PRELIMINARY ASSESSMENT
ASAN BEACH UNIT
WAR IN THE PACIFIC NATIONAL HISTORICAL PARK
ASAN, GUAM

DECEMBER 2003

Prepared for:
Department of the Interior
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War in the Pacific Historical Park

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Site: Asan Beach Unit
War in the Pacific National Park
Asan, Guam

EPA ID No.: The site has not been entered into the CERCLIS Data Base, therefore, there is no EPA ID number for this site.

Unitek Project No.: 0352

1. INTRODUCTION

In accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA), the National Park Service conducted a Preliminary Assessment (PA) at the Asan Beach Unit (ABU) of the War in the Pacific National Historic Park (WPNHP), Asan, Guam. This PA has been prepared in accordance with US Environmental Protection Agency (EPA) Guidance for Performing Preliminary Assessments under CERCLA. The purpose of this investigation was to collect information concerning conditions at the ABU sufficient to assess the threat posed to human health and the environment and to determine the need for additional CERCLA/SARA or other appropriate action. The scope of the investigation included review of available file information, a comprehensive target survey, and onsite reconnaissance (November 21, 2003).

2. SITE DESCRIPTION, OPERATIONAL HISTORY, AND WASTE CHARACTERISTICS

2.1 Location

The Territory of Guam is the largest and southernmost of the Mariana Islands in the western part of the Pacific Ocean. Guam has an area of about 212 square miles and is approximately 30 miles long ranging between 4 and 11.5 miles wide. The ABU of the WPNHP is located in Asan, Guam (Figure 1). The geographic coordinates are 13^0 28' 28" N Latitude and 144^0 42'32" E Longitude (Reference 1; Reference 2). To reach the site from the Guam International Airport, turn left (west) on to Route 10A to Marine Drive (Route 1). Turn left (south) on to Marine Drive and go approximately 6.5 miles to Asan. The park unit is on the Oceanside of Marine Drive.

Guam is warm and humid all year round, but does have two distinct seasons, one wet and the other dry. The mean annual temperature is 81^0F about which daily maximums and minimums vary no more than 10 ^{0}F. The relative humidity ranges from an average of 65 to 80 percent in the afternoon to 85 to 100 percent at night. The mean annual rainfall over the island ranges from 85 inches on the west cost near Apra to about 115 inches on the jagged limestone peaks of southern Guam (Reference 3, pp. A9, A10, A11).

2.2 Site Description

The total area of the ABU is 554 acres, of which 109 are land acres and 445 are offshore acres. This unit of the WPNHP includes all lands on the ocean side of Marine Drive between and including Adelup and Asan Point (Figure 2). Except for the limestone promontories of these two points, the land is a flat, coastal plain with a sandy beach, 15 to 30 feet wide, fronting the shoreline. The offshore area encompasses extensive reef formations, up to 1,000 feet wide, paralleling the shoreline. Water inside the reef varies from one to four feet deep and during the low tide many areas of the reef are exposed. There is one small island, Camel Rock, near Asan Point (Reference 4, pp. 10, 11, 13). Only the onshore portion of the site was visited during the November 21, 2003 site reconnaissance.

Of the 445 offshore acres, approximately 16.5 acres have been surveyed by the Department of the Navy and have been found to contain approximately 64 tons of unexploded World War II Japanese and American ordnance (Figure 3). The ordnance ranges in size from 0.30-caliber bullets to 500-pound bombs. The ammunition dump at Camel Rock was the result of a post invasion cleanup of ordnance. The Navy gathered the ordnance, sealed them in tar, loaded them on crates and then dumped the crates into the ocean near Camel Rock. (Reference 5, Reference 6, Reference 7, pp. 517, 518, Reference 8, Reference 9).

The 109 land acres include most of the land seaward from Marine Drive from Asan Point to Adelup Point. Non WPNHP developments within this area include six privately owned homes, four small businesses, the old WPNHP Museum, a small park operated by the Government of Guam, and a Government of Guam sewage pumping station (along the central portion of the site) and Government Offices located at Adelup Point. The Asan Point Vicinity or the old "Naval Hospital Annex," encompasses the largest landmass. It contains current WPNHP facilities including roads, parking lots, rest rooms, and WPNHP Monuments. The Asan Point Vicinity also contains the remains of abandoned developments including paved roads, parking lots, concrete building foundations, Japanese Defensive Positions, and a hardfill area (Reference 10, Reference 11, Reference 12).

2.3 Operational History and Waste Characteristics

The historical use of the site is well documented (Reference 13, p. appendix B). The site was used for subsistence fishing, Leprosy Colony, Prison Camp, Prisoner of War Camp,

Quartermaster Depot (including a small arms range), Limestone Quarry, Japanese Defensive Positions, Military Camp, Civil Service Camp, Navy Hospital Annex, Vietnamese Refugee Camp, and finally a National Historical Park.

The small arms range associated with the Marine Corps quartermaster depot mentioned in the 1922 Governor of Guam Annual Report states that target practice was held on the range at Asan, however, it does not explain where the range was located (Reference 14, pp. 47, 48). The WPNHP staff was aware of the range, but did not know its location (Reference 15). The extent of the quartermaster depot facilities or how long they were in use is unknown (Reference 13, p. 76).

The World War II Japanese Defensive Positions that were neutralized during the 1944 US invasion have been surveyed and researched by the WPNHP staff. No obvious hazardous substances remain at these sites (Reference 15, Reference 16, Reference 17, and Reference 12).

All wastes identified during the site reconnaissance of the hardfill area were not CERCLA hazardous substances. The wastes observed were concrete, asphalt, metal, tires, ceramics (from bathroom fixtures), and asbestos (Reference 11, Reference 12). The asbestos was non-friable transite wallboard, therefore, not a CERCLA hazardous substance as per Title 40 Code of Federal Regulations Part 302.

The only documentation of hazardous substances being disposed at the site is the approximately 64 tons of Unexploded World War II Japanese and American Ordnance (Reference 5).

3. GROUND WATER PATHWAY

3.1 Hydrogeologic Setting

The Island of Guam has two very distinct physiographic divisions; the southern half, composed of rugged volcanic uplands, and the northern half, characterized by a limestone plateau. The boundary between the southern volcanics and the northern limestone plateau is approximately 1 mile northeast of the boundary of the ABU at Adelup Point (Reference 18, pp. 3-1, 3-2, Figure 3-2).

Practically all of Guam can be described in terms of two general rock types, limestones and volcanics. In a relative sense, the volcanics are aquicludes when associated with limestones. In an absolute sense, both the limestones and volcanics are aquifers, but the characteristics to store and transmit water are magnitudes more favorable for the limestone (Reference 19, p. 24).

The ABU is located in the Southern Volcanics Physiographic Division of Guam. Geologically, this division is characterized primarily by a dissected and relatively rugged volcanic upland, on which limestones were sometimes deposited, Reference 18, p. 3-1). No drinking water wells are

located in this physiographic division within 4 miles of the ABU, however, there is a spring in Asan that supplies water to the municipal drinking water system (Reference 20, Reference 21). The Asan spring is a high level perched water in a small limestone aquifer lying on an impermeable volcanic basement whose elevation is above sea level. Rainfall infiltrates into the limestone, accumulates in its lower section, and flows along the limestone-volcanics contact to discharge as a spring where the contact is exposed (Reference 19, p. Appendix A-9).

Nineteen drinking water wells are located within a 4-mile radius of the site (Figure 4), however, none of these wells derive their water from the ABU (Reference 20, Reference 21).

The geology of the ABU is varied (Reference 22, p. Plate 1). From the tip of Asan point along the shoreline to the eastern edge of Adelup point, the geology is that of beach deposits. Beach deposits consist of beach sand and gravel, beach rock in the intertidal zone, and patches of recently emerged detrital limestone. Sand generally is less than 15 feet above sea level, seldom as much as 30 feet above. Adelup point's geology is that of Mariana limestone, specifically Qtmr reef facies. Qtmr reef facies are massive, generally compact, porous, and cavernous white limestone of reef origin, especially along cliff faces, made up mostly of corals in position of growth in matrix of encrusting calcareous algae. The elevated portion of Asan Point's geology is also that of Mariana limestone, specifically Qtma Agana argillaceous member. Qtma Agana argillaceous member is coarse to fine grained pale yellow, tan, or brown fossiliferous detrital limestone containing 2 to 5 percent disseminated clay and as much as 20 percent clay in pockets and cavities; includes undifferentiated lenses of above facies. Formation typically unconformable upon underlying rocks. Maximum aggregate thickness of formation is as much as 500 feet in some cliffs. The low-lying flat area in from the beach at Asan Point has the geology of Alluvium. Alluvium clay deposits, mostly 30 to 100 feet thick; muck and clay in marshy estuarine deposits on the west cost, and clay fill in large sinks in limestone areas.

The geology of Asan Point area has been significantly altered by enlarging of the Agana-Sumay Road, quarrying activities, First Camp Asan Construction, Second Camp Asan Construction, Navy Hospital Annex Construction, Super typhoon Pamela clean up, and finally the WPNHP park construction (Reference 4, p. 11, Reference 13, pp. 77, 78, 79).

The depth to groundwater at the ABU is variable and is estimated based on available topographic information (Reference 1). The depth to groundwater from the tip of Asan point along the shoreline to the eastern edge of Adelup point where beach deposits exist is anticipated from 0-20 feet below ground surface. The depth to ground water under the majority of the elevated portions of Asan and Adelup Points is anticipated to be between 20 and 60 feet. Groundwater fluctuations in elevation and flow direction within these areas are anticipated based on tidal influences and proximity of the ocean. The over-all groundwater flow direction under the entire site is to the north towards the Philippine Sea based on the topography in the vicinity of the ABU (Reference 1).

3.2 Ground Water Targets

The population, within a 4-mile radius of the site, obtains their water from municipal water supplies. The closest population center to the site is the village of Asan. The majority of Asan Village Residents receive their water from the Asan Spring, which is a municipal water supply. Some Asan residents located along Marine Drive, and all Piti Village Residents receive their water from the Navy Pipeline, which derives its water from the Fena Reservoir. The remaining population, within the 4-mile radius of the site, receives their water from municipal water supplies derived from both water wells and the Navy Pipeline. Because Guam does not have a separate distribution and transmission water system, there is no way of predicting the source of water for a particular residence (Reference 20).

3.3 Ground Water Conclusions

A release of hazardous substances from unexploded World War II Japanese and American ordnance disposed at the ABU to ground water is not suspected due to the location of the ordinance and geology and hydrology of this area. All residences on Guam receive their water from municipal sources, none of which obtain water from the ABU area.

4. SURFACE WATER PATHWAY

4.1 Hydrologic Setting

Two rivers cross the ABU, the Asan River and the Matque River. Both of these streams have intermittent flow. The Asan River has a US Geological Survey stream gage. The average flow rate of the Asan River is 0.12 cubic feet per second (Reference 23). No hazardous substances are associated with these rivers (Reference 12).

The offshore section of the ABU is located in the Philippine Sea. The hazardous substances within the ABU are located in the Philippine Sea near Camel Rock (Reference 5). Nearshore currents at the ABU are influenced by the North Equatorial Current (NEC), tides, and wind direction. The NEC moves westward across the central Pacific. Surface current directions of the NEC vary from the northwest during the winter to the southwest during the summer. Tides on Guam are semidiurnal with considerable diurnal inequality. Guam lies in the belt of northeast tradewinds. Tradewind flow is dominant during all seasons, but it is especially pronounced during the winter season. A study of nearshore currents of the West Coast of Guam was conducted in 1971 (Reference 24, pp. 5, 6, 71, 72, 86, 87, 99). This study conducted current metering and dye trace studies to determine the best location for sewage outfalls. The study concluded that the current Agana sewage outfall was not a good location because of the eddying nature of circulation in Agana Bay. The study recommended the outfall be placed at the end of Cabras Island. Although not specifically studied, the currents along the ABU can be are

assumed to be similar to those of Agana Bay, as the ABU was not recommended as a location for sewage outfall.

4.2 Surface Water Targets

There are no drinking water intakes located downstream of the site. All residents are served by a municipal system, which obtains it water from surface waters and ground water, are separated physiologically and geographically from the site (Reference 18, p. 3-1, Reference 20, Reference 21, and Reference 22, p. Plate 1).

The Philippine Sea within the ABU is used for subsistence and recreational fishing. Reef fishes are caught with both rod and reel and throw nets. A popular fishing spot is Asan Cut, which is usually fished on a daily basis (Reference 25).

Also with in the ABU is part of the Government of Guam Piti Bomb Holes Preserve. This preserve's primary goal is to restore reef fish populations by restricting fishing. The preserve and surrounding water's are heavily used for water recreation, including snorkeling and SCUBA diving (Reference 25).

Marine mammals and turtles have been observed within the ABU, however, no nesting or birthing activities have been documented in these waters (Reference 25, Reference 26).

No fish tissue sampling has been conducted within the ABU, however, fish tissue sampling has been conducted at Apra Harbor and the Agana boat basin (Reference 25). These samples were collected and analyzed for PCBs.

4.3 Surface Water Conclusions

There are no indications of a release of contaminates to surface water. However, if the hazardous substances near Camel Rock where to release contamination, nearshore currents could spread the contamination to reefs surrounding the site. After storms or heavy surf activity, unexploded ordnance, general small arms ammunition, is occasionally found on the beach of the ABU (Reference 15). When this is reported to the ABU staff, they contact the Navy Explosive Ordinance Personnel to remove the ordnance.

5. SOIL EXPOSURE AND AIR PATHWAYS

5.1 Physical Conditions

The ABU is currently operated by the WPNPS. The park is not fenced, however, vehicles are restricted to two different parking areas. The ocean side parking area has a locked gate that is open from 8:00 a.m. to 3:00 p.m. daily. The Marine drive parking lot is never closed (Reference

15). Access to the surface water section of the park is not restricted. However, local dive shops are informed as to the hazards of diving in the area (Reference 6).

Soils at the ABU are classified into five different categories by the US Geological Survey (Reference 27, p. Sheet 11).

The elevated portions of Asan point are classified as the Ritidian –Rock outcrop complex, 15-20 percent slopes. This unit consists of dissected limestone plateaus and escarpments. Occasional benches and vertical cliffs are present. Soil types are 50 percent Ritidian extremely cobbly clay loam and 45 percent rock outcrop. The permeability of both soil types is moderately rapid or rapid and run off is very slow. These areas are typically forested and used for wildlife habitat and watershed. (Reference 27, p. 51).

The elevated portions of Adelup point are classified as the Guam Urban Land-Pulantat. Soils here are very shallow and shallow, well drained, level to gently sloping soils, and Urban land; on plateaus (Reference 27, p. 11).

The lower elevated portions of Adelup and Asan points are classified as Urban land-Ustorthents complex, nearly level. This unit is 60 percent Urban land and 30 percent Ustorthents. Ustorthents consist of quarried fill material, commonly crushed coral gravel and cobbles and a few pockets of very gravelly clay and clay loam. Some areas are covered with clay or clay loam for lawns or landscaping. Permeability of Ustorthents is moderately rapid. (Reference 27, p.59)

A large section of the shoreline in the vicinity of the Asan Bay is classified as Inarajan Clay, 0-4 percent slopes. The soil of this unit is deep and very deep, poorly drained soils on broad valley bottoms. This soil formed in alluvium derived from volcanic rock and limestone and has slow permeability (Reference 27, pp. 36,37)

A small section of the shoreline in the vicinity of Chorrito Cliff is classified as Agfayan-Akina association, extremely steep. Soils consist of 60 percent Agafayan clay and 30 percent Akina silty clay in this area, both derived from volcanic parent material. Both soil types are well-drained, slow permeability, with rapid runoff and severe hazard of water erosion. (Reference 27, p. 19). This area has been altered by heavy equipment for the construction of Marine Drive.

5.2 Soil and Air Targets

There are park visitors and staff on site nearly every day. The nearest residences are located with in the over all park boundaries. There are six residences and four small businesses located on the central coast between Asan Point and Adelupe Point (Reference 12, Reference 15). The nearest school is located 0.9 miles to the south of the site (Reference 12). There are approximately 2,090 people living with in 0.25 miles of the site (Reference 28, pp. 1, 2). The population within a 4-mile radius of the site is approximately 23,417 as determined by combining the census data of

Asan, Piti, Hagatna, Agana Heights, Chalan Pago-Ordot, Mongmong-Toto-Maite, and Sinajana Districts (Reference 28, pp. 1, 2).

There are no sensitive terrestrial environments within or adjacent to the ABU (Reference 29, Reference 30, Reference 31, Reference 32).

There have been no reports of air emission violations within or adjacent to the ABU (Reference 31).

5.3 Soil Exposure and Air Pathway Conclusions

A release to the soil or air is not suspected because the hazardous substances at the site are located in the ocean near Camel Rock. In addition, no odors, stressed vegetation, blowing dust or soil was observed during the site reconnaissance and interview with WPNPS staff (Reference 12, Reference 15).

6. SUMMARY AND CONCLUSIONS

The only documentation of hazardous substances being disposed of at the site is the approximately 64 tons of Unexploded World War II Japanese and American Ordnance located near Camel Rock (Reference 5). The surface water pathway has the potential to transport contamination to human targets through the food chain. However, there are no indications that such contamination has occurred. Lastly, there is the potential for physical harm for individuals beach walking, wading, free diving and SCUBA diving.

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