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PROJECT REVIEW SUMMARY REPORT
CTO #0041, ACTIVITY 04

SITE INVESTIGATION FOR THE NAVAL TRAINING CENTER
NAVY EXCHANGE GAS STATION
SOLID WASTE ASSESSMENT TEST PROPOSAL FOR
MARINE CORPS RECRUIT DEPOT DISPOSAL AREA
DOCUMENT CONTROL NO. CLE-JO2-01F041-04-S1-0002
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1.0 INTRODUCTION

1.1 Contractual Authority

This Summary Report was prepared in response to Task 2, of Contract Task Order (CTO) #0041, Activity 4 under the Navy Comprehensive Long Term Environmental Action Navy (CLEAN) Contract Number N68711-89-D-9296. The technical approach and scope of this report were developed in consultation with Camela Bryan, Naval Remedial Project Manager, under the CLEAN program.

1.2 Purpose and Scope

The objective of this Summary Report is as follows:

- To summarize the history, current status, and investigations performed to date for the Marine Corps Recruit Depot (MCRD) Disposal Area, and the Navy Exchange Gas Station. Both sites are located at the Naval Training Center (NTC), San Diego, California.

- To recommend or outline revisions required to the existing work plans for the Site Investigation (SI) to be conducted at the NTC Navy Exchange Gas Station, and the Solid Waste Assessment Test (SWAT) to be conducted at MCRD Disposal Area. These recommendations will provide an outline for the SI and SWAT technical approach. As a result, minimal comments or revisions to the SI and SWAT work plan will be required as the technical approach will already have been outlined by Jacobs Engineering Group (Jacobs) and approved by the Navy as part of this report.

This Summary Report has been organized as follows: Section 1.0 includes introductory information; Section 2.0 provides a discussion of the site descriptions and histories; Section 3.0 describes the regional and site settings; Section 4.0 describes previous site investigations; and Section 5.0 presents Jacobs recommended technical approach.

2.0 SITE DESCRIPTION AND HISTORY

2.1 Marine Corps Recruit Depot (MCRD) Disposal Area

The U.S. Marine Corps operated this refuse disposal area on reclaimed salt marsh land between Lindberg Field and the boat channel, from approximately 1950 until 1971. The land was transferred to NTC San Diego in 1975. Since that time, the site has been primarily used as a recreational area (golf driving range, track, and basketball court), and as a rubble disposal area. The northeast portion of the site is designated as a protected area for the California least tern. The least tern is listed as an endangered species by the U.S. Fish and Wildlife Service and the California Department of Fish and Game.

The disposal area occupies approximately 32 acres of land and is located between McCain Road and Puerto Rico Street. Aerial photographs indicate that the northeast corner of the landfill is located beneath the southwest corner of the Lindberg Field runway. This area was added to the airport in the early 1970s during an expansion of the runway.

The site was used predominantly for disposal of refuse generated from activities at MCRD San Diego and NTC San Diego. Before 1960 material was randomly disposed of along the northern edge of the salt marsh, gradually extending southward into the marshy area. By 1960 dredge material was being used to reclaim the salt marsh, and wastes were being buried in east-west trenches (8 feet by 60 feet by 120 feet) dug into the material. An estimated 5 million cubic feet of waste was disposed of at the site, during its years of operation (NEESA, 13-089).

The disposal area received dumpster waste from MCRD with some dumpster wastes from NTC San Diego during the middle years of operations. Before 1971 hazardous wastes were regularly placed in the dumpsters, including infectious wastes, paint wastes, and empty pesticide containers. Additionally, wood preserving chemical sludge (pentachlorophenol) was transported to the landfill for disposal. It has been reported that approximately 500 gallons per year of pentachlorophenol sludges were disposed of from the late 1950s to the late 1960s (NEESA, 13-089).

Materials from shop activities at MCRD San Diego and NTC San Diego that were disposed of at the landfill include motor waste oils, methyl isobutyl, ketone xylene, methyl ethyl ketone, gasoline, paints and thinners, and plating wastes (possibly including cyanides). An estimated 3,000 to 4,000 gallons of liquid hazardous wastes from NTC San Diego and an estimated 9,000 to 15,000 gallons from the MCRD were disposed of at this site (NEESA, 13-089).

Transformers and their contents were also disposed of at the site. Transformers were removed from service at an average of about one per month. Dielectric fluids were drained either directly into the fill area or into waste oil tanks and used to oil the surface of the disposal area for dust control. Polychlorinated biphenyls (PCBs) were commonly used in dielectric fluid at the time that this disposal took place, but it is not known whether any of the disposed transformers contained PCBs (IT, 1987).

An Initial Assessment Study (IAS) conducted in 1986 concluded that potential contaminated pathways exist at the site. These pathways include moderately to highly permeable fill material (10^{-3} to 10^{-1} cm/sec) underlying the center and surface drainage or runoff into the boat channel. A possible onsite contaminate receptor is the California

lest tern. Possible off-site contaminant receptors include indigenous aquatic species inhabiting the estuary and San Diego Bay. Furthermore if any of the hazardous wastes migrated into the Bay, human exposure to contaminants could occur through recreational contact.

2.2 Navy Exchange Gas Station

The Navy Exchange Gas Station is located on the corner of NTC San Diego. In 1973, construction of an off-base hotel was initiated at a site located near the southwest corner of the base (Scott and Nimitz Boulevards). Gasoline was encountered in one of the excavation trenches at the site. The Navy Exchange Gas Station, situated 300 feet from the site, was the nearest upgradient gas station and was suspected of being the source of the gasoline. A single boring at the station detected leaded gasoline at a depth of 12 feet. Subsequently tank integrity tests were conducted on the fuel tanks and it was concluded that all of the fuel tanks were tight (NEESA, 13-089).

The IAS concluded that the only potential contaminant pathway is the moderately to highly permeable fill material (10^{-3} to 10^{-1} cm/sec) underlying the site and if movement did occur, the gasoline is likely to migrate toward the San Diego Bay (approximately 1,500 feet south of the site).

3.0 REGIONAL AND SITE SETTING

3.1 Location

Information on the NTC and MCRD San Diego regional setting and contaminant transport potential was taken directly from the 1986 Initial Assessment Study (IAS) and the 1987 Remedial Investigation Verification Step Work Plan (RI Work Plan).

NTC San Diego is located in the City of San Diego, near the northernmost point of the San Diego Bay. Situated near one of the older established residential sections, the NTC is bordered to the north by Lytton Avenue and Puerto Rico Street and to the south by Harbor Drive and Nimitz Boulevard. The facility is divided geographically by a boat channel, connected to the North San Diego Bay. Lindberg Field Municipal Airport is located northeast of the facility.

The MCRD Disposal Area is located between McCain Road and Puerto Rico Street. The northeast corner of the disposal area is located beneath the southwest corner of Lidbergh Field runway. This area was added to the airport in the early 1970s during an expansion of the runway.

The Navy Exchange Gas Station is located in the southwest corner of the NTC San Diego.

3.2 Climate

The IAS Section 4.5.4.1 describes the climatology of the study area. "The coastal strip of San Diego has a semi-arid Mediterranean climate characterized by hot summers and mild winters. The region receives approximately 10 inches of rainfall per year and has an evaporation rate of approximately 64 inches per year. The monthly mean temperature is lowest in January, about 52° F, and highest in August, about 72° F. Prevailing winds are from the northeast in the winter and west in the summer; velocities in the afternoon range from 5 to 15 miles per hour."

3.3 Geology

The NTC San Diego is located within the San Diego Continental Margin. Surficial geologic units cropping out at the facility consist of artificial fill and the Bay Point Formation. Outcrops of the Bay Point Formation are limited to the highest elevations of the facility located in the northwest corner of the NTC San Diego. Most of the facility is located on artificial fill.

The facility is divided geographically by an estuary, identified on regional maps as a boat channel. This channel is the last remnant of the San Diego River Bed. Materials dredged from the channel and San Diego Bay have been used in landfilling NTC San Diego. Records indicate that the fill is similar on each side of the channel.

Historical maps (U.S. Engineer Office, 1989) of the study area show that the northwest area of the NTC was already filled by 1939. The same map also shows that on MCRD San Diego the area north of Midway Avenue was also filled by 1939. In the early 1940s the tidelands areas immediately south of the above limits were hydraulically filled with 7 to 12 feet of dredging soils from the San Diego Bay. These data suggest that the surficial geology of NTC San Diego and MCRD San Diego is relatively consistent on both sides of the estuary, and that water quality and lithologic data obtained at one

location can be applied to other locations. The original layers of the hydraulic fill are medium to soft. In the tidal area, the fill lies over tidal bay deposits (NAVFACENGCOM, 1981) which consist of silty clay and occur at a depth of approximately 17 feet. Drill logs from borings on NTC San Diego indicate the fill material consist of clayey to silty sands. The Bay Point Formation Crops out in the higher elevation along the northwest boundary of the NTC San Diego. It is predominantly marine, poorly consolidated, pale brown, fine- to medium-grained sandstone. The unit is fossiliferous, the assemblage consisting of mollusks, foraminifera, and ostracods which indicate a estuarine (brackish water) environment of disposition. From the aforementioned lithographic descriptions it is inferred that the hydraulic conductivity of the hydraulic fill is in the range of 10^{-4} to 10^{-2} cm/sec; and that of the Bay Point Formation is in the range of 10^{-6} to 10^{-4} cm/sec, as are the silty clays of the tidelands bay deposits.

Major north-south trending faults exist to the east and west of the study area. However, no faults cross any of the bases in the study area. Thus, there are no linear zones of high hydraulic conductivity on or near the activities related to fault activity. Therefore there is no opportunity for preferential migration of contaminants along zones of structurally enhanced permeability. The hydraulic conductivity of the tidelands bay deposits is probably lower than that of the overlaying artificial fill. This difference will tend to minimize downward vertical flow of groundwater from the artificial fill into the bay deposits.

3.4 Hydrology

The estuary divides NTC San Diego and MCRD San Diego. Landfilling around and dredging of the channel has altered the shoreline to the point that there is little resemblance of the channel to a natural body of water. The channel is no longer fed by a natural, continuous supply of fresh water at its northern end. At its southern end it opens to the San Diego Bay and is subject to tidal action. Because of the tidal action, water flow in the boat channel is bi-directional, being northward during the flood tide and southward during the abbitide.

Overland surface runoff on the bases is collected by storm sewers that ultimately discharge into boat channel. A concrete lined open channel drainage system is located near the southern boundary of NTC San Diego.

To date, the groundwater at NTC San Diego has not been mapped. Therefore accurate descriptions of flow directions, gradients or divides are not possible. Groundwater occurs at depths of approximately 7 to 11 feet (NAVFACENGCOM, 1981) within the soils of artificial fill and underlying bay deposits in the tidelands areas and probably at slightly deeper depth within the Bay Point Formation in the upland area of NTC San Diego. Recharge to the water table through infiltration of surface water is limited due to the fact that most the area is paved or is covered by lawns and building. Groundwater discharge areas are probably the estuary, the bay front areas at the Harbor Island south of MCRD San Diego, and the commercial boat basin south of Fleet Anti-Submarine Warfare Training Center, San Diego. Flow directions will generally be toward these bodies of water.

Although hydraulic conductivity in the artificial fill is moderate to high, groundwater flow rates in the fill areas are probably slow, on the order of 3 to 30 feet per year. Contributing factors are low recharge rates, and low, flat topography with water table elevations near sea level which generate low gradients. In the upland areas west of NTC San Diego, steeper topography and low to moderately low hydraulic conductivities may contribute to steeper groundwater gradients despite limited recharge. The

gradients in the upland area may be sufficiently steep to create a MRC dynamic groundwater flow rigme. Potential flow rate may be on the order of 10 to 100 feet per year.

The water table is saline and tidally influenced in the northern area of MCRD San Diego. These data are consistent with the proximity of the shoreline of the San Diego Bay to the area in 1939; the emplacement of hydraulic fill using sea water as the hydraulic vehicle in the early 1940s, the limited recharge of fresh water to the water table during succeeding decades; and probable displacement and/or mixing with sea water of recharged fresh water by tidal fluctuation. Because of the similar underlying tidelands geologic materials and the same source of artificial fill and emplacement process it can be assumed that the water table at NTC San Diego is subject to the same hydrologic and water quality influences therefore, the water table in the artificial fill and underlying bay deposits at NTC San Diego is probably saline and subject to tidal fluctuations.

4.0 PREVIOUS INVESTIGATIONS

Documents that contain substantive information concerning the MCRD Disposal Area and the NTC Navy Exchange Gas Station are chronologically listed in Table 4.1 and described below.

4.1 Subsurface Contamination Screening Investigation (Woodward-Clyde Consultants, 1985)

The investigation was conducted to evaluate whether a 100 feet by 200 feet rectangular area adjacent to the eastern boundary of the existing MCRD cogeneration facility and western boundary of the MCRD Disposal Area received significant quantities of hazardous materials associated with motor pool and vehicle maintenance activities at the site.

Nine soil samples and three groundwater samples were collected from nine test pits. The soil samples were analyzed for pesticides and polychlorinated biphenyls (PCBs) total phenols, total organic halides, and total cadmium, chromium and lead. The water samples were analyzed for total oil and grease (page 2). Results showed no evidence of pesticides, PCBs or phenols in the soil. Total organic halides were encountered in the soil at concentrations ranging from below detection limits of 14 ppm to concentrations of 21 ppm. Total cadmium concentrations ranged from below detection limits of 24 ppm to concentrations of 36 ppm. Total chromium concentrations were detected between 3.9 ppm and 14 ppm. Total lead concentrations were detected at levels ranging from below the detection limit of 5 ppm to as high as 41 ppm. The highest concentration of grease and oil in the water samples was 12 ppm. (page 3).

The investigation concluded that it was unlikely that significant quantities of hazardous materials from motor pool and vehicle maintenance activities were disposed of in significant quantities at the site.

4.2 Initial Assessment Study (IAS) (SCS Engineers, 1986)

The IAS concluded that neither the MCRD Disposal Area or the NTC Navy Exchange Gas Station posed an immediate threat to human health or the environment, but that both sites did warrant confirmation studies under the Navy Assessment and Control Installation Pollutant Program to assess potential long-term impacts (page 3.1).

MCRD Disposal Area

The IAS recommended that 40 soil samples be collected from 10 20-foot borings, with four case samples per boring (case samples retrieved every five feet) at the site (page 3.1). It was suggested that one sample from each of the 20-foot borings be analyzed for "organic matter" and chlorinated hydrocarbons. This sample would consist of a composite of four core samples retrieved from each boring. It was also proposed that each boring be converted to a groundwater monitoring well by installing 4-inch PVC with the bottom 5 five feet perforated with 0.020 inch slots (page 3-4). Proposed groundwater samples would be analyzed for chlorinated hydrocarbons, lead and mercury. It was also recommend that five surface samples be collected from five 5-foot boring with one composites sample from each boring (page 3-4). Composite samples from the 5-foot borings would be analyzed for PCBs and landfill gas would be monitored by installing shallow (5-foot) monitoring probes (page 3-4).

Table 4-1

Chronological Document Inventory

Date	Title	Author
October 1985	Report of Subsurface Contamination Screening Investigation Cogeneration Facility Expansion Marine Corps Recruit Depot, San Diego, California.	Woodward-Clyde Consultants
February 1986	Initial Assessment Study of Naval Training Center, Marine Corps Recruit Depot and Fleet Anti-Submarine Warfare Training Center, San Diego, California	SCS Engineers, Inc.
October 1987	Remedial Investigation Verification Step Work Plan Naval Training Center, San Diego, California	IT Corporation

NTC Navy Exchange Gas Station

The IAS proposed 12 soil samples and four groundwater samples be collected at the site (page 3-6). The 12 soil samples would be collected from four 15-foot borings with three case samples retrieved from each boring at 5-foot intervals. Each borehole would be converted to a groundwater monitoring well by installing 4-inch PVC with the bottom five feet perforated with 0.020 inch slots. It was proposed that if gasoline was encountered in any of the soil or groundwater samples, addition monitoring wells would be installed to determine the extent of contaminant migration off-site.

4.3 Remedial Investigation Verification Step Work Plan (IT Corporation, 1987)

The purpose of the work plan was to provide guidance and procedures necessary to determine whether contaminants are present at concentrations considered toxic or hazardous to human health or the environment, and to determine if further investigation would be required to delineate the extent of potential contamination at the MCRD Disposal Area and NTC Navy Exchange Gas Station.

MCRD Disposal Area

The work plan recommended that a total of eight soil borings be drilled to collect soil samples at the site. The borings would be drilled and sampled to groundwater or to a depth of ten feet. Two soil samples would be collected from each boring. The boring locations would be concentrated in the northern quarter of the site, since aerial photographs indicated that dumping was primarily performed in this area (page 3-4). Proposed borings in the central portion of the site would be used to investigate disposal trenches that records indicated were excavated in the fill material and then used for waste disposal. At least two borings would be located in the vicinity of the track and playing courts. Past records show that this areas was the last area to be built up at the site. The work plan also proposed nine monitoring wells be installed at the site (page 3-4). Five of the wells would be installed near the site boundaries to intercept possible contaminant migration. Upgradient wells would provide background data. Four additional wells would be installed in the interior of the site, since this area was determined from records as being most likely contaminated (page 3-4).

It was also stated in the work plan that four existing wells, installed by Woodward-Clyde Consultants in 1986, would be used to collect groundwater samples; a copy of the 1986 Woodward-Clyde report was not available for review during the development of this report.

The soil and groundwater samples collected at the site would be analyzed for volatile organics, semivolatile organics, pesticides, PCBs, polychlorinated dibenzodioxins (PCDDS), metals and cyanide (page 6-1).

The proposed work plan differs from the recommendations in the IAS as follows.

- Nine monitoring wells would be installed and sampled instead of ten. Four existing monitoring wells located on and off site would be used.

- Continuous sampling would be performed instead of the recommended sampling at 5-foot intervals. Samples for analysis would be selected from the continuous core.

- Monitoring wells would be located within the site area in addition to around the perimeter.
- Shallow soil borings would be sampled to approximately 10 feet instead of 5 feet.

NTC Navy Exchange Gas Station

The work plan proposed that six monitoring wells be installed at the site. Each boring would be drilled to a depth of 20 feet and continually sampled during drilling. One soil sample would be collected from each borehole for chemical analysis and one groundwater sample would be collected from each well. One sample of floating product would be collected from the well which contained the thickest layer of measurable product. Also a product sample would be collected from the pump for finger printing purposes (page 3-6) Soil, groundwater and product samples would be analyzed for volatile organic hydrocarbons, total petroleum hydrocarbons and organic lead.

The proposed work plan differs from recommendations in the IAS as follows.

- The number of monitoring wells was increased from four to six
- The boring depth was increased from 15 feet to 20 feet to ensure adequate penetration of the saturated zone

5.0 RECOMMENDED APPROACH

Based on the review of existing documents, a site visit by the Jacobs PjM and discussions with the Navy RPM and Activity Contact, Jacobs has recommended the following approach described below for the SWAT Proposal and Site Investigation work plan.

5.1 Recommended Approach for the Navy Exchange Gas Station (Site 1)

1. Review existing historical documentation of previous site investigations and tank integrity tests. This review will also include a records review at the Regional Water Quality Control Board, San Diego Region and the San Diego County Department of Health Services to determine if information is available on site investigations for gas stations in the near vicinity of Site 1, which would be pertinent to this site investigation.

2. Conduct a soil gas survey at Site 1 to identify soil and/or groundwater monitoring locations. The soil gas survey will be conducted by placing a grid over the entire site. Soil gas samples will be taken at 30-40-foot intervals from a depth of approximately 4 feet. A contour concentration map will be developed from the results of the analyses of the significant volatile compounds measured across the entire site.

3. Soil borings will be drilled in "hot spots" identified by the soil gas survey. Soil borings will be drilled to a depth of 15 feet with samples being taken at 2.5-, 5-, 10- and 15-foot depths. Soil samples will be analyzed for total petroleum hydrocarbons, benzene, toluene, xylene, ethylbenzene and lead.

4. A minimum of four soil borings will be completed as groundwater monitoring wells in order to monitor releases or potential releases from Site 1. The monitoring system will also serve to satisfy the Uunderground Storage Tank Regulations as mandated by the California Administrative Code (CAC), Title 23, Chapter 3, Subchapter 16. Groundwater samples will be analyzed for total petroleum hydrocarbons and benzene, toluene, xylene and ethylbenzene, and lead.

5. A Health and Safety Plan will be written for this site which will be according to Jacobs procedures and guidelines.

5.2 Recommended Approach for the Marine Corp Recruit Depot (MCRD) Disposal Area (Site 3)

1. The previous remedial investigation work plan did not meet the requirements of a SWAT Proposal as required by the State Water Resources Control Board. It is recommended that a new work plan be formulated for this site to comply with state requirements for a SWAT investigation. The SWAT Proposal will also serve to fulfill the requirement for the preparation of a SI work plan for Site 3. The SWAT proposal will include a minimum of four monitoring wells, one upgradient and three downgradient, to characterize the geology and hydrogeology of the site as well as providing monitoring stations to determine if the site has adversely impacted groundwater. The proposal will also include provisions for soil sampling, vadose zone sampling, surface water and sediment sampling. Rationale for selecting the monitoring locations and analytical procedures will be

included in the proposal. General field methods and procedures as described in Jacobs SOPs will be included. A thorough background records search will be conducted to compile all the available information on the site including waste types and quantities, site construction and maintenance and regulatory orders.

2. A Health and Safety plan will be written for this site which will be according to Jacobs procedures and guidelines.