4,4'-DDE	UG/KG	2	4	2			40	1100	M51SS02S01		4	10	2	3.4	4	5.2	1900	13.1
OLM01.0P	4,4'-DDT	UG/KG	2	4	2			43	450	M51SS02S01	J	2	10	2	3.4	4	200	320	6.3
OLM01.0P	Aroclor-1254	UG/KG	2	4	2			510	1000	M51SS01S01	J	0	10	2	34	160			
OLM01.0P	Aroclor-1260	UG/KG	2	4	2			280	340	M51SS01S01	J	0	10	2	34	160			
OLM01.0P	Endosulfan sulfate	UG/KG	1	4	2	6.7	6.7	55	55	M51SS02S01	NJ	0	10	2	3.4	16			
OLM01.0P	gamma-Chlordane	UG/KG	1	4	2	3.5	3.5	16	16	M51SS02S01	J	0	10	2	1.8	8.1			
PCB Wipe																			
OLM01.0C	Aroclor-1254	UG/KG	2	6	0	0.5	0.5	0.91	1.4	M51WW05S01	J								

Notes:

8015B/OG = Total Fuel Hydrocarbons
OLM01.0P = CLP Pesticides/PCBs
OLM01.0C = PCB Wipe

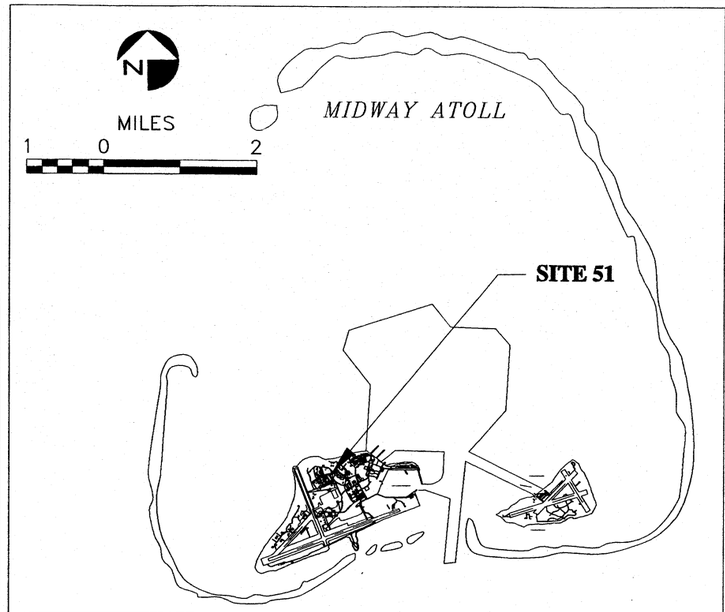
#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

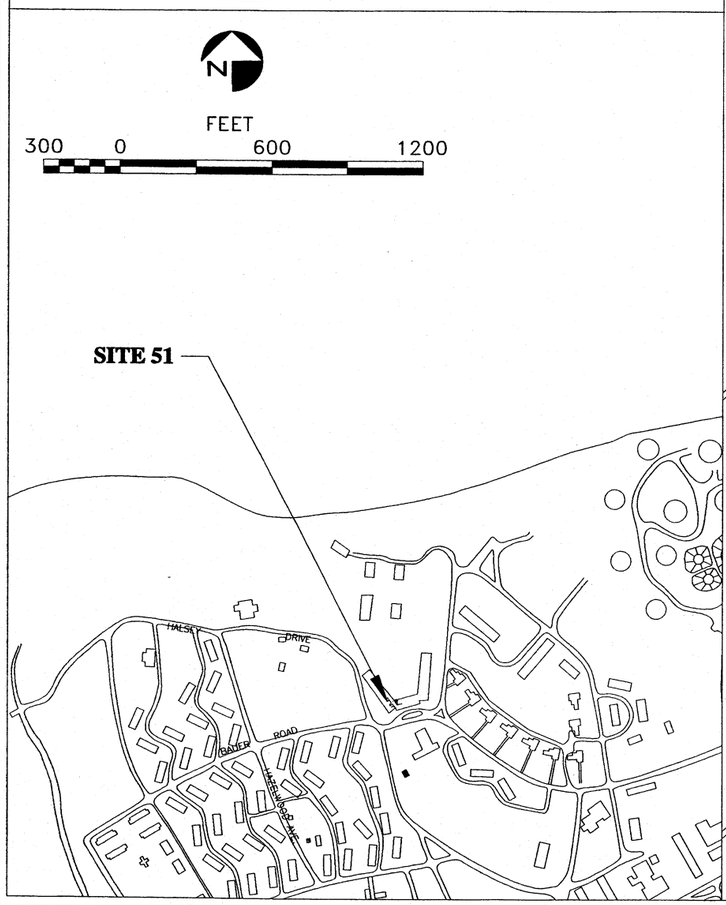
J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
NJ = Presumptive Evidence of the Presence of the Material at an Estimated Quantity (Data Validator Qualification)
Mean = Geometric Mean

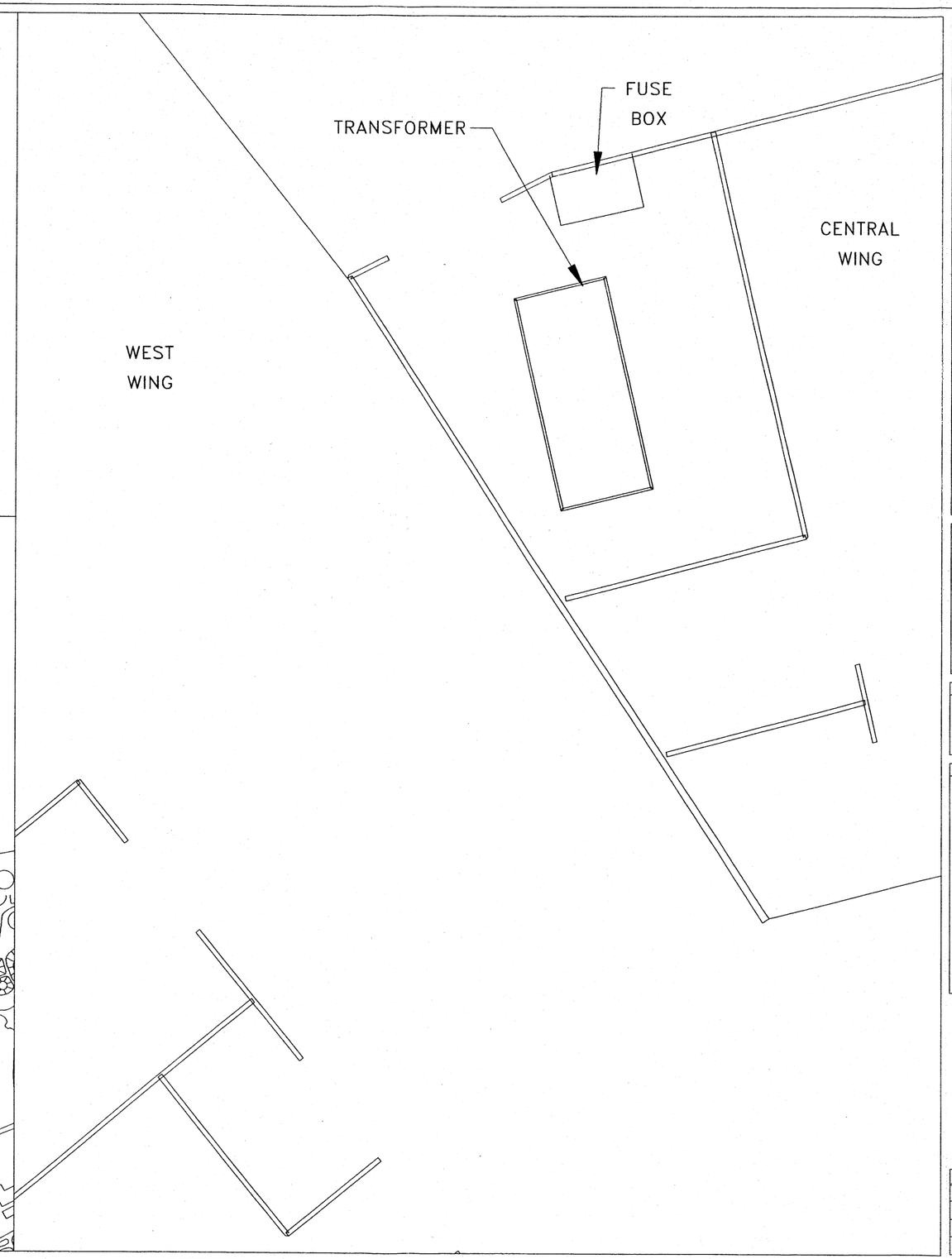
Table 24.6-1
Risk Description (Weight-of-Evidence) Summary - Site 51

ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
• Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
No probability for acute or chronic adverse affects in any individuals of special status bird species from direct and/or secondary exposure to site-related CPEC.							YES
• Impairment of reproduction in ground-nesting birds	CPEC present in surface soils		all TQs < 0				
• Impairment of reproduction in burrowing birds	CPEC present in surface soils		PCB 1254 TQ = 0.24 but in surface soils				
• Impairment of reproduction in shorebirds	CPEC present in surface soils		all TQs < 0				

Figures
Section 24







LEGEND

NOTES

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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE51\05179536.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

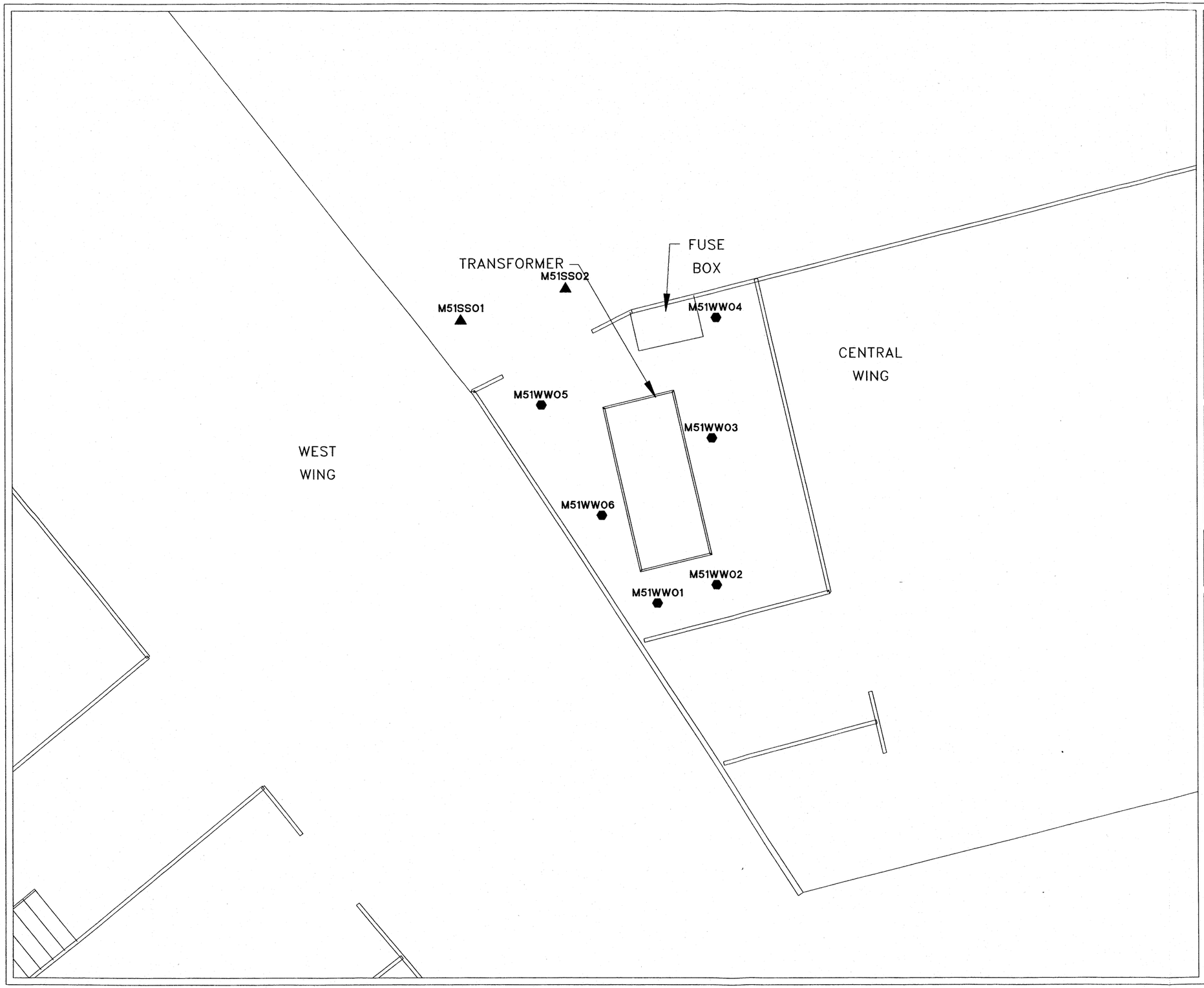
GEORGE CANNON SCHOOL
(SITE 51)
SAND ISLAND

FEET
2 0 4 8

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE

24.1-1



LEGEND

M##SS## ▲ SURFACE SOIL SAMPLE LOCATION AND IDENTIFICATION NUMBER

M##WW## ⬢ PCB WIPE SAMPLE LOCATION AND IDENTIFICATION NUMBER

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SOURCES

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DWG. #1038656 DWG. #1038657

TITLE

SURFACE SOIL AND PCB WIPE SAMPLE LOCATIONS (SITE 51) SAND ISLAND

N

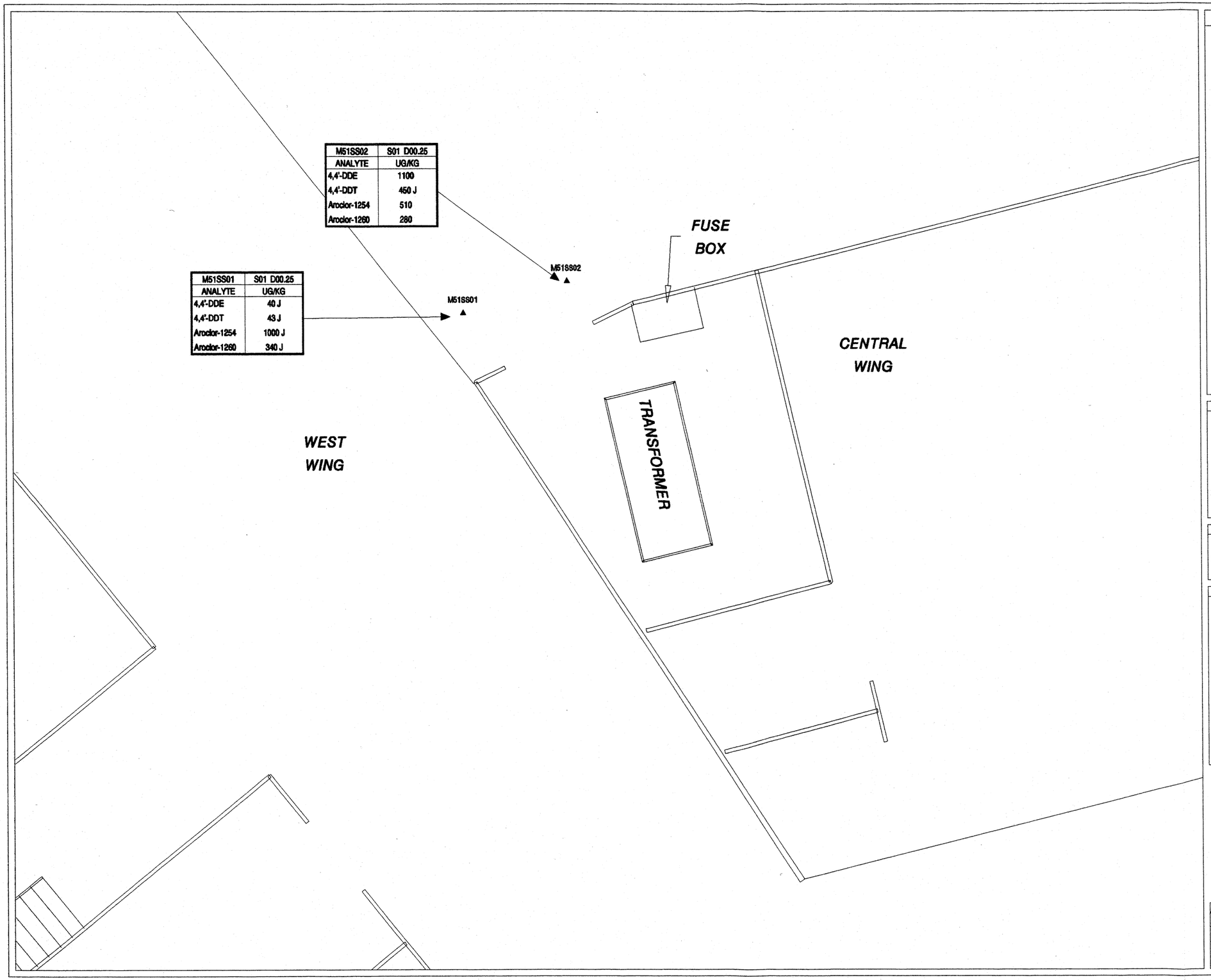
FEET

2 0 4 8

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE

24.2-1



M51SS02	S01 D00.25
ANALYTE	UG/KG
4,4'-DDE	1100
4,4'-DDT	450 J
Aroclor-1254	510
Aroclor-1260	280

M51SS01	S01 D00.25
ANALYTE	UG/KG
4,4'-DDE	40 J
4,4'-DDT	43 J
Aroclor-1254	1000 J
Aroclor-1260	340 J

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M51SS02	OGDEN SAMPLE ID
1100	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

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3. PROJECT NUMBER 110190186
4. FILE: /appe/hmr/cto138/maps/m5179524

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

PESTICIDES AND PCBs DETECTED IN SURFACE SOIL SAMPLES (SITE 51) SAND ISLAND

N

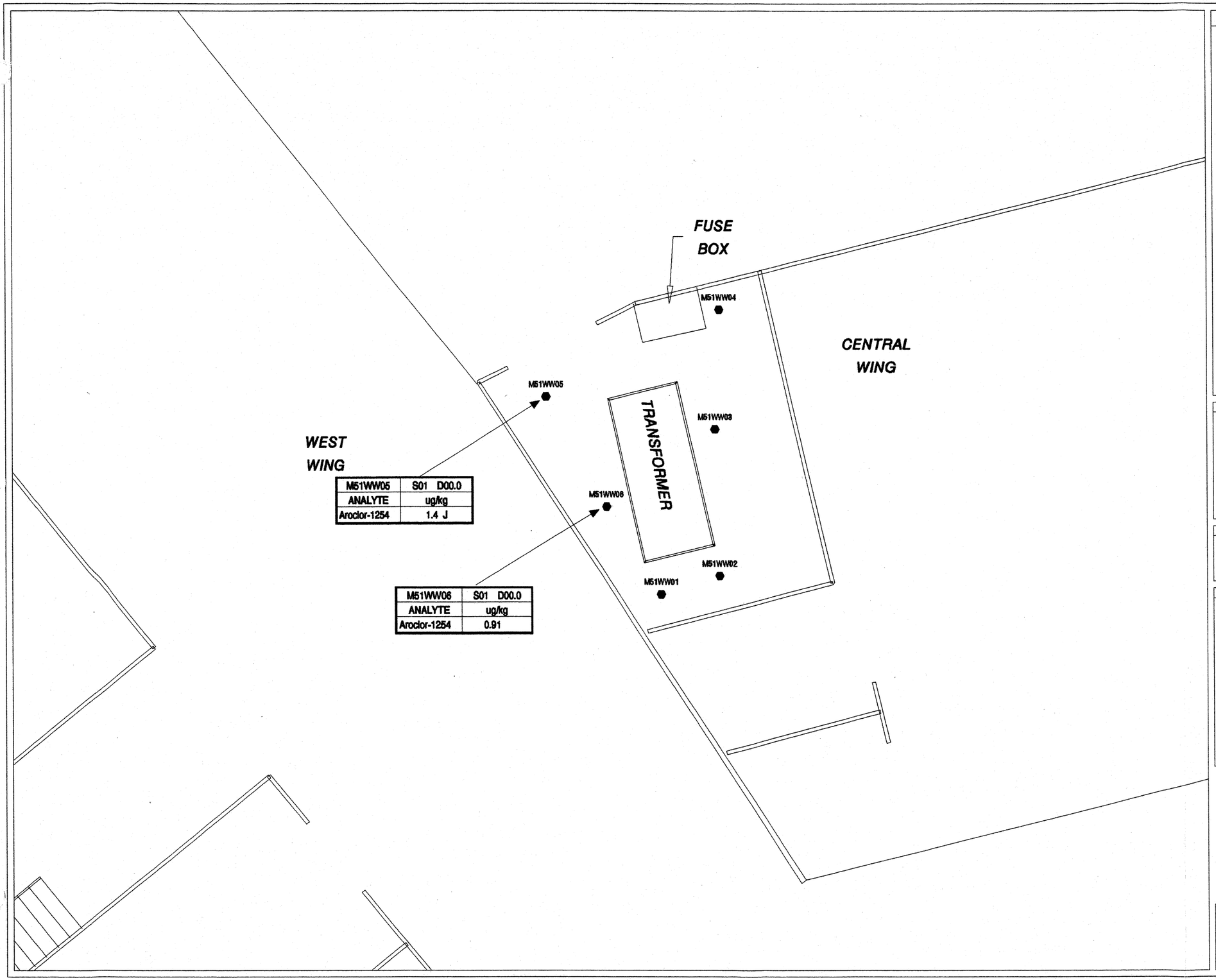
FEET

0 2 4 8 12

DATE	REV.	DRW'N.	INIT.	CHKD.	INIT.	APPR.	INIT.
12/20/95	1	CMF		HFP		JMC	

FIGURE

24.5-1



M51WW05	S01 D00.0
ANALYTE	ug/kg
Aroclor-1254	1.4 J

M51WW06	S01 D00.0
ANALYTE	ug/kg
Aroclor-1254	0.91

LEGEND

⬢	PCB WIPE SAMPLE LOCATION
M51WW02	OGDEN SAMPLE ID
1.4	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

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3. PROJECT NUMBER 110190196
4. FILE: /appe/hm/cto126/maps/m51179540

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 1038856 & 1038857

TITLE

PCB CONCENTRATIONS DETECTED FOR PCB WIPE SAMPLES (SITE 51) SAND ISLAND

N

FEET

0 2 4 8 12

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

24.5-2

Section 25

SECTION 25
TRANSFORMERS BEHIND CHAPEL (SITE 52)

This report describes the results of the SI field work conducted intermittently from August through November, 1994 at the Transformers Behind the Chapel Site, Sand Island (Site 52). The review was conducted to determine whether Site 52 received hazardous substances, whether dielectric oil leaks may have occurred, and to assess the likelihood for soil and ground-water contamination at the Site. A discussion of SI activities, findings, conclusions, and recommendations is presented below.

This report is organized as follows: Site background information is documented in Section 25.1; a description of SI field sampling activities is presented in Section 25.2; methods used for sample analysis are summarized in Section 25.3; physical characteristics of the Site observed during the investigation activities are discussed in Section 25.4; a summary of the analytical results is presented in Section 25.5; the SERA is described in Section 25.6; and conclusions and recommendations for the Site are presented in Section 25.7.

25.1 BACKGROUND INFORMATION

The potential contaminant of concern, PCB dielectric oil, may have leaked from the three operational transformers located at the Site (Figure 25.1-1). Although no releases have been reported, and no visible evidence of leaks was observed during the SI, the concrete pad and the surrounding gravel and soil may have been impacted. Table 25.1-1 lists the contaminants that may be present at Site 52 and the analytical tests that were implemented to characterize the Site.

Table 25.1-1

**POTENTIAL CHEMICAL CONTAMINANTS
TRANSFORMERS BEHIND CHAPEL
SITE 52**

Waste Type	Years of Disposal	Potential Chemical Constituents	Analytical Category
Dielectric Fluid	Unknown	Heavy-end Hydrocarbons, PCBs	Total Fuel Hydrocarbons, PCBs

25.2 SAMPLING METHODS AND LOCATIONS

Surface Soil

Four surface soil samples and a co-located QC duplicate sample were collected from the northern, western, and southern edges, and from the southeastern corner of the concrete transformer pad (Figure 25.2-1). The top 2 inches of soil were removed, and samples were obtained with stainless steel spoons from between 2 and 4 inches below grade. Samples were placed glass in containers and packed on ice for shipment to the analytical laboratory.

PCB Wipe Sampling

PCB wipe samples were collected at six locations on the concrete transformer pad (Figure 25.2-2). One QC duplicate sample was also collected.

25.3 ANALYTICAL METHODS

Surface Soil

Surface soil samples were submitted to an offsite laboratory for analysis of PCBs and pesticides by EPA method 8080 (Aroclors) and fuels by method 8015 M/OG. (Table 25.3-1).

Wipe Sampling

The PCB wipe samples were submitted to an offsite laboratory for analysis by EPA Method 8080. (Table 25.3-1).

25.4 PHYSICAL CHARACTERISTICS

The transformer pad, Site 52, is located in a level grassy field approximately 100 feet southwest of the chapel. The concrete pad is approximately 5 feet wide, 10 feet long and is surrounded by an 8 foot tall chain link fence. Three transformers are mounted on the pad.

25.4.1 Topography

Site 52 is bounded by roads to the north and west. The ground surface at the Site is generally level. No drainage features were observed in the vicinity of the Site.

25.4.2 Geology and Soils

The following geologic description is based on observations made during the surface soil sampling program. Surface soils at Site 52 are tan, white, and brown, fine- to medium-grained coralline sands and silty sands with coral fragments. No evidence of soil staining, debris, or waste was visible in any of the samples. Soil sampling logs are included in Appendix D.

25.4.3 Hydrogeology

The hydrogeologic characteristics of this Site were not investigated.

25.5 SUMMARY OF ANALYTICAL RESULTS

This section summarizes the results of laboratory analyses performed on Site 52 samples. Table 25.5-1 lists the analytical methods, the number of detects, the total number of samples, the number of samples rejected during data validation, the minimum undetected concentration, the maximum undetected concentration, the minimum detected concentration, the maximum detected concentration, and the sample with the maximum concentration. In addition, the concentrations of compounds detected at Site 52 are compared to Sand Island background levels. Analytical results for all samples and

analytes are contained in Appendix L. Complete CLP and low-level analytical data are available at PACNAVFACENGCOM offices at Pearl Harbor, Hawaii.

25.5.1 Surface Soil Samples

All four surface soil samples had detectable concentrations of petroleum hydrocarbons in the C20-C30 (lubricant oil) range. The maximum petroleum hydrocarbon concentration detected was estimated at 490 mg/kg (sample M52SS04S01). Aroclor-1254 at a concentration of 200 μg/kg was detected in one of the four surface soil samples. DDD, DDE, DDT, alpha- and gamma-chlordane, endosulfan I, and endosulfan sulfate were detected in at least one of the four samples. Maximum concentrations of 4,4'-DDE and 4,4'-DDT were 4,900 and 3,100 μg/kg, respectively.

25.5.2 PCB Wipe Samples

PCB concentrations in all wipe samples were below the method detection limit (0.50 $\mu g/100\ cm^2$).

25.6 Screening Ecological Risk Assessment

25.6.1 Problem Formulation

Tasks to be accomplished during Problem Formulation include (a) developing a Site description based on current Site investigations, existing literature, any prior preliminary assessments, and Site history; (b) identifying potential stressors, exposure pathways, and ecological receptors (habitats and species); (c) discussing the nature of adverse effects associated with a given stressor; (d) defining ecologically appropriate assessment and measurement endpoints; and (e) making an initial evaluation of risks posed by the Site.

For a Site to present the potential for risk, it must exhibit the following three criteria: contain stressors in abiotic media at detectable and biologically significant concentrations, provide exposure pathways linking stressors to ecological receptors, and have ecological receptors (those associated with assessment endpoints) that either utilize the Site, are present nearby, or are in range of stressors migrating from the Site. If

Problem Formulation determines that one or more of these criteria are absent, the Site is recommended for NFA and the risk assessment is concluded at this point. If all criteria are met, then completion of the SERA process is required.

25.6.1.1 Site Description

Behind the chapel on Sand Island (Figure 25.1-1) is a transformer pad containing three operational transformers. The dimensions of the concrete pad are approximately 5 feet by 10 feet and the fenced area is approximately 23 feet by 35 feet. Transformer oil, which may contain PCBs, may have been released onto the concrete floor and into nearby surface soils. The transformer pad is surrounded by ruderal habitat and ironwood trees. The Site is located approximately 1,400 feet from the north shore of Sand Island.

25.6.1.2 Stressor Identification

Data obtained from the chemical analysis of field samples were used to calculate ECs, as described in Section 4.3.1.1.1. CPECs were then identified following the methods described in Section 4.3.1.1.2. 4,4'-DDD, 4,4'-DDE and 4,4'-DDT were the only CPECs identified onsite with ECs of 0.208, 4.33, and 2.56 mg/kg, respectively. Since birds will not nest on the concrete transformer pad, the PCB wipe samples were not considered in the CPEC selection process.

25.6.1.3 Potential Ecological Effects

CPECs identified that may adversely affect receptors onsite are DDD, DDE, and DDT. CPEC physicochemical properties and toxicology, as they relate to potential exposure routes and sensitive ecological receptors, are summarized in Section 4.2.3 and described in detail in Appendix J.

25.6.1.4 Ecological Receptor Identification

There are several ecological receptors for contaminants associated with Site 52, including the Laysan albatross, Bonin petrel or wedge-tailed shearwater, white tern, Pacific golden-plover, and ruddy turnstone (Section 4.2.4). Laysan albatross, white terns, and either

Bonin petrels or wedge-tailed shearwater all nest adjacent to the Site, and plovers and turnstones forage in the grass around the pad.

25.6.1.5 Exposure Pathway Identification

The CSM appropriate to this Site is shown in Figure 4.2-2. Potentially complete terrestrial exposure routes include direct exposure to CPECs through dermal contact, incidental ingestion of contaminated surface soil, and ingestion of contaminated prey items. Incidental ingestion and dermal contact with surface soils potentially contaminated with CPECs are of primary concern for the albatross onsite. Inhalation of vapors and dermal exposure to CPECs are principal routes for the burrowing Bonin petrel. The plover and turnstone would likely be exposed through direct ingestion of contaminated prey items.

25.6.1.6 Endpoints

Assessment endpoints #1 and #2 in Section 4.2.6.1 are appropriate for Site 52. Testable hypotheses #1 and #2 are also applicable to this Site, as described in Section 4.2.6.2. Measurement endpoints chosen for this Site include endpoints #1 through #3, as presented in Section 4.2.6.3.

25.6.1.7 Summary

Based on the preceding information it was concluded that this Site met the three criteria that indicate the potential for risk and that completion of the SERA process was required.

25.6.2 Exposure Analysis

Target receptors for contaminants in the surface soil onsite include ground nesting seabird species, Laysan albatross, burrowing species, Bonin petrel or wedge-tailed shearwater, and shorebirds, Pacific golden-plover and ruddy turnstones. Exposure pathway models (c.f., Section 4.3.1.3) applicable to burrowing birds (#1), ground-nesting birds (#2), and shorebirds (#3) were used for the various types of bird species that occur onsite. The Laysan albatross was evaluated for incidental ingestion and dermal absorption of

contaminants in surface soils. The Bonin petrel was evaluated for dermal exposure, incidental ingestion, and inhalation of vapors using surface soil contaminant concentrations due to a lack of data on subsurface soil concentrations. Terrestrial target receptors also identified onsite were the ruddy turnstone and Pacific golden-plover, both shorebirds. The Pacific golden-plover was chosen as a representative shorebird species. The primary exposure route to the shorebirds was via ingestion of invertebrates (insects) that have been exposed to contaminants in the surface soils. Equations for calculating EPVs are described in Section 4.3.1.4. The EPVs for DDD, DDE, and DDT were 0.0022, 0.0462, and 0.0273 mg/kg-d for ground-nesting birds, 0.0063, 0.142, and 0.0791 mg/kg-d for burrowing birds, and 0.0101, 0.139, and 0.115 mg/kg-d for shorebirds, respectively.

25.6.3 Ecological Effects Analysis

The potential for adverse ecological effects to terrestrial bird species was evaluated by using literature-derived data on CPEC toxicity with respect to specific target receptors and, when such data were not available, to appropriate surrogate test species. The toxicity reference value (TRV) for DDD is 4.1 mg/kg-d, while TRVs for DDE and DDT are 0.03 mg/kg-d and 0.011 mg/kg-d, respectively. The TRV table and toxicological profiles are provided in Appendix J.

25.6.4 Risk Characterization

Risk was estimated using a quotient methodology described in Section 4.3.3.1. Results of the risk description weight-of-evidence analyses are summarized in Table 25.6-1 and discussed below.

The compounds exhibiting TQs greater than zero were DDE (0.19, 0.68, and 0.66) for all three bird types, and DDT (0.02) for shorebirds, indicating a low to moderate potential for adverse effects. Several studies have shown that DDT affects calcium metabolism in birds. This action results in eggshell thinning and reduced reproductive success (Mearns et al. 1990); therefore, there is a low to moderate risk of reproductive effects to ground-nesting birds, burrowing birds, and shorebirds onsite from exposure to ΣDDT. Burrowing bird risk was estimated using surface soil data, due to the lack of subsurface

samples. Therefore, the risk to burrowing birds is likely to be overestimated because these pesticides tend to sorb strongly to surface soils.

25.6.5 Uncertainty Analysis

All uncertainties for terrestrial sites discussed in Section 4.3.3.3 apply to this Site. One data gap particular to this Site is the lack of subsurface soil data.

25.6.6 SERA Conclusions

The assessment endpoint for special status bird species is not expected to be met. There is a low potential for risk to all bird species from DDE and to shorebirds from DDT. DDT and its metabolites can produce adverse reproductive effects in bird species.

25.7 Conclusions and Recommendations

Elevated levels of DDD, DDE, and DDT were detected in surface soil. Based on the results of the SERA, a low to moderate risk exists for terrestrial wildlife due to exposure to DDT and DDE in surface soils at Site 52.

We recommend that onsite surface soils found to contain levels of DDT or DDE greater than 1.0 ppm be delineated and removed from the Site and disposed of in an appropriate manner. Following removal of the impacted soils, the Site should be returned to grade with clean soil and revegetated.

Tables
Section 25

TABLE 25.3-1 (Page 1 of 1)
ANALYTICAL METHODS
TRANSFORMER PAD BEHIND CHAPEL (SITE 52)

		ROUTINE ANALYTICAL LABORATORY	
	ANALYTICAL METHOD	8015 M/OG	8080
EPA ID	OGDEN ID	FUELS	PCBs
SURFACE SOIL SAMPLES			
MK001	M52SS01S01D0025	X	X
MK002	M52SS01D01D0025	X	X
MK003	M52SS02S01D0025	X	X
MK004	M52SS03S01D0025	X	X
MK005	M52SS04S01D0025	X	X
PCB WIPES			
MK007	M52WW01S01D000	-	X
MK008	M52WW01D01D000	-	X
MK009	M52WW02S01D000	-	X
MK010	M52WW03S01D000	-	X
MK011	M52WW04S01D000	-	X
MK012	M52WW05S01D000	-	X
MK013	M52WW06S01D000	-	X
EQUIPMENT RINSATE			
MK006	M52XW04E01D000	X	X

"X" = Indicates analytical method performed on sample.

Table 25.5-1
Summary of Analytical Results
Transformer Pad Behind Chapel, Sand Island (Site 52)

			Site 52									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL																			
8015B/OG	C20-C30 (Lubricant Oil Range)	MG/KG	4	4	0			28	490	M52SS04S01		1	8	0	21	24	44	44	13.3
OLM01.0P	4,4'-DDD	UG/KG	1	8	4	3.7	7.1	260	260	M52SS04S01	J	0	10	2	3.4	16			
OLM01.0P	4,4'-DDE	UG/KG	4	8	4			240	4900	M52SS04S01	J	4	10	2	3.4	4	5.2	1900	13.1
OLM01.0P	4,4'-DDT	UG/KG	4	8	4			34	3100	M52SS04S01	J	2	10	2	3.4	4	200	320	6.3
OLM01.0P	alpha-Chlordane	UG/KG	1	8	4	1.9	3.7	11	11	M52SS04S01	J	0	10	2	1.8	8.1			
OLM01.0P	Aroclor-1254	UG/KG	1	8	4	37	71	200	200	M52SS04S01	J	0	10	2	34	160			
OLM01.0P	Endosulfan I	UG/KG	1	8	4	1.9	3.7	15	15	M52SS04S01	J	0	10	2	1.8	8.1			
OLM01.0P	Endosulfan sulfate	UG/KG	4	8	4			10	78	M52SS04S01	NJ	0	10	2	3.4	16			
OLM01.0P	gamma-Chlordane	UG/KG	1	8	4	1.9	3.7	17	17	M52SS04S01	J	0	10	2	1.8	8.1			

Notes:

8015B/OG = Total Fuel Hydrocarbons
OLM01.0P = CLP Pesticides/PCBs

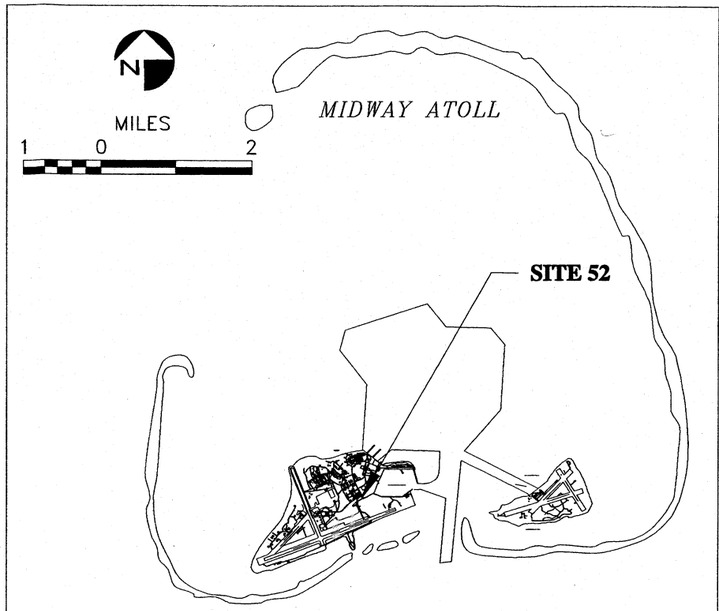
#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

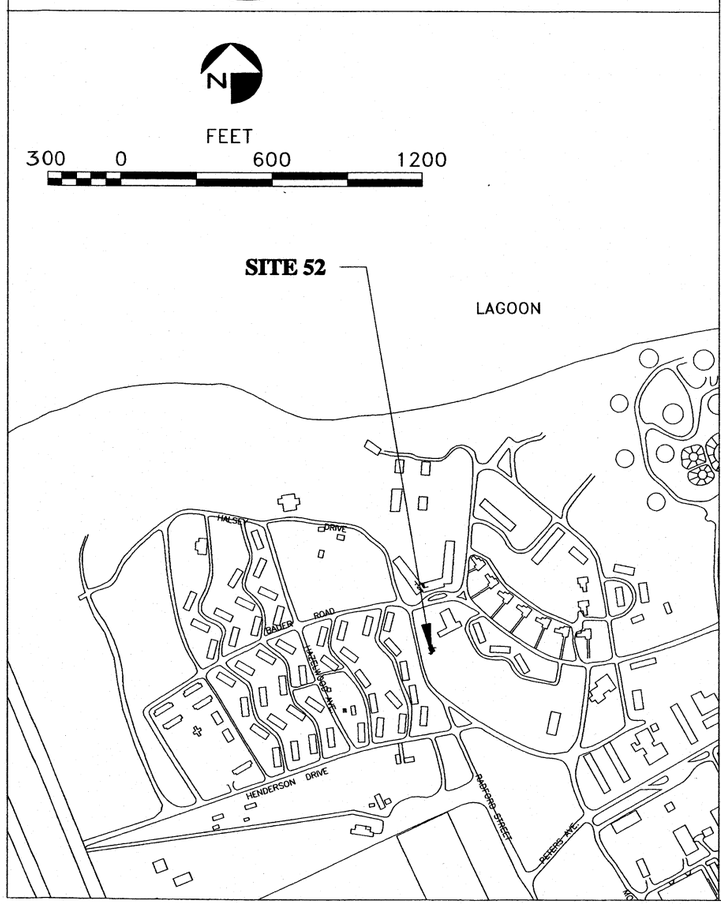
J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
NJ = Presumptive evidence of the Presence of the Material at an Estimated Quantity (Data Validator Qualification)
Mean = Geometric Mean

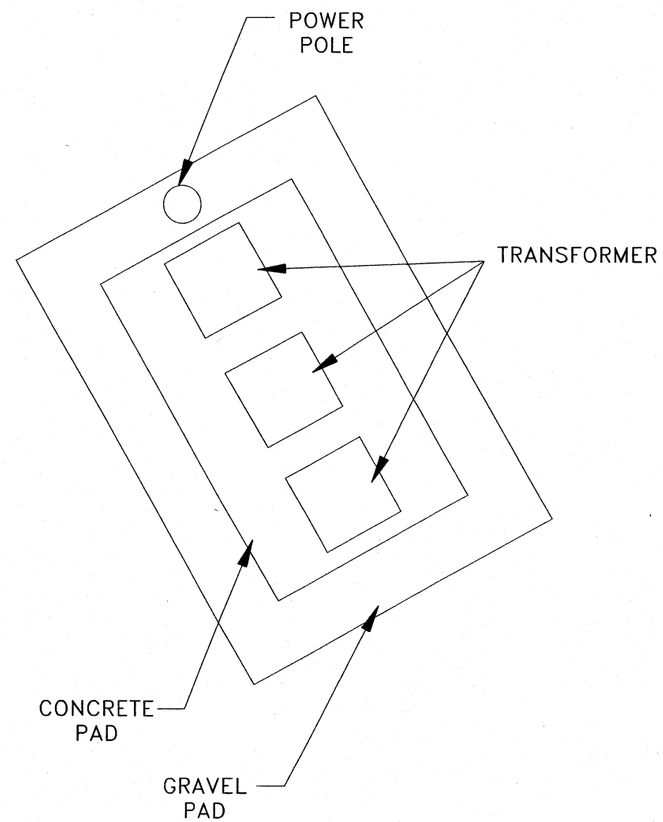
Table 25.6-1
Risk Description (Weight-of-Evidence) Summary - Site 52

ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
• Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
No probability for acute or chronic adverse affects in any individuals of special status bird species from direct and/or secondary exposure to site-related CPEC.							NO
• Impairment of reproduction in ground-nesting birds	CPEC present in surface soils		DDE TQ = 0.19				
• Impairment of reproduction in burrowing birds	CPEC present in surface soils		DDE TQ = 0.68, but in surface soils				
• Impairment of reproduction in shorebirds	CPEC present in surface soils		DDE TQ = 0.66; DDT TQ = 0.02				

Figures
Section 25







LEGEND

NOTES

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2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE52\05179544.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

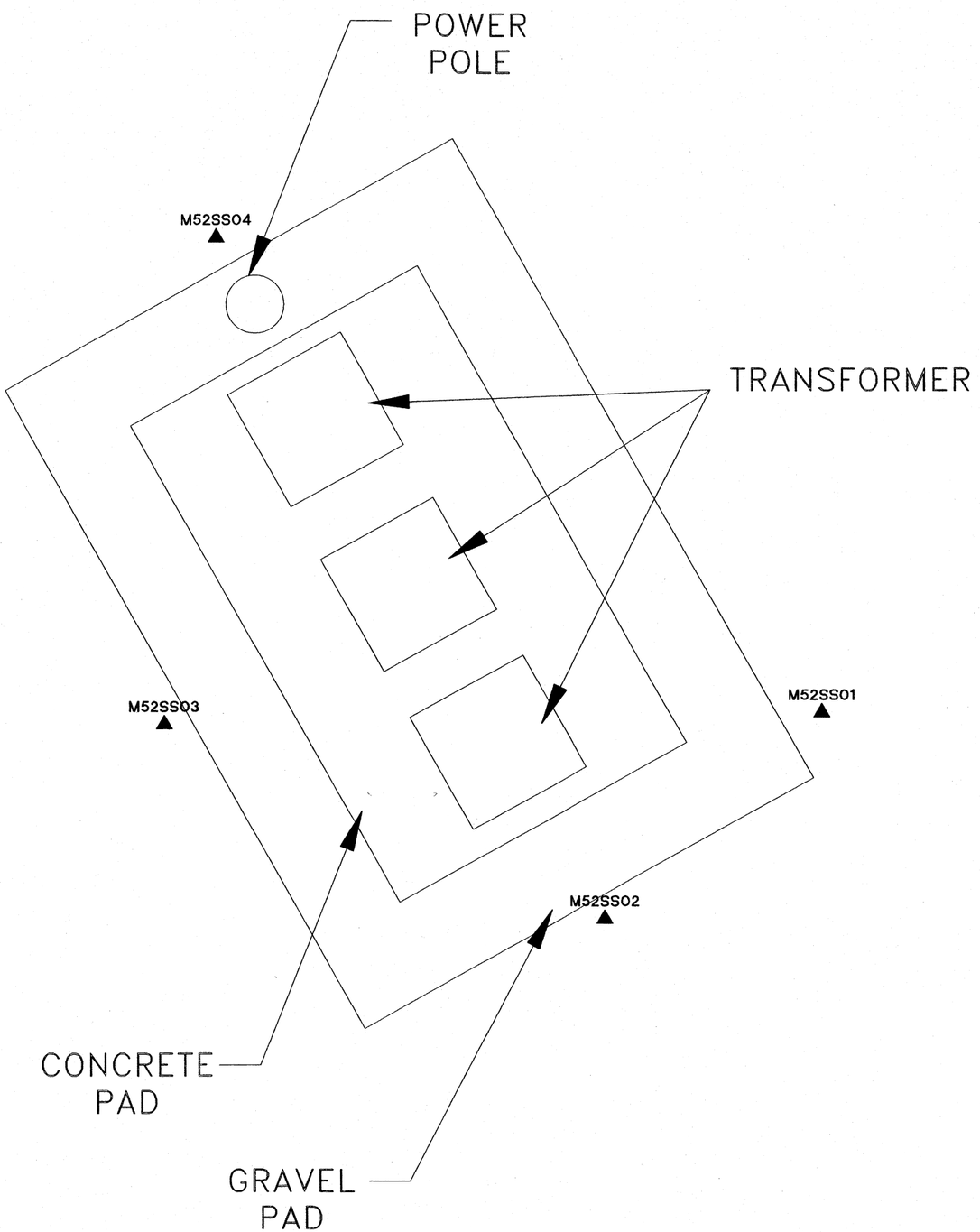
TITLE

TRANSFORMER PAD BEHIND CHAPEL
(SITE 52)
SAND ISLAND

N
FEET
5 0 10 20

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
25.1-1



LEGEND

M##SS## ▲ SURFACE SOIL SAMPLE LOCATION AND IDENTIFICATION NUMBER

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE52\05179545.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

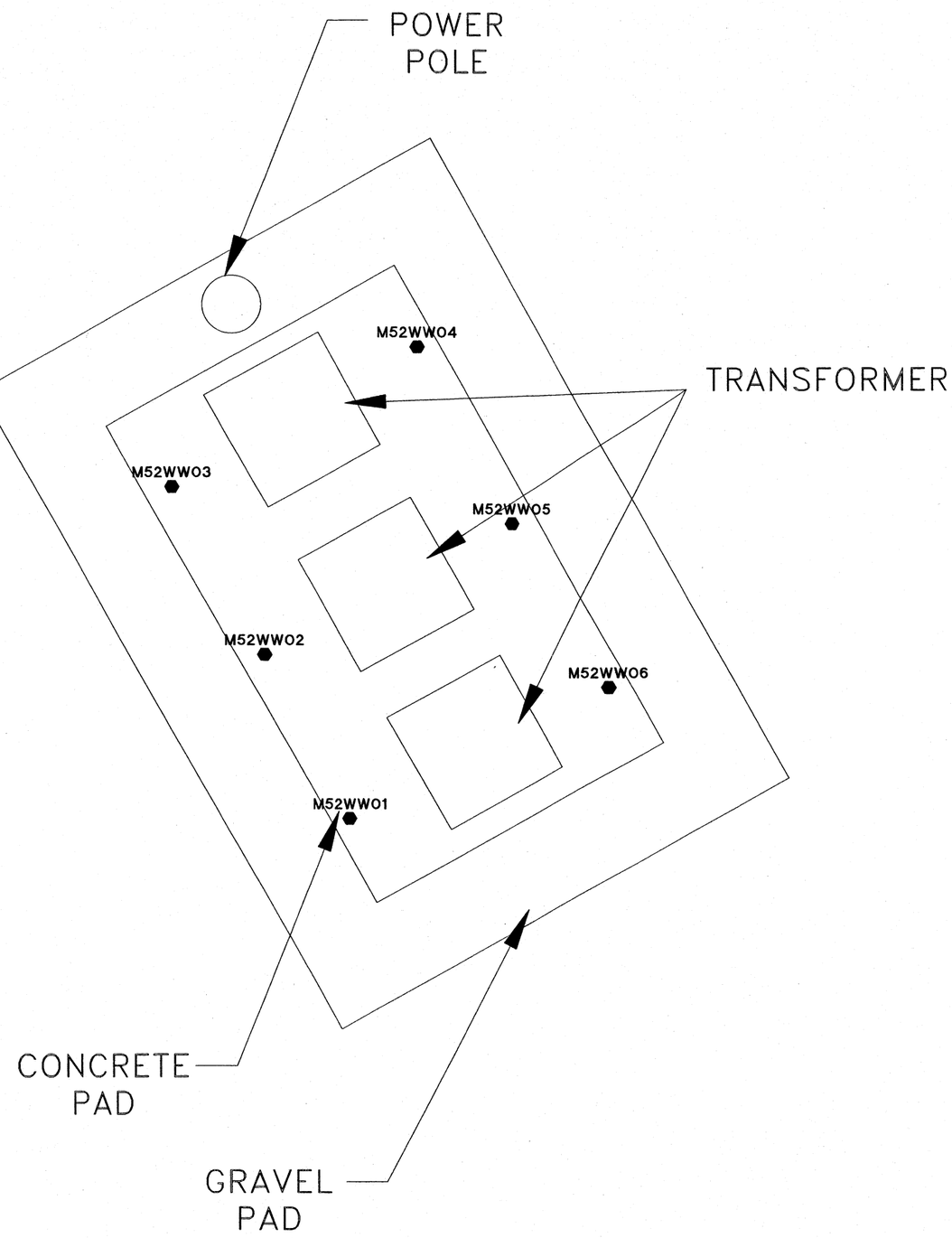
SURFACE SOIL SAMPLE LOCATIONS
(SITE 52)
SAND ISLAND

N

FEET
3 0 6 12

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
25.2-1



LEGEND

M##WW## PCB WIPE SAMPLE LOCATION AND IDENTIFICATION NUMBER

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE52\05179546.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

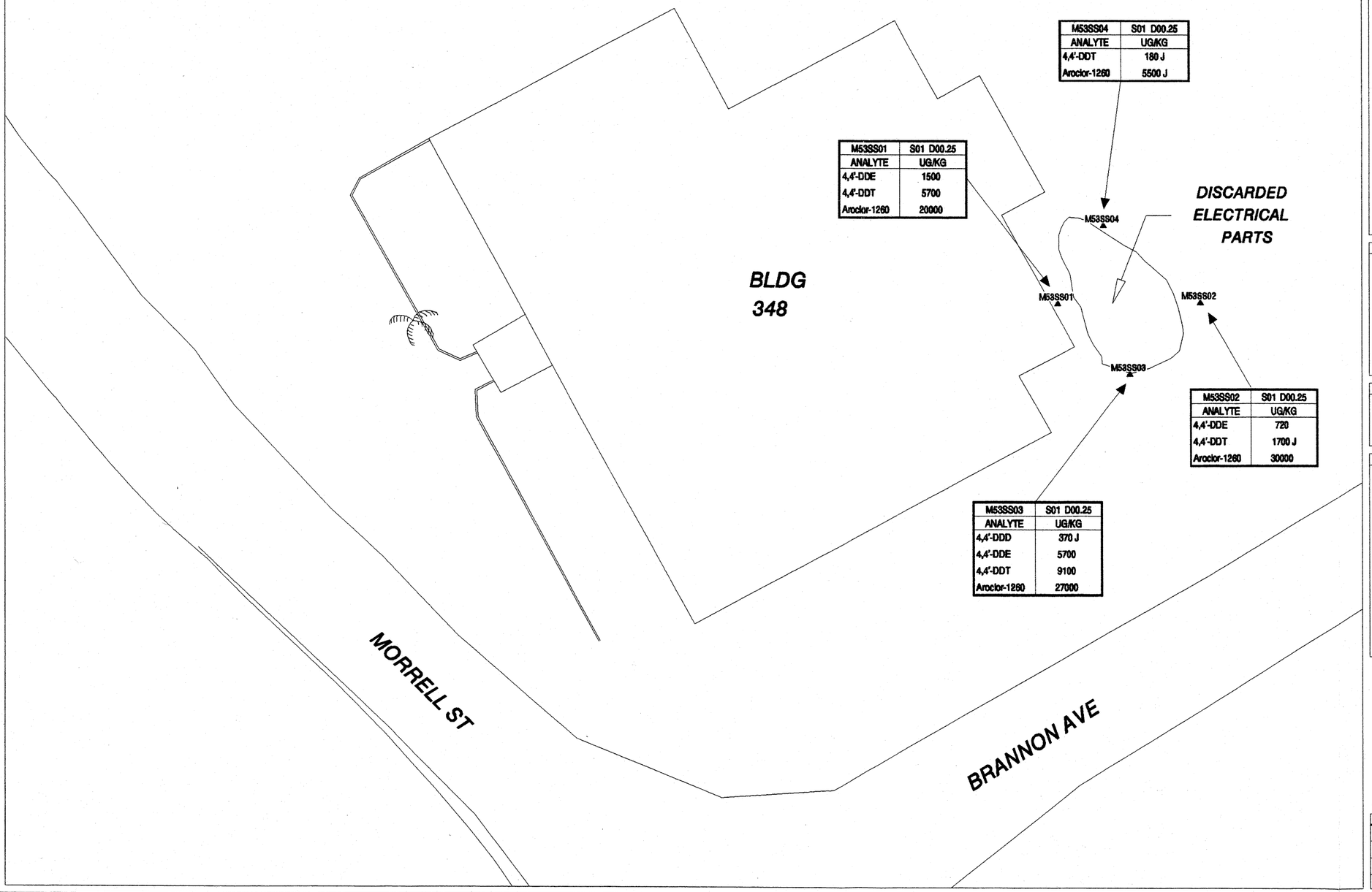
PCB WIPE SAMPLE LOCATIONS
(SITE 52)
SAND ISLAND

N

FEET
3 0 6 12

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
25.2-2



M53SS01	S01 D00.25
ANALYTE	UG/KG
4,4'-DDE	1500
4,4'-DDT	5700
Aroclor-1260	20000

M53SS02	S01 D00.25
ANALYTE	UG/KG
4,4'-DDE	720
4,4'-DDT	1700 J
Aroclor-1260	30000

M53SS03	S01 D00.25
ANALYTE	UG/KG
4,4'-DDD	370 J
4,4'-DDE	5700
4,4'-DDT	9100
Aroclor-1260	27000

M53SS04	S01 D00.25
ANALYTE	UG/KG
4,4'-DDT	180 J
Aroclor-1260	5500 J

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M53SS02	OGDEN SAMPLE ID
370	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, EB-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER 110190138
4. FILE: /appe/hm/cto138/maps/m6179554

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

PESTICIDES AND PCBs DETECTED IN SURFACE SOIL SAMPLES (SITE 53) SAND ISLAND

N

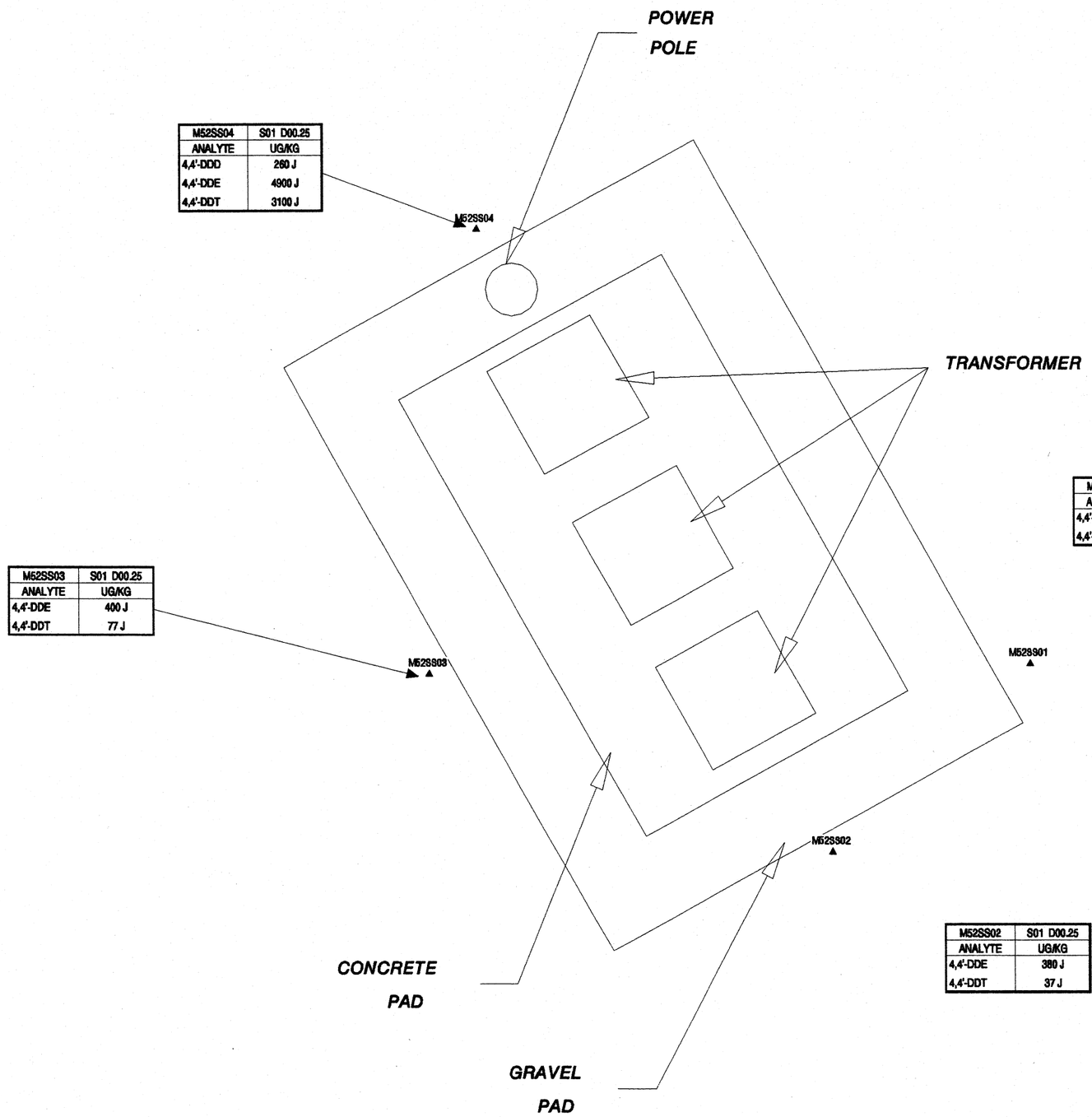
FEET

0 10 20 40 60

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
12/20/95	1	CMF		HFP		JMC	

FIGURE

26.5-1



M52SS04	S01 D00.25
ANALYTE	UG/KG
4,4'-DDD	260 J
4,4'-DDE	4900 J
4,4'-DDT	3100 J

M52SS03	S01 D00.25
ANALYTE	UG/KG
4,4'-DDE	400 J
4,4'-DDT	77 J

M52SS01	S01 D00.25
ANALYTE	UG/KG
4,4'-DDE	240
4,4'-DDT	34 J

M52SS02	S01 D00.25
ANALYTE	UG/KG
4,4'-DDE	380 J
4,4'-DDT	37 J

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M52SS02	OGDEN SAMPLE ID
260	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110160136
4. FILE: /appa/hm/cto136/mapa/m6149549

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 1038856 & 1038857

TITLE

PESTICIDES AND PCBs DETECTED IN SUBSURFACE SOIL SAMPLES (SITE 52) SAND ISLAND

N

FEET

0 3 6 12 18

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
12/20/95	1	CMF		HFP		JMC	

FIGURE

25.5-1

Section 26

SECTION 26
ABANDONED PW/ADMIN BUILDING 348 (SITE 53)

This report describes the results of the SI field work conducted intermittently from August through November 1994 at the abandoned Public Works/Administration Building 348, Sand Island (Site 53). The review was conducted to determine whether Site 53 received hazardous substances as a result of leaking electrical equipment, and to assess the likelihood for soil and ground-water contamination at the Site. A discussion of the work conducted during the SI, along with findings, conclusions, and recommendations, is presented below.

This report is organized as follows: Site background information is documented in Section 26.1; a description of SI field sampling activities is presented in Section 26.2; methods used for sample analysis are summarized in Section 26.3; physical characteristics of the Site observed during the investigation activities are discussed in Section 26.4; a summary of analytical results is presented in Section 26.5; the SERA is described in Section 26.6; and conclusions and recommendations for the Site are presented in Section 26.7.

26.1 BACKGROUND INFORMATION

The abandoned Public Works/Administration building is located on Sand Island at the southwest corner of the Superblock (Figure 26.1-1). The purpose of this investigation was to test soil at the Site for PCBs which may have been released from the discarded electrical parts located behind the building. Table 26.1-1 lists the potential contaminants and the associated analytical categories.

Table 26.1-1

**POTENTIAL CHEMICAL CONTAMINANTS
ABANDONED PW/ADMIN BUILDING 348
SITE 53**

Waste Type	Years of Disposal	Potential Chemical Constituents	Analytical Category
Dielectric Fluid	Unknown	Heavy-end Hydrocarbons, PCBs	Total Fuel Hydrocarbons, PCBs

26.2 Sampling Methods and Locations

Four surface soil samples and one duplicate sample were collected at the Site to screen for surface soil contamination (Figure 26.2-1). Sampling locations were selected in areas outside of doorways, in areas where equipment had been stored or discarded, and in areas where spills or disposal of hazardous substances were likely to occur.

26.3 Analytical Methods

The selection of analytes and analytical methods was based on the type of activities known to have been conducted at the Site and on the contaminants (oil and PCBs) suspected to be present. Analytical methods are summarized in Table 26.3-1.

Surface Soil

Surface soil samples were submitted to an offsite laboratory for analysis of fuels by Method 8015 M/OG and PCBs and pesticides by EPA Method 8080.

26.4 Physical Characteristics

Building 348 is located on Sand Island north of the intersection of Brannon Avenue and Morrell Street, at the southwest corner of the Superblock (Figure 1.4-1). The discarded electrical parts are located within 40 feet of the east wall of the building, and lie within an area about 20 feet wide and 30 feet long (Figure 26.1-1).

26.4.1 Topography

The Site is level. No drainage features were noted.

26.4.2 Geology and Soils

The geologic investigation at this small Site was limited to observation of surface soil during the sampling program. The surface soil was found to consist of silty sand with organic material.

26.4.3 Hydrogeology

The hydrogeology of this Site was not investigated.

26.5 Summary of Analytical Results

This section summarizes the results of laboratory analyses performed on Site 53 samples. Table 26.5-1 lists the analytical methods, the number of detects, the total number of samples, the number of samples rejected during data validation, the minimum undetected concentration, the maximum undetected concentration, the minimum detected concentration, the maximum detected concentration, and the sample with the maximum concentration. In addition, the concentrations of compounds detected at Site 53 are compared to Sand Island background levels. Analytical results for all samples and analytes are contained in Appendix L. Complete CLP and low-level analytical data are available at PACNAVFACENGCOM offices at Pearl Harbor, Hawaii.

26.5.1 Surface Soil Samples

Among the surface soil samples tested for fuels, PCBs, and pesticdes, the maximum fuels concentration was 1,900 mg/kg of lubricant oil-range (C20-C30) hydrocarbons. Aroclor-1260 was detected in all four surface soil samples at concentrations ranging from 5,500 µg/kg to 30,000 µg/kg. Alpha-chlordane, endosulfan sulfate, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT were also detected in some of the samples. DDE and DDT concentrations were the greatest with maximum detected concentrations of 5,700 and 9,100 µg/kg,

respectively. Figure 26.5-1 depicts the sampling locations and pesticide/PCB concentrations.

26.6 SCREENING ECOLOGICAL RISK ASSESSMENT

26.6.1 Problem Formulation

Tasks to be accomplished during Problem Formulation include (a) developing a Site description based on current Site investigations, existing literature, any prior preliminary assessments, and Site history; (b) identifying potential stressors, exposure pathways, and ecological receptors (habitats and species); (c) discussing the nature of adverse effects associated with a given stressor; (d) defining ecologically appropriate assessment and measurement endpoints; and (e) making an initial evaluation of risks posed by the Site.

For a Site to present the potential for risk, it must exhibit the following three criteria: (a) contain stressors in abiotic media at detectable and biologically significant concentrations, (b) provide exposure pathways linking stressors to ecological receptors, and (c) have ecological receptors (those associated with assessment endpoints) that either utilize the Site, are present nearby, or are in range of stressors migrating from the Site. If Problem Formulation determines that one or more of these criteria are absent, the Site is recommended for NFA and the risk assessment is concluded at this point. If all criteria are met, then completion of the SERA process is required.

26.6.1.1 Site Description

This former Public Works/Administration building is located at the southwest corner of the Superblock on Sand Island (Figure 1.4-1). Ironwood trees and some ruderal habitat surround Building 348. Electrical parts possibly filled with PCB oil were observed discarded behind the building and may be the source of chemical contamination at this Site.

26.6.1.2 Stressor Identification

Because of the early availability of chemical analysis data, ECs were computed and CPECs were identified at this point in the SERA process, using the methods previously described in Sections 4.3.1.1.1 and 4.3.1.1.2. Data obtained from the chemical analysis of field samples were used to calculate ECs, as described in Section 4.3.1.1.1. CPECs were then chosen following the methods described in Section 4.3.1.1.2. Aroclor-1260 was detected in the surface soils with an EC of 30.0 mg/kg. DDD, DDE, and DDT were also identified as CPECs in surface soils with ECs of 0.37, 5.7, and 9.1 mg/kg, respectively.

26.6.1.3 Potential Ecological Effects

The CPECs Aroclor-1260, DDD, DDE, and DDT are all organochlorines that may have adverse effects on ecological receptors. The physicochemical and toxicological properties of these CPECs, as they relate to potential exposure routes and sensitive ecological receptors, are summarized in Section 4.2.3 and described in Appendix J.

26.6.1.4 Ecological Receptor Identification

Ecological receptors for contaminants associated with this Site include the Laysan albatross, red-tailed tropicbird, and white tern (Section 4.2.4). These species were observed nesting outside Building 348.

26.6.1.5 Exposure Pathway Identification

Potentially complete terrestrial exposure routes for Site 53 include direct exposure to contaminated soil through dermal contact and incidental ingestion of contaminated surface soil. These exposure routes are of primary concern for ground-nesting bird species such as the albatross and tropicbird.

26.6.1.6 Endpoints

The potential receptors onsite are comprised solely of terrestrial seabird species that feed offshore; therefore, only assessment endpoint #1 in Section 4.2.6.1 and testable hypothesis #1 in Section 4.2.6.2. are appropriate for this Site. Measurement endpoint #2 in Section 4.2.6.3 was selected for this Site.

26.6.1.7 Summary

Based on the preceding information, it was concluded that this Site met all three of the criteria that indicate the potential for ecological risk and that completion of the SERA process was required.

26.6.2 Exposure Analysis

Target receptors for Site 53 consist of ground-nesting seabird species that occupy the Site. Although these seabirds feed exclusively offshore, making onsite secondary exposure impossible, other potential exposure pathways are present. The model applicable to ground-nesting birds (#2) was used for both the Laysan albatross and red-tailed tropicbirds (c.f., Section 4.3.1.3). Laysan albatross surface soil exposure to Aroclor-1260 from incidental ingestion was estimated at 0.00965 mg/kg-d and the dermal absorption dose was estimated at 1.55 mg/kg-d of contaminants from surface soils. The total EPV calculated for the albatross was 1.56 mg/kg-d. Total EPVs for Laysan albatross exposure to DDD, DDE, and DDT in surface soils are 0.0039, 0.0608, and 0.097 mg/kg-d, respectively.

26.6.3 Ecological Effects Analysis

The potential for adverse ecological effects was evaluated using literature-derived data on CPEC toxicity with respect to a specific target receptor, the Laysan albatross. A toxicity reference value (TRV) of 0.084 mg/kg-d was calculated for Aroclor-1260 in birds. TRVs for DDD, DDE, and DDT are 4.1 mg/kg-d, 0.03 mg/kg-d, and 0.11 mg/kg-d, respectively. TRV derivation is described in Section 4.3.2.2.

26.6.4 Risk Characterization

Risk was estimated using a quotient methodology described in Section 4.3.3.1. Results of the risk description weight-of-evidence analyses are summarized in Table 26.6-1 and discussed below.

Aroclor-1260 had a TQ of 1.27, and DDE had a TQ of 0.31 for ground-nesting birds. A TQ in the range of one to two indicates a moderate to high potential for adverse effects to these birds. The principal route of uptake of DDE and Aroclor-1260 for these ground-nesting birds was via dermal absorption. There is evidence that the use of PCBs and other organochlorines by developing countries may affect resident and migratory marine species worldwide through global transport via the atmosphere and oceans. Residual levels of these toxins (less than one part-per- trillion) have been shown to bioaccumulate readily to levels of concern in higher marine organisms (Tanabe et al. 1994). Consequentially, the additional marginal doses received on Midway could represent a greater risk to these birds than if they were not already exposed to another source.

26.6.5 Uncertainty Analysis

Section 4.3.3.3 describes all of the uncertainties that apply to this Site.

26.6.6 SERA Conclusions

The assessment endpoint for special status bird species is not expected to be met because of the potential risk to ground-nesting bird species from Aroclor-1260 and DDE.

26.7 Conclusions and Recommendations

Aroclor-1260 was detected in all four of the surface soil samples collected from the vicinity of the disposed electrical parts behind Bldg. 348. PCB concentrations ranged from a minimum of 5.5 ppm to a maximum of 30 ppm, which pose a moderate to high risk to terrestrial wildlife and seabirds found onsite. It is recommended that all remaining electrical equipment and any surface soils found to contain PCBs greater than 1.0 ppm be removed from the Site and disposed of properly.

DDE was detected in three of the four samples, while DDT was detected in all four samples. DDT concentrations were greater than maximum DDE concentrations; however, only DDE concentrations detected in surface soils were determined to pose a risk to ground-nesting birds due to the greater toxicity of DDE. It is recommended that both DDT and DDE at concentrations exceeding 1 ppm in surface soils onsite should be delineated, removed, and disposed of properly. Following soil removal activities, the Site should be returned to grade with clean soil and revegetated.

Tables
Section 26

TABLE 26.3-1 (Page 1 of 1)
ANALYTICAL METHODS
ABANDONED PW/ADMIN, BUILDING 348 (SITE 53)

		ROUTINE ANALYTICAL LABORATORY	
	ANALYTICAL METHOD	8015 M/OG	8080
EPA ID	OGDEN ID	FUELS	PCBs
SURFACE SOIL SAMPLES			
MK250	M53SS01S01D0025	X	X
MK251	M53SS02S01D0025	X	X
MK252	M53SS03S01D0025	X	X
MK253	M53SS03D01D0025	X	X
MK254	M53SS04S01D0025	X	X

"X" = Indicates analytical method performed on sample.

Table 26.5-1
Summary of Soil Results
Abandoned PW/Admin (Bldg 348), Sand Island (Site 53)

			Site 53									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL																			
8015B/OG	C06-C11 (Gasoline Range)	MG/KG	2	4	0	5.4	5.6	7.6	29	M53SS04S01		0	8	0	5.2	6.1			
8015B/OG	C11-C14 (Kerosene Range)	MG/KG	2	4	0	5.4	5.6	7.6	31	M53SS04S01		0	8	0	5.2	6.1			
8015B/OG	C14-C20 (Diesel Range)	MG/KG	4	4	0			17	140	M53SS04S01		1	8	0	5.2	5.9	10	10	3.27
8015B/OG	C20-C30 (Lubricant Oil Range)	MG/KG	4	4	0			750	1900	M53SS04S01		1	8	0	21	24	44	44	13.3
OLM01.0P	4,4'-DDD	UG/KG	1	8	4	34	190	370	370	M53SS03S01	J	0	10	2	3.4	16			
OLM01.0P	4,4'-DDE	UG/KG	3	8	4	34	34	720	5700	M53SS03S01		4	10	2	3.4	4	5.2	1900	13.1
OLM01.0P	4,4'-DDT	UG/KG	4	8	4			180	9100	M53SS03S01		2	10	2	3.4	4	200	320	6.3
OLM01.0P	alpha-Chlordane	UG/KG	1	8	4	18	96	140	140	M53SS03S01		0	10	2	1.8	8.1			
OLM01.0P	Aroclor-1260	UG/KG	4	8	4			5500	30000	M53SS02S01		0	10	2	34	160			
OLM01.0P	Endosulfan sulfate	UG/KG	3	8	4	190	190	47	350	M53SS03S01	NJ	0	10	2	3.4	16			

Notes:

8015B/OG = Total Fuel Hydrocarbons
OLM01.0P = CLP Pesticides/PCBs

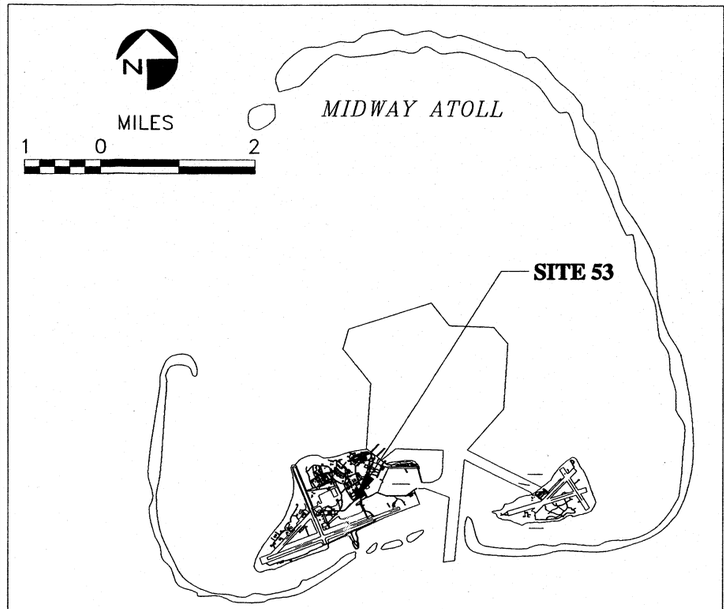
#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

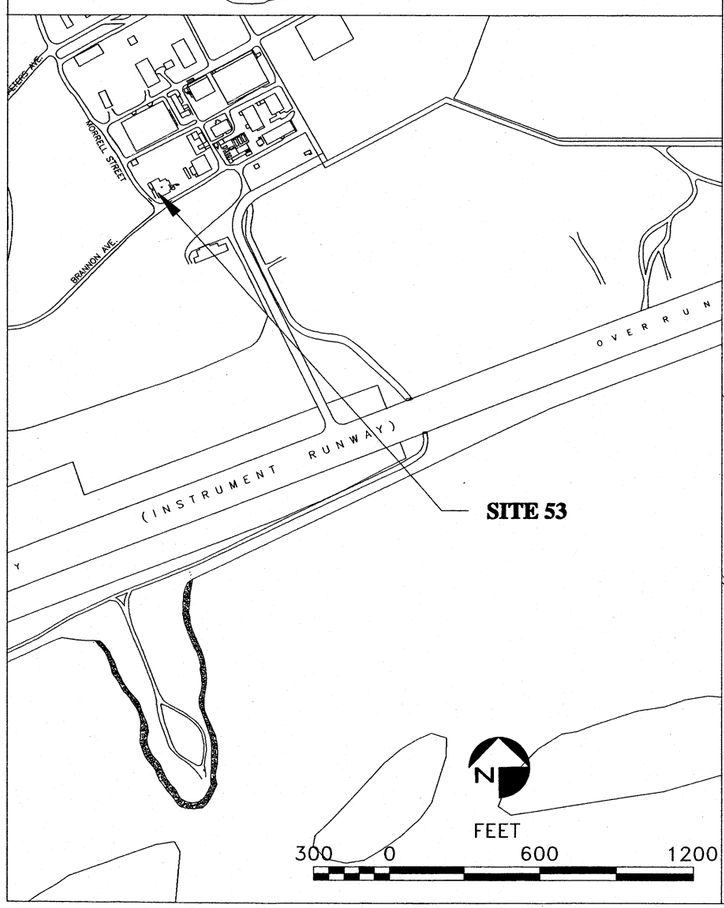
J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
NJ = Presumptive Evidence of the Presence of the Material at an Estimated Quantity (Data Validator Qualification)
Mean = Geometric Mean

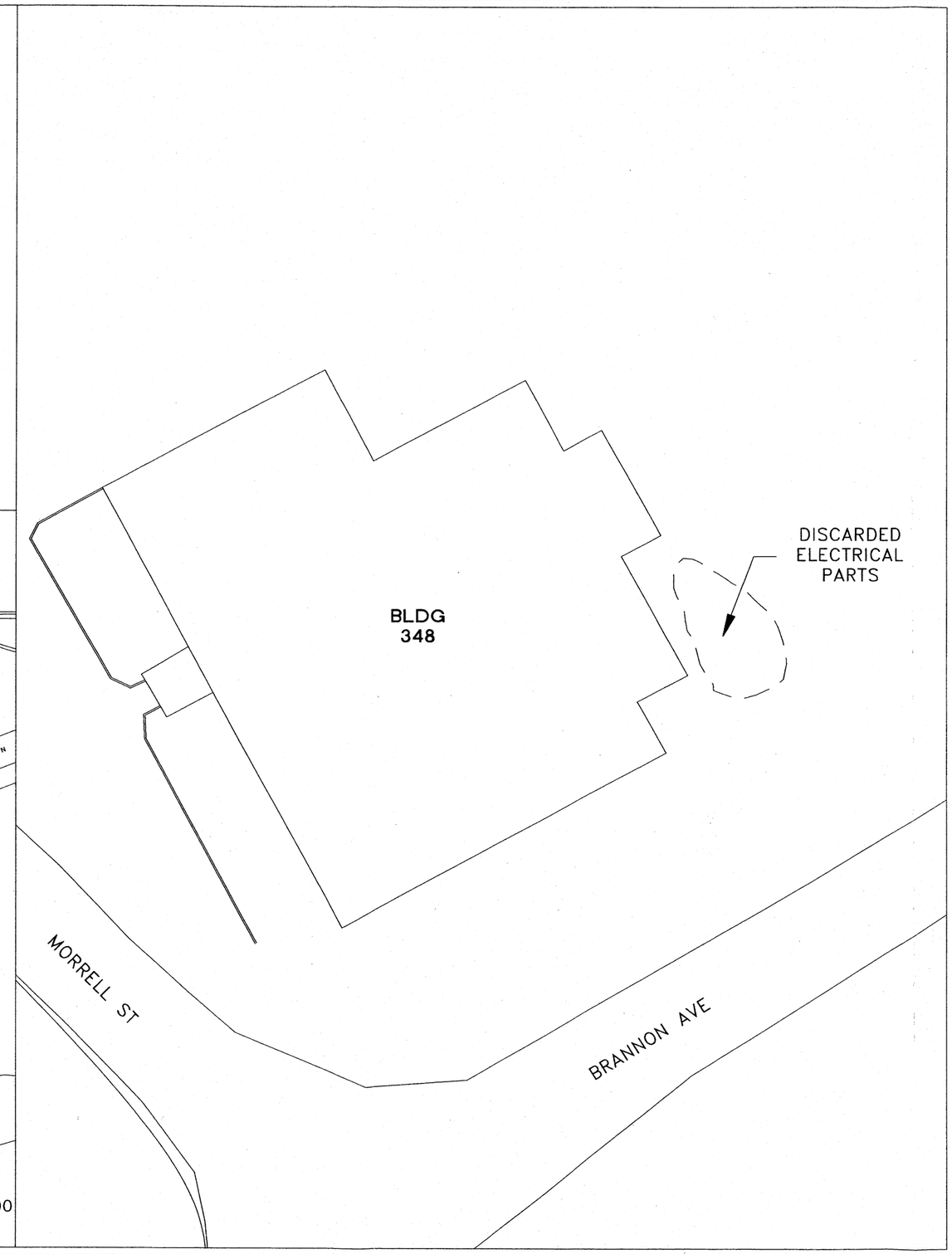
Table 26.6-1
Risk Description (Weight-of-Evidence) Summary - Site 53

ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
• Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
No probability for acute or chronic adverse affects in any individuals of special status bird species from direct and/or secondary exposure to site-related CPEC.							NO
• Impairment of reproduction in ground-nesting birds	CPEC present in surface soils		one TQ > 0 Aroclor-1260 key contaminant				
• Impairment of reproduction in burrowing birds							
• Impairment of reproduction in shorebirds							

Figures
Section 26







LEGEND

NOTES

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2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE53\05179552.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

ABANDONED PW/ADMINISTRATION, BLDG 348
(SITE 53)
SAND ISLAND

N
FEET
12.5 0 25 50

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
26.1-1

LEGEND

M##SS## ▲ SURFACE SOIL SAMPLE LOCATION AND IDENTIFICATION NUMBER

NOTES

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6. FILE : ..\MIDWAY\SITEINVS\SITE53\05179553.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

SURFACE SOIL SAMPLE LOCATIONS
(SITE 53)
SAND ISLAND

N

FEET
10 0 20 40

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
26.2-1

Section 27

SECTION 27
ABANDONED RIFLE RANGE (SITE 64)

This report describes the results of the SI field work conducted at the Abandoned Rifle Range, Sand Island (Site 64) in November 1994. The purpose of the investigation was to determine whether Site 64 received hazardous substances, and to assess the likelihood for soil and ground-water contamination at the Site. A discussion of the work conducted during the SI, along with findings, conclusions, and recommendations, is presented below.

This report is organized as follows: Site background information is documented in Section 27.1; a description of SI field sampling activities is presented in Section 27.2; Section 27.3 notes that laboratory analyses were not required for this investigation; physical characteristics of the Site observed during the investigation activities are discussed in Section 27.4; a summary of analytical results is presented in Section 27.5; the SERA is described in Section 27.6; and conclusions and recommendations for the Site are presented in Section 27.7.

27.1 BACKGROUND INFORMATION

Site 64 is a former rifle range located adjacent to the north end of the abandoned runway on Sand Island (Figure 27.1-1). It was investigated during the 1993 EBS Site visit and again during SI field work. The only visible remains of the rifle range are several partially buried metal posts that may have served as target supports. Plans of the facility do not indicate that a target backdrop existed, and no mounds or sand dunes that may have served as target backdrops were evident. Lead from spent bullets is the primary contaminant of concern at Site 64 (Table 27.1-1); however, no evidence of spent bullets or other lead debris was found.

Table 27.1-1

POTENTIAL CHEMICAL CONTAMINANTS
RIFLE RANGE
SITE 64

Waste Type	Years of Disposal	Potential Chemical Constituents	Analytical Category
Lead Bullets	Unknown	Lead	Metals

27.2 Sampling Methods and Locations

The Site was initially investigated by means of a Geonics EM-61 Time Domain Metal Detector. Due to interference from the metal posts (that may have served as target supports), no clear signal indicating buried bullets could be obtained in the presumed vicinity of the targets. Geophysical screening further away from the metal posts did not result in a signal indicating buried metallic debris or bullets.

Because the geophysical survey was unsuccessful in the vicinity of the presumed target area, 10 observation holes were excavated with a hand auger in a grid pattern around the metal posts (Figure 27.2-1). Each observation hole was excavated to a depth of 1.5 feet. The soil was spread out with a shovel and examined by hand sifting. No traces of metal, debris, or spent bullets were found in this investigation.

27.3 Analytical Methods

Because no evidence of any spent bullets or lead contaminated soils was observed, samples from this Site were not submitted for laboratory analyses.

27.4 Physical Characteristics

The following sections summarize the physical characteristics of the Site as determined by field observations and investigations.

27.4.1 Topography

The potential bullet impact area, sampled by hand auger soil sampling, is approximately 100 feet by 150 feet (Figure 27.1-1). Firing lines appear to have been located 100, 200, 300, and 500 yards south of the target area. The Site is flat, and lies at an elevation of 10 feet or less above MSL.

27.4.2 Geology and Soils

Surface and near-surface soils, as exposed in the hand auger holes, consist of relatively uniform coral sands typical of Sand Island.

27.5 Summary of Analytical Results

Samples from this Site were not subjected to laboratory analysis.

27.6 Screening Ecological Risk Assessment

27.6.1 Problem Formulation

Tasks to be accomplished during Problem Formulation include (a) developing a Site description based on current Site investigations, existing literature, any prior preliminary assessments, and Site history; (b) identifying potential stressors, exposure pathways, and ecological receptors (habitats and species); (c) discussing the nature of adverse effects associated with a given stressor; (d) defining ecologically appropriate assessment and measurement endpoints; and (e) making an initial evaluation of risks posed by the Site.

For a Site to present the potential for risk, it must exhibit the following three criteria: contain stressors in abiotic media at detectable and biologically significant concentrations, provide exposure pathways linking stressors to ecological receptors, and have ecological receptors (those associated with assessment endpoints) that either utilize the Site, are present nearby, or are in range of stressors migrating from the Site. If Problem Formulation determines that one or more of these criteria are absent, the Site is

recommended for NFA and the risk assessment is concluded at this point. If all criteria are met, then completion of the SERA process is required.

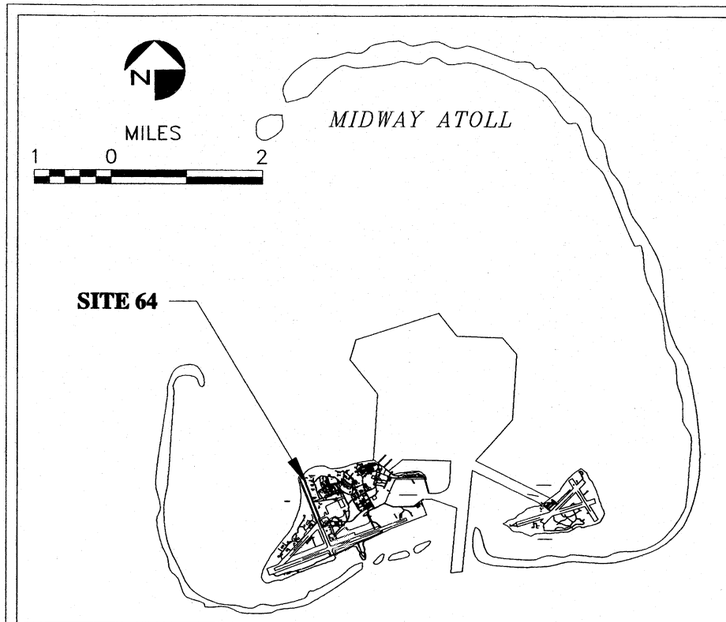
27.6.1.1 Site Description

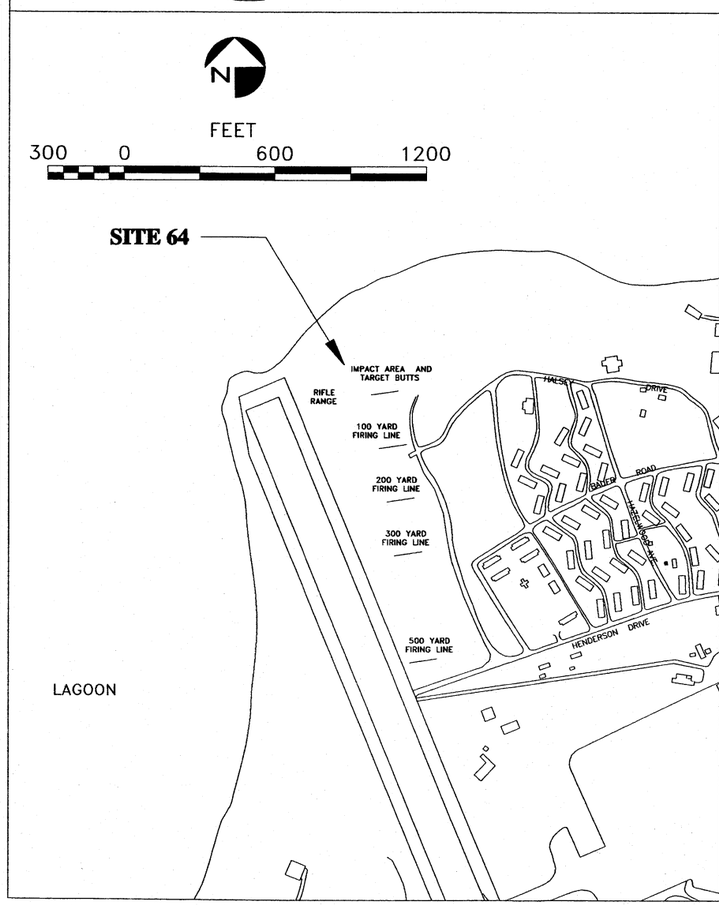
The former rifle range is located adjacent to the north end of the abandoned runway on Sand Island (Figure 27.1-1). Sparse *Casuarina* forest on loose sandy substrate dominates the Site. Laysan albatross, red-tailed tropicbirds, and white terns nest in the Site vicinity. Lead, the only suspected contaminant, was not detected, therefore, no complete exposure pathway to ecological receptors of concern can exist at this Site. This Site does not meet the three criteria needed to create the potential for risk and completion of the SERA process is not required.

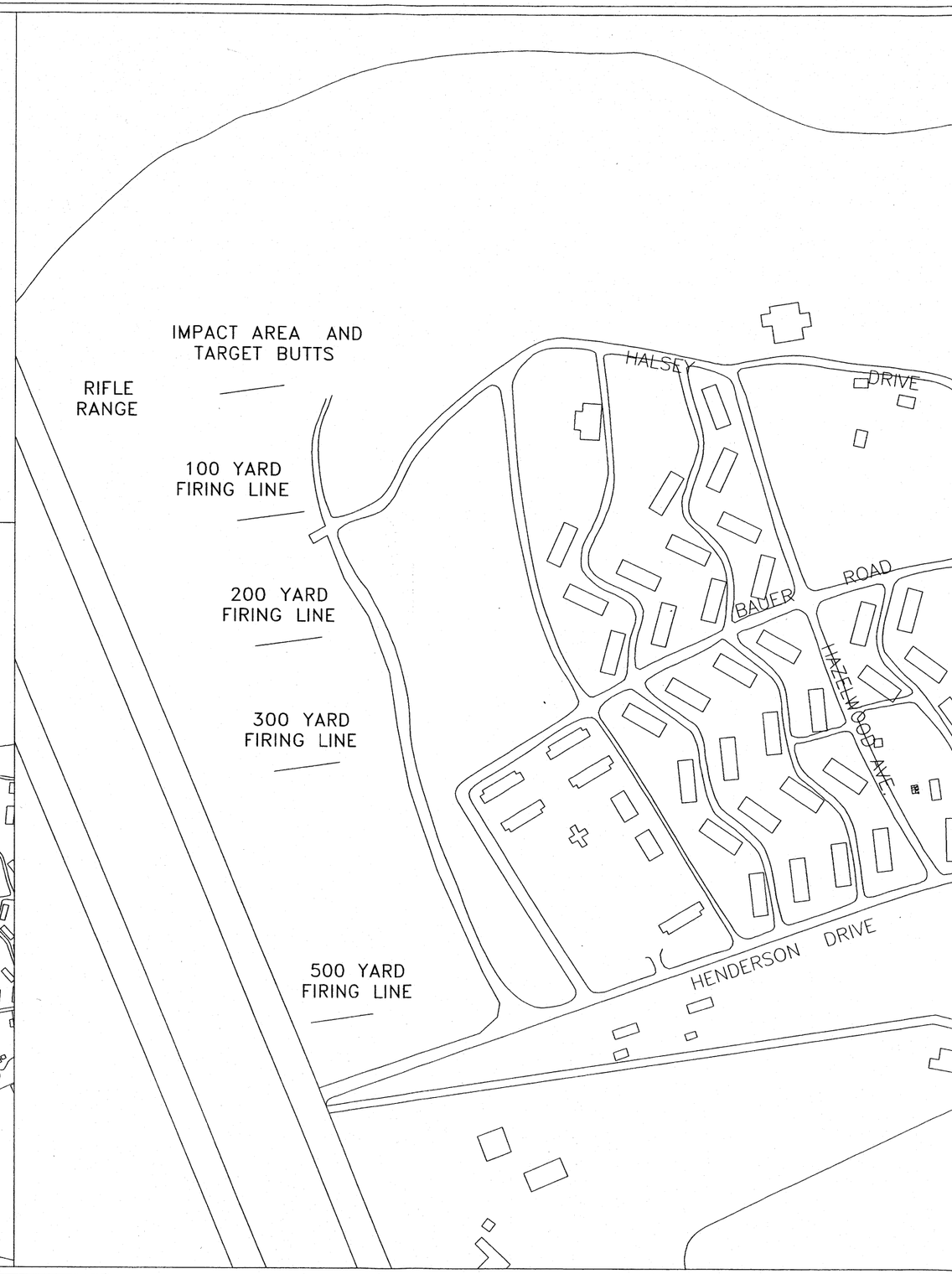
27.7 Conclusions and Recommendations

No potential contaminant sources or evidence of past contaminants were discovered at the Site; therefore, this Site does not present a potential risk to ecological receptors.

Figures
Section 27







LEGEND

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE64\05179558.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

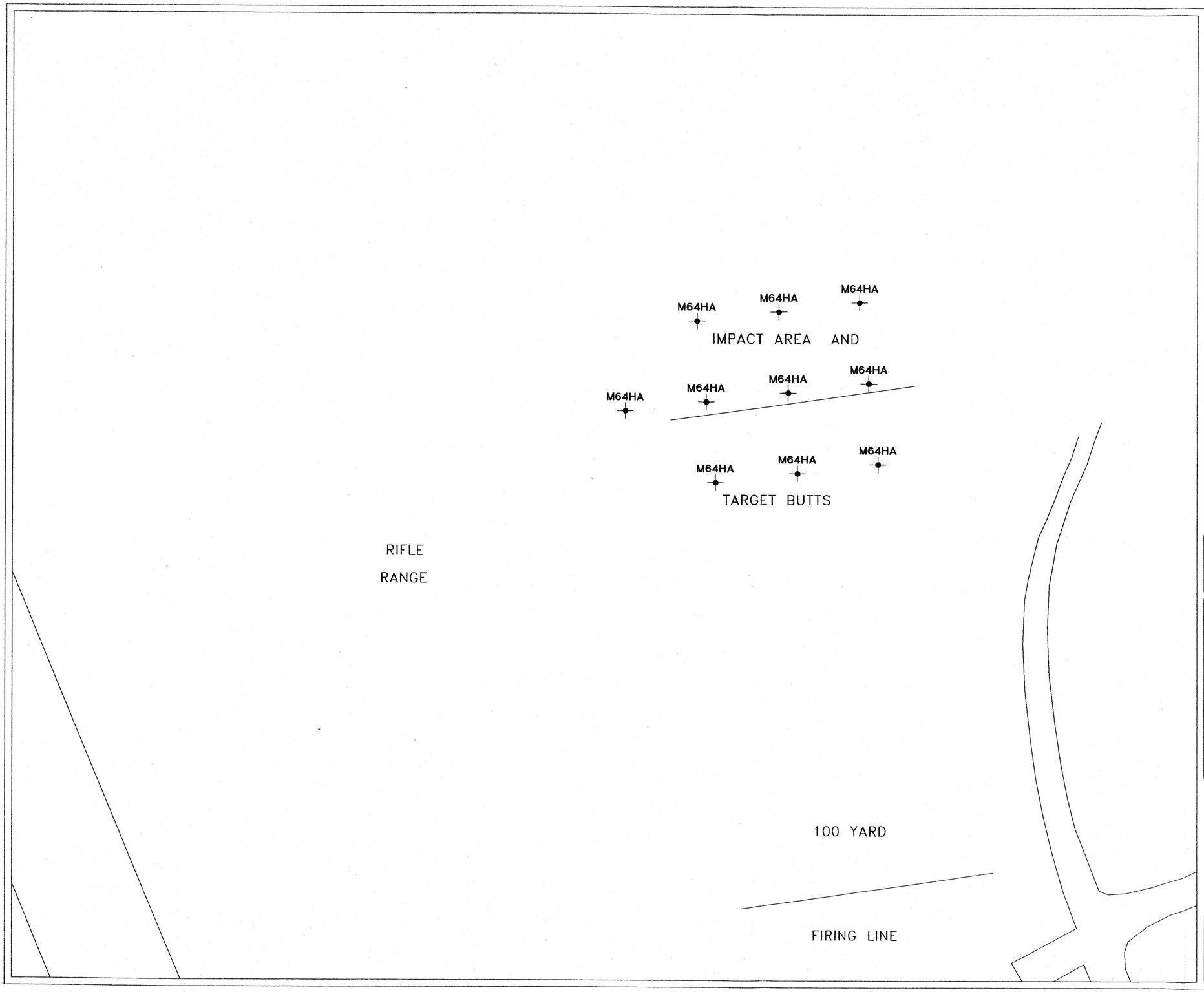
TITLE

ABANDONED RIFLE RANGE
(SITE 64)
SAND ISLAND

N
FEET
65 0 130 260

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
27.1-1



LEGEND

M##HA## HAND AUGER SAMPLE LOCATION AND IDENTIFICATION NUMBER

NOTES

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5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE64\05229507.DWG DATE: 5-22-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

HAND AUGER SAMPLE LOCATIONS
(SITE 64)
SAND ISLAND

N

FEET
30 0 60 120

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
27.2-1

Section 28

SECTION 28
TRAP SHOOTING RANGE (SITE 65)

This report describes the results of the SI field work conducted from August through November 1994 at the Trap Shooting Range (Site 65). The purpose of the review was to determine whether or not Site 65 received hazardous substances, and to assess the likelihood for soil and ground-water contamination at the Site. A discussion of the work conducted during the SI, along with findings, conclusions, and recommendations, is presented below.

This report for is organized as follows: Site background information is documented in Section 28.1; a description of SI field sampling activities is presented in Section 28.2; methods used for sample analysis are summarized in Section 28.3; physical characteristics of the Site observed during the investigation activities are discussed in Section 28.4; a summary of analytical results is presented in Section 28.5; the SERA is described in Section 28.6; and conclusions and recommendations for the Site are presented in Section 28.7.

28.1 BACKGROUND INFORMATION

Site 65 consists of the marine environment located off the north shore of Rocky Point Peninsula, north of the entrance to Sand Island's Inner Harbor (Figure 28.1-1). Although little remains of the land-based trap shooting facilities, thorough searches of the general area and information from engineering drawings confirmed the location and indicated the shooting direction. Underwater reconnaissance revealed areas with broken and whole clay pigeons approximately 300 to 500 feet from shore. As shown in Table 28.1-1, the potential contaminant source of concern at this Site is residual lead shot found in the lagoon.

Table 28.1-1

**POTENTIAL CHEMICAL CONTAMINANTS
TRAP SHOOTING RANGE
SITE 65**

Waste Type	Years of Disposal	Potential Chemical Constituents	Analytical Category
Lead Shot	Unknown	Lead	Metals

28.2 SAMPLING METHODS AND LOCATIONS

A marine reconnaissance of the Site was completed to identify habitats and species occurring in the Site vicinity. Paired transects were completed to estimate numbers and coverage of species. Lists of species observed at each Site are included in Appendix A. To screen for residual lead at the Site, horizontal and vertical sediment, tissue, and infauna samples were collected (Figure 28.2-1).

Broken and whole clay pigeons were found approximately 300 to 500 feet from shore; therefore, it was estimated that lead shot would be likely to fall between 300 and 600 feet from shore. Using this information, six inshore and offshore sampling locations were set within this range along the centerline of the shooting direction. Locations were also set 75 feet north and 75 feet south of the centerline. Horizontal sediment samples for chemical and toxicity analysis were taken at the two locations along the mid-line of the sampling grid (Locations 02 and 05) with a QC duplicate sample taken at Location 02. Vertical sediment samples were taken at all six locations. Cores for infaunal analysis were taken at both mid-line stations.

The area potentially contaminated by trap shot was primarily characterized as a seagrass bed; therefore, the only species collected for tissue chemistry analysis was the seagrass *Halophila ovalis*, a primary producer. Tissue samples were collected at both mid-line locations. A QC duplicate sample was taken at Location 05. In addition, species were enumerated and the density of *Halophila ovalis* was estimated along transects placed between the mid-line locations and the locations to the north and south.

28.3 ANALYTICAL METHODS

The choice of analytical methods was based on the suspected contaminant source (lead shot) and the ecological setting (marine lagoon). All samples and analytical methods are listed in Table 28.3-1.

Nine marine sediment and three tissue samples were analyzed for metals by low-level methods. Three of the sediment samples were also tested for toxicity with an echinoderm development bioassay.

28.4 PHYSICAL CHARACTERISTICS

Site 65 is located near the north shore of Rocky Point Peninsula, north of the entrance to Sand Island's Inner Harbor. The potentially impacted sea bed is estimated to lie approximately 300 to 600 feet offshore. Section 28.6 provides additional information on the physical characteristics of the Site.

28.5 SUMMARY OF ANALYTICAL RESULTS

The sections and tables below summarize the results of laboratory analyses performed on Site 65 samples. Marine sediment sample results are presented in Table 28.5-1. Marine tissue analytical results and marine sediment toxicity testing results are discussed in Section 28.6.

The table lists the analytical methods, the number of detects, the total number of samples, the number of samples rejected during data validation, the minimum undetected concentration, the maximum undetected concentration, the minimum detected concentration, the maximum detected concentration, and the sample with the maximum concentration. In addition, concentrations of compounds detected at Site 65 are compared to Sand Island background levels. Analytical results for all samples and analytes are contained in Appendix L. Complete CLP and low-level analytical data are available at PACNAVFACENGCOM offices at Pearl Harbor, Hawaii.

28.5.1 Marine Sediment

Among the marine sediment samples, concentrations of 6 of the 12 metals detected were above mean Sand Island background levels (Table 28.5-1). The maximum lead concentration was 200 mg/kg (Figure 28.5-1).

28.6 SCREENING ECOLOGICAL RISK ASSESSMENT

28.6.1 Problem Formulation

Tasks to be accomplished during Problem Formulation include (a) developing a Site description based on current Site investigations, existing literature, any prior preliminary assessments, and Site history; (b) identifying potential stressors, exposure pathways, and ecological receptors (habitats and species); (c) discussing the nature of adverse effects associated with a given stressor; (d) defining ecologically appropriate assessment and measurement endpoints; and (e) making an initial evaluation of risks posed by the Site.

For a Site to present the potential for risk, it must exhibit the following three criteria: (a) contain stressors in abiotic media at detectable and biologically significant concentrations, (b) provide exposure pathways linking stressors to ecological receptors, and (c) have ecological receptors (those associated with assessment endpoints) that either utilize the Site, are present nearby, or are in range of stressors migrating from the Site. If Problem Formulation determines that one or more of these criteria are absent, the Site is recommended for NFA and the risk assessment is concluded at this point. If all criteria are met, then completion of the SERA process is required.

28.6.1.1 Site Description

Site 65 is located south of the Cargo Piers and north of the entrance to Inner Harbor on Sand Island. The actual Site was initially identified by the presence of clay pigeons and fragments, most of which were found approximately 485 to 650 feet offshore from the range.

Coarse sand extends approximately 32.5 feet offshore from the foot of the seawall. The area beyond the coarse sand was characterized by coral rubble and fine sand for a distance of approximately 160 feet. Water depth gradually increased away from shore and was approximately 13 feet at the outer edge of the coral rubble zone. Outside this area, water depth increased to 19 to 26 feet near the edge of the ship channel, where the lagoon floor was fine silt and clay.

28.6.1.2 Stressor Identification

Because of the early availability of chemical analysis data, ECs were computed and CPECs were identified at this point in the SERA process, using the methods previously described in Sections 4.3.1.1.1 and 4.3.1.1.2. Chemical data for marine sediment, summarized in Table 28.6-1, indicate the principal CPECs are antimony, thallium, and tin. Lead, the contaminant of concern onsite due to its presence in shot, was determined not to be a CPEC.

28.6.1.3 Potential Ecological Effects

CPECs identified onsite that may adversely affect receptors onsite are antimony, tin and thallium. CPEC physicochemical properties and toxicology, as they relate to potential exposure routes and sensitive ecological receptors, are summarized in Section 4.2.3 and described in detail in Appendix J.

28.6.1.4 Ecological Receptor Identification

No organisms were found in the inshore sand area. Disturbance from wave action in shallow water (2-5 feet) and the resulting coarse sand may explain the lack of organisms here. The area with coral rubble supported a fairly diverse biota including those algal, invertebrate, and fish species commonly observed in other coral rubble habitats (Section 2.0).

The biota living on the deeper mud/sand bottom, where the lead shot from trap shooting activities was expected, was not as diverse as on the coral rubble bottom. A large amount of this area was covered with patches of the seagrass *Halophila ovalis,* ranging in density

from 8 to 86 blades per 100 cm^2. Small diameter burrows were also very common; approximately 25 percent of these were mounded, usually indicative of the presence of ghost shrimp (thalassinids). Ghost shrimp are active burrowers that transport fine sediments to the surface from as deep as 3 feet below the sediment surface. Less frequently encountered were larger burrows, probably made by mantis shrimp (*Stomatopoda*). Other biota observed were brown algae (*Dictyota acutiloba*, *D. barteyresii* and *Padina thivyi*), gastropods (*Terebra* sp.), snapping shrimp (*Alpheus* sp.), and an unidentified small goby living in many of the burrows.

The primary ecological receptors in the marine environment are the Pacific green sea turtle and the Hawaiian monk seal. Additional receptors include marine fishes, invertebrates, and algae, which form a food web with the sea turtle and monk seal at the higher trophic levels. Through this food web, CPECs could potentially be biomagnified in tissues of the ecological receptors of primary concern.

28.6.1.5 Exposure Pathway Identification

The CSM appropriate to this Site is shown in Figure 4.2-2. Lead ammunition may have entered the marine environment directly; therefore, potential exposure routes to marine receptors would include direct contact with contaminated sediment, ingestion of sediment, ingestion of lead shot, and ingestion of contaminated prey.

28.6.1.6 Endpoints

Assessment endpoints (#2 and #3) and testable hypotheses appropriate for this Site are listed in Sections 4.2.6.1 and 4.2.6.2, respectively. Measurement endpoints are selected for this Site include #3, #4, #6, #7, and #8 listed in Section 4.2.6.3.

28.6.1.7 Summary

Based on the screening methods, CPECs identified at Site 65 were antimony, thallium, and tin. Lead, the contaminant reportedly associated with the Site, was not identified as a CPEC based upon the sampling and analyses conducted. For the remaining metals, ECs were based on the results of total metals analysis. These results tend to seriously

overstate actual ECs for what are relatively insoluble (and thus not readily bioavailable) compounds; therefore, it is likely that only a small fraction of these metals are available to marine life. In addition, the EC for thallium is within the range that commonly occurs in sandstone and limestone sediments (0.05-1.7 ppm). It is possible that receptors could ingest lead pellets; however, the probability for direct ingestion is low. Finally, lead concentrations in sediment samples were below the ER-L for sediment and lead was not identified as a CPEC. Because a contaminant of concern was not identified onsite, risk is negligible. The assessment endpoints for protection of benthic communities and marine special status species are expected to be met.

28.7 Conclusions and Recommendations

Marine sediment samples in the suspected firing range area indicate that CPECs are antimony, thallium, and tin. Lead, the contaminant of concern onsite due to its presence in shot, was determined not to be a CPEC in marine sediments. The results of the SERA indicate minimal risk to onsite marine receptors due to the identified CPECs. No further investigation or action is recommended for Site 65.

Tables
Section 28

TABLE 28.3-1 (Page 1 of 1)
ANALYTICAL METHODS
FORMER TRAP SHOOTING RANGE (SITE 65)

		SPECIAL ANALYTICAL LABORATORY				
	ANALYTICAL METHOD	STIV141A	STIV141C	STIII213	STIV141E	TOXICITY
EPA ID	OGDEN ID	LL SVOC	LL PCB	LL METALS	LL PEST	
MARINE SEDIMENT SAMPLES						
MK501	M65MS01S01D020	-	-	X	-	-
MK502	M65MS02S01D000	-	-	X	-	X
MK503	M65MS02D01D000	-	-	X	-	X
MK504	M65MS02S02D020	-	-	X	-	-
MK505	M65MS03S01D020	-	-	X	-	-
MK506	M65MS04S01D020	-	-	X	-	-
MK507	M65MS05S01D020	-	-	X	-	X
MK508	M65MS05S02D020	-	-	X	-	-
MK509	M65MS06S01D020	-	-	X	-	-
MARINE TISSUE SAMPLES						
MK510	M65MT02S01D002	-	-	X	-	-
MK511	M65MT05S01D002	-	-	X	-	-
MK512	M65MT05D01D002	-	-	X	-	-
EQUIPMENT RINSATE SAMPLES						
MK500	M65XW00E00D000	X	X	X	X	-

"X" = Indicates analytical method performed on sample.

Table 28.5-1
Summary of Marine Sediment Results for Inorganics
Trap Shooting Range, Sand Island (Site 65)

			Site 65									Atoll Background (Deep Sites)							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
DEEP SITES																			
STIII213	Antimony	MG/KG	6	6	0			0.343	5.17	M65MS03S01	J	0	4	0	0.249	0.26			
STIII213	Arsenic	MG/KG	1	6	0	3	3.3	10.3	10.3	M65MS03S01		0	4	0	2.3	3			
STIII213	Cadmium	MG/KG	6	6	0			0.06	0.24	M65MS04S01		4	4	0			0.033	0.046	0.0406
STIII213	Chromium	MG/KG	1	6	0	12	12	15.1	15.1	M65MS01S01		0	4	0	11	12			
STIII213	Copper	MG/KG	6	6	0			7.2	12.6	M65MS02S02		4	4	0			6.3	9	7.3
STIII213	Iron	MG/KG	6	6	0			187	844	M65MS04S01		2	4	0	19	19	19.3	36.5	15.9
STIII213	Lead	MG/KG	2	6	0	5.3	5.8	8.3	200	M65MS03S01	J	0	4	0	5.2	5.5			
STIII213	Mercury	MG/KG	4	6	0	0.025	0.025	0.027	0.043	M65MS04S01	J	0	4	0	0.025	0.025			
STIII213	Silver	MG/KG	1	6	0	0.04	0.04	0.04	0.04	M65MS05S01		0	4	0	0.04	0.04			
STIII213	Thallium	MG/KG	6	6	0			0.032	0.096	M65MS02S02	J	0	4	0	0.024	0.024			
STIII213	Tin	MG/KG	6	6	0			0.535	1.39	M65MS02S02	J	3	4	0	0.047	0.047	0.047	0.055	0.0424
STIII213	Zinc	MG/KG	4	6	0	4	4.1	7.2	9.8	M65MS04S01		0	4	0	3.5	3.8			

Notes:

STIII213 = NOAA Status and Trends Low Level Metals

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
Mean = Geometric Mean

Table 28.6-1
Marine Sediment CPEC Selection - Site 65

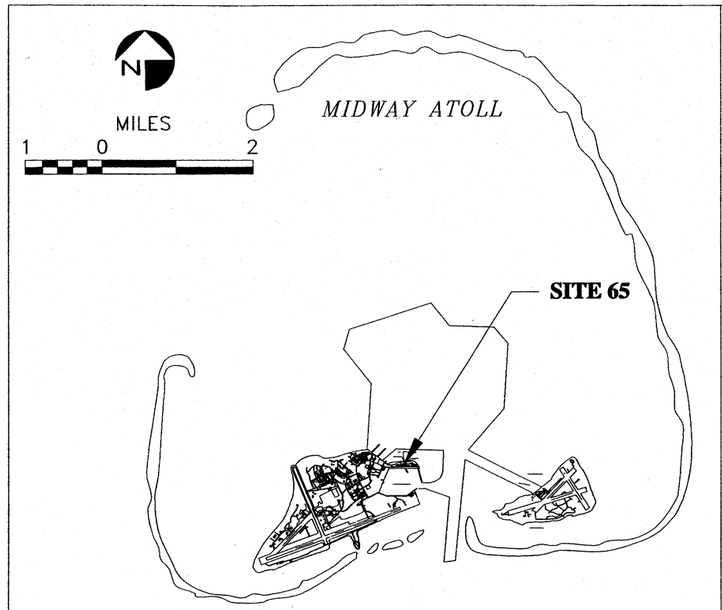
Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic									
Antimony	100		3.43E-01	5.17E+00	6.50E-01	2.32E+00	2.00E+00	2.54E-01	YES
Arsenic	16.7	3.00E+00	1.03E+01	1.03E+01	2.17E+00	5.04E+00	8.20E+00		No(6)
Cadmium	100		6.00E-02	2.40E-01	1.23E-01	2.08E-01	1.20E+00	4.06E-02	No(6)
Chromium	16.7	1.20E+01	1.51E+01	1.51E+01	7.00E+00	1.03E+01	8.10E+01		No(6)
Copper	100		7.20E+00	1.26E+01	9.11E+00	1.10E+01	3.40E+01	7.30E+00	No(5)
Iron	100		1.87E+02	8.44E+02	5.39E+02	8.44E+02		2.16E+01	No(p)
Lead	33.3	5.30E+00	8.30E+00	2.00E+02	6.79E+00	4.07E+01	4.67E+01		No(6)
Mercury	66.7	2.50E-02	2.70E-02	4.30E-02	2.50E-02	4.15E-02	1.50E-01		No(6)
Silver	16.7	4.00E-02	4.00E-02	4.00E-02	2.24E-02	3.14E-02	1.00E+00		No(6)
Thallium	100		3.20E-02	9.60E-02	5.63E-02	8.75E-02			YES
Tin	100		5.35E-01	1.39E+00	9.06E-01	1.36E+00		4.24E-02	YES
Zinc	66.7	4.00E+00	7.20E+00	9.80E+00	5.38E+00	9.80E+00	1.50E+02	2.81E+00	No(6)

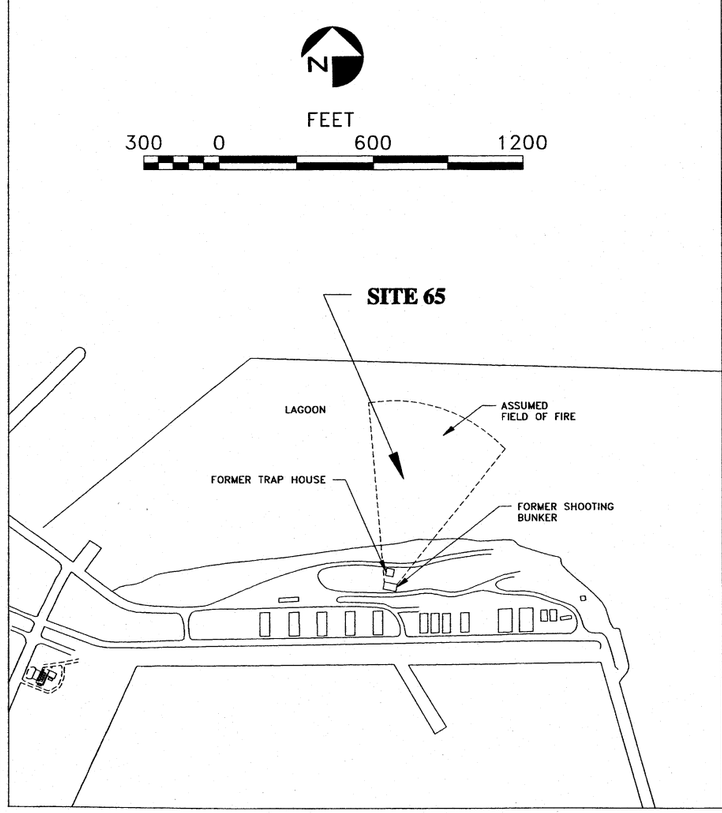
*TBC values used for sediments are the ER-L values from Long and Morgan (1992 and 1994). Values for PAHs were used for alkyl substitued PAHS as well.
**Mean value of background marine sediment samples taken at Midway Atoll.

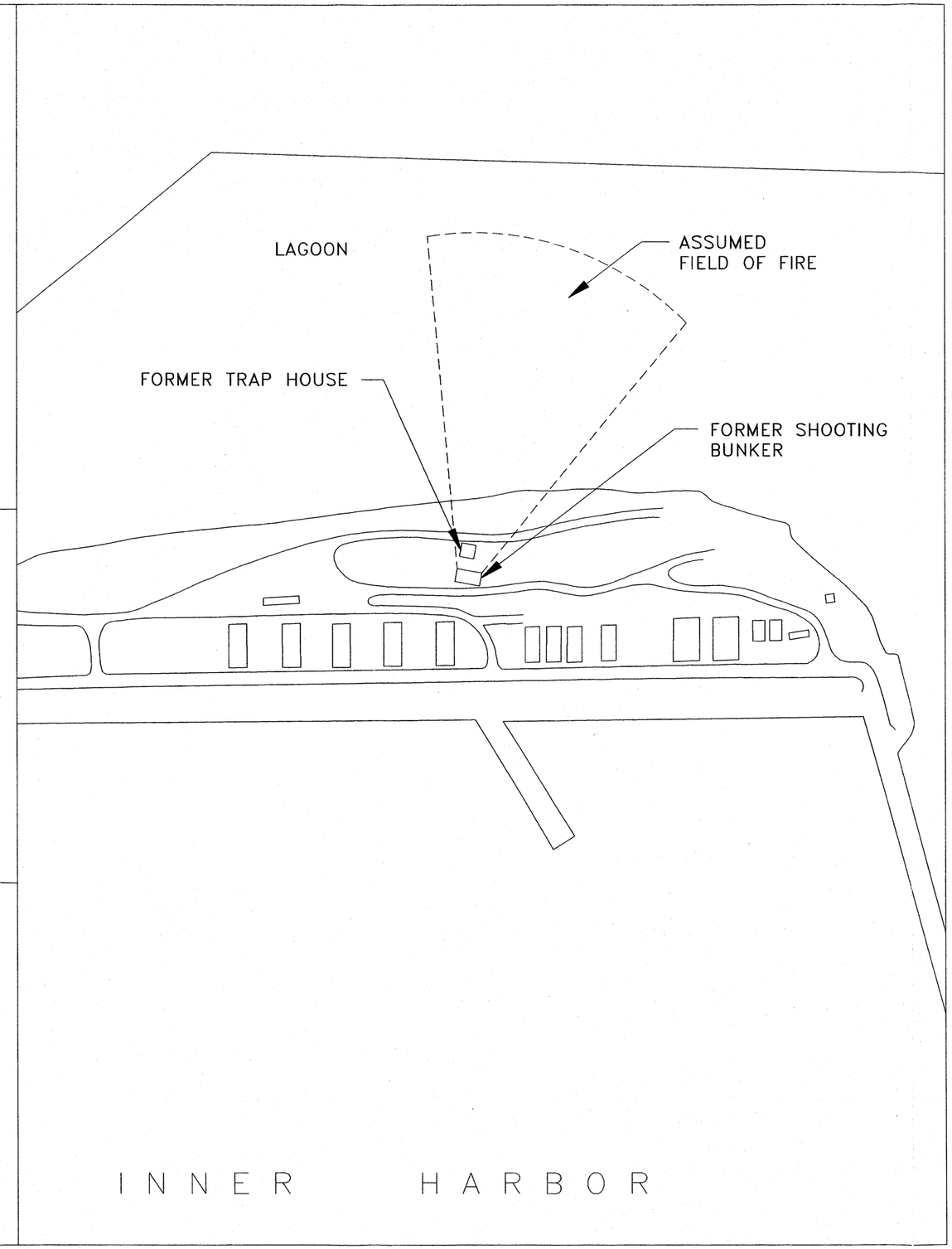
CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Figures
Section 28







LEGEND

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING ENGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE65\05229508.DWG DATE: 5-22-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

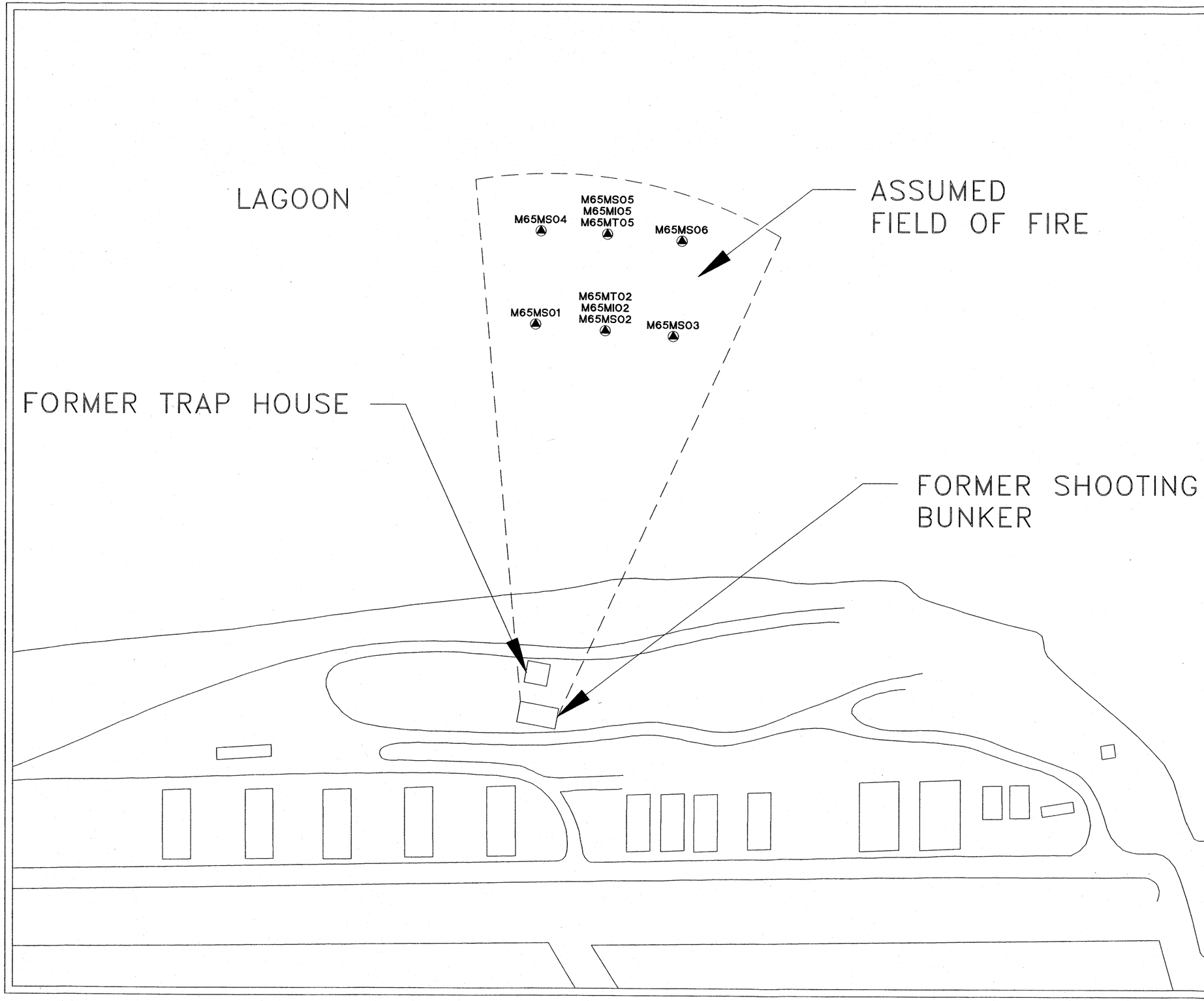
TITLE

TRAP SHOOTING RANGE
(SITE 65)
SAND ISLAND

N
FEET
150 0 300 600

DATE	REV.	DRWN.	INT.	CHKD.	INT.	APPR.	INT.

FIGURE
28.1-1



LEGEND

M##MS## — MARINE SEDIMENT SAMPLE LOCATION AND IDENTIFICATION NUMBER(S)

M##MT## — MARINE TISSUE SAMPLE LOCATION AND IDENTIFICATION NUMBER(S)

M##MI## — MARINE INFAUNA SAMPLE LOCATION AND IDENTIFICATION NUMBER(S)

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE65\05229509.DWG DATE: 5-22-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

MARINE SAMPLE LOCATIONS
(SITE 65)
SAND ISLAND

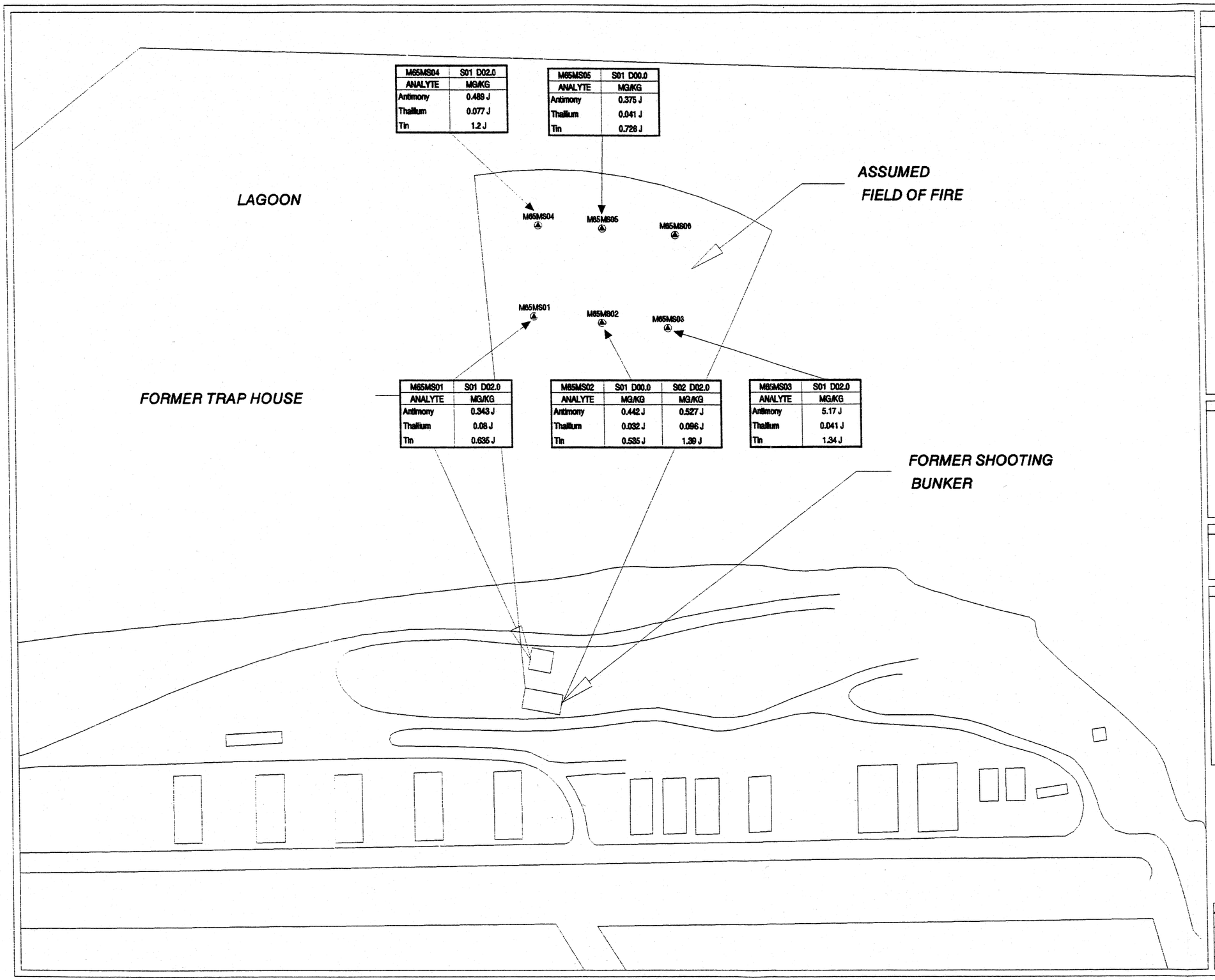
N

FEET
75 0 150 300

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE

28.2-1



M65MS04	S01 D02.0
ANALYTE	MG/KG
Antimony	0.489 J
Thallium	0.077 J
Tin	1.2 J

M65MS05	S01 D00.0
ANALYTE	MG/KG
Antimony	0.375 J
Thallium	0.041 J
Tin	0.728 J

M65MS01	S01 D02.0
ANALYTE	MG/KG
Antimony	0.343 J
Thallium	0.08 J
Tin	0.635 J

M65MS02	S01 D00.0	S02 D02.0
ANALYTE	MG/KG	MG/KG
Antimony	0.442 J	0.527 J
Thallium	0.032 J	0.096 J
Tin	0.535 J	1.39 J

M65MS03	S01 D02.0
ANALYTE	MG/KG
Antimony	5.17 J
Thallium	0.041 J
Tin	1.34 J

LEGEND

▲	MARINE SEDIMENT SAMPLE LOCATION
M65MS02	OGDEN SAMPLE ID
5.17	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/hm/cto138/mapa/m6149542

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

LOW LEVEL METAL CONCENTRATIONS DETECTED IN MARINE SEDIMENT SAMPLES (SITE 65) SAND ISLAND

N

FEET

0 75 150 300 450

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
12/20/95	1	CMF		HFP		JMC	

FIGURE

28.5-1

Section 29

SECTION 29
NORTHWEST DRUM DISPOSAL AREA (SITE 98)

This report describes the results of the SI field work conducted intermittently from August through November 1994 at the Northwest Drum Disposal Area, Sand Island (Site 98). The purpose of the review was to determine whether Site 98 received hazardous substances, and to assess the likelihood for soil and ground-water contamination at the Site. A discussion of the work conducted during the SI, along with findings, conclusions, and recommendations, is presented below.

This report is organized as follows: Site background information is documented in Section 29.1; a description of SI field sampling activities is presented in Section 29.2; methods used for sample analysis are summarized in Section 29.3; physical characteristics of the Site observed during the investigation activities are discussed in Section 29.4; a summary of analytical results is presented in Section 29.5; the SERA is described in Section 29.6; and conclusions and recommendations for the Site are presented in Section 29.7.

29.1 BACKGROUND INFORMATION

Site 98 was first investigated during the 1994 Ogden SI reconnaissance north of Site 07, near the western edge of abandoned Runway 15-33 (Figure 29.1-1). The disposal Site is located in a vegetated area and contains a pile of deteriorated, empty, 55-gallon drums. One drum was marked as "Lube Oil" with a 1983 manufacturing date, while labels on all other drums had been obliterated. The Site is not currently used by the Navy or BOS Contractor. The Site was first discovered during the SI Site reconnaissance in September 1994. No records of the Site are known to exist. Potential contaminant sources and associated analytical categories are summarized in Table 29.1-1.

Table 29.1-1

**POTENTIAL CHEMICAL CONTAMINANTS
NORTHWEST DRUM DISPOSAL AREA
SITE 98**

Waste Type	Years of Disposal	Potential Chemical Constituents	Analytical Category
Lubricating and Waste Oil, Unknown	Unknown	Heavy-end Hydrocarbons, PCBs, Solvents, Metals	Total Fuel Hydrocarbons, Volatile Organic Compounds, Semi Volatile Organic Compounds, Organochlorine Pesticides and PCBs, Metals

29.2 Sampling Methods and Locations

Soil Vapor

A soil vapor survey was conducted on September 23, 1994 by TEG and Ogden personnel to screen for petroleum hydrocarbons and VOCs in subsurface soils and ground water. Two samples were taken at approximately 3 fbgs near the empty 55-gallon drums (Figure 29.2-1).

Direct-push

PRC and Ogden personnel collected direct-push soil samples at four locations and direct-push ground-water samples at two locations, on October 11, 1994. This action was taken to screen for contamination in subsurface soil and ground water (Figure 29.2-1). One QC duplicate soil sample and one QC duplicate ground-water sample were also collected. Soil samples were collected just above the capillary fringe. Water samples were taken below 3.4 fbgs, (the depth to ground water). A maximum ground-water PID headspace reading of 2.3 ppm was observed. Visible evidence of contamination was not detected.

Surface Soil

To test for contamination in surface soils and compare surface soil to subsurface soil, two surface soil samples were collected at opposite ends of a trench prior to excavation (Figure 29.2-2).

Trench Soil

Two subsurface soil samples and one QC duplicate sample were collected from within the trench to test for contamination in subsurface soil (Figure 29.2-2). Trench soil samples were collected with pre-cleaned stainless steel trowels and placed in glass jars, or taken directly from the backhoe bucket with pre-cleaned stainless steel sleeves. Samples were immediately placed on ice in coolers for transport to the analytical laboratory.

29.3 Analytical Methods

Soil Vapor

The two soil vapor samples were immediately analyzed in the field by portable GC for TFH, VOCs, and to determine the ratio of percent CO_2 to percent O_2 (Table 29.3-1).

Direct-push

All direct-push soil and ground-water samples were analyzed at the routine analytical laboratory for fuels, CLP VOCs, CLP SVOCs, CLP pesticides/PCBs, and CLP metals (Table 29.3-1).

Surface Soil

Two samples were submitted to the offsite routine analytical laboratory for analysis of fuels. Two other samples were submitted to the special analytical laboratory for analysis of SVOCs, PCBs, metals, and pesticides by low-level detection methods (Table 29.3-1).

Trench Soil

Two trench soil samples and one QC duplicate were submitted to the offsite routine analytical laboratory for analysis of fuels, CLP VOCs, CLP SVOCs, CLP pesticides/PCBs, and CLP metals (Table 29.3-1).

29.4 PHYSICAL CHARACTERISTICS

29.4.1 Topography

Site 98 is generally flat and heavily vegetated. The Site is bounded on the northwest by an earthen berm about 15 feet high and is completely surrounded on all other sides by ironwood forest.

29.4.2 Geology and Soils

Between the surface and 1 fbgs, the soil consists of sand with minor amounts of organics from the ironwood trees and golden crown-beard. The interval between 1 and 4 fbgs consists of fine-grained, pale yellow, poorly sorted sand.

29.4.3 Hydrogeology

Ground water was encountered at a depth of 3 to 4 fbgs during trench excavation.

29.5 SUMMARY OF ANALYTICAL RESULTS

The sections and tables below summarize the results of laboratory analyses performed on Site 98 samples. For soil samples, analytical laboratory results for organic and inorganic compounds are summarized in Tables 29.5-1 and 29.5-2, respectively. Ground-water sampling results are presented in Table 29.5-3.

The tables list the analytical methods, the number of detects, the total number of samples, the number of samples rejected during data validation, the minimum undetected concentration, the maximum undetected concentration, the minimum detected concentration, the maximum detected concentration, and the sample with the maximum concentration. In addition, the concentrations of compounds detected at Site 98 are compared to Sand Island background levels. Analytical results for all samples and analytes are contained in Appendix L. CLP and low-level analytical data are available at PACNAVFACENGCOM offices at Pearl Harbor, Hawaii.

29.5.1 Soil Vapor

TFH vapors were not detected at either of the two sampling locations. The complete TEG soil vapor survey report is included in Appendix C.

29.5.2 Surface Soil

Among the surface soil samples, concentrations of one of five pesticides detected and five of ten metals detected, were above mean Sand Island background levels. The maximum pesticide concentration was 3 µg/kg of 4,4'-DDE. Thirteen PCB congeners were detected; the congener with the maximum concentration was PCB-153 at 1.9 µg/kg. Concentrations of 33 SVOCs were slightly above mean background levels. At 53 µg/kg, benzo(b)fluoranthene had the highest concentration among the SVOCs detected. The highest concentration of lead detected in a surface soil sample from this Site was 6.4 mg/kg. The maximum fuels concentration detected among these samples was 27 mg/kg of lubricant oil range hydrocarbons (C20-C30). Figure 29.5-1 depicts the surface soil sampling locations and selected pesticide/PCB concentrations.

29.5.3 Subsurface Soil

CLP pesticides/PCBs were not detected among the subsurface soil samples. Concentrations of 9 of the 13 CLP metals detected were above mean Sand Island background levels. Fuels were not detected among the subsurface soil samples. All SVOC concentrations were below mean background levels established for Sand Island. At 110 µg/kg, phenol was the SVOC with the highest concentration. VOC concentrations were also low. At 13 µg/kg, acetone, a common laboratory artifact, was the VOC with the highest concentration detected in a subsurface soil sample from this Site. Figures 29.5-2 and 29.5-3 depict the subsurface soil sampling locations with selected VOC and SVOC concentrations.

29.5.4 Ground Water

Fuels, CLP pesticides/PCBs, CLP VOCs and CLP SVOCs were not detected in any of the ground-water samples. Concentrations of 8 of the 10 CLP metals detected were above mean Sand Island background levels (Figure 29.5-4).

29.6 Screening Ecological Risk Assessment

29.6.1 Problem Formulation

Tasks to be accomplished during Problem Formulation include (a) developing a Site description based on current Site investigations, existing literature, any prior preliminary assessments, and Site history; (b) identifying potential stressors, exposure pathways, and ecological receptors (habitats and species); (c) discussing the nature of adverse effects associated with a given stressor; (d) defining ecologically appropriate assessment and measurement endpoints; and (e) making an initial evaluation of risks posed by the Site.

For a Site to present the potential for risk, it must exhibit the following three criteria: contain stressors in abiotic media at detectable and biologically significant concentrations, provide exposure pathways linking stressors to ecological receptors, and have ecological receptors (those associated with assessment endpoints) that either utilize the Site, are present nearby, or are in range of stressors migrating from the Site. If Problem Formulation determines that one or more of these criteria are absent, the Site is recommended for NFA and the risk assessment is concluded at this point. If all criteria are met, then completion of the SERA process is required.

29.6.1.1 Site Description

Site 98 is located near the western edge of abandoned Runway 15-33 on Sand Island (Figure 29.1-1). The Site is located in a depression dominated by golden crown-beard, and contains a few deteriorated, empty, 55-gallon drums (Figure 29.6-1). The depression is surrounded by ironwood forest. Site 98 was a drum disposal area and is currently not being used. The types of material disposed of at this Site are unknown.

29.6.1.2 Stressor Identification

Stressors are chemicals that have the potential to adversely impact ecological receptors. Because of the early availability of chemical analysis data, ECs were computed and CPECs were identified at this point in the SERA process, using the methods previously described in Sections 4.3.1.1.1 and 4.3.1.1.2. Data obtained from the chemical analysis of field samples were used to calculate ECs, as described in Section 4.3.1.1.1. CPECs were then identified following the methods described in Section 4.3.1.1.2. Detailed results of CPEC selection for surface soils (<6 inches bgs) are shown in Table 29.6-1; for subsurface soils (>1.0 fbgs) in Table 29.6-2, and for ground water in Table 29.6-3. Results of the CPEC selections are summarized in Table 29.6-4. The majority of CPECs for Site 98 were organochlorine compounds (pesticides and SVOCs) detected in surface and subsurface soils. Arsenic was the only CPEC detected in the ground water.

29.6.1.3 Potential Ecological Effects

CPECs onsite that may have effects on ecological receptors include arsenic, trans-nonaclor, and various SVOCs. CPEC physicochemical and toxicological properties, as they relate to potential exposure routes and sensitive ecological receptors, are summarized in Section 4.2.3 and described in detail in Appendix J.

29.6.1.4 Ecological Receptor Identification

There are several ecological receptors associated with Site 98, including the Laysan albatross, Bonin petrel, wedge-tailed shearwater, red-tailed tropicbird, white tern, brown noddy, and bristle-thighed curlew (Section 4.2.4). The number of burrows observed scattered onsite indicated that the nesting populations of petrels and shearwaters were at moderate levels. Albatross, tropicbirds and white terns were also observed in moderate numbers onsite. Noddys and curlews were observed in habitat adjacent to the Site.

29.6.1.5 Exposure Pathway Identification

Potentially complete terrestrial exposure routes at Site 98 include direct exposure to contaminated soil through dermal contact, incidental ingestion of contaminated surface

soil, ingestion of contaminated prey items, and inhalation of volatile compounds. Incidental ingestion and dermal contact with contaminated soils are of primary concern for the albatross, noddy, and tropicbird onsite. Inhalation of vapors and dermal exposure are principal routes for the burrowing Bonin petrel and wedge-tailed shearwater. Direct ingestion of contaminated prey items by the curlew would be the principal route of concern for this species. There is no ground-water pathway for terrestrial receptors.

29.6.1.6 Endpoints

The potential receptors onsite are comprised of terrestrial seabird and shorebird species; therefore, assessment endpoint #1 in Section 4.2.6.1 and testable hypotheses #1 and #2 in Section 4.2.6.2. are appropriate for this Site. Measurement endpoints #1, #2, and #3 in Section 4.2.6.3 were selected for this Site.

29.6.1.7 Summary

Based on the preceding information, it was concluded that this Site met all three of the criteria that indicate the potential for ecological risk and that completion of the SERA process was required.

29.6.2 Exposure Analysis

Terrestrial target receptors for Site 98 include seabird and shorebird species that occupy the Site. Exposure pathway models (c.f., Section 4.3.1.3) applicable to burrowing birds (#1), ground-nesting birds (#2), and shorebirds (#3) were used for the various types of bird species that occur onsite. The Laysan albatross was evaluated for incidental ingestion and dermal absorption of contaminants from surface soils. Another terrestrial target receptor identified onsite was the ruddy turnstone, a shorebird. The primary exposure pathway for shorebirds was estimated to be ingestion of invertebrates (insects) that have been exposed to contaminants in surface soils. Equations for calculating EPVs are given in Section 4.3.1.4. Exposure doses via each pathway and EPVs for each receptor are listed in Table 29.6-5.

29.6.3 Ecological Effects Analysis

The potential for adverse ecological effects was evaluated using literature-derived data on CPEC toxicity with respect to specific target receptors: the Laysan albatross and golden-plover. Toxicity reference values were calculated, as described in Section 4.3.2.2, and appear in Table 29.6-6. Toxicity profiles are provided in Appendix J.

29.6.4 Risk Characterization

Risk was estimated using a quotient methodology described in Section 4.3.3.1; results of these calculations are shown in Table 29.6-6. Results of the risk description weight-of-evidence analyses are summarized in Table 29.6-7 and discussed below.

No CPECs had TQs greater than zero indicating the levels of CPECs onsite were unlikely to pose a risk to any potential receptors (Table 29.6-6). Trans-nonaclor could not be evaluated for shorebirds because of data gaps that prevented TQ analysis.

29.6.5 Uncertainty Analysis

Section 4.3.3.3 describes all of the uncertainties that apply to this Site.

29.6.6 SERA Conclusions

Based on analysis of the chemical data, the assessment endpoint for special status bird species is expected to be met at Site 98. TQ analysis revealed that it is unlikely that any CPEC poses an acute or chronic risk to the potential receptors at Site 98.

29.7 Conclusions and Recommendations

Low levels of PAHs, pesticides, and PCBs were detected in surface soil samples collected in the vicinity of Site 98. Very low levels (1 ppb) of the volatile organic compounds, trichloroethene and tetrachloroethene, were found in subsurface soils and no organic compounds were detected in ground water at the Site. Metals were detected in surface soil, subsurface soil, and ground-water samples collected at the Site.

The results of the SERA indicate that the detected levels of organic and inorganic compounds in surface soils, subsurface soils, and ground water should present a negligible risk to terrestrial wildlife; therefore, no further investigation or remedial action is recommended for Site 98. It is recommended that empty drums and other debris at this Site that may pose an entrapment or entanglement hazard to birds be removed and disposed of in an appropriate manner.

Tables
Section 29

TABLE 29.3-1
ANALYTICAL METHODS
NORTHWEST DRUM DISPOSAL AREA (SITE 98)

		ROUTINE ANALYTICAL LABORATORY					SPECIAL ANALYTICAL LABORATORY			
	ANALYTICAL METHOD	8015 M/OG	OLM01.8V	OLM01.8B	OLM01.8P	ILM03.OX	STIV141A	STIV141C	STIII213	STIV141E
					OC					
EPA ID	OGDEN ID	FUELS	VOC	SVOC	PEST/PCB	METALS	LL SVOC	LL PCB	LL METALS	LL PEST
SURFACE SOIL SAMPLES										
MU001	M98SS01S01D0025	X	-	-	-	-	-	-	-	-
MU002	M98SS01S02D0025	-	-	-	-	-	X	X	X	X
MU003	M98SS01S03D0025	X	-	-	-	-	-	-	-	-
MU004	M98SS01S04D0025	-	-	-	-	-	X	X	X	X
TRENCH SOIL SAMPLES										
MU005	M98TS01S01D040	X	X	X	X	X	-	-	-	-
MU006	M98TS01S02D010	X	X	X	X	X	-	-	-	-
MU007	M98TS01D02D010	X	X	X	X	X	-	-	-	-
DIRECT PUSH SOIL SAMPLES										
MU012	M98PS01S01D040	X	X	X	X	X	-	-	-	-
MU013	M98PS02S01D034	X	X	X	X	X	-	-	-	-
MU014	M98PS02D01D034	X	X	X	X	X	-	-	-	-
MU017	M98PS03S01D034	X	X	X	X	X	-	-	-	-
MU018	M98PS04S01D037	X	X	X	X	X	-	-	-	-
DIRECT PUSH WATER SAMPLES										
MU011	M98PW01S01D034	X	X	X	X	X	-	-	-	-
MU015	M98PW03S01D034	X	X	X	X	X	-	-	-	-
MU016	M98PW03D01D034	X	X	X	X	X	-	-	-	-
EQUIPMENT RINSATE SAMPLES										
MU008	M98XW01E01D000	X	X	X	X	X	-	-	-	-
MU009	M98XW01E02D000	-	-	-	-	-	X	X	X	X
TRIP BLANK SAMPLES										
MU010	M98XW00T00D000	-	X	-	-	-	-	-	-	-

"X" = Indicates analytical method not performed on sample.

Table 29.5-1
Summary of Soil Results for Organics
Northwest Drum Disposal Area, Sand Island (Site 98)

			Site 98									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL																			
8015B/OG	C20-C30 (Lubricant Oil Range)	MG/KG	1	2	0	22	22	27	27	M98SS01S03		1	8	0	21	24	44	44	13.3
STIV141A	Acenaphthene	UG/KG	2	2	0			0.076	0.55	M98SS01S02		3	9	1	0.17	0.18	0.072	5.2	0.154
STIV141A	Anthracene	UG/KG	2	2	0			0.4	1.7	M98SS01S02		8	9	1			0.086	24	0.531
STIV141A	Benzo(a)Anthracene	UG/KG	2	2	0			4.3	32	M98SS01S02		8	9	1			1	260	4.1
STIV141A	Benzo(a)Pyrene	UG/KG	2	2	0			6.5	32	M98SS01S02		8	9	1			0.84	270	3.89
STIV141A	Benzo(b)Fluoranthene	UG/KG	2	2	0			12	53	M98SS01S02		8	9	1			0.94	300	6.13
STIV141A	Benzo(e)pyrene	UG/KG	2	2	0			6.9	26	M98SS01S02		8	9	1			0.83	160	3.97
STIV141A	Benzo(g,h,i)perylene	UG/KG	2	2	0			6.8	23	M98SS01S02	J	8	9	1			0.79	55	3.27
STIV141A	Benzo(k)Fluoranthene	UG/KG	2	2	0			3.2	17	M98SS01S02		8	9	1			0.55	130	2.75
STIV141A	Chrysene	UG/KG	2	2	0			7.2	34	M98SS01S02		8	9	1			1.6	300	6.46
STIV141A	Chrysenes, C1-alkyl-substitute	UG/KG	2	2	0			4.8	12	M98SS01S02		8	9	1			0.57	180	2.97
STIV141A	Chrysenes, C2-alkyl-substitute	UG/KG	2	2	0			5.7	6.5	M98SS01S02		6	9	1	0.26	0.26	0.84	59	1.58
STIV141A	Chrysenes, C3-alkyl-substitute	UG/KG	2	2	0			3.9	5.9	M98SS01S04		3	9	1	0.26	0.28	7.1	22	0.731
STIV141A	Chrysenes, C4-alkyl-substitute	UG/KG	2	2	0			1.2	4.8	M98SS01S04		3	9	1	0.26	0.28	5	11	0.608
STIV141A	Dibenzo(a,h)Anthracene	UG/KG	2	2	0			1.4	5.4	M98SS01S02		8	9	1			0.15	20	0.676
STIV141A	Dibenzothiophene	UG/KG	2	2	0			0.062	0.47	M98SS01S02		4	9	1	0.16	0.17	0.097	4	0.149
STIV141A	Dibenzothiophenes, C1-alkyl-su	UG/KG	2	2	0			0.082	0.33	M98SS01S02		4	9	1	0.16	0.17	0.08	3.5	0.147
STIV141A	Dibenzothiophenes, C2-alkyl-su	UG/KG	1	2	0	0.17	0.17	0.37	0.37	M98SS01S02		4	9	1	0.16	0.17	0.2	6.5	0.243
STIV141A	Dibenzothiophenes, C3-alkyl-su	UG/KG	1	2	0	0.17	0.17	0.17	0.17	M98SS01S04		3	9	1	0.16	0.18	0.29	5.2	0.225
STIV141A	Fluoranthene	UG/KG	2	2	0			6	41	M98SS01S02		8	9	1			2	370	8.68
STIV141A	Fluoranthenes+Pyrenes, C1-alk	UG/KG	2	2	0			3.3	13	M98SS01S02		8	9	1			1.1	200	3.98
STIV141A	Fluoranthenes+Pyrenes, C2-alk	UG/KG	2	2	0			4.9	12	M98SS01S02		7	9	1	0.2	0.2	0.97	140	3
STIV141A	Fluoranthenes+Pyrenes, C3-alk	UG/KG	2	2	0			3.3	3.8	M98SS01S04		5	9	1	0.2	0.2	0.71	38	0.976
STIV141A	Fluorene	UG/KG	2	2	0			0.04	0.14	M98SS01S02	J	4	9	1	0.22	0.22	0.064	3	0.146
STIV141A	Fluorenes, C1-alkyl-substitute	UG/KG	2	2	0			0.12	0.16	M98SS01S02	J	1	9	1	0.22	0.25	2	2	0.164
STIV141A	Indeno(1,2,3-cd)pyrene	UG/KG	2	2	0			6.6	26	M98SS01S02	J	8	9	1			0.67	180	3.2
STIV141A	Naphthalenes, C2-alkyl-substit	UG/KG	2	2	0			0.17	0.32	M98SS01S02		1	8	0	0.23	0.26	0.58	0.58	0.146
STIV141A	Perylene	UG/KG	2	2	0			1.8	9.6	M98SS01S02		8	9	1			0.22	51	1.38
STIV141A	Phenanthrene	UG/KG	2	2	0			1.2	8.2	M98SS01S02		8	9	1			0.33	89	1.78

Notes:

8015B/OG = Total Fuel Hydrocarbons
STIV141A = NOAA Status and Trends Semi Volatiles

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 29.5-1
Summary of Soil Results for Organics
Northwest Drum Disposal Area, Sand Island (Site 98)

			Site 98									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL - continued																			
STIV141A	Phenanthrenes+Anthra., C1-alk	UG/KG	2	2	0			0.58	2.8	M98SS01S02		8	9	1			0.44	59	1.46
STIV141A	Phenanthrenes+Anthra., C2-alk	UG/KG	2	2	0			0.54	1.8	M98SS01S02		7	9	1	0.28	0.28	0.5	43	1.16
STIV141A	Phenanthrenes+Anthra., C3-alk	UG/KG	2	2	0			0.59	1.3	M98SS01S02		4	9	1	0.27	0.29	0.43	21	0.54
STIV141A	Phenanthrenes+Anthra., C4-alk	UG/KG	2	2	0			1.9	7.9	M98SS01S02		5	8	0	0.27	0.29	1.4	75	1.19
STIV141A	Pyrene	UG/KG	2	2	0			5.8	37	M98SS01S02		8	9	1			2.1	390	8.67
STIV141C	PCB-101 (2,2',3,5,5')	UG/KG	1	2	0	0.011	0.011	0.17	0.17	M98SS01S04		4	8	0	0.011	0.012	0.1	1.7	0.054
STIV141C	PCB-105 (2,3,3',4,4')	UG/KG	2	2	0			0.11	0.16	M98SS01S02		5	8	0	0.012	0.014	0.11	1.2	0.0884
STIV141C	PCB-118 (2,3',4,4',5)	UG/KG	2	2	0			0.56	0.66	M98SS01S04		8	8	0			0.085	2.8	0.506
STIV141C	PCB-128 (2,2',3,3',4,4')	UG/KG	2	2	0			0.2	0.56	M98SS01S04		7	8	0	0.014	0.014	0.048	1.2	0.16
STIV141C	PCB-138 (2,2',3,4,4',5')	UG/KG	2	2	0			0.89	1.1	M98SS01S02		8	8	0			0.27	5.5	1.24
STIV141C	PCB-153 (2,2',4,4',5,5')	UG/KG	2	2	0			1.5	1.9	M98SS01S02		8	9	1			0.46	5.9	1.64
STIV141C	PCB-170 (2,2',3,3',4,4',5)	UG/KG	1	2	0	0.057	0.057	1	1	M98SS01S04		7	8	0	0.059	0.059	0.14	1.4	0.293
STIV141C	PCB-180 (2,2',3,4,4',5,5')	UG/KG	2	2	0			0.57	0.62	M98SS01S02		8	8	0			0.23	2	0.846
STIV141C	PCB-187 (2,2',3,4',5,5',6)	UG/KG	2	2	0			0.4	0.56	M98SS01S02		6	8	0	0.027	0.027	0.14	1.4	0.238
STIV141C	PCB-195 (2,2',3,3',4,4',5,6)	UG/KG	1	2	0	0.012	0.012	0.094	0.094	M98SS01S04		8	8	0			0.032	0.38	0.127
STIV141C	PCB-206 (2,2',3,3',4,4',5,5',6	UG/KG	1	2	0	0.01	0.01	0.077	0.077	M98SS01S04		7	8	0	0.011	0.011	0.036	0.76	0.0866
STIV141C	PCB-209 (2,2',3,3',4,4',5,5',6	UG/KG	1	2	0	0.012	0.012	0.094	0.094	M98SS01S04		7	8	0	0.013	0.013	0.037	0.94	0.0931
STIV141C	PCB-66 (2,3',4,4')	UG/KG	1	2	0	0.014	0.014	0.071	0.071	M98SS01S04		4	9	1	0.014	0.016	0.35	7.3	0.11
STIV141E	4,4'-DDE	UG/KG	2	2	0			2.6	3	M98SS01S02		8	12	4			0.6	1300	13.2
STIV141E	4,4'-DDT	UG/KG	1	2	0	0.021	0.021	0.29	0.29	M98SS01S04		8	10	2			0.091	260	3.57
STIV141E	Aldrin	UG/KG	1	2	0	0.016	0.016	0.016	0.016	M98SS01S04		0	8	0	0.015	0.018			
STIV141E	Hexachlorobenzene	UG/KG	2	2	0			0.015	0.023	M98SS01S04		6	8	0	0.018	0.019	0.0089	0.027	0.0121
STIV141E	trans-Nonachlor	UG/KG	2	2	0			0.28	0.48	M98SS01S02		8	9	1			0.043	18	0.699
SUBSURFACE SOIL																			
OLM01.0B	bis(2-Ethylhexyl)phthalate	UG/KG	1	6	0	360	390	53	53	M98TS01S01	J	3	12	0	370	580	60	95	155
OLM01.0B	Phenol	UG/KG	1	6	0	360	410	110	110	M98PS03S01	J	1	12	0	370	580	500	500	223
OLM01.0V	(Meta+Para)-Xylene	UG/KG	2	6	0	1	1	2	2	M98TS01S01		1	12	0	1	1	2	2	0.561
OLM01.0V	1,2-Dichloroethane	UG/KG	1	6	0	1	1	3	3	M98TS01S01		0	12	0	1	1			

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles
STIV141C = NOAA Status and Trends PCBs
STIV141E = NOAA Status and Trends Pesticides
OLM01.0B = CLP Semi Volatiles
OLM01.0V = CLP Volatiles

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 29.5-1
Summary of Soil Results for Organics
Northwest Drum Disposal Area, Sand Island (Site 98)

			Site 98									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SUBSURFACE SOIL - continued																			
OLM01.0V	Acetone	UG/KG	3	6	0	11	11	9	13	M98TS01S01		12	12	0			16	200	39.1
OLM01.0V	Methylene Chloride	UG/KG	2	6	0	5	22	2	3	M98PS01S01	J	2	12	0	5	7	1	2	2.6
OLM01.0V	Tetrachloroethene	UG/KG	1	6	0	1	1	1	1	M98TS01S02		0	12	0	1	1			
OLM01.0V	Toluene	UG/KG	1	6	0	2	2	2	2	M98TS01S01		0	12	0	2	3			
OLM01.0V	Trichloroethene	UG/KG	1	6	0	1	1	1	1	M98TS01S01		0	12	0	1	1			

Notes:

OLM01.0V = CLP Volatiles

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 29.5-2
Summary of Soil Results for Inorganics
Northwest Drum Disposal Area, Sand Island (Site 98)

			Site 98									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
SURFACE SOIL																			
STIII213	Antimony	MG/KG	2	2	0			0.121	0.162	M98SS01S04		8	8	0			0.288	1.06	0.537
STIII213	Cadmium	MG/KG	2	2	0			0.729	0.91	M98SS01S02	J	8	8	0			0.53	1.44	0.946
STIII213	Copper	MG/KG	2	2	0			3.9	7.4	M98SS01S04		5	8	0	3.32	3.32	5.6	7.8	3.83
STIII213	Iron	MG/KG	2	2	0			316	1060	M98SS01S04		8	8	0			64.2	2060	334
STIII213	Lead	MG/KG	1	2	0	4.37	4.37	6.4	6.4	M98SS01S04		5	8	0	4.37	4.37	5.8	9.7	4.61
STIII213	Mercury	MG/KG	1	2	0	0.025	0.025	0.031	0.031	M98SS01S02		3	8	0	0.025	0.025	0.029	0.062	0.0203
STIII213	Nickel	MG/KG	2	2	0			0.711	0.98	M98SS01S02		2	8	0	5.7	7.3	5.9	9.8	3.84
STIII213	Silver	MG/KG	1	2	0	0.04	0.04	0.054	0.054	M98SS01S02		7	8	0	0.04	0.04	0.0413	0.741	0.073
STIII213	Tin	MG/KG	2	2	0			0.087	0.106	M98SS01S04		2	8	0	0.072	0.197	5	6.06	0.186
STIII213	Zinc	MG/KG	2	2	0			17.8	29.2	M98SS01S04		8	8	0			7.8	75.8	19.6
SUBSURFACE SOIL																			
ILM03.0	Barium	MG/KG	6	6	0			5	5.4	M98PS01S01	J	12	12	0			4.3	92.3	8.19
ILM03.0	Beryllium	MG/KG	4	6	0	0.55	0.56	0.19	0.3	M98PS04S01	J	8	12	0	0.33	0.5	0.21	0.57	0.264
ILM03.0	Cadmium	MG/KG	5	6	0	0.04	0.04	0.05	0.08	M98PS01S01		7	12	0	0.04	0.06	0.04	0.35	0.0615
ILM03.0	Calcium	MG/KG	6	6	0			310000	332000	M98PS04S01	J	12	12	0			34100	350000	276000
ILM03.0	Chromium	MG/KG	2	6	0	5.2	5.4	6.9	7	M98TS01S01		12	12	0			4.1	19	6.09
ILM03.0	Iron	MG/KG	6	6	0			7.1	10.4	M98PS04S01	J	11	12	0	2.7	2.7	2	6910	33.6
ILM03.0	Magnesium	MG/KG	6	6	0			15300	17900	M98PS04S01		12	12	0			14900	20800	17200
ILM03.0	Manganese	MG/KG	4	6	0	3.2	3.3	3.3	4.1	M98TS01S02		12	12	0			3.2	124	7.21
ILM03.0	Potassium	MG/KG	6	6	0			42.3	80	M98TS01S01	J	12	12	0			44.9	248	65.2
ILM03.0	Selenium	MG/KG	2	6	0	1.9	2.3	1.9	2.2	M98TS01S01	J	12	12	0			1.3	2.2	1.83
ILM03.0	Silver	MG/KG	4	6	0	1.4	1.4	1.5	2	M98PS03S01		2	12	0	1.4	2	1.4	2.2	0.861
ILM03.0	Sodium	MG/KG	6	6	0			2410	2740	M98TS01S01	J	12	12	0			2250	4110	2680
ILM03.0	Vanadium	MG/KG	1	6	0	0.65	1.4	1.3	1.3	M98TS01S01	J	11	12	0	0.76	0.76	0.9	12.5	1.58

Notes:

STIII213 = NOAA Status and Trends Low Level Metals
ILM03.0 = CLP Metals

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
Mean = Geometric Mean
Mean = Geometric Mean

SI98SS.XLS

Table 29.5-3
Summary of Groundwater Results for Inorganics
Northwest Drum Disposal Area, Sand Island (Site 98)
Page 1 of 1

			Site 98									Sand Island Background							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
ILM03.0	Arsenic	UG/L	2	2	0			32	40.9	M98PW01S01		2	4	0	1.5	2.2	14.7	19	3.9
ILM03.0	Cadmium	UG/L	1	2	0	0.2	0.2	0.33	0.33	M98PW01S01		0	4	0	0.2	0.2			
ILM03.0	Calcium	UG/L	2	2	0			208000	345000	M98PW01S01		4	4	0			150000	351000	208000
ILM03.0	Copper	UG/L	1	2	0	6.6	6.6	2.73	2.73	M98PW01S01	J	0	4	0	2.7	2.7			
ILM03.0	Iron	UG/L	2	2	0			570	929	M98PW01S01	J	4	4	0			298	836	474
ILM03.0	Magnesium	UG/L	2	2	0			278000	293000	M98PW01S01		4	4	0			49300	522000	110000
ILM03.0	Manganese	UG/L	1	2	0	4	4	6.07	6.07	M98PW01S01		4	4	0			3.8	17.9	5.89
ILM03.0	Potassium	UG/L	2	2	0			58600	60300	M98PW01S01		4	4	0			12000	142000	25000
ILM03.0	Sodium	UG/L	2	2	0			1520000	1570000	M98PW01S01	J	3	4	0	15	15	167000	223000	15700
ILM03.0	Thallium	UG/L	1	2	0	2.3	2.3	2.31	2.31	M98PW01S01		0	4	0	2.3	2.3			

Notes:

ILM03.0 = CLP Metals

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
Mean = Geometric Mean

Table 29.6-1
Surface Soil CPEC Selection - Site 98

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic									
Antimony	100		1.21E-01	1.62E-01	1.40E-01	1.62E-01	2.87E-01	5.37E-01	No(5)
Cadmium	100		7.29E-01	9.10E-01	8.14E-01	9.10E-01	5.63E+00	6.17E-01	No(5)
Copper	100		3.90E+00	7.40E+00	5.37E+00	7.40E+00	1.00E+02	1.57E+00	No(6)
Iron	100		3.16E+02	1.06E+03	5.79E+02	1.06E+03		2.06E+02	No(p)
Lead	50	4.37E+00	6.40E+00	6.40E+00	3.74E+00	6.40E+00	7.28E+00	6.28E+00	No(5)
Mercury	50	2.50E-02	3.10E-02	3.10E-02	1.97E-02	3.10E-02	2.40E-02	3.90E-02	No(5)
Nickel	100		7.11E-01	9.80E-01	8.35E-01	9.80E-01	2.65E+02	8.48E-01	No(5)
Silver	50	4.00E-02	5.40E-02	5.40E-02	3.29E-02	5.40E-02		8.14E-01	No(5)
Tin	100		8.70E-02	1.06E-01	9.60E-02	1.06E-01		3.14E-01	No(5)
Zinc	100		1.78E+01	2.92E+01	2.28E+01	2.92E+01	1.11E+01	2.21E+01	No(5)
Organic									
4,4'-DDE	100		2.60E-03	3.00E-03	2.79E-03	3.00E-03	1.58E-02		No(6)
4,4'-DDT	50	2.10E-05	2.90E-04	2.90E-04	5.52E-05	2.90E-04	1.58E-02		No(6)
Acenaphthene	100		7.60E-05	5.50E-04	2.04E-04	5.50E-04	2.30E+00		No(6)
Aldrin	50	1.60E-05	1.60E-05	1.60E-05	1.13E-05	1.60E-05	1.03E+00		No(6)
Anthracene	100		4.00E-04	1.70E-03	8.25E-04	1.70E-03	2.30E+00		No(6)
Benzo(a)anthracene	100		4.30E-03	3.20E-02	1.17E-02	3.20E-02	2.30E+00		No(6)
Benzo(a)pyrene	100		6.50E-03	3.20E-02	1.44E-02	3.20E-02	2.30E+00		No(6)
Benzo(b)fluoranthene	100		1.20E-02	5.30E-02	2.52E-02	5.30E-02	2.30E+00		No(6)
Benzo(e)pyrene	100		6.90E-03	2.60E-02	1.34E-02	2.60E-02	2.30E+00		No(6)
Benzo(g,h,i)perylene	100		6.80E-03	2.30E-02	1.25E-02	2.30E-02	2.30E+00		No(6)
Benzo(k)fluoranthene	100		3.20E-03	1.70E-02	7.38E-03	1.70E-02	2.30E+00		No(6)
Chrysene	100		7.20E-03	3.40E-02	1.56E-02	3.40E-02	2.30E+00		No(6)
Chrysenes, C1-alky	100		4.80E-03	1.20E-02	7.59E-03	1.20E-02	2.30E+00		No(6)
Chrysenes, C2-alky	100		5.70E-03	6.50E-03	6.09E-03	6.50E-03	2.30E+00		No(6)
Chrysenes, C3-alky	100		3.90E-03	5.90E-03	4.80E-03	5.90E-03	2.30E+00		No(6)
Chrysenes, C4-alky	100		1.20E-03	4.80E-03	2.40E-03	4.80E-03	2.30E+00		No(6)
Dibenzo(a,h)anthracene	100		1.40E-03	5.40E-03	2.75E-03	5.40E-03	2.30E+00		No(6)
Dibenzothiophene	100		6.20E-05	4.70E-04	1.71E-04	4.70E-04	2.30E+00		No(6)
Dibenzothiophenes, C1-alky	100		8.20E-05	3.30E-04	1.64E-04	3.30E-04	2.30E+00		No(6)
Dibenzothiophenes, C2-alky	50	1.70E-04	3.70E-04	3.70E-04	1.77E-04	3.70E-04	2.30E+00		No(6)
Dibenzothiophenes, C3-alky	50	1.70E-04	1.70E-04	1.70E-04	1.20E-04	1.70E-04	2.30E+00		No(6)
Fluoranthene	100		6.00E-03	4.10E-02	1.57E-02	4.10E-02	2.30E+00		No(6)
Fluoranth+Pyr, C1-alky	100		3.30E-03	1.30E-02	6.55E-03	1.30E-02	2.30E+00		No(6)
Fluoranth+Pyr, C2-alky	100		4.90E-03	1.20E-02	7.67E-03	1.20E-02	2.30E+00		No(6)
Fluoranth+Pyr, C3-alky	100		3.30E-03	3.80E-03	3.54E-03	3.80E-03	2.30E+00		No(6)
Fluorene	100		4.00E-05	1.40E-04	7.48E-05	1.40E-04	2.30E+00		No(6)
Fluorenes, C1-alky	100		1.20E-04	1.60E-04	1.39E-04	1.60E-04	2.30E+00		No(6)

Table 29.6-1
Surface Soil CPEC Selection - Site 98

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Hexachlorobenzene	100		1.50E-05	2.30E-05	1.86E-05	2.30E-05			YES
Indeno(1,2,3-cd)pyrene	100		6.60E-03	2.60E-02	1.31E-02	2.60E-02	2.30E+00		No(6)
Naphthalenes, C2-alky	100		1.70E-04	3.20E-04	2.33E-04	3.20E-04	2.30E+00		No(6)
PCB-66	50	1.40E-05	7.10E-05	7.10E-05	2.23E-05	7.10E-05	1.24E-01		No(6)
PCB-101	50	1.10E-05	1.70E-04	1.70E-04	3.06E-05	1.70E-04	1.24E-01		No(6)
PCB-105	100		1.10E-04	1.60E-04	1.33E-04	1.60E-04	1.24E-01		No(6)
PCB-118	100		5.60E-04	6.60E-04	6.08E-04	6.60E-04	1.24E-01		No(6)
PCB-128	100		2.00E-04	5.60E-04	3.35E-04	5.60E-04	1.24E-01		No(6)
PCB-138	100		8.90E-04	1.10E-03	9.89E-04	1.10E-03	1.24E-01		No(6)
PCB-153	100		1.50E-03	1.90E-03	1.69E-03	1.90E-03	1.24E-01		No(6)
PCB-170	50	5.70E-05	1.00E-03	1.00E-03	1.69E-04	1.00E-03	1.24E-01		No(6)
PCB-180	100		5.70E-04	6.20E-04	5.94E-04	6.20E-04	1.24E-01		No(6)
PCB-187	100		4.00E-04	5.60E-04	4.73E-04	5.60E-04	1.24E-01		No(6)
PCB-195	50	1.20E-05	9.40E-05	9.40E-05	2.37E-05	9.40E-05	1.24E-01		No(6)
PCB-206	50	1.00E-05	7.70E-05	7.70E-05	1.96E-05	7.70E-05	1.24E-01		No(6)
PCB-209	50	1.20E-05	9.40E-05	9.40E-05	2.37E-05	9.40E-05	1.24E-01		No(6)
Perylene	100		1.80E-03	9.60E-03	4.16E-03	9.60E-03	2.30E+00		No(6)
Phenanthrene	100		1.20E-03	8.20E-03	3.14E-03	8.20E-03	2.30E+00		No(6)
Phenanth+Anthra., C1-alky	100		5.80E-04	2.80E-03	1.27E-03	2.80E-03	2.30E+00		No(6)
Phenanth+Anthra., C2-alky	100		5.40E-04	1.80E-03	9.86E-04	1.80E-03	2.30E+00		No(6)
Phenanth+Anthra., C3-alky	100		5.90E-04	1.30E-03	8.76E-04	1.30E-03	2.30E+00		No(6)
Phenanth+Anthra., C4-alky	100		1.90E-03	7.90E-03	3.87E-03	7.90E-03	2.30E+00		No(6)
Pyrene	100		5.80E-03	3.70E-02	1.46E-02	3.70E-02	2.30E+00		No(6)
trans-Nonachlor	100		2.80E-04	4.80E-04	3.67E-04	4.80E-04			YES

*TBC values are NOAEL dietary concentrations assuming a diet of 100% soil, from Opresko et. al. (1994) ; values for B(a)P were substituted for PAHs without a dose in Opresko, and the value for Arochlor 1248 was substituted for all the PCB congeners.
**Mean value of background surface soil samples taken on Sand Island.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 29.6-2
Subsurface Soil CPEC Selection - Site 98

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (mg/kg)	Range of detected Concentrations Minimum (mg/kg)	Range of detected Concentrations Maximum (mg/kg)	Mean Concentration (mg/kg)	Environmental Concentration (EC) (mg/kg)	TBC Values* (mg/kg)	Background Concentration** (mg/kg)	CPEC?
Inorganic									
Barium	100		5.00E+00	5.40E+00	5.21E+00	5.36E+00	3.85E+01	8.19E+00	No(5)
Beryllium	66.7		1.90E-01	3.00E-01	2.68E-01	3.00E-01	3.41E+00	2.64E-01	No(5)
Cadmium	83.3	4.00E-02	5.00E-02	8.00E-02	4.93E-02	7.31E-02	5.63E+00	6.15E-02	No(5)
Calcium	100		3.10E+05	3.32E+05	3.22E+05	3.30E+05		2.76E+05	No(3)
Chromium	33.3		6.90E+00	7.00E+00	3.65E+00	6.07E+00	3.99E+00	6.09E+00	No(5)
Iron	100		7.10E+00	1.04E+01	8.73E+00	9.99E+00		3.36E+01	No(p)
Magnesium	100		1.53E+04	1.79E+04	1.62E+04	1.72E+04		1.72E+04	No(3)
Manganese	66.7		3.30E+00	4.10E+00	2.81E+00	4.10E+00	4.54E+02	7.21E+00	No(5)
Potassium	100		4.23E+01	8.00E+01	5.23E+01	6.59E+01		6.52E+01	No(3)
Selenium	33.3		1.90E+00	2.20E+00	1.31E+00	1.88E+00	1.85E+00	1.83E+00	No(5)
Silver	66.7	1.40E+00	1.50E+00	2.00E+00	1.28E+00	2.00E+00		8.61E-01	No(5)
Sodium	100		2.41E+03	2.74E+03	2.57E+03	2.70E+03		2.68E+03	No(3)
Vanadium	16.7	6.50E-01	1.30E+00	1.30E+00	5.06E-01	9.18E-01	4.44E+01	1.58E+00	No(5)
Organic									
(Meta+Para)-Xylene	33.3	1.00E-03	2.00E-03	2.00E-03	7.94E-04	1.70E-03			YES
1,2-Dichloroethane	16.7	1.00E-03	3.00E-03	3.00E-03	6.74E-04	1.64E-03	7.45E+01		No(6)
Acetone	50	1.10E-02	9.00E-03	1.30E-02	7.73E-03	1.14E-02	5.16E+01		No(6)
bis(2-Ethylhexyl)phthalate	16.7	3.60E-01	5.30E-02	5.30E-02	1.50E-01	5.30E-02	2.22E+00		No(1)
Methylene Chloride	33.3	5.00E-03	2.00E-03	3.00E-03	3.54E-03	3.00E-03	3.02E+01		No(6)
Phenol	16.7	3.60E-01	1.10E-01	1.10E-01	1.73E-01	1.10E-01			YES
Tetrachloroethene	16.7	1.00E-03	1.00E-03	1.00E-03	5.61E-04	7.70E-04			YES
Toluene	16.7	2.00E-03	2.00E-03	2.00E-03	1.12E-03	1.52E-03	5.96E+01		No(6)
Trichloroethene	16.7	1.00E-03	1.00E-03	1.00E-03	5.61E-04	7.70E-04			YES

*TBC values are NOAEL dietary concentrations assuming a diet of 100% soil, from Opresko et. al. (1994) ; values for B(a)P were substituted for PAHs without a dose in Opresko, and the value for Arochlor 1248 was substituted for all the PCB congeners.
**Mean value of background subsurface soil samples taken on Sand Island.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 29.6-3
Groundwater CPEC Selection - Site 98

Analyte	Frequency of Detection (%)	Minimum Undetected Concentration (ug/l)	Range of detected Concentrations Minimum (ug/l)	Range of detected Concentrations Maximum (ug/l)	Mean Concentration (ug/l)	Environmental Concentration (EC) (ug/l)	ARAR Values* (ug/l)	Background Concentration** (ug/l)	CPEC?
Inorganic									
Arsenic	100		3.20E+01	4.09E+01	3.62E+01	4.09E+01	3.60E+01	3.90E+00	YES
Cadmium	50	2.00E-01	3.30E-01	3.30E-01	1.82E-01	3.30E-01	9.30E+00	1.68E-02	No(6)
Calcium	100		2.08E+05	3.45E+05	2.68E+05	3.45E+05		2.08E+05	No(3)
Copper	50	6.60E+00	2.73E+00	2.73E+00	3.00E+00	2.73E+00	2.90E+00	1.22E+00	No(6)
Iron	100		5.70E+02	9.29E+02	7.28E+02	9.29E+02	1.00E+03	4.74E+02	No(p)
Magnesium	100		2.78E+05	2.93E+05	2.86E+05	2.93E+05		1.10E+05	No(3)
Manganese	50	4.00E+00	6.07E+00	6.07E+00	3.48E+00	6.07E+00	1.10E+01	5.89E+00	No(5)
Potassium	100		5.86E+04	6.03E+04	5.94E+04	6.03E+04		2.50E+04	No(3)
Sodium	100		1.52E+06	1.57E+06	1.54E+06	1.57E+06		1.57E+04	No(3)
Thallium	50	2.30E+00	2.31E+00	2.31E+00	1.63E+00	2.31E+00	4.00E+01	3.75E-02	No(6)

*The lowest marine chronic value from the NAWQC and HWQC was used when available, then freshwater chronic and freshwater and marine acute values were used if no chronic numbers were listed. For PAHs with no NAWQC or HWQC the value for Fluoranthene (16 ug/L) was used.
**Mean value of background ground water samples taken on Sand Island.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common laboratory contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concentration
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 29.6-4
CPEC Environmental Concentrations in all Abiotic Media - Site 98

Analyte	EC (mg/kg) Surface Soil	EC (mg/kg) Subsurface Soil	EC (mg/L) Groundwater
Inorganic			
Arsenic			4.09E-02
Organic			
(Meta+Para)-Xylene		1.70E-03	
Hexachlorobenzene	2.30E-05		
Phenol		1.10E-01	
Tetrachloroethene		7.70E-04	
trans-Nonachlor	4.80E-04		
Trichloroethene		7.70E-04	

Blanks indicate that the analyte was not chosen as a CPEC for that medium

Table 29.6-5
Target Receptor Exposure Point Values - Site 98

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Ground-nesting Bird (Laysan albatross)			Burrowing Bird (Bonin petrel)				Shorebird (golden-plover)	
	dermal (mg/kg-d)	ingestion (mg/kg-d)	EPV_{gn} (mg/kg-d)	dermal (mg/kg-d)	ingestion (mg/kg-d)	vapor (mg/kg-d)	EPV_{bb} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{sb} (mg/kg-d)
Organic									
(Meta+Para)-Xylene	ND	ND	ND	2.46E-04	1.60E-06	6.36E-06	2.54E-04	ND	ND
Hexachlorobenzene	1.19E-06	7.40E-09	1.20E-06	ND	ND	ND	ND	1.38E-06	1.38E-06
Phenol	ND	ND	ND	1.59E-02	1.03E-04	DG	1.60E-02	ND	ND
Tetrachloroethene	ND	ND	ND	1.12E-04	7.23E-07	1.59E-05	1.28E-04	ND	ND
trans-Nonachlor	2.48E-05	1.54E-07	2.50E-05	ND	ND	ND	ND	DG	DG
Trichloroethene	ND	ND	ND	1.12E-04	7.23E-07	2.24E-05	1.35E-04	ND	ND

ND = not detected/not selected as CPEC
DG = data gap; no parameter available for exposure calculation

Table 29.6-6
Toxicity Quotients for Target Receptors - Site 98

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Ground-nesting Bird (Laysan albatross)			Burrowing Bird (Bonin petrel)			Shorebird (golden-plover)		
	EPV	TRV	TQ*	EPV	TRV	TQ*	EPV	TRV	TQ*
Organic									
(Meta+Para)-Xylene	ND	2.06E-01		2.54E-04	2.06E-01		ND	2.06E-01	
4,4'-DDE	ND	3.00E-02		ND	3.00E-02		ND	3.00E-02	
Hexachlorobenzene	1.20E-06	1.00E+00		ND	1.00E+00		1.38E-06	1.00E+00	
Phenol	ND	6.00E+00		1.60E-02	6.00E+00		ND	6.00E+00	
Tetrachloroethene	ND	2.00E+00		1.28E-04	2.00E+00		ND	2.00E+00	
trans-Nonachlor	2.50E-05	1.20E+00		ND	1.20E+00		DG	1.20E+00	DG
Trichloroethene	ND	1.54E+00		1.35E-04	1.54E+00		ND	1.54E+00	

* TQ = log(EPV/TRV); only data gaps (DG) and TQ values greater than or equal to 0 are shown

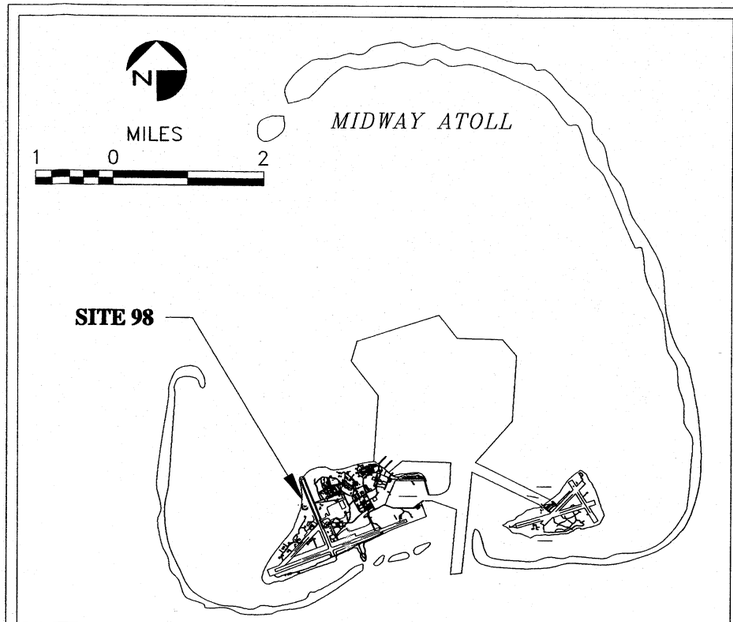
ND = not detected/not selected as CPEC

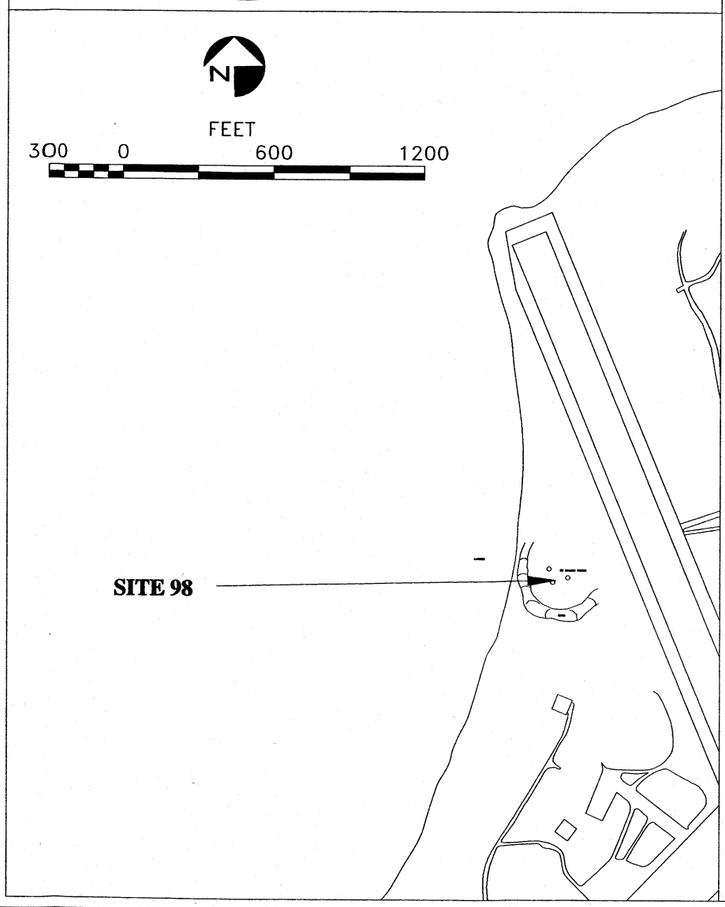
DG = data gap; no parameter available for exposure calculation

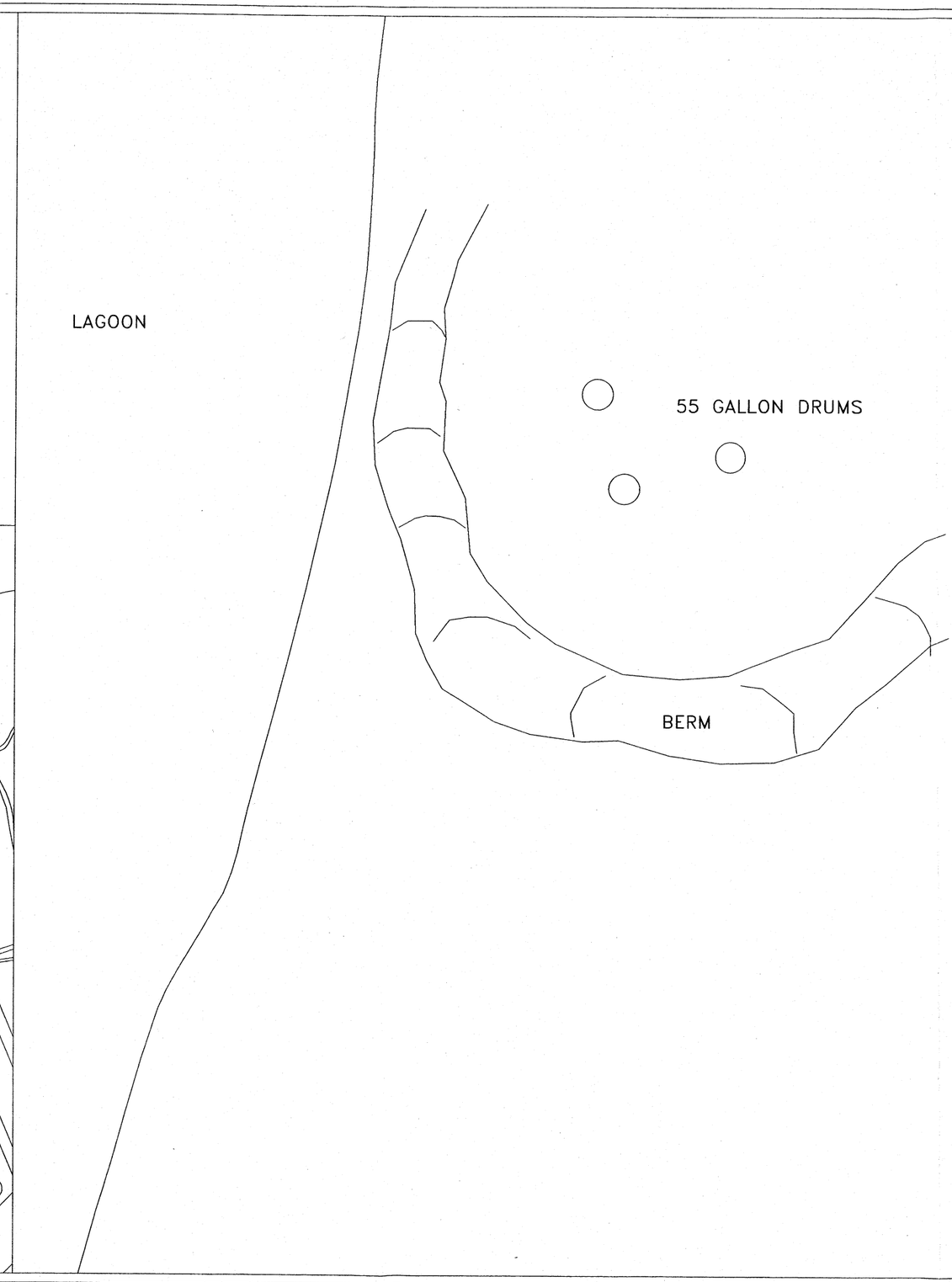
Table 29.6-7
Risk Description (Weight-of-Evidence) Summary - Site 98

ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
• Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
No probability for acute or chronic adverse affects in any individuals of special status bird species from direct and/or secondary exposure to site-related CPEC.							YES
• Impairment of reproduction in ground-nesting birds	CPEC present in surface soils						
• Impairment of reproduction in burrowing birds	CPEC present in subsurface soils						
• Impairment of reproduction in shorebirds	CPEC present in surface soils						

Figures
Section 29







LEGEND

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING ENGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE98\05179560.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

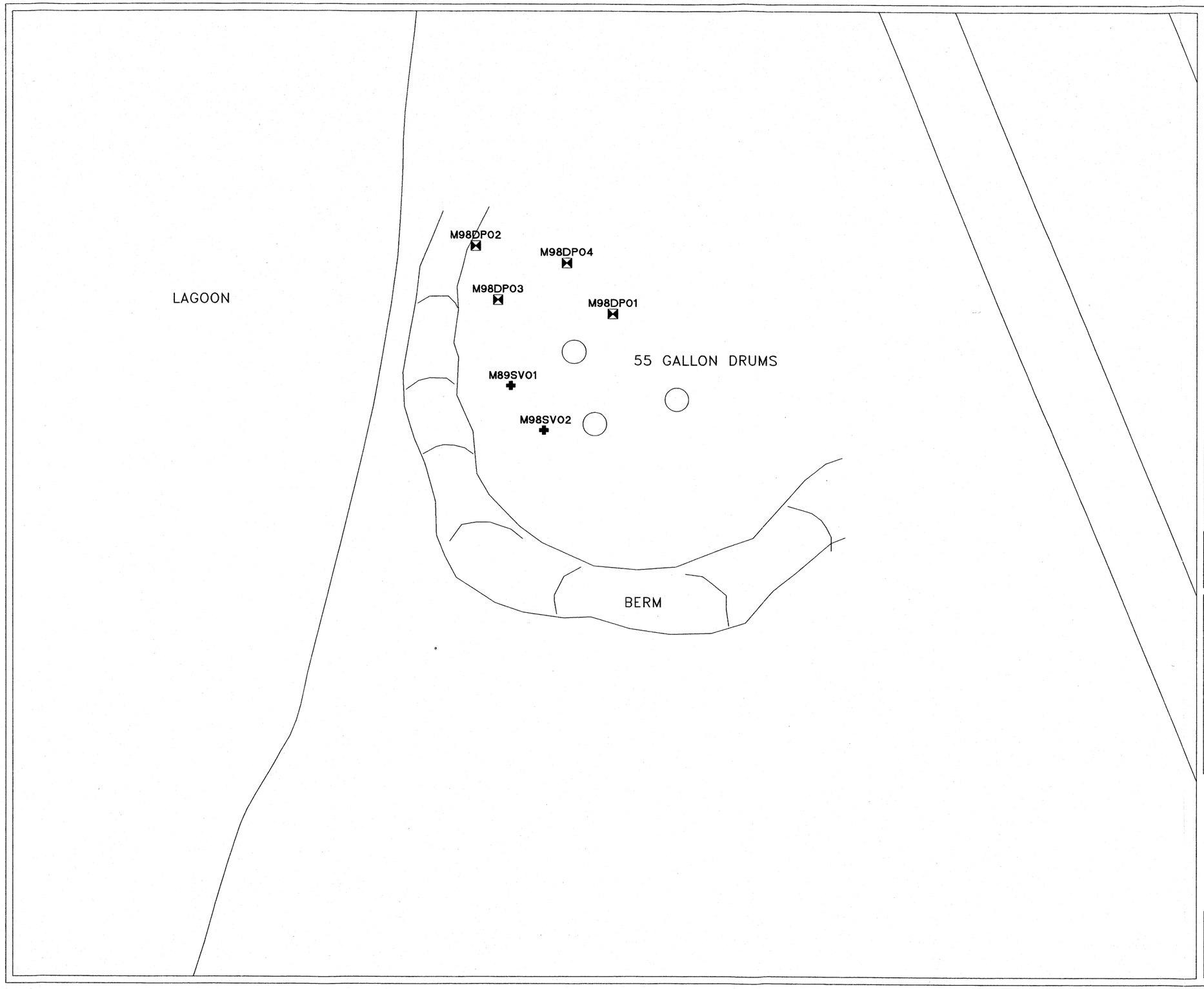
TITLE

NORTHWEST DRUM DISPOSAL AREA
(SITE 98)
SAND ISLAND

N
FEET
50 0 100 200

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
29.1-1



LEGEND

M##DP## — DIRECT PUSH SAMPLE LOCATION AND IDENTIFICATION NUMBER

M##SV## — SOIL VAPOR SAMPLE LOCATION AND IDENTIFICATION NUMBER

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING ENGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
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5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE98\05179561.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

DIRECT PUSH AND SOIL VAPOR SAMPLE LOCATIONS (SITE 98) SAND ISLAND

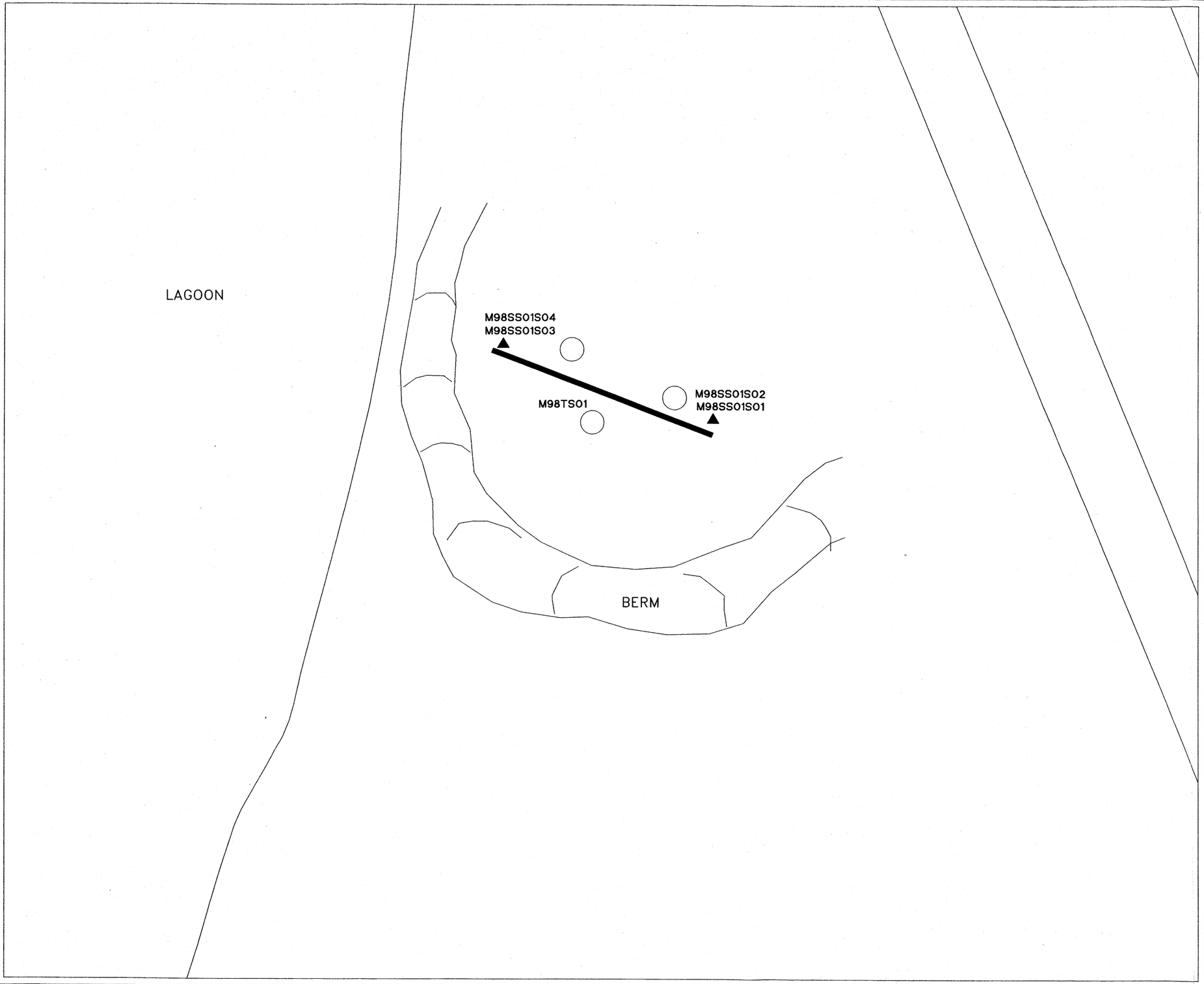
N

FEET
50 0 100 200

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE

29.2-1



LEGEND

M##SS## — SURFACE SOIL SAMPLE LOCATION AND IDENTIFICATION NUMBER

M##TS## — TRENCH LOCATION AND IDENTIFICATION NUMBER

55 GALLON DRUM

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE98\05179563.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

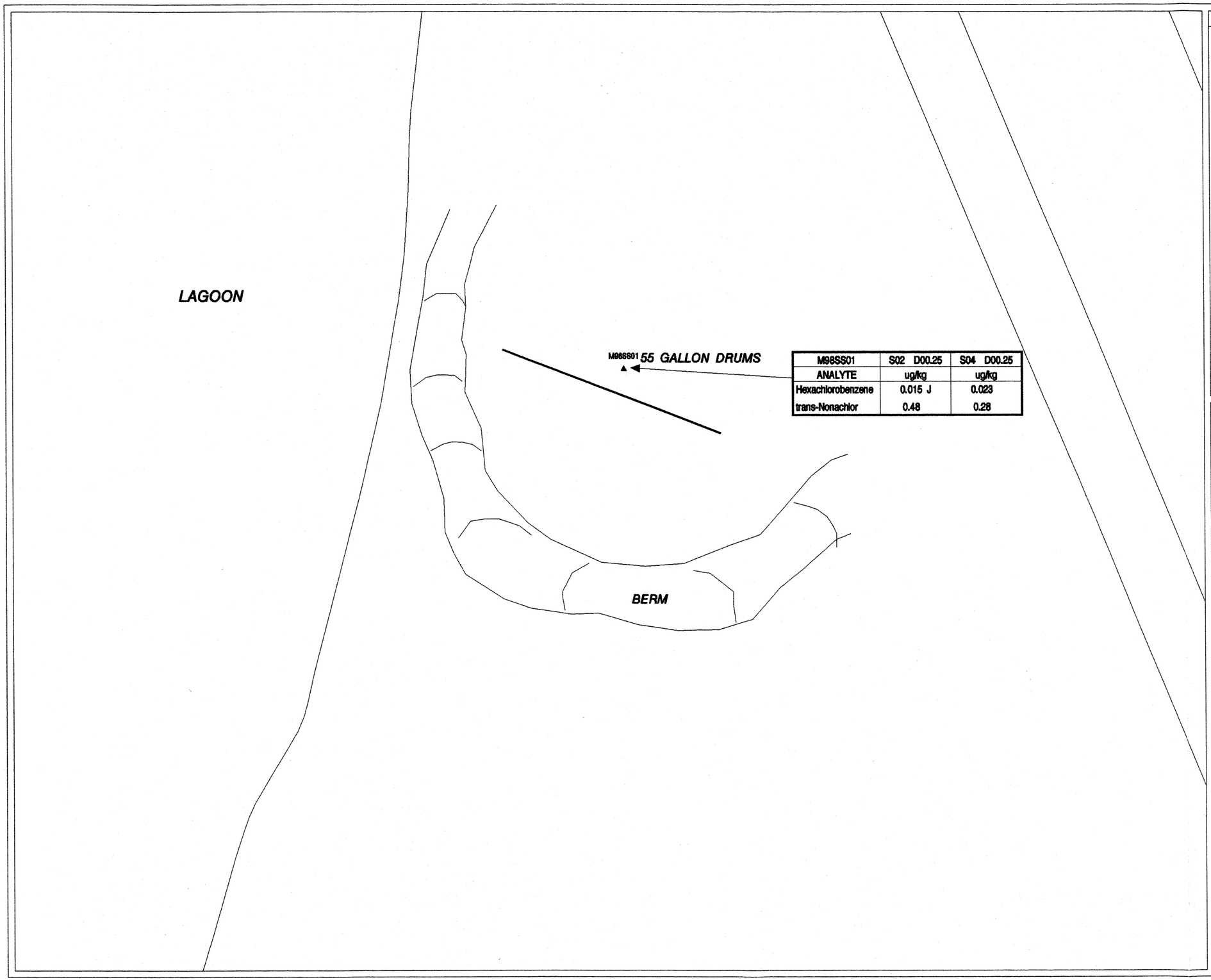
SURFACE SOIL AND TRENCH SAMPLE LOCATIONS (SITE 98) SAND ISLAND

N

FEET
50 0 100 200

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
29.2-2



M98SS01	S02 D00.25	S04 D00.25
ANALYTE	ug/kg	ug/kg
Hexachlorobenzene	0.015 J	0.023
trans-Nonachlor	0.48	0.28

LEGEND

▲	SURFACE SOIL SAMPLE LOCATION
M98SS02	OGDEN SAMPLE ID
0.023	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY
—	TRENCH LOCATION

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-3, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appe/hm/cto136/mape/m5179566

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038657

TITLE

LOW LEVEL PESTICIDES AND PCB'S DETECTED IN SURFACE SOIL SAMPLES (SITE 98) SAND ISLAND

N

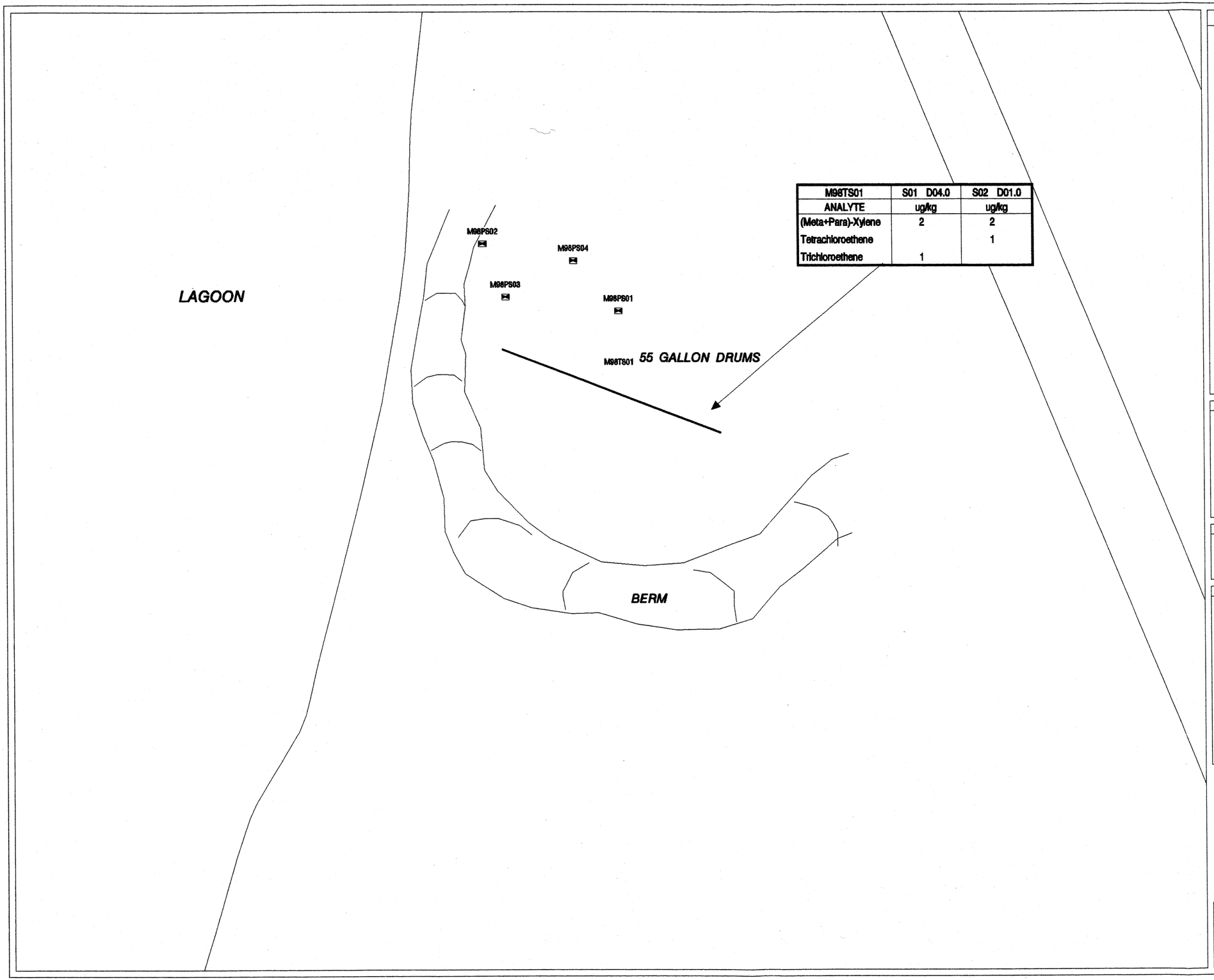
FEET

0 50 100 200 300

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	BH

FIGURE

29.5-1



M98TS01	S01 D04.0	S02 D01.0
ANALYTE	ug/kg	ug/kg
(Meta+Para)-Xylene	2	2
Tetrachloroethene		1
Trichloroethene	1	

LEGEND

⧓	DIRECT PUSH SOIL SAMPLE LOCATION
▬	TRENCH SAMPLE LOCATION
M98TS02	OGDEN SAMPLE ID
2	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appe/hm/cto135/maps/m5179568

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

VOLATILE ORGANIC COMPOUNDS DETECTED IN SUBSURFACE SOIL SAMPLES (SITE 98) SAND ISLAND

N

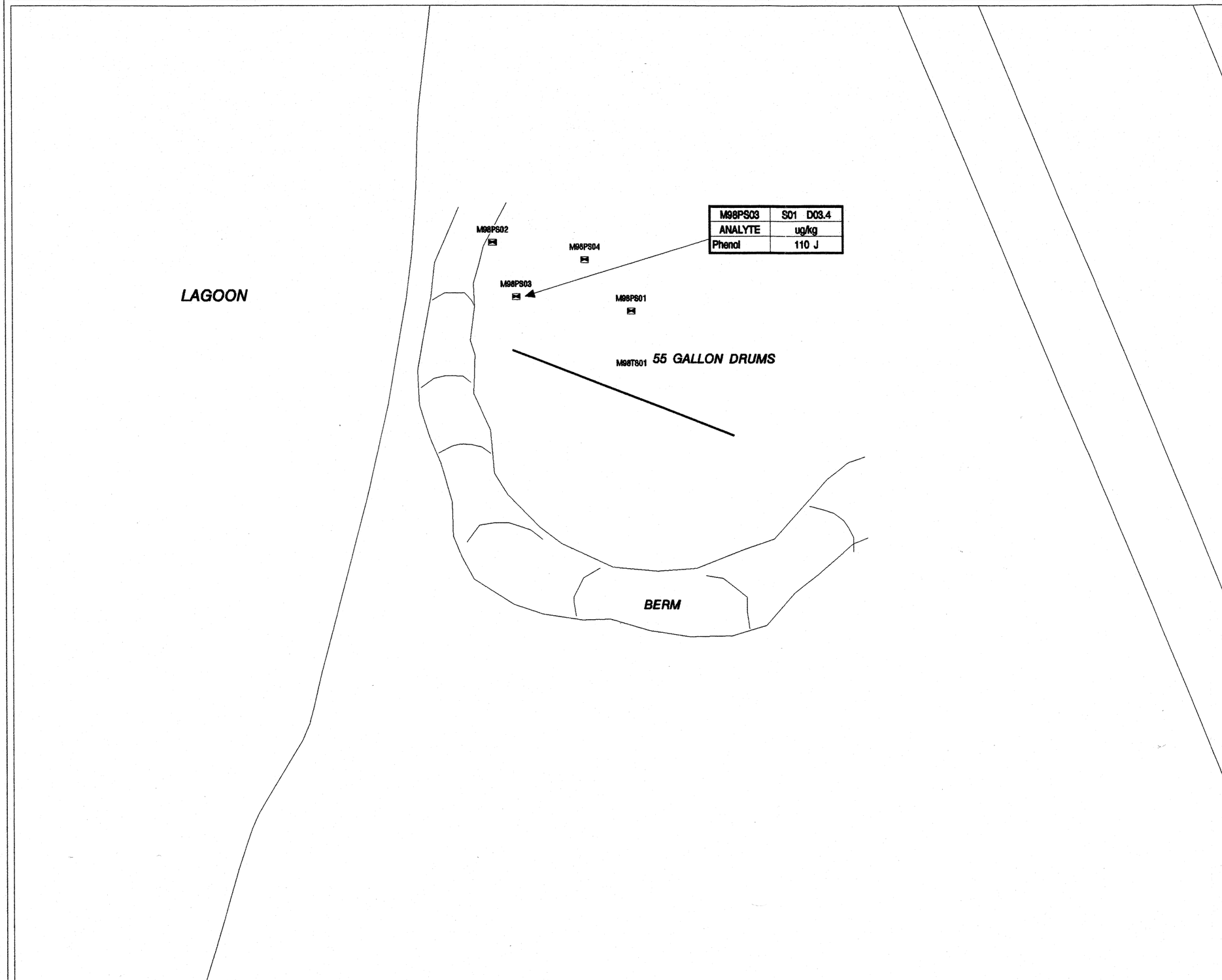
FEET

0 50 100 200 300

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HPF	HPF	JMC	JMC

FIGURE

29.5-2



M98PS03	S01 D03.4
ANALYTE	ug/kg
Phenol	110 J

LEGEND

⧗	DIRECT PUSH SAMPLE LOCATION
—	TRENCH SAMPLE LOCATION
M98PS02	OGDEN SAMPLE ID
110	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appe/hm/cto136/maps/m5179560

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

SEMIVOLATILE ORGANIC COMPOUNDS DETECTED IN SUBSURFACE SOIL SAMPLES (SITE 98) SAND ISLAND

N

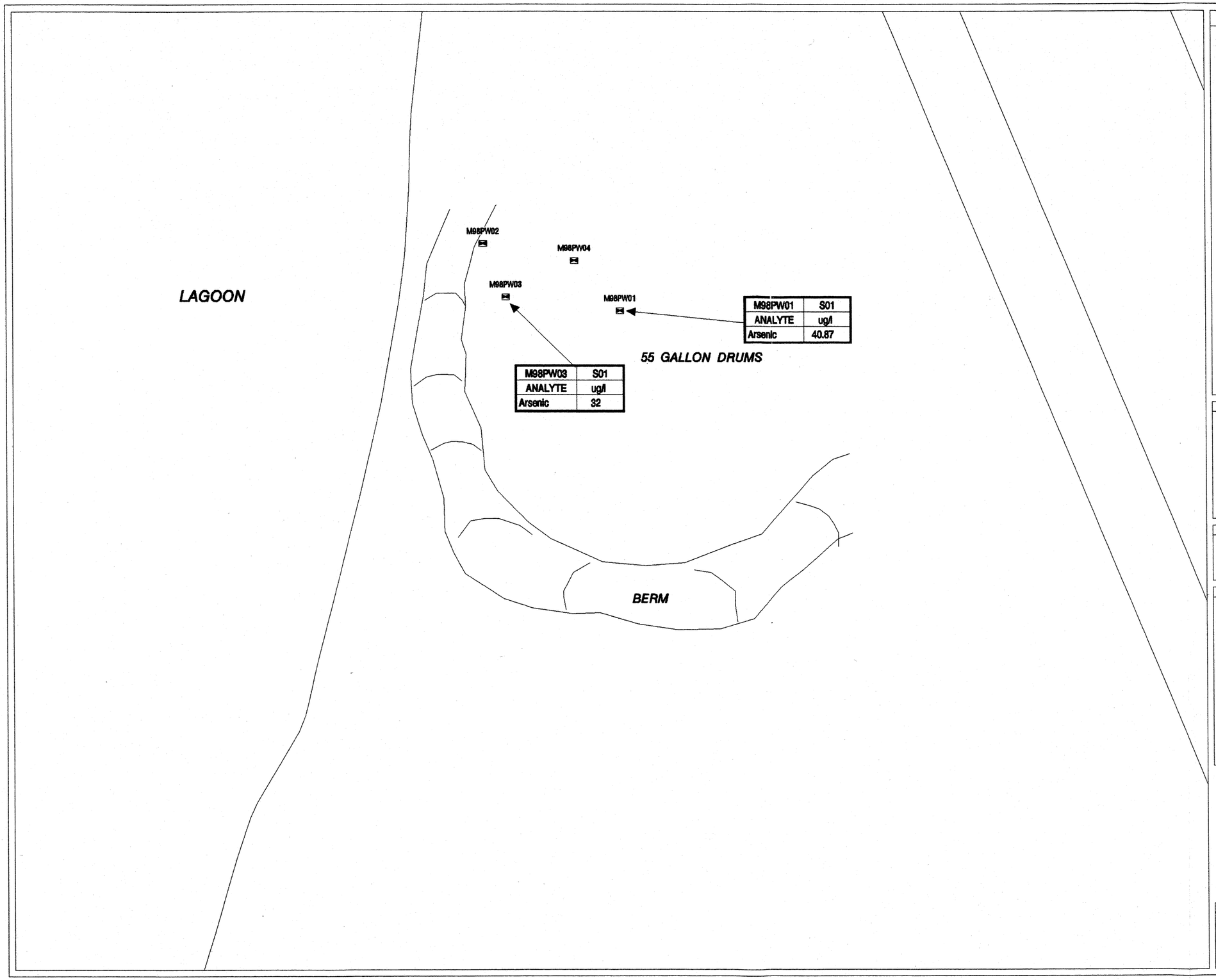
FEET

0 50 100 200 300

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

29.5-3



LEGEND

⊠	DIRECT PUSH SAMPLE LOCATION
M98PW02	OGDEN SAMPLE ID
40.87	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E8-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/tum/cto136/mapa/m6179573

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038657

TITLE

METAL CONCENTRATIONS DETECTED IN GROUNDWATER SAMPLES (SITE 98) SAND ISLAND

N

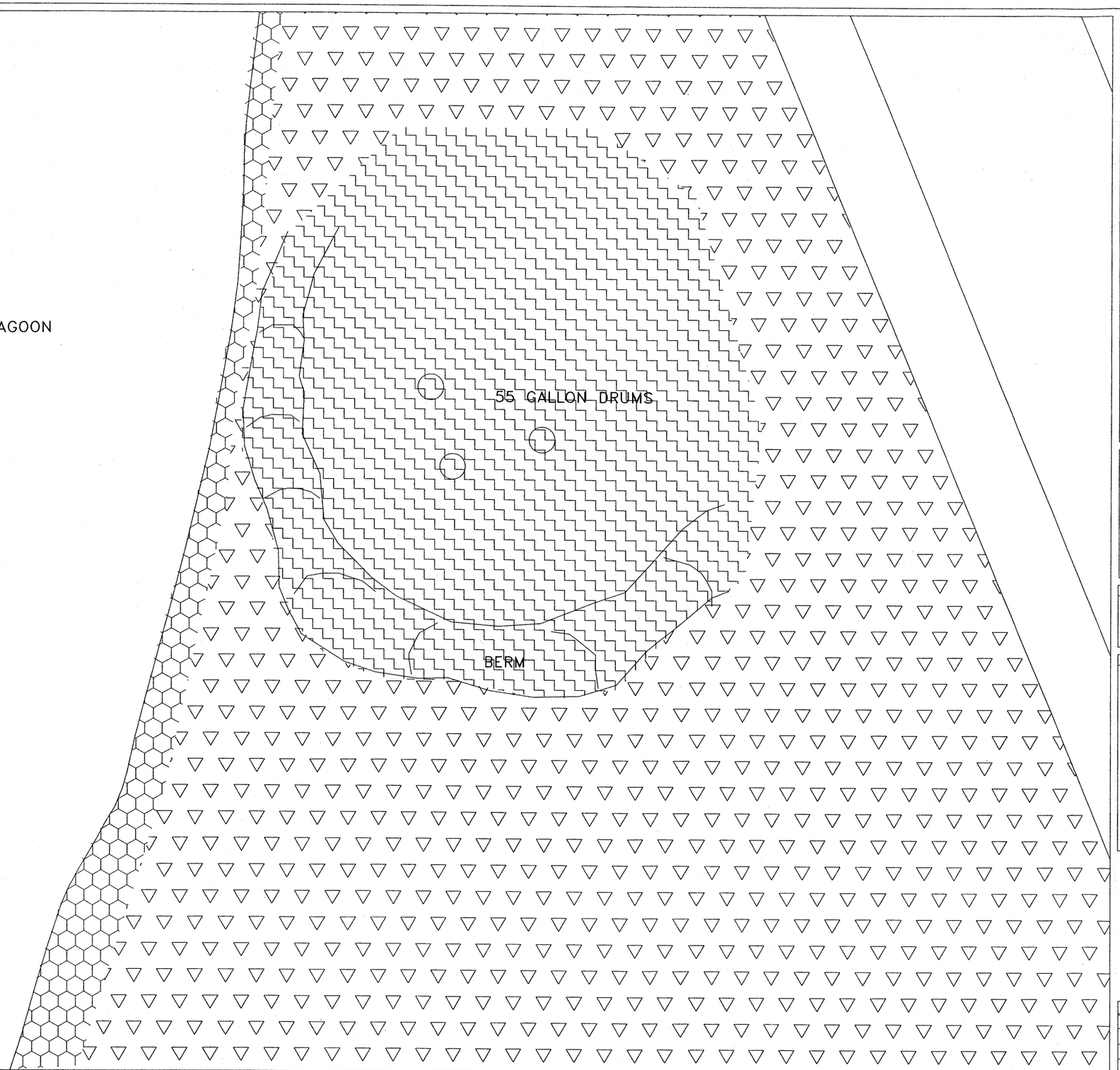
FEET

0 50 100 200 300

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	CMF	HFP	HFP	JMC	JMC

FIGURE

29.5-4



LEGEND

- NON-NATIVE HERB HABITAT
- CASUARINA FOREST
- DISTURBED HABITAT
- COASTAL STRAND
- SANDY BEACH
- RUDERAL HABITAT
- NON-NATIVE HERB/SMALL CASUARINA TREES
- DEVELOPED

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5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE98\05179577.DWG DATE: 5-17-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

VEGETATION COMMUNITIES
(SITE 98)
SAND ISLAND

N

FEET
50 0 100 200

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
29.6-1

Section 30

SECTION 30
INNER HARBOR (SITE 99)

This report describes the results of the SI field work conducted intermittently from August through November 1994 at the Inner Harbor, Sand Island (Site 99). The purpose of the review was to determine whether Site 99 received hazardous substances, and to assess the likelihood for soil and ground-water contamination at the Site. A discussion of the work conducted during the SI, along with findings, conclusions, and recommendations, is presented below.

The report for Site 99 is organized as follows: Site background information is documented in Section 30.1; a description of SI field sampling activities is presented in Section 30.2; methods used for sample analysis are summarized in Section 30.3; physical characteristics of the Site observed during the investigation activities are discussed in Section 30.4; a summary of analytical results is presented in Section 30.5; the SERA is described in Section 30.6; and conclusions and recommendations for the Site are presented in Section 30.7.

30.1 BACKGROUND INFORMATION

Site 99 consists of the underwater environment within the Inner Harbor (located at the eastern end of Sand Island [Figure 30.1-1]). The Site was added to the study plan after it was reported that wastes, particularly lead-acid batteries, were discarded in the harbor. Reconnaissance efforts concentrated on the north side of the harbor near the three finger piers (each about 60 feet long) on the west side, and the single tug boat pier (about 150 feet long) on the east. A small pile containing three or four batteries and several individual batteries were discovered to the east of the finger piers during an underwater survey that extended 100 feet out into the harbor from the quay wall. Other objects noted during the reconnaissance included tires, metal 55-gallon drums, concrete blocks, anchors, sheet metal, and a large (approximately 60 ft) sunken barge. Potential contaminant sources and associated analytical categories are summarized in Table 30.1-1.

Table 30.1-1

**POTENTIAL CHEMICAL CONTAMINANTS
INNER HARBOR
SITE 99**

Waste Type	Years of Disposal	Potential Chemical Constituents	Analytical Category
Batteries, Unknown	Unknown	Waste Fuels and Oils, Metals (Pb, Cd, Cr, Ni, Hg)	Semi Volatile Organic Compounds, Organochlorine Pesticides, PCBs, Metals

30.2 Sampling Methods and Locations

Marine reconnaissance and sampling programs were completed to evaluate the impact of potential contaminant sources on the subaqueous environment (Figure 30.2-1). Paired transects were completed to identify habitats and species and to estimate numbers and coverage of species. Lists of species observed at each Site are included in Appendix A. Two marine sediment samples were collected for chemical analysis, infaunal analysis, and toxicity testing. No tissue or water samples were collected at this Site.

Reconnaissance efforts included creating a grid pattern and systematically diving at 31 locations throughout the Inner Harbor. A 3,350 ft^2 circle was surveyed by divers at each location to find and identify other battery disposal sites. No evidence of other battery disposal sites was found in the Inner Harbor during these searches. A horizontal sediment sample, a QC duplicate horizontal sediment sample, and cores for infaunal analysis were collected near a battery pile adjacent to the quay.

30.3 Analytical Methods

Two marine sediment samples were analyzed at the special analytical laboratory for SVOCs, PCBs, metals, and pesticides by low-level methods, and for total organic carbon. The samples and the associated analytical methods are listed in Table 30.3-1.

30.4 PHYSICAL CHARACTERISTICS

The Inner Harbor is about 2,000 feet long (east-west) and 1,500 feet wide (north-south). The central part is approximately 35 feet deep. The substrate is sand with coral rubble.

30.5 SUMMARY OF ANALYTICAL RESULTS

The sections and tables below summarize the results of laboratory analyses performed on Site 99 samples. Tables 30.5-1 and 30.5-2 give analytical results for organic and inorganic contaminants in marine sediment samples.

The tables list the analytical methods, the number of detects, the total number of samples, the number of samples rejected during data validation, the minimum undetected concentration, the maximum undetected concentration, the minimum detected concentration, the maximum detected concentration, and the sample with the maximum concentration. Analytical results for all samples and analytes are contained in Appendix L. Complete CLP and low-level analytical data are available at PACNAVFACENGCOM offices at Pearl Harbor, Hawaii.

30.5.1 Marine Sediment

Maximum concentrations of one of the seven pesticides and eight of the twelve metals detected by low-level methods in the marine sediment samples were above mean Sand Island background levels. Eleven PCB congeners were detected; PCB-187 was the congener with the highest concentration at 4.2 μg/kg. The pesticide with the maximum concentration was 4,4'-DDD at 1.3 μg/kg. The highest lead concentration detected was 47.5 mg/kg. A total of 32 SVOCs were detected at concentrations exceeding background levels established for marine sediments. Benzo(b)fluoranthene was the SVOC with the highest concentration, 440 μg/kg. Figures 30.5-1 and 30.5-2 depict the marine sediment sampling locations with pesticide/PCB and metals concentrations.

30.6 SCREENING ECOLOGICAL RISK ASSESSMENT

30.6.1 Problem Formulation

Tasks to be accomplished during Problem Formulation include (a) developing a Site description based on current Site investigations, existing literature, any prior preliminary assessments, and Site history; (b) identifying potential stressors, exposure pathways, and ecological receptors (habitats and species); (c) discussing the nature of adverse effects associated with a given stressor; (d) defining ecologically appropriate assessment and measurement endpoints; and (e) making an initial evaluation of risks posed by the Site.

For a Site to present the potential for risk, it must exhibit the following three criteria: contain stressors in abiotic media at detectable and biologically significant concentrations, provide exposure pathways linking stressors to ecological receptors, and have ecological receptors (those associated with assessment endpoints) that either utilize the Site, are present nearby, or are in range of stressors migrating from the Site. If Problem Formulation determines that one or more of these criteria are absent, the Site is recommended for NFA and the risk assessment is concluded at this point. If all criteria are met, then completion of the SERA process is required.

30.6.1.1 Site Description

The Inner Harbor was surveyed for the presence of batteries using a grid with 325 foot centers. Bounce dives were made at the intersection of the perpendicular lines where a 32.5 foot radius arc was swum. Most of the bounce dives did not locate any batteries; however, a battery pile was found 3-6.5 feet from the northern harbor quay wall between the eastern quay wall separating the harbor and the lagoon and the easternmost finger pier at a depth of 10 feet. The substrate was comprised of 50 percent sand and 50 percent rubble mixed with sand, with coral rubble and outcroppings. The substrate was located in a 50-foot wide band along the quay wall (depth from about 10-16 feet). Approximately 50 feet away from the quay wall, the bottom sloped steeply into the harbor reaching a depth of 32.5 feet. The sea floor in this area was fine silt and clay.

30.6.1.2 Stressor Identification

Because of the early availability of chemical analysis data, ECs were computed and CPECs were identified at this point in the SERA process, using the methods previously described in Sections 4.3.1.1.1 and 4.3.1.1.2. Chemical data for marine sediment, summarized in Table 30.6-1, indicate the principal CPECs include metals (e.g., copper, lead, manganese, mercury, thallium, and tin), pesticides, and various PCB congeners.

30.6.1.3 Potential Ecological Effects

CPECs that may adversely effect receptors onsite are copper, lead, manganese, mercury, thallium, tin, hexachlorobenzene, lindane, mirex, photomirex, and 11 PCB congeners. CPEC physicochemical properties and toxicology, as they relate to potential exposure routes and sensitive ecological receptors, are summarized in Section 4.2.3 and described in detail in Appendix J.

30.6.1.4 Ecological Receptor Identification

Each of the substrates identified in the Inner Harbor had different biota associated with them. The coral rubble and outcroppings adjacent to the quay wall provided a habitat for the algae *Dictyota acutiloba* and *Caulerpa serrulata*; two corals, *Pocillopora* spp. and *Porites* spp.; and the sea urchin, *Echinometra mathaei*. In the deeper area, large plants (about 8 inches tall) of the calcareous green alga *Halimeda opuntia* were present. Few animals were associated with the deeper area. Burrows up to 4 inches in diameter were observed on the sea floor; these possibly are indicative of mantis shrimp (*Stomatopoda*). Fish species observed onsite include those species associated with coral rubble (Section 2.0).

The primary ecological receptors in the Inner Harbor are the Pacific green sea turtle and the Hawaiian monk seal. Turtles are occasionally seen grazing on algae growing in the harbor. Seals have been reported hauled-out on the boat launching ramp. Additional receptors include marine algae, invertebrates, and fishes, which form a food web with the sea turtle and monk seal at the higher trophic levels. Through this food web, CPECs could potentially be biomagnified in tissues of ecological receptors of primary concern.

30.6.1.5 Exposure Pathway Identification

The CSM appropriate to this Site is shown in Figure 4.2-2. The primary contaminant source at this Site is leakage from batteries dropped on the sea floor. The batteries may have leaked, or may soon leak, into the surrounding sediment and overlying water. Contaminants may remain suspended in the marine surface water or may precipitate out into the sediment. Potential exposure routes to marine receptors would include direct contact with contaminated sediment and surface water, ingestion of sediment, and ingestion of contaminated prey.

30.6.1.6 Endpoints

Assessment endpoints #2 and #3 and testable hypotheses appropriate for this Site are listed in Sections 4.2.6.1 and 4.2.6.2, respectively. Measurement endpoints selected for this Site include #3, #4, #6, and #8 listed in Section 4.2.6.3.

30.6.1.7 Summary

Based on the preceding information it was concluded that this Site met the three criteria that indicate the potential for risk and that completion of the SERA process was required.

30.6.2 Exposure Analysis

Exposure was evaluated using the following two approaches:

1. Food chain models were used to estimate exposure (dose) for higher trophic level receptors. Exposure pathway models (c.f., Section 4.3.1.3) applicable to this Site were sea turtles (#4) and monk seals (#5). These exposure pathways and endpoints were evaluated using models described in Section 4.3.1.4. Results of these evaluations are shown in Table 30.6-2.
2. Sediment bioassays were used to provide corroborating evidence as to the potential for bioavailability of contaminants.

Conservative food chain modeling estimated that species at higher trophic levels could receive doses from direct exposure to CPECs in abiotic media, and from secondary exposure to Site-related CPECs that have bioaccumulated in their prey or forage items. Bioassay results further suggest that some Site-related CPECs are bioavailable.

30.6.3 Ecological Effects Analysis

The potential for adverse ecological effects was evaluated using the following three approaches:

1. Sediment bioassays, which considered both chronic (percentage normality [% normal] in sea urchin embryos) and acute (percentage survival [% survival] in sea urchin embryos) endpoints; results are shown in Table 30.6-3
2. Comparison of onsite and reference area benthic infaunal macroinvertebrate communities in terms of presence/absence of specific species, species diversity (H' index), and assemblage evenness (J index) (Table 30.6-4)
3. Literature-derived data on CPEC toxicity with respect to specific target receptors and, when such data were not available, to appropriate surrogate test species (Toxicity reference values are shown in Table 30.6-5 and toxicity profiles for CPECs are provided in Appendix J.)

Sediment bioassay results indicate that mean % normal was significantly less ($P<0.05$) in onsite sediments than in those taken from reference sites, suggesting that sediment-related contaminants have the potential to induce chronic adverse effects in infauna by affecting larval development. Over time, chronic effects could lead to changes in benthic community structure and reduction in prey availability for receptors at higher trophic levels. There was a significant difference ($P<0.05$) in mean % survival between onsite and background samples suggesting that onsite contaminants also have the potential to induce acute adverse effects.

To place the results in perspective, the infaunal community is described by descriptive statistics calculated for infauna sampled at one location (mean of three replicates) and compared to infauna sampled at two reference sites to place the results in perspective (Table 30.6-4).

Table 30.6-4

SITE 99 - INFAUNA SUMMARY STATISTICS

	Number of Individuals Mean	SE	Number of Taxa	Species Diversity (H')	Evenness (J)
Inner Harbor Battery Sampling Location					
M99MI01S01	62.67	9.77	12	0.73	0.68
Shallow Reference Sampling Locations					
M00MI01S01	119.0	6.11	10	0.13	0.13
M00MI02S01	42.7	10.53	8	0.42	0.46

The number of taxa is greater onsite than in the shallow reference samples; diversity and evenness are higher as well. The most abundant taxon was the annelid family Chaetopteridae (29 individuals per liter), which accounted for 46 percent of the organisms at the Site. Most chaetopterids are perennial indicating that the environment is fairly stable. Also abundant were the annelid families Syllidae (9.7 individuals per liter [15%]), Eunicidae (7.3 individuals per liter [12%]), and Cirratulidae (7.3 individuals per liter [12%]). Comparison of the shallow reference sites with onsite infauna samples are not conclusive, but do not appear to reflect any current chronic or acute effects from CPECs onsite.

30.6.4 Risk Characterization

Risk estimation was performed using a quotient methodology as described in Section 4.3.3.1. Results of these calculations are shown in Table 30.6-5. Results of the risk description weight-of-evidence analyses are summarized in Table 30.6-6 and discussed below.

Toxicity quotient analysis indicates that benthic marine invertebrates are potentially at risk from CPECs present in sediment; these findings are in agreement with those from bioassay tests. Results identify copper, lead, manganese, mercury, and PCB congeners

(PCB-77, PCB-101, PCB-118) as primary risk drivers, posing a high potential to cause adverse effects. Other PCB congeners (PCB-153, PCB-187) are considered to pose a low potential to cause adverse effects on invertebrates. These findings agree with the acute and chronic toxicity observed in the bioassay tests. There were no conclusive differences in the infaunal community at the Site compared with the reference sites.

Green sea turtles were expected to be exposed to CPECs through consumption of CPECs bioconcentrated from seawater into the tissues of aquatic macrophytes. Site-specific data on seawater concentrations (the principal source of contaminant uptake for aquatic macrophytes), or macrophyte tissue concentrations, were not collected; therefore, the risk to turtles could not be fully evaluated. The lack of macrophytes onsite suggests that the Site offers few feeding opportunities for sea turtles.

All TQ values for monk seals exposed to CPECs in the sediment were less than zero, indicating the risk to seals onsite is negligible.

30.6.5 Uncertainty Analysis

All uncertainties discussed in Section 4.3.3.3 apply to this Site. Specific data gaps at this Site were those involving seawater and aquatic macrophyte tissue concentrations.

30.6.6 SERA Conclusions

The assessment endpoint for benthic infauna communities is not met due to the risk indicated from several CPECs. Certain Site-related metals and PCB congeners exist at the Site at levels which could induce chronic effects in benthic marine invertebrates. The assessment endpoint for special status marine receptors is expected to be met because the TQ analysis did not indicate any risk to monk seals, and sea turtles are unlikely to frequent the Site due to a lack of forage.

30.7 Conclusions and Recommendations

The Inner Harbor was searched for batteries and other potentially hazardous waste debris by creating a grid pattern and systematically diving 31 locations throughout the Inner

Harbor. A 3350 ft^2 circular quadrate was taken by divers at each location to find any other battery disposal sites. These searches did not reveal any potentially hazardous disposal areas in the Inner Harbor, with the exception of a small pile containing three or four batteries, as well as several individual batteries to the east of the finger piers.

Sediment samples collected in the vicinity of the batteries exhibited elevated concentrations of copper, lead, manganese, mercury, and PCB congeners (PCB-77, PCB-101, PCB-118). Based on the results of the SERA, the metals and PCB congeners that exist at this Site are present at levels which could induce chronic effects in benthic marine invertebrates. The SERA did not indicate risk to monk seals; risk to sea turtles is considered to be minimal as they are unlikely to frequent the area due to a lack of forage.

We recommend that the batteries be removed and disposed of properly. Due to an absence of significant risk to marine mammals and reptiles as indicated by the SERA, further investigation and/or remediation of sediments in the vicinity of the battery piles is not recommended.

After the batteries have been removed, caged bivalves will be placed around the Inner Harbor to monitor contaminant uptake by marine invertebrates through time. This monitoring effort will address potential contamination in areas around the Inner Harbor.

TABLE 30.3-1 (Page 1 of 1)
ANALYTICAL METHODS
INNER HARBOR (SITE 99)

			SPECIAL ANALYTICAL LABORATORY					
	ANALYTICAL METHOD	STIV141A	STIV141C	STIII213	STIV141E	9060 M	ASTM GRSZ	TOXICITY
EPA ID	OGDEN ID	LL SVOC	LL PCB	LL METALS	LL PEST	TOC		
MARINE SEDIMENT SAMPLES								
MV001	M99MS01D01D000	X	X	X	X	X	X	X
MV002	M99MS01D01D000	X	X	X	X	X	X	X

"X" = Indicates analytical method performed on sample.

Table 30.5-1
Summary of Marine Sediment Results for Organics
Inner Harbor Battery, Sand Island (Site 99)

			Site 99									Atoll Background (Shallow Sites)							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
9060M	Total Organic Carbon	UG/G	1	1	0			3400	3400	M99MS01S01	J	4	4	0			300	3600	1290
STIV141A	Acenaphthene	UG/KG	1	1	0			6.6	6.6	M99MS01S01		0	6	2	0.24	0.25			
STIV141A	Acenaphthylene	UG/KG	1	1	0			5.8	5.8	M99MS01S01		0	6	2	0.24	0.25			
STIV141A	Anthracene	UG/KG	1	1	0			39	39	M99MS01S01		0	6	2	0.22	0.23			
STIV141A	Benzo(a)Anthracene	UG/KG	1	1	0			200	200	M99MS01S01		0	6	2	0.28	0.29			
STIV141A	Benzo(a)Pyrene	UG/KG	1	1	0			250	250	M99MS01S01		0	6	2	0.17	0.18			
STIV141A	Benzo(b)Fluoranthene	UG/KG	1	1	0			440	440	M99MS01S01		1	6	2	0.38	0.4	0.058	0.058	0.143
STIV141A	Benzo(e)pyrene	UG/KG	1	1	0			210	210	M99MS01S01		0	6	2	0.31	0.33			
STIV141A	Benzo(g,h,i)perylene	UG/KG	1	1	0			180	180	M99MS01S01		0	6	2	0.37	0.39			
STIV141A	Benzo(k)Fluoranthene	UG/KG	1	1	0			150	150	M99MS01S01		0	6	2	0.32	0.35			
STIV141A	Chrysene	UG/KG	1	1	0			250	250	M99MS01S01	J	0	6	2	0.37	0.39			
STIV141A	Chrysenes, C1-alkyl-substitute	UG/KG	1	1	0			170	170	M99MS01S01		0	6	2	0.37	0.39			
STIV141A	Chrysenes, C2-alkyl-substitute	UG/KG	1	1	0			77	77	M99MS01S01		0	6	2	0.37	0.39			
STIV141A	Chrysenes, C3-alkyl-substitute	UG/KG	1	1	0			51	51	M99MS01S01		0	6	2	0.37	0.39			
STIV141A	Chrysenes, C4-alkyl-substitute	UG/KG	1	1	0			23	23	M99MS01S01		0	6	2	0.37	0.39			
STIV141A	Dibenzo(a,h)Anthracene	UG/KG	1	1	0			40	40	M99MS01S01		0	6	2	0.41	0.44			
STIV141A	Dibenzothiophene	UG/KG	1	1	0			11	11	M99MS01S01		0	6	2	0.23	0.25			
STIV141A	Dibenzothiophenes, C1-alkyl-su	UG/KG	1	1	0			21	21	M99MS01S01		0	6	2	0.23	0.25			
STIV141A	Dibenzothiophenes, C2-alkyl-su	UG/KG	1	1	0			47	47	M99MS01S01		0	6	2	0.23	0.25			
STIV141A	Dibenzothiophenes, C3-alkyl-su	UG/KG	1	1	0			59	59	M99MS01S01		0	6	2	0.23	0.25			
STIV141A	Fluoranthene	UG/KG	1	1	0			370	370	M99MS01S01		2	6	2	0.28	0.3	0.04	0.054	0.0821
STIV141A	Fluoranthenes+Pyrenes, C1-alk	UG/KG	1	1	0			260	260	M99MS01S01		0	6	2	0.28	0.3			
STIV141A	Fluoranthenes+Pyrenes, C2-alk	UG/KG	1	1	0			140	140	M99MS01S01		0	6	2	0.28	0.3			
STIV141A	Fluoranthenes+Pyrenes, C3-alk	UG/KG	1	1	0			67	67	M99MS01S01		0	6	2	0.28	0.3			
STIV141A	Fluorene	UG/KG	1	1	0			6.8	6.8	M99MS01S01		0	6	2	0.31	0.33			
STIV141A	Indeno(1,2,3-cd)pyrene	UG/KG	1	1	0			190	190	M99MS01S01		0	6	2	0.28	0.3			
STIV141A	Perylene	UG/KG	1	1	0			55	55	M99MS01S01		0	6	2	0.13	0.13			
STIV141A	Phenanthrene	UG/KG	1	1	0			150	150	M99MS01S01		2	6	2	0.39	0.41	0.071	0.076	0.121
STIV141A	Phenanthrenes+Anthra., C1-alk	UG/KG	1	1	0			120	120	M99MS01S01		0	6	2	0.39	0.41			
STIV141A	Phenanthrenes+Anthra., C2-alk	UG/KG	1	1	0			100	100	M99MS01S01		0	6	2	0.39	0.41			

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles

#D = No. of Detects

#S = Total No. of Samples

#R = No. of Samples Rejected During Data Validation

FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)

*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)

Mean = Geometric Mean

Table 30.5-1
Summary of Marine Sediment Results for Organics
Inner Harbor Battery, Sand Island (Site 99)

			Site 99									Atoll Background (Shallow Sites)							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
STIV141A	Phenanthrenes+Anthra., C3-alk	UG/KG	1	1	0			63	63	M99MS01S01		0	6	2	0.39	0.41			
STIV141A	Phenanthrenes+Anthra., C4-alk	UG/KG	1	1	0			110	110	M99MS01S01		0	6	2	0.39	0.41			
STIV141A	Pyrene	UG/KG	1	1	0			390	390	M99MS01S01		2	6	2	0.28	0.3	0.035	0.067	0.0838
STIV141C	PCB-101 (2,2',3,5,5')	UG/KG	1	1	0			0.49	0.49	M99MS01S01		0	4	0	0.015	0.016			
STIV141C	PCB-118 (2,3',4,4',5)	UG/KG	1	1	0			0.45	0.45	M99MS01S01		0	4	0	0.024	0.025			
STIV141C	PCB-138 (2,2',3,4,4',5')	UG/KG	1	1	0			1.2	1.2	M99MS01S01		0	4	0	0.022	0.024			
STIV141C	PCB-153 (2,2',4,4',5,5')	UG/KG	1	1	0			2.5	2.5	M99MS01S01		0	4	0	0.02	0.021			
STIV141C	PCB-170 (2,2',3,3',4,4',5)	UG/KG	1	1	0			0.65	0.65	M99MS01S01		0	4	0	0.079	0.084			
STIV141C	PCB-180 (2,2',3,4,4',5,5')	UG/KG	1	1	0			2	2	M99MS01S01		0	4	0	0.023	0.024			
STIV141C	PCB-187 (2,2',3,4',5,5',6)	UG/KG	1	1	0			4.2	4.2	M99MS01S01		0	4	0	0.035	0.038			
STIV141C	PCB-195 (2,2',3,3',4,4',5,6)	UG/KG	1	1	0			0.57	0.57	M99MS01S01		0	4	0	0.016	0.017			
STIV141C	PCB-206 (2,2',3,3',4,4',5,5',6	UG/KG	1	1	0			0.35	0.35	M99MS01S01		0	4	0	0.014	0.015			
STIV141C	PCB-209 (2,2',3,3',4,4',5,5',6	UG/KG	1	1	0			1.9	1.9	M99MS01S01		0	4	0	0.017	0.018			
STIV141C	PCB-77 (3,3',4,4')	UG/KG	1	1	0			1.6	1.6	M99MS01S01		0	4	0	0.03	0.032			
STIV141E	2,4'-DDD	UG/KG	1	1	0			0.95	0.95	M99MS01S01		0	4	0	0.021	0.023			
STIV141E	2,4'-DDT	UG/KG	1	1	0			0.4	0.4	M99MS01S01		0	4	0	0.033	0.035			
STIV141E	4,4'-DDD	UG/KG	1	1	0			1.3	1.3	M99MS01S01		0	4	0	0.037	0.039			
STIV141E	gamma-BHC (Lindane)	UG/KG	1	1	0			0.039	0.039	M99MS01S01	J	0	4	0	0.022	0.023			
STIV141E	Hexachlorobenzene	UG/KG	1	1	0			0.04	0.04	M99MS01S01	J	1	4	0	0.025	0.027	0.01	0.01	0.0121
STIV141E	Mirex	UG/KG	1	1	0			0.14	0.14	M99MS01S01		0	4	0	0.025	0.027			
STIV141E	Photomirex	UG/KG	1	1	0			0.17	0.17	M99MS01S01		0	4	0	0.034	0.036			

Notes:

STIV141A = NOAA Status and Trends Semi Volatiles
STIV141C = NOAA Status and Trends PCBs
STIV141E = NOAA Status and Trends Pesticides

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
*J = The Associated Numerical Value Is An Estimated Quantity (Laboratory Qualification)
Mean = Geometric Mean

Table 30.5-2
Summary of Marine Sediment Results for Inorganics
Inner Harbor Battery, Sand Island (Site 99)

			Site 99									Atoll Background (Deep Sites)							
METHOD	ANALYTE	UNITS	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MAX SAMPLE	FL	#D	#S	#R	MIN UNDETECT	MAX UNDETECT	MIN DETECT	MAX DETECT	MEAN CONC
DEEP SITES																			
STIII213	Antimony	MG/KG	1	1	0			0.93	0.93	M99MS01S01		0	4	0	0.249	0.26			
STIII213	Arsenic	MG/KG	1	1	0			3.5	3.5	M99MS01S01		0	4	0	2.3	3			
STIII213	Cadmium	MG/KG	1	1	0			0.187	0.187	M99MS01S01		4	4	0			0.033	0.046	0.0406
STIII213	Chromium	MG/KG	1	1	0			12.3	12.3	M99MS01S01		0	4	0	11	12			
STIII213	Copper	MG/KG	1	1	0			34.6	34.6	M99MS01S01	J	4	4	0			6.3	9	7.3
STIII213	Iron	MG/KG	1	1	0			13400	13400	M99MS01S01		2	4	0	19	19	19.3	36.5	15.9
STIII213	Lead	MG/KG	1	1	0			47.5	47.5	M99MS01S01		0	4	0	5.2	5.5			
STIII213	Manganese	MG/KG	1	1	0			62	62	M99MS01S01		0	4	0	34	35			
STIII213	Mercury	MG/KG	1	1	0			0.279	0.279	M99MS01S01		0	4	0	0.025	0.025			
STIII213	Thallium	MG/KG	1	1	0			0.04	0.04	M99MS01S01		0	4	0	0.024	0.024			
STIII213	Tin	MG/KG	1	1	0			2.86	2.86	M99MS01S01		3	4	0	0.047	0.047	0.047	0.055	0.0424
STIII213	Zinc	MG/KG	1	1	0			46.1	46.1	M99MS01S01		0	4	0	3.5	3.8			

Notes:

STIII213 = NOAA Status and Trends Low Level Metals

#D = No. of Detects
#S = Total No. of Samples
#R = No. of Samples Rejected During Data Validation
FL = Data Validation Qualifier (Flag)

J = The Associated Numerical Value Is An Estimated Quantity (Data Validator Qualification)
Mean = Geometric Mean

Table 30.6-1
Marine Sediment CPEC Selection - Site 99

Analyte	Environmental Concentration (mg/kg)	TBC Value (mg/kg)	Background Concentration** (mg/kg)	CPEC?*
Inorganic				
Antimony	9.30E-01	2.00E+00		No(6)
Arsenic	3.50E+00	8.20E+00		No(6)
Cadmium	1.87E-01	1.20E+00	5.84E-02	No(6)
Chromium	1.23E+01	8.10E+01		No(6)
Copper	3.46E+01	3.40E+01	6.96E+00	YES
Iron	1.34E+04		3.22E+01	No(p)
Lead	4.75E+01	4.67E+01		YES
Manganese	6.20E+01			YES
Mercury	2.79E-01	1.50E-01		YES
Thallium	4.00E-02		1.90E-02	YES
Tin	2.86E+00		3.55E-02	YES
Zinc	4.61E+01	1.50E+02		No(6)
Organic				
2,4'-DDD	9.50E-04	2.00E-03		No(6)
2,4'-DDT	4.00E-04	1.58E-03		No(6)
4,4'-DDD	1.30E-03	2.00E-03		No(6)
Acenaphthene	6.60E-03	1.60E-02		No(6)
Acenaphthylene	5.80E-03	4.40E-02		No(6)
Anthracene	3.90E-02	8.53E-02		No(6)
Benzo(a)anthracene	2.00E-01	2.61E-01		No(6)
Benzo(a)pyrene	2.50E-01	4.30E-01		No(6)
Benzo(b)fluoranthene	4.40E-01	1.70E+00		No(6)
Benzo(e)pyrene	2.10E-01	1.70E+00		No(6)
Benzo(g,h,i)perylene	1.80E-01	1.70E+00		No(6)
Benzo(k)fluoranthene	1.50E-01	1.70E+00		No(6)
Chrysene	2.50E-01	3.84E-01		No(6)
Chrysenes, C1-alky	1.70E-01	3.84E-01		No(6)
Chrysenes, C2-alky	7.70E-02	3.84E-01		No(6)
Chrysenes, C3-alky	5.10E-02	3.84E-01		No(6)
Chrysenes, C4-alky	2.30E-02	3.84E-01		No(6)
Dibenzo(a,h)anthracene	4.00E-02	6.34E-02		No(6)
Dibenzothiophene	1.10E-02	5.52E-01		No(6)
Dibenzothiophenes, C1-alky	2.10E-02	5.52E-01		No(6)
Dibenzothiophenes, C2-alky	4.70E-02	5.52E-01		No(6)
Dibenzothiophenes, C3-alky	5.90E-02	5.52E-01		No(6)
Fluoranthene	3.70E-01	6.00E-01		No(6)
Fluoranth+Pyr, C1-alky	2.60E-01	6.00E-01		No(6)
Fluoranth+Pyr, C2-alky	1.40E-01	6.00E-01		No(6)
Fluoranth+Pyr, C3-alky	6.70E-02	6.00E-01		No(6)
Fluorene	6.80E-03	1.90E-02		No(6)
gamma-BHC (Lindane)	3.90E-05			YES
Hexachlorobenzene	4.00E-05			YES
Indeno(1,2,3-cd)pyrene	1.90E-01	1.70E+00		No(6)
Mirex	1.40E-04			YES
PCB-77	1.60E-03			YES
PCB-101	4.90E-04			YES
PCB-118	4.50E-04			YES

Table 30.6-1
Marine Sediment CPEC Selection - Site 99

Analyte	Environmental Concentration (mg/kg)	TBC Value (mg/kg)	Background Concentration** (mg/kg)	CPEC?*
PCB-138	1.20E-03			YES
PCB-153	2.50E-03			YES
PCB-170	6.50E-04			YES
PCB-180	2.00E-03			YES
PCB-187	4.20E-03			YES
PCB-195	5.70E-04			YES
PCB-206	3.50E-04			YES
PCB-209	1.90E-03			YES
Perylene	5.50E-02	1.70E+00		No(6)
Phenanthrene	1.50E-01	2.40E-01		No(6)
Phenanth+Anthra., C1-alky	1.20E-01	2.40E-01		No(6)
Phenanth+Anthra., C2-alky	1.00E-01	2.40E-01		No(6)
Phenanth+Anthra., C3-alky	6.30E-02	2.40E-01		No(6)
Phenanth+Anthra., C4-alky	1.10E-01	2.40E-01		No(6)
Photomirex	1.70E-04			YES
Pyrene	3.90E-01	6.65E-01		No(6)

*TBC values used for sediments are the ER-L values from Long and Morgan (1992 and 1994).
Values for PAHs were used for alkyl substitued PAHS as well.
**Mean value of background marine sediment samples taken at Midway Atoll.

CPEC SELECTION CODE

YES: selected as CPEC
No(1): common lab contaminant
No(2): frequency of detection <= 5%
No(3): essential nutrient
No(4): water/soil chemistry
No(5): environmental concentration < 2x background concen.
No(6): EC < ARAR/TBC value
No(7): not persistent, soluble, or mobile
No(p): professional judgement

Table 30.6-2

Target Receptor Exposure Point Values - Site 99

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates	Marine Reptile (green sea turtle)			Marine Mammal (monk seal)	
	EPV_{inv} (mg/L)	ingestion (sw)* (mg/kg-d)	ingestion (gw)** (mg/kg-d)	EPV_{st} (mg/kg-d)	ingestion (mg/kg-d)	EPV_{ms} (mg/kg-d)
Inorganic						
Copper	9.89E-01	ND	ND	ND	2.63E+00	2.63E+00
Lead	5.28E-02	ND	ND	ND	3.44E-02	3.44E-02
Manganese	9.54E-01	ND	ND	ND	DG	DG
Mercury	2.79E-02	ND	ND	ND	3.72E-02	3.72E-02
Thallium	6.15E-05	ND	ND	ND	DG	DG
Tin	1.14E-02	ND	ND	ND	DG	DG
Organic						
gamma-BHC (Lindane)	6.04E-06	ND	ND	ND	1.91E-05	1.91E-05
Hexachlorobenzene	2.15E-08	ND	ND	ND	5.37E-06	5.37E-06
Mirex	DG	ND	ND	ND	DG	DG
PCB-77	1.19E-06	ND	ND	ND	2.31E-04	2.31E-04
PCB-101	3.02E-05	ND	ND	ND	1.94E-04	1.94E-04
PCB-118	3.66E-06	ND	ND	ND	1.12E-04	1.12E-04
PCB-138	1.99E-07	ND	ND	ND	1.23E-04	1.23E-04
PCB-153	3.87E-07	ND	ND	ND	2.53E-04	2.53E-04
PCB-170	4.71E-08	ND	ND	ND	5.54E-05	5.54E-05
PCB-180	1.23E-07	ND	ND	ND	1.64E-04	1.64E-04
PCB-187	2.20E-07	ND	ND	ND	3.33E-04	3.33E-04
PCB-195	4.63E-08	ND	ND	ND	4.99E-05	4.99E-05
PCB-206	2.06E-10	ND	ND	ND	1.01E-05	1.01E-05
PCB-209	9.97E-12	ND	ND	ND	1.94E-05	1.94E-05
Photomirex	DG	ND	ND	ND	DG	DG

* assumes ingestion of aquatic macrophytes exposed to surface waters

** assumes ingestion of aquatic macrophytes exposed to undiluted ground water discharged into surface waters

ND = not detected/not selected as CPEC

DG = data gap; no parameter available for exposure calculation

Table 30.6-3

Sediment Bioassay Test Results - Site 99

SAMPLE TYPE / ID#	EPA	REP	VIAL	# NORMAL	# ABNORMAL	TOTAL/ML	% NORMAL	% ABNORMAL	% SURVIVAL	AVERAGE % NORMALITY	AVERAGE % SURVIVAL
Control	CONTROL	A	1	231	22	253	91.3	8.7	110.0		
	CONTROL	B	32	192	16	208	92.3	7.7	90.4		
	CONTROL	C	59	272	32	304	89.5	10.5	132.2		
	CONTROL	D	60	135	24	159	84.9	15.1	69.1		
	CONTROL	E	4	225	19	244	92.2	7.8	106.1	90.0	101.6
Reference											
M00MS01S01	MA665	A	52	133	14	147	90.5	9.5	63.9		
	MA665	B	87	111	6	117	94.9	5.1	50.9		
	MA665	C	104	186	7	193	96.4	3.6	83.9		
	MA665	D	137	163	6	169	96.4	3.6	73.5		
	MA665	E	53	174	18	192	90.6	9.4	83.5	93.8	71.1
M00MS02S01	MA668	A	9	149	7	156	95.5	4.5	67.8		
	MA668	B	116	160	8	168	95.2	4.8	73.0		
	MA668	C	12	220	8	228	96.5	3.5	99.1		
	MA668	D	115	145	3	148	98.0	2.0	64.3		
	MA668	E	69	210	10	220	95.5	4.5	95.7		
M00MS02D01	MA670	A	28	223	25	248	89.9	10.1	107.8		
	MA670	B	78	258	5	263	98.1	1.9	114.3		
	MA670	C	105	134	2	136	98.5	1.5	59.1		
	MA670	D	118	166	6	172	96.5	3.5	74.8		
	MA670	E	85	174	6	180	96.7	3.3	78.3	96.0	83.4
Onsite											
M99 MS01S01	MV001	A	35	28	158	186	15.1	84.9	80.9		
	MV001	B	92	59	41	100	59.0	41.0	43.5		
	MV001	C	132	0	0	0					
	MV001	D	80	55	95	150	36.7	63.3	65.2		
	MV001	E	40	18	70	88	20.5	79.5	38.3		
M99 MS01D01	MV002	A	18	17	38	55	30.9	69.1	23.9		
	MV002	B	103	176	6	182	96.7	3.3	79.1		
	MV002	C	39	53	21	74	71.6	28.4	32.2		
	MV002	D	102	29	12	41	70.7	29.3	17.8		
	MV002	E	19	112	16	128	87.5	12.5	55.7	54.3	48.5

Table 30.6-5
Toxicity Quotients for Target Receptors - Site 99

CONTAMINANT OF POTENTIAL ECOLOGICAL CONCERN	Marine Invertebrates			Marine Reptile (green sea turtle)			Marine Mammal (monk seal)		
	EPV	TRV	TQ *	EPV	TRV	TQ *	EPV	TRV	TQ *
Inorganic									
Antimony	ND	1.60E+00		ND	3.50E-03		ND	3.50E-02	
Arsenic	ND	3.60E-02		ND	2.00E-01		ND	1.20E-01	
Cadmium	ND	9.30E-03		ND	1.00E-01		ND	1.20E+01	
Chromium	ND	5.00E-02		ND	6.00E-01		ND	1.40E+00	
Cobalt	ND	2.90E-04		ND	5.40E-02		ND	5.40E-01	
Copper	9.89E-01	2.90E-03	2.53	ND	9.72E+00		2.63E+00	3.07E+01	
Lead	5.28E-02	5.60E-03	0.97	ND	2.16E+01		3.44E-02	7.70E-01	
Manganese	9.54E-01	1.10E-02	1.94	ND	1.80E+01		DG	1.80E+02	DG
Mercury	2.79E-02	3.00E-05	2.97	ND	1.28E+00		3.72E-02	2.75E+01	
Thallium	6.15E-05	4.00E-02		ND	7.40E-04		DG	7.40E-03	DG
Tin	1.14E-02	3.50E-02		ND	1.40E+00		DG	1.40E+01	DG
Organic									
gamma-BHC (Lindane)	6.04E-06	8.00E-05		ND	1.10E-01		1.91E-05	3.60E-01	
Hexachlorobenzene	2.15E-08	1.29E-01		ND	1.00E+00		5.37E-06	1.00E-02	
Mirex	DG	1.00E-06	DG	ND	2.20E-01		DG	3.69E+00	DG
PCB-77	1.19E-06	2.00E-07	0.77	ND	1.89E-01		2.31E-04	3.90E-04	
PCB-101	3.02E-05	2.00E-07	2.18	ND	2.38E-01		1.94E-04	2.82E-03	
PCB-118	3.66E-06	2.00E-07	1.26	ND	1.52E-01		1.12E-04	8.90E-04	
PCB-138	1.99E-07	2.00E-07		ND	1.68E-01		1.23E-04	3.76E-02	
PCB-153	3.87E-07	2.00E-07	0.29	ND	2.38E-01		2.53E-04	4.51E-02	
PCB-170	4.71E-08	2.00E-07		ND	2.60E-02		5.54E-05	5.92E-03	
PCB-180	1.23E-07	2.00E-07		ND	8.20E-02		1.64E-04	2.87E-03	
PCB-187	2.20E-07	2.00E-07	0.04	ND	8.70E-02		3.33E-04	4.73E-02	
PCB-195	4.63E-08	2.00E-07		ND	2.38E-01		4.99E-05	2.87E-03	
PCB-206	2.06E-10	2.00E-07		ND	2.38E-01		1.01E-05	2.87E-03	
PCB-209	9.97E-12	2.00E-07		ND	2.38E-01		1.94E-05	2.87E-03	
Photomirex	DG	1.00E-06	DG	ND	2.20E-01		DG	3.69E+00	DG

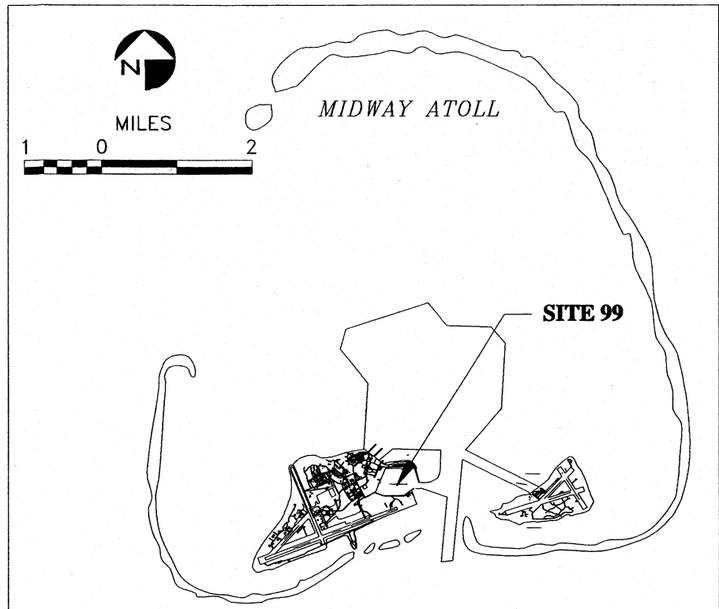
* TQ = log(EPV/TRV); only data gaps (DG) and TQ values greater than or equal to 0 are shown
ND = not detected/not selected as CPEC
DG = data gap; no parameter available for exposure calculation

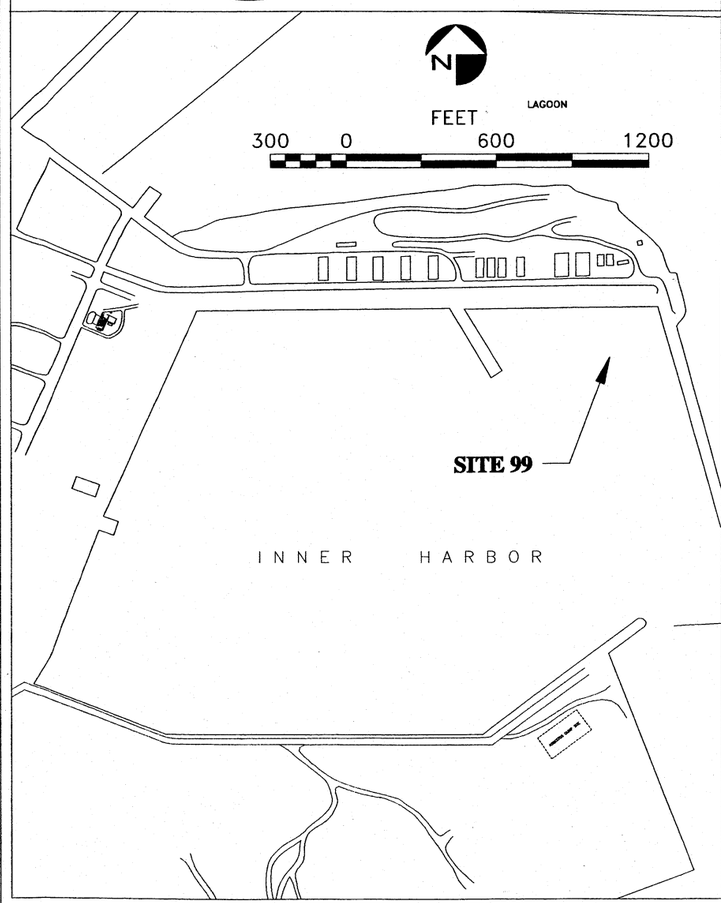
Table 30.6-6
Risk Description (Weight-of-Evidence) Summary - Site 99

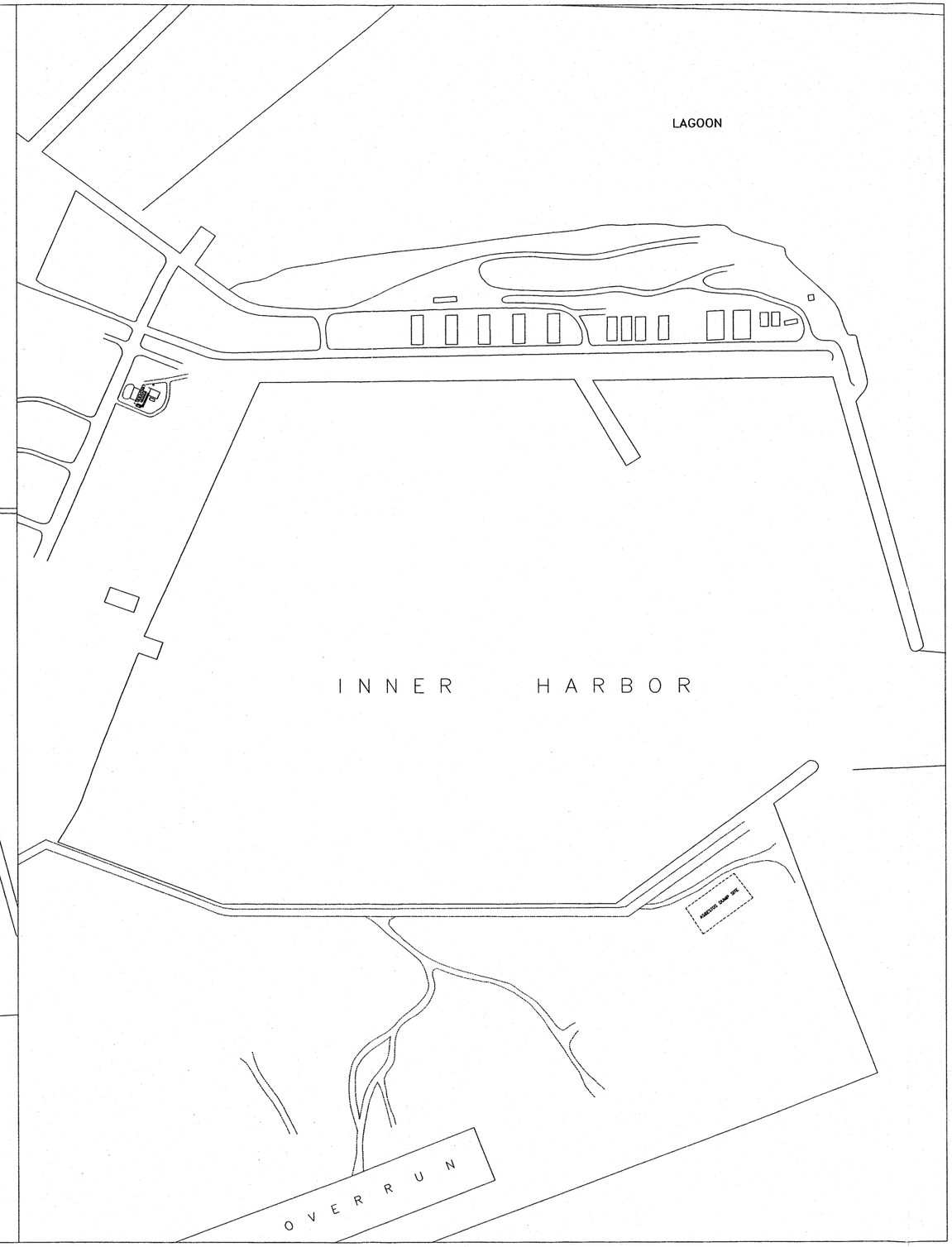
ASSESSMENT ENDPOINT	LINE-OF-EVIDENCE						CONCLUSION
_ Measurement Endpoint	Abiotic Media Chemical Analysis	Tissue Chemical Analysis	Ecotoxicity (food web model, TQ, TI)	Infaunal Community Analysis	Acute Toxicity (% survival)	Chronic Toxicity (% normal)	Assessment Endpoint Met?
Maintenance of a subtidal infaunal and reef fish community not affected by acute or chronic exposure to site-related CPEC.							NO
_ Direct testing of acute and chronic toxicity of CPEC in sediment	CPEC present in sediment		Several TQ > 0		Significant ($p<0.05$) adverse effects	Significant ($p<0.05$) adverse effects	
_ Direct measurement of tissue chemistry (tissue concentration)		No tissue samples collected at this site					
_ Several metrics describing the abundance and trophic structure of the benthic infaunal macroinvertebrate community				Difference between site and two reference locatiions.			
No probability for acute or chronic adverse affects in any individuals of special status marine species from direct and/or secondary exposure to site-related CPEC.							YES
_ Chronic toxicity in green sea turtles	CPEC present in sediment	No tissue samples collected at this site	DG, no surface water or tissue conc. data				
_ Impairment of reproduction in Hawaiian monk seals	CPEC present in sediment	No tissue samples collected at this site	some DG, rest TQ < 0				

DG = data gap precludes possibility of analysis

Figures
Section 30







LEGEND

NOTES

1. THE ACCURACY OF THIS DOCUMENT IS LIMITED TO THE QUALITY OF THE SOURCE INFORMATION AND IS NOT SUITABLE FOR MAPPING ENGINEERING APPLICATIONS AND IS NOT TO BE USED FOR "AS BUILT"
2. HORIZONTAL CONTROL POINT ESTABLISHED BY USNS ON SITE WAS USED AS BASIS OF DRAWING
3. VERTICAL CONTROL WAS BASED ON BM#11 WITH AN ELEVATION OF 8.52 FEET (MLLW)
4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE99\05229510.DWG DATE: 5-22-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

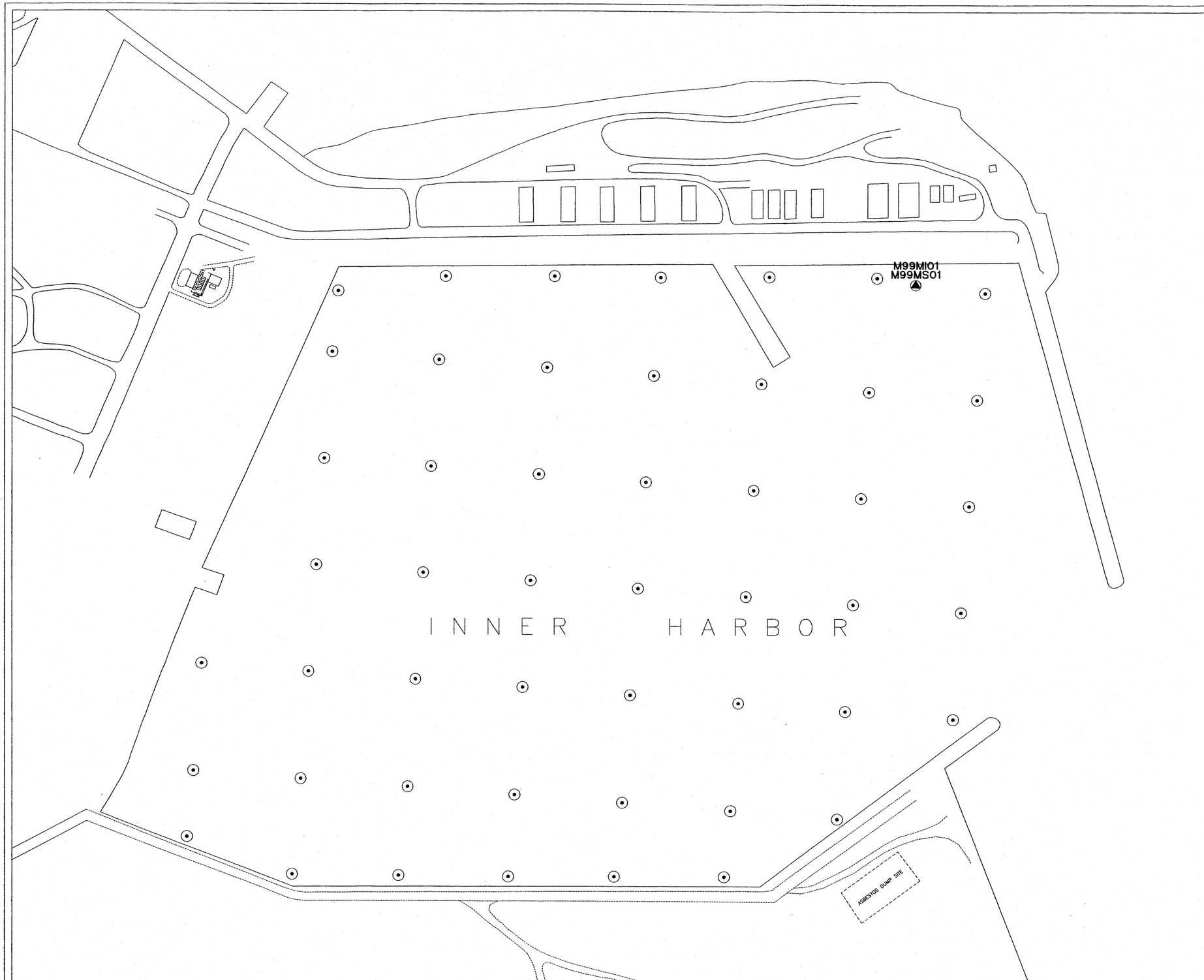
TITLE

INNER HARBOR
(SITE 99)
SAND ISLAND

FEET
225 0 450 900

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
30.1-1



LEGEND

M##MS## — MARINE SAMPLE LOCATION AND IDENTIFICATION NUMBER(S)

M##MI## — MARINE INFAUNA SAMPLE LOCATION AND IDENTIFICATION NUMBER(S)

MARINE RECONNAISSANCE LOCATION

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
5. PROJECT NUMBER: 110190136
6. FILE : ..\MIDWAY\SITEINVS\SITE99\05229511.DWG DATE: 5-22-95

SOURCES

PERRY ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DWG. #1038656 DWG. #1038657

TITLE

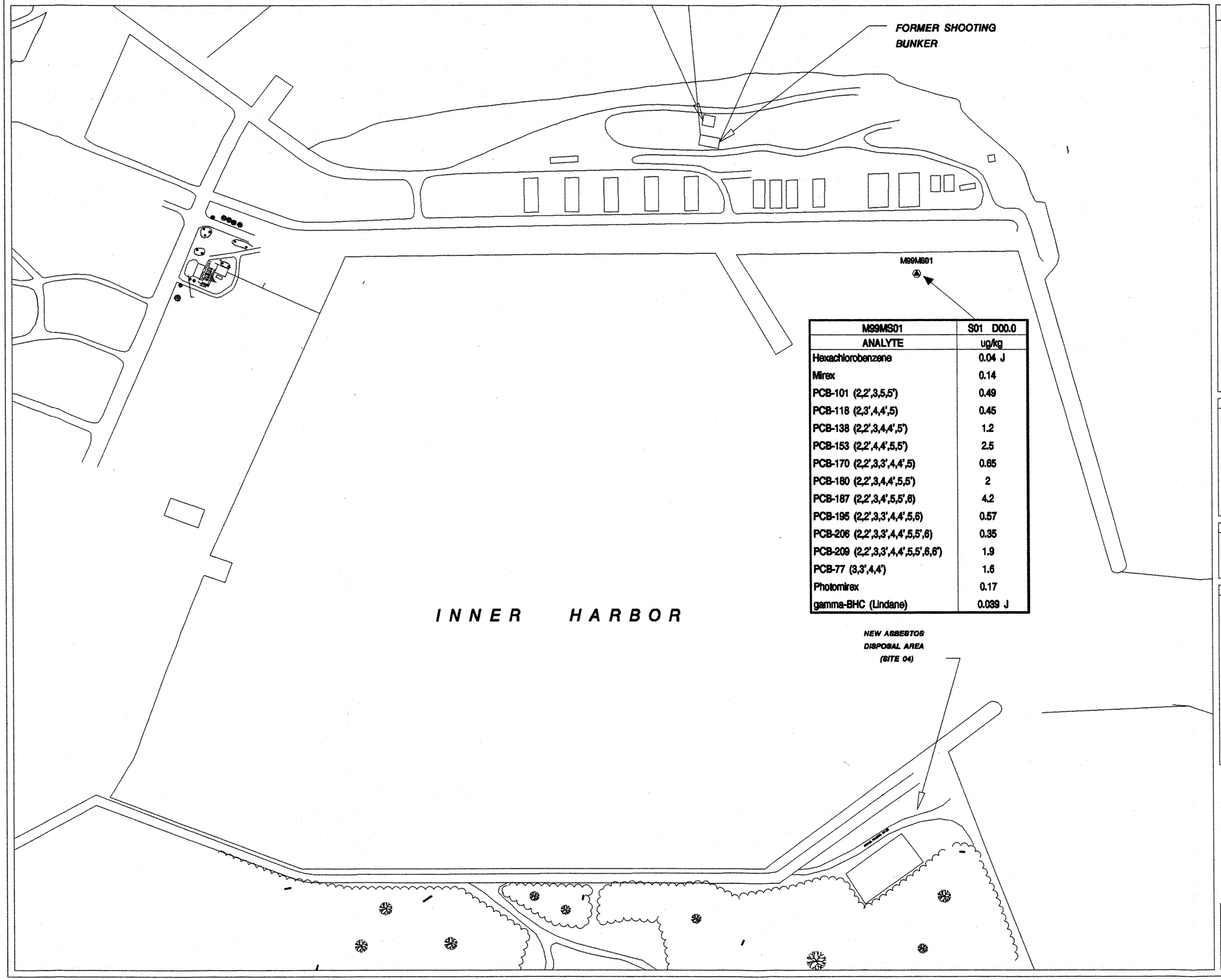
MARINE RECONNAISSANCE AND SAMPLE LOCATIONS (SITE 99) SAND ISLAND

N

FEET
150 0 300 600

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.

FIGURE
30.2-1



M99MS01	S01 D00.0
ANALYTE	ug/kg
Hexachlorobenzene	0.04 J
Mirex	0.14
PCB-101 (2,2',3,5,5')	0.49
PCB-118 (2,3',4,4',5)	0.45
PCB-138 (2,2',3,4,4',5')	1.2
PCB-153 (2,2',4,4',5,5')	2.5
PCB-170 (2,2',3,3',4,4',5)	0.65
PCB-180 (2,2',3,4,4',5,5')	2
PCB-187 (2,2',3,4',5,5',6)	4.2
PCB-195 (2,2',3,3',4,4',5,6)	0.57
PCB-206 (2,2',3,3',4,4',5,5',6)	0.35
PCB-209 (2,2',3,3',4,4',5,5',6,6')	1.9
PCB-77 (3,3',4,4')	1.6
Photomirex	0.17
gamma-BHC (Lindane)	0.039 J

LEGEND

▲	MARINE SEDIMENT SAMPLE LOCATION
M99MS02	OGDEN SAMPLE ID
0.04	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

NOTES

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, E9-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190136
4. FILE: /appa/hmv/cto136/mapa/m6149544

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

LOW LEVEL PESTICIDES AND PCB'S DETECTED IN MARINE SEDIMENT SAMPLES (SITE 99) SAND ISLAND

N

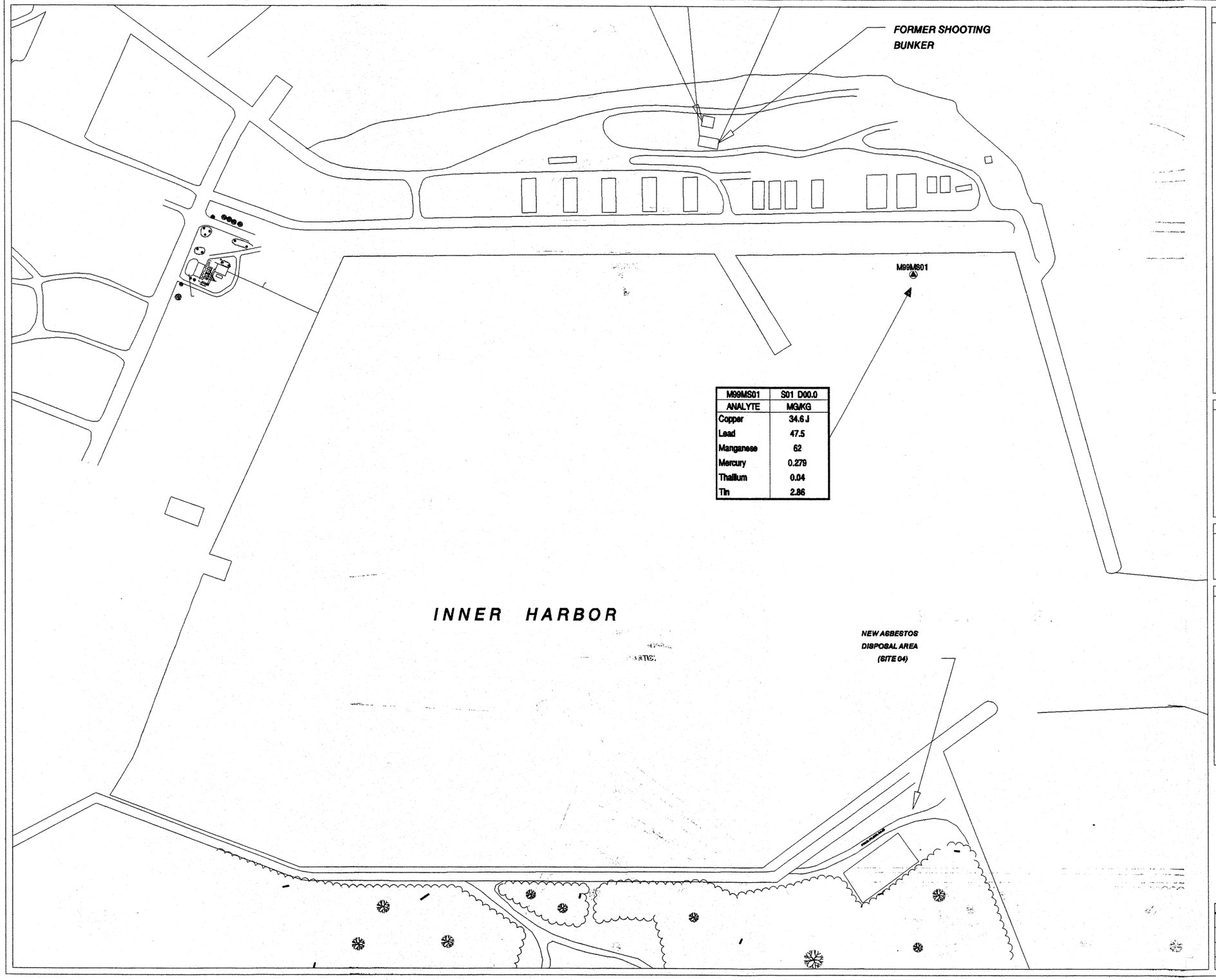
FEET

0 150 300 600 900

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
07/10/95	1	CMF	cmf.	HFP	HFP	JMC	JM

FIGURE

30.5-1



M99MS01	S01 D00.0
ANALYTE	MG/KG
Copper	34.6 J
Lead	47.5
Manganese	62
Mercury	0.279
Thallium	0.04
Tin	2.86

LEGEND

▲	MARINE SEDIMENT SAMPLE LOCATION
M99MS02	OGDEN SAMPLE ID
34.6	CONCENTRATION OF COMPOUND OF POTENTIAL ECOLOGICAL CONCERN.
S##	SAMPLE NUMBER
D##.#	DEPTH IN FEET
J	ESTIMATED QUANTITY

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4. PLANE COORDINATE SYSTEM FOR SAND AND EASTERN ISLANDS, ES-217, DRAWING NO.: SUR-6, USNS MIDWAY ISLAND
3. PROJECT NUMBER 110190186
4. FILE: /appe/hm/cto136/maps/m5179578

SOURCES

PERRY AND ASSOCIATES INC.,
U. S. NAVAL STATION, MIDWAY ISLAND
DRAWING NO.: 103856 & 1038857

TITLE

LOW LEVEL METAL CONCENTRATIONS DETECTED IN MARINE SEDIMENT SAMPLES (SITE 99) SAND ISLAND

N

FEET

0 150 300 600 900

DATE	REV.	DRWN.	INIT.	CHKD.	INIT.	APPR.	INIT.
12/20/95	1	CMP		HFP		JMC	

FIGURE

30.5-2