REVISED RCRA FACILITY ASSESSMENT REPORT
ATLANTIC FLEET WEAPONS TRAINING FACILITY
VIEQUES, PUERTO RICO
EPA ID. NO. PRD980536221

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LAND POLLUTION CONTROL AREA
HAZARDOUS WASTE BUREAU
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I. INTRODUCTION

A RCRA Facility Assessment (RFA) embraces the identification of past, present or potential releases of hazardous wastes or hazardous constituents into the environment from any unit or activity that involves management of solid wastes as defined in 40 CFR 261.2 in a permitted under interim status facility. The assessment shall address releases of hazardous wastes or constituents to all media including soil, groundwater, surface water, air, and the generation of subsurface gas. Any release that has migrated beyond the facility boundaries shall also be considered. The ulterior purpose of an RFA will be the implementation of corrective action where necessary as mandated by the 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA) of 1976.

The present RFA report is intended to identify the Solid Wastes Management Units (SWMUs) and Areas of Concern (AOCs) that could have potential or a history of hazardous wastes releases at the Atlantic Fleet Weapons Training Facility (AFWTF) of Vieques, Puerto Rico (PRD980536221). The AFWTF is located in the municipality of Vieques in the Commonwealth of Puerto Rico. The facility is situated about seven miles east of US Roosevelt Roads at the Caribbean Sea. Attachment 1 is a map that shows the location of the AFWTF plant within the municipality of Ceiba. The local contact person for environmental affairs is:

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A Solid Waste Management Unit (SWMU) is defined as "any discernible unit at which solid or hazardous wastes have bee placed at any time, irrespective of whether the unit wa intended for the management of solid or hazardous wastes. I would include any area at which hazardous wastes or hazardou constituents have been routinely and systematically released but, it would include accidental spills from production area and units in which wastes have not been manage". In the othe hand, and Area of Concern is defined as "any area at whic hazardous wastes or hazardous constituents have been release but such release is not routinely and systematically done. A AOC also include any area for which there is suspicion that release occurred".

A. History

Vieques lies six miles off the southeastern coast of the Island of Puerto Rico. Nine thousand people live there. Vieques and its surrounding waters constitute a unique ecological entity, including coral reefs, spectacular and environmentally fragile phosphorescent bays, endangered sea turtles, brown pelicans, manatees, and valuable archaeological, historical, and natural resources.

Vieques has a long and varied cultural history. The first inhabitants were Carib Indians who came from continental South American by way of the Lesser Antilles and occupied Vieques and the neighboring island of Culebra on their way to Puerto Rico and beyond. They were displaced in subsequent centuries by waves of French, English, Danish and Spanish settlers. By the 19th Century, Vieques had achieved a substantial measure of social and economic stability. In the wake of the Spanish-American War, Vieques, along with the rest of Puerto Rico, came under the political control of the United States.

Today, Vieques is in economic disadvantage. Cane crop is one of the dominant industries in the island as recently as three decades ago, has largely disappeared. Fishing, small-scale agriculture, and livestock production are now the principal economic activities of the island's inhabitants.

During World War II, the Navy acquired title to over 79 percent of the land on Vieques. From 1939 to 1970, air-to-ground and ship-to-shore training conducted by the Navy in the Atlantic Fleet Weapons Range was almost entirely aimed at targets on Culebra, a sparsely inhabited island located nine miles to the north of Vieques. Vieques was used principally for small-scale artillery training. Navy activity on Vieques before 1970 was relatively insubstantial in comparison to the levels of Navy training then being conducted on Culebra, and the subsequent levels of activity on Vieques. (See Attachment #2 for Civil Action Barceló vs. Brown, April 30, 1980)

The NAVY realized that, due to the controversial nature of its training programs on Culebra, the transfer of programs to Vieques was likely to spark opposition and had to be achieved slowly. In a confidential communication in December, 1971, a Navy official wrote, "With regard to Vieques, ...we should be very careful not to appear to increase our tempo of operations above that of previous years..." An internal Navy memorandum in april, 1972, warned that because of the "extreme sensitivity" of any plan for transferring Culebra operations to Vieques, all Navy message traffic on the subject should be "flagged limited distribution special handling".

Between 1971 and 1975, the Navy gradually and steadily transferred training activities from Culebra to Vieques. By the end of 1975, the Navy had transferred to Vieques all of the military training activities that had previously been conducted on Culebra that could be moved to Vieques. As a result of the shift of training from Culebra to Vieques, the Navy has tremendously intensified the level of weapons firing against Vieques. Combined weapons training activity (simultaneous ship-to-shore and air-to-ground bombardment) on Vieques increased from five hours in 1970 to 362 hours in 1977. The Navy dropped approximately 3,886,000 pounds of ordnance on Vieques in the first six months of 1978. Between 1974 and 1977, the Navy increased by over 900 percent the number of 500 (MK82), 1,000 (MK83), and 2,000 (MK84) pound bombs dropped on and around Vieques.

B. Current Facility Operation

Vieques Island is located approximately seven miles southeast of the U.S. Naval Station Roosevelt Roads, Puerto Rico. With a local surface area of roughly 33,000 acres, approximately 22,600 acres of Vieques Island are owned by the U.S. Navy. this is comprised of three areas: (1) the Naval Ammunition Facility (NAF), comprised of 8,000 acres and located on the western most tip of the island; (2) the Eastern Maneuver Area (EMA), comprised of 11,000 acres and located within the east-central portion of the island; and (3) the Atlantic Fleet Weapons Training Facility, comprised of 3,600 acres and located on the eastern portion of the island. EMA and AFWTF are collectively known as the Inner Range, which encompasses the area extending to a limit of three miles from the shoreline. The AIA is located within the AFWTS; this impact range is primarily utilized for the above-described gunfire and ordnance delivery training activities. Attachment 2 presents a vicinity map which shows the AFWTF location relative to Puerto Rico, Naval Station Roosevelt Roads, and other nearby islands.

Within the Inner Range, the Atlantic Fleet's ships, aircraft and marine forces carry out training in all aspects of naval gunfire support, air-to-ground ordnance delivery, air-to-surface mine delivery, amphibious landings, small arms, artillery and tank fire, and combat engineering. In addition, the AIA is used semiannual for the treatment of retrograde (unserviceable ordnance) which is classified as a hazardous waste. These materials are treated through open burning/open detonation (OB/OD).

The AFWTF, located on the eastern tip of the island, is tasked with providing facilities and scheduling naval gunfire support and air-to-ground ordnance delivery training for Atlantic Fleet ships, NATO ships, air wings, and smaller air units from other allied nations and the Puerto Rican National Guard. In addition, AFWTF operates other military facilities which are not located on Vieques.

The Eastern Maneuver Area is located adjacent to and to the west of the AFWTF. The Fleet Marine Force, Atlantic, conducts training for Marine amphibious units, battalion landing teams and combat engineering units on the Eastern Maneuver Area. On occasion, other allies having a presence in the Caribbean and the Puerto Rican National Guard also utilizes the Eastern Maneuver Area.

Ammunition is stored at the Naval Ammunition Facility on the western tip of Vieques Island. Operated by the Weapons Department of Naval Station Roosevelt Roads, the Naval Ammunition Facility's mission is to receive, store and issue all ordnance authorized by Naval Station Roosevelt Roads for support of the Atlantic Fleet units.

The west-central portion of the island is privately owned. Several small towns and villages are located within this area. Cattle grazing is the primary land use in this area. In addition, sections of the EMA, excluding the AIA, are leased to local ranchers for cattle grazing.

These tree facilities constitute 22,000 acres of the 33,000 acres of Vieques Island. The remainder of the island is owned by either the Commonwealth of Puerto Rico or private individuals. The activities of the AFWTF, the Eastern Maneuver Area and the Naval Ammunition Facility function under the consolidated command of Commander Fleet Air Caribbean and Naval Forces Caribbean, whose headquarters are at Naval Station Roosevelt Roads. The commanding officer of AFWTF has jurisdiction over scheduling all naval exercises in the Inner Range.

C. Identification of All Waste Stream

One of the reasons this facility is considered miscellaneous unit is the unique nature of the waste treatec Unlike drums of spent solvent, these wastes are packaged i devices such as bombs, grenades, rockets and flares. Further these items have a long history (prior to RCRA regulations) o being tracked from cradle-to-grave for safety purposes.

An extensive series of standard operating procedures technical manuals, technical bulletins, and field publications provide instruction on the proper methods and techniques of treating explosive ordnance. These include NAVSEA OP-5 (Ammunition and Explosives Ashore Safety Regulations for Handling, Storing, Production, Renovation and Shipping) and the 60-series publications. EOD utilizes OP-5 procedures in conducting OB/OD operations; however, due to the unique aspects of each operation, field decisions based on field conditions and the technical expertise of the EOD personnel are also made. The 60-series publications are a collection of over 1,700 documents providing detailed handling and disposition instructions for individual types of ordnance. Ordnance specific technical manuals (TMs) and field manuals (FMs) also provide information on ordnance disposal.

Through their extensive training, EOD Technicians are capable of identifying ordnance through many means. First, all explosive ordnance is labeled with a specific military number. From this number, the ordnance can be identified. Once the ordnance has been identified, the type of explosives, propellants or pyrotechnics in the ordnance can be identified.

One possible exception to this is the ash generated during open burning. While this ash will almost certainly no longer have the hazardous characteristic of reactivity, it may have the hazardous characteristic of toxicity as defined by the TCLP analytical procedure. Previous experience indicates that the ash is not a hazardous waste. However, it will be drummed and transported to the mainland as a potential hazardous waste. The ash will be stored in the Roosevelt Roads hazardous waste container storage facility until it is sampled and analyzed to determine if it meets the definition of a hazardous waste. If the ash should meet this definition, it will be declared a hazardous waste at that time and will be stored, treated and disposed of per all applicable federal and Puerto Rican hazardous waste regulations.

DESCRIPTION OF ORDNANCE

Explosives

Explosives fall into one of the following two categories:

- Detonating or high explosive materials:

  (a) Primary, or initiating explosives (detonators), such as lead azide, mercury fulminate, lead (lead trinitroresorcinate).

  (b) Secondary explosives such as TNT-AN, Tetryl, PETN, RDX, TNT, ammonium picrate, picric acid, DNT (Dinitro-toluene).

- Deflagration or low explosives such as smokeless powder (colloided cellulose nitrate), black powder nitrocotton.

Primary or initiating high explosives are quite sensitive materials which can be made to explode by the application of fire or by means of a blow. They are very dangerous to handle and are used in comparatively small quantities to start the explosion of larger quantities of less sensitive explosives.

Secondary high explosives are materials which are quite insensitive to both mechanical shock and flame but which explode with great violence when set off by explosive shock, such as that obtained by detonating a small amount of initiating explosive in contact with the high explosive. Decomposition proceeds by means of detonation, which is rapid chemical destruction progressing directly through the mass of the explosive. Detonation is thought to be a chain reaction and proceeds at rates frequently as high as 6,000 m/s. It is this high rate of energy release, rather than the energy given off that makes a product an explosive. Nitroglycerin has only one-eighth the energy of gasoline. On the other hand, most high explosives, when unconfined or unshocked, will merely burn if ignited.

Low explosives, or propellants, differ from high explosives in their mode of decomposition; they only burn. Burning is a phenomenon that proceeds not through the body of the material but through layers parallel to the surface. It is quite slow in its action, comparatively speaking, rarely exceeding 0.25 m/s. The action of low explosives is, therefore, less shattering. Low explosives evolve large volumes of gas on combustion in a definite and controllable manner.

Possibly the most powerful non-atomic military explosives are cast aluminized mixtures such as Torpex and HBX (RDX, TNT, aluminum and wax). Because military requirements are extremely strict, only a few explosives have survived competitive testing.

Projectiles

A high artillery shell consists of thin brass or steel cartridge case holding the primer, igniter, and propellant charge. This case is designed to fit smoothly into the gun and, on explosion, to expand, scaling the breech of the gun so that the escape of gases from the burning of the propellant charge is prevented, thus allowing the full effect of the propellant to be exerted on the projectile (destructive half of the shell).

The primer contains a small amount of primary explosive or sensitive mixture (e.g., $KCLO_3$ + $Pb(CNS)_2$ + Sb_2S_3 + TNT + ground glass).. This mixture explodes under the impact of the firing pin and produces a flame which ignites the black powder charge in the igniter, in turn igniting the propellant charge of smokeless powder. The burning of the smokeless powder causes the rapid emission of heated gas, which ejects the propellant from the gun. At the target, upon impact or upon functioning of the time fuse mechanism, a small quantity of primer (detonator) is set off; this causes explosion of the booster, an explosive of intermediate sensitivity (between that of a primary explosive and the bursting charge), which picks up the explosive wave from the primary explosive, amplifies it, and ensures complete detonation of the bursting charge. The bursting charge, or high explosive, is usually TNT alone or mixed with ammonium nitrate, RDX, PETN, and ammonium nitrate.

Smoke Producing Ordnance

Various chemicals have been used to produce smokes or fogs primarily designed to conceal the movements of troop or installations from enemy observations. Screening smokes are basically of two compositions: (1) dispersion of solid particles in air, which correspond to true smoke, and (2) dispersion of minute liquid droplets, which resemble natural fogs or mists. One of the important innovations of World War II was the use of smokes not dependent on waste but prepared by atomization of high boiling fractions of petroleum. Much of the hiding effect of all smokes is due to their ability to scatter light waves by reflection.

This is more effective than obstructing. Smokes may be dispersed by various methods including mechanical, thermal, and chemical.

White phosphorus is loaded directly into shells, bombs, and grenades in the molten state. The material is dissipated by the force of the explosion and immediately burns to P_2O_5. In terms of pounds of smoke producing agent, this is the most efficient obscuring smoke. The smoke causes coughing and acid burns. These particles also have some incendiary effect. It has been improved by the development of plasticized white phosphorous.

Hexachlorethane is employed in mixtures with finely powdered aluminum and zinc oxide which are started by a fuse. the burning power here is that of phosphorous. The $ZnCl_2$, which is hygroscopic, attracts moisture to form a fog, the finely divided Al_2O_3 deflects the light rays and the carbon colors the cloud gray. These mixtures are used in shells, grenades, and floating smoke pots and are known as volatile hygroscopic chloride.

A mixture of sulfuric trioxide and chlorosulfuric acid is used which hydrolyses in air to produce and acidic mixture. This blend of chemicals is used by low flying airplanes equipped with spray tanks and replaces the more costly titanium tetrachloride. The resulting fumes are highly acidic and cannot be handled by troops. The screening power of the smoke due to the hygroscopic action is not nearly as effective as that of phosphorous. this compound is also more difficult to store and handle.

Colored smokes are produced by burning a pyrotechnic mixture of fuel and various colored organic dyes. Anthraquinone dyes provide superior characteristics when dispersed into the air, where they act as aerosols of brilliant hue. They are used for signaling purposes.

Pyrotechnics

Pyrotechnic compositions engage in oxidation-reduction reactions that resemble that of propellants and explosives, but generally produce little or no gas. They are heterogeneous mixtures of finely powdered metal, metal alloy, or organic fuel and inorganic oxidizers. Such compositions are commonly used for flares, signals, tracers, incendiaries, delays, igniters, heating mixtures, and in devices where the formation of much gas is unacceptable either because the gas pressure causes unwanted changes in the reaction rate or the system is not designed to withstand the pressure without rupturing. Although pyrotechnic compositions are composed of inert ingredients, their accidental initiation during the manufacturing process may be accomplished by the same catastrophic consequences that attend explosive detonations. Mixtures of finely divided oxidizers and metals are sensitive to initiation by friction or by spark.

Propellants

Rocket propulsion fuel systems derive their energy from chemical sources. Propellants are low explosives and carry their own oxidant or other reactant necessary to cause the planned reaction. The thrust of the escaping hot gases pushes the device forward, according to the principle that forces act equally in opposite directions. Propellant fuels are presented under liquid and solid, or castable. Actually there is a great variety of choices in which a combination of energy sources and conversation mechanisms are used for the design of efficient propulsion systems.

Solid propellants are simple in design and more easily handled than liquid propellants. Originally solid propellants were classified in two groups: (1) heterogeneous or composite propellants (oxidizer and reducer present in two distinct phases), and (2) homogeneous, or double based (oxidizer and reducer present in a single distinct phase, e.g.,

nitrocellulose dissolved in nitroglycerin). Small percentages of additives are used to control the physical and chemical properties of the solid propellant. Composite propellants commonly use ammonium perchlorate to supply the oxygen required for the reaction. The most common gaseous products of the oxidation-reduction reactions are hydrogen, water, carbon monoxide, carbon dioxide, and nitrogen.

Propellants generally operate at low pressures up to about 2900 psi in rockets and up to about 100,000 psi in high performance guns. The process is characterized by a reaction front that moves in a direction normal to the exposed surface of the grain, processing from the outside to within in laminar layers. The rate of burning depends on the intrinsic rate of decomposition of the propellant and the rate of heat transfer from the hot gases above the propellant surface.

III. ENVIRONMENTAL SETTING

Topography

The topography of Vieques is characterized by a series of low hills and small valleys. The areas of highest elevation are generally found along the east-west longitudinal axis of the island, and exhibit a more angular block structure than the adjacent lower hills lying north and south of the main axis. The hills on the western end of the island generally differ in form and character from those on the eastern end of the island. The hills in the west are gentler and more rolling with a deeper soil profile than those on the east end, which are angular and rugged in appearance and have a greater amount of exposed rock surface. The highest point on the western end of the island is Monte Pirate (elevation 1,000 feet); on the eastern end, the highest point is Cerro Matías (elevation 420 feet).

In addition to the hilly central portion of the island, there are several low-lying coastal zones. The largest zones are located in the northwest corner of the island, on the east end north of Bahia Salina del Sur, and in the southern valley between Esperanza and Bahía Tapón. These coastal zones are generally level and contain extensive lagoons and mangrove swamps.

The topography of the OB and OD units is basically level. There are no specific drainage patters due to the presence of a series of small irregular drainage basins which are continuously altered by the bombing activities. The area generally slopes in a southwesterly direction toward Laguna Anones.

Geology

The geology of Vieques is characterized by three major rock types in the upland areas, and unconsolidated sedimentary deposits in the lowlands. The three main rock types are Upper Cretaceous volcanic rocks, Upper Cretaceous or Lower Tertiary intrusive rocks, and Upper Tertiary and Quaternary sedimentary rocks. The consolidated sedimentary deposits of Vieques are of Quaternary age and consist of alluvial deposits, beach and dune deposits, and swamp and marsh deposits.

The oldest rocks exposed on Vieques are presumed to be of Upper Cretaceous age and are mostly andesites, tuffs, and conglomerates. It is generally believed that these rocks were deposited in a marine environment, and that they are similar to rocks of this age found on Puerto Rico and the Virgin Islands. The bedding thickness of these deposits is believed to vary across the island; total thickness is difficult to determine because of metamorphism of the rocks and generally poor surface exposure. These volcanic rocks are most common on the eastern end of the island.

During the Upper Cretaceous or Lower Tertiary period, the emplacement of a quartz diorite complex pluton resulted in the deformation and metamorphosis of the Cretaceous volcanic rocks. The quartz diorite plutonic rocks outcrop over a large percentage of the island, particularly in the western and central portions. The pluton is divided into two major bodies by a narrow belt of metamorphosed andesites and andesite tuffs running from Isabel Segunda to Bahia de la Chiva. The western pluton is generally coarse-grained and equiangular in texture, while the eastern pluton is generally finer grained with a microgranitic texture.

There are also well distributed local occurrences of mafic intrusives throughout the island. Dark-colored, fine-grained dike rocks outcrop at various locations throughout the island, while coarse-grained rocks of varying color and texture outcrop at the western end of the island in the quartz diorite complex.

Limestones of Upper Tertiary age outcrop at three major areas on the island. There are limestone headlands located on the south coast opposite Camp García and also on the extreme eastern tip of Vieques. A third outcrop of limestone, approximately 50 feet thick, covers two acres of Punta Caballo on the north coast. Limestone was once a widespread deposit around the coast of Vieques, but has since been eroded. The limestone is locally known as the Puerto Ferro limestone and is of Tertiary-Miocene age. The thickness is 125 to 140 feet on the south coast and 160 to 175 feet on the eastern tip of the island. On the south coast, the limestone rests on granodiorite basement rock.

Quaternary deposits include beach, swamp, and alluvial deposits. Alluvial deposits of Quaternary age blanket most of the valleys of Vieques. On the south coast these areas include: the area from Esperanza to Camp García, the area around Ensenada Honda, and the area around Laguna Playa Grande. On the north coast they include the Valle de Resolución de Hacienda Arcadia area. Alluvial deposits are stream-laid silt, clay, and gravel derived from the disintegration of diorite or volcanic rock. Fringing the drowned shoreline of Vieques are assorted deposits of beach and windblown sand and lagoon and salt marsh mud. These deposits are Pleistocene to Holocene in age.

There are two potentially important geologic resources on the island of Vieques: sand, and crushed or quarried stone. In addition, various studies have revealed copper mineralization occurrences over several areas of the quartz diorite intrusives, and the various limestone deposits have been investigated as possible sources for cement and crushed stone. However, little potential exists for profitable exploitation of the copper minerals because of a lack of concentrations extensive enough to warrant development; and most of the limestone has been found to be too soft to be used for crushed stone and of insufficient purity to be used for cement.

There are two major types of sand deposits found on Vieques. The first type is an alluvial deposit found in valleys filled with the material formed from the weathering of the quartz diorite intrusive. The deposits, which are found primarily on the western end of the island, consist of coarse siliceous sand. Several alluvial sand deposits are currently being exploited; however, all of these are relatively small operations. The sand from these deposits is used primarily for construction purposes including concrete, mortar, and fine aggregate for building block construction. A large deposit of alluvial sand, offering good potential for development, is present along Quebrada La Mina.

The second type of sand deposit is a marine-deposited calcareous sand located on the fringe beaches. These deposits are not of sufficient quantity to warrant long-term development.

The quartz diorite of the west-central part of the island offers excellent potential for crushed or quarried stone operations. Several small sites in this area are presently being worked by hand methods. In addition, the Navy operates a quarry in metamorphosed volcanics near Desembarcadero Mosquito which produces substantial amounts of stone for military construction. Several other inactive quarries are also present on the island. Sufficient quarry stone appears to be available for the island;s construction needs.

Soils

The majority of the soils on Vieques are residual in nature. Because of the tropical wet and dry type climate and the relatively impermeable intact volcanic rock, soil development has been severely limited on the eastern portion of the island, resulting in a very shallow soil profile. Generally, the soils on the eastern end of the island are fine-grained with a high clay content. The soil profiles on the western end of the island, which are somewhat better developed, have been formed by the weathering of the underlying granite intrusive.

The larger valleys of Vieques are blanked and filled by alluvial deposits of Quaternary age. These stream-laid deposits consist of clay, silt, sand, and gravel derived from the parent volcanic or intrusive rock. The larger valleys include Valle de Resolución on the northwest side of the island and the large valley stretching from Esperanza to Camp García on the south coast. Although the alluvial deposits in these valleys vary in thickness, they are generally greater than 40 feet thick. In addition to the major soil areas mentioned above, the areas along the shoreline are covered with deposits of beach, alluvial and windblown sand, lagoon and salt marsh muds.

The island of Vieques, due to its small size and relatively uniform climate, has a limited range of soils series. The Descalabrado soils are the most common in Vieques, covering more than 30% of the total land area. They are moderately steep to steep (5% to 50%), shallow, well-drained solid which are found above consolidated volcanic rocks.

They were formed in a medium to fine-textured residuum derived from this same rock. The surface layer is typically very dark brown to dark grayish-brown, 3 to 7 inches thick. The type of vegetation which usually occurs on this soil type largely consists of grasses and shrubs. All types or phases of this soil series on Vieques have severe limitations for both agricultural and non-agricultural land uses due to low rainfall, steep slopes, shallow soils, and in come cases the presence of rocks. All these soils are easily eroded. Virtually all are classified with a land capability that restricts use to grazing, woodland, or wildlife.

The Vieques series is found on another 26% of the island's total land area. Vieques soils occur on moderate to steep slopes (5% to 40%) in the dry uplands. They are formed from partially weathered granitic rocks. They are shallow, and in a typical profile the dark brown surface layer is 4 to 8 inches thick. Drainage is good, runoff medium, and permeability moderate. Texture ranges from loam to clay loam. Associated series are the Descalabrado, Coamo, and Guayama, all of which also form significant portions of the island's surface area.

The Coamo series constitutes almost another 16% of the total land area of the island. Coamo soils are gently sloped, deep, fairly rich soils which have a variety of uses if properly managed. Characteristically, they are deep and well-drained, occurring over deep layers of stratified coarse-textured materials. They formed in sediments derived from volcanic and limestone rocks. Usually, the surface layer is very dark brown, and slightly acidic to neutral. Subsoils are mildly to moderately alkaline. Typical natural vegetation consists of xerophytic trees and brush. This soil series is considered good for agriculture.

At least 8% of Vieques' surface is covered by a land type called simply rock land, where rock outcrops cover 50% to 70% of the surface area, or where loose stones and boulders are common. The shallow soil between and around the rocks is insufficient to be classified by soil series. The slope gradient ranges from 60% to 70%. Natural vegetative cover is usually brush and wild grasses, though on Vieques some of the higher undisturbed peaks are still forested. There are two subcategories of the rock land type on Vieques; volcanic rock land and limestone rock land. Neither has any agricultural or engineering uses. The capability unit classification restricts use to wildlife habitat, recreation, and aesthetic purposes. The OB and OD units are located in an area of the AIA primarily characterized as rock land.

The remaining 15% of the island's area is distributed in nine additional series of varying quality. They are Ametia, Cartagena, Cataño, Coastal Beaches, Descalabrado, Fraternidad, Jacana, Pandura, Paso Seco, Pancena and Pozo Blanco.

Air-to-Ground Ordnance (ATG) delivery and Naval Gunfire Support (NGFS) training activities in the AFWTF result in disturbance to vegetation and surface and subsurface soils which could lead to accelerate soil erosion. However, natural conditions of topography, soils precipitation, vegetation, and drainage patterns in the AFWTF minimize the soil erosion potential. In general, the topography in the Air Impact Area (AIA) is relatively flat, and the drainage basins are small with no defined drainage channels. The soils are very porous, and rainfall is suspected to be lower than for the western portions of the island. With the exception of the target areas themselves, the access roads and the Eastern and Western Friendly Front Lines, the AIA is well-vegetated. Most of the target are located on hilltops and are surrounded by well-vegetated slopes which trap and hold sediment eroded from target areas. The bombing also creates a cratered landscape which helps to retard surface runoff and minimize erosion. Some mitigation measures have been implemented which also have reduced soil erosion and sedimentation. These measures include berms and sediment basins constructed around the mock air strip which help minimize erosion to Laguna Anones.

Surface Water

The topography of Vieques consists of a series of low hills and shallow valleys with an average elevation of about 200 feet above sea level. The highest point on the eastern end of the island is Cerro Matías; on the western end of the island, the highest point is Monte Pirata. The higher elevations are generally along the east-west axis of the island. From the high points, small, normally dry streambeds or quebradas flow either north or south toward the sea. This division of the drainage results in many small drainage basins, most of which are less than a mile in length, only a fraction of a square mile in drainage area, and have no well-defined drainage channel.

Vieques has no perennial surface drainage. Rainfall on Vieques ranges from 25 to 45 inches annually. Thirty-six inches is considered the average annually precipitation for the island as a whole. Based on features for the U.S. Virgin Islands, the amount of water that evaporates and is transpired back into the atmosphere is about 90% of the rainfall.

An additional 5% is infiltrated and recharges groundwater aquifers. Thus the amount of rainfall that is accounted for by runoff is only 5%. In the rainy season, channels in many of the valleys contain runoff; however, in the dry season, the streams tend to pond or dry up entirely. Groundwater discharge sustains several springs in the quebradas during the dry season. One of two steams are said to have flowed continuously at some time in the past, probably before well fields lowered the water table.

The nearest surface water bodies to the OB/OD units are the Laguna Anones and the Caribbean Sea. Laguna Anones, located approximately 1/8 mile from the OB unit and 1/4 mile from the OD unit, is the nearest water body. The majority of runoff from the two units would drain into this lagoon. Samples taken under the NPDES program from this lagoon revealed no indications of contamination.

Groundwater

Vieques has two major aquifers: the Valle de Resolución aquifer located beneath the western portion of the island within the NAF, and the Valle de Esperanza aquifer located within a 4-square-mile area between the village of Esperanza and Camp García on the southern portion of the island. Of these, the Valle de Esperanza is more productive. Prior to the installation of the water line from the main island of Puerto Rico in 1978, the Valle de Esperanza aquifer supplied most of the potable water for the island. This aquifer currently serves as the water supply source for Camp García and OP-1 only.

To supply the island with potable water before the installation of the water pipeline, the Puerto Rico Aqueduct and Sewer Authority, or PRASA, maintained a network of 16 wells which cumulatively pumped 450,000 gallons per day (gpd). The PRASA well field, located in Esperanza, is currently not in use.

The US Geological Survey (USGS) recently completed a two-year study of groundwater resources in Vieques in general and in the Valle de Resolución and Valle de Esperanza in particular (Torres 1985). The study showed rainfall to be the primary source of local groundwater, recharging aquifers through infiltration.

Analyses of samples from wells near Esperanza revealed that groundwater is a sodium-bicarbonate type generally characterized as hard and suitable for uses other than irrigation. Because of high sodium levels, untreated groundwater used for irrigation on a long-term basis would result in the accumulation of salts in the soils (Torres 1985). The relatively high concentrations of chloride previously recorded (i.e., in 1977) in groundwater from the Valle de Esperanza aquifer are attributed to seawater encroachment as a result of excessive groundwater withdrawals, and to the accumulation of salts from infiltration of sea spray, a condition typical of islands with low rainfall. Since withdrawals from the PRASA wells have been discontinued, chloride concentrations in the groundwater have decreased substantially from 205 milligrams per liter (mg/l) to 94 mg/l (Torres 1985).

Climate

Vieques' climate is tropical-marine, with minimal fluctuations in temperature. Easterly trade winds, which blow directly across the island year-round, moderate the tropical heat considerably.

The US Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), has established two weather stations on Vieques since 1982; one located near the main gate at Camp Garcia, and one located in the main area of the camp. However, data from these station have been erratic, with only one station (the one near the main gate) reporting sufficient daily values to warrant publication. This station records only precipitation and temperature.

The mean annual temperature on Vieques is approximately 79°F to 80°F, with little variation in mean monthly temperatures. Historical data show August as the warmest month, at 81.8°F, and February the coldest, at 76.0°F. The minimal variation in monthly temperature ranges is attributed to two factors. First, the island is surrounded by water, the temperature of which changes little from the warmest to the coolest season; and second, the island is near the equator, which accounts for the relatively small differences in energy received from the sun from season to season. Monthly extreme temperatures at Esperanza ranged from 98°F to 60°F for a 14-year period of record. The mean daily temperature range (the difference between the daytime maximum and the nightime minimum) is estimated to be between 15° and 25°.

There is little information on rainfall patterns on Vieques. Available data from the western end of the island indicate that an average of approximately 45 inches of rainfall occur annually. However, it is reported that rainfall varies from east to west across the island, ranging from an estimated annual average of 25 inches in the east to between 45 and 50 inches in the west, and on an island-wide basis, average rainfall is estimated to be 36 inches per year. However, there are no data to support this conclusion. The island's rainy season is typically characterized as August to November, although rain showers occur frequently throughout the year.

IV. SUMARRY OF VISUAL SITE INSPECTION

The Permits and Engineering Section performed a Visual Site Inspection on June 5, 1995 as requested by EPA to the Atlantic Fleet Weapons Training Facility (AFWTF) in Vieques, Puerto Rico. The purpose of this inspection was to familiarize the EQB personnel with the facility and to update its RFA.

The following personnel were present during the visit:

Bob Lucas
Explosive Safety
ATWTF

Sindulfo Castillo
Director
Environmental Engineering Division
Public Work Department
US Naval Station Roosevelt Roads

Herminio Concepción - EQB

Nancy I. Meléndez - EQB

Oneida Delgado - EQB

We arrived at the wharf and met with Mr. Sindulfo Castillo and then we took the Navy Ferry to Vieques Island. At the observation post we met Bob Lucas (Explosive Safety) to discuss information needed. Then, we were moved to the open detonation area, and were informed that no hazardous wastes resulted from the activities. Photos were taken from the open detonation area. Information from all the units identified in the RFA of 1988 was requested.

The area where the units are located is a range used by the Navy for target practice. The area is bombed over 200 days per year with the same types of ordnance which are treated at the OB/OD units. Once or twice each year, the Navy Explosive Ordnance Detachment (EOD) clears paths into the target area so that the targets can be repaired. As part of this path clearing exercise, undetonated ordnance is located, removed from the soil and detonated for the purpose of safety. It should be noted that neither the target practice or path clearing activities are subject to regulation under RCRA.

still true - MMR exempts

Material to be detonated is carefully placed in the hole according to NAVY's SOP's. Demolition material which is used to destroy the ammunition or components is transferred from storage to the demolition range. A primer cord is attached to the demolition material and blasting caps are attached to the primer cord. The primer cord is then attached to the circuit wire and the bulldozer then covers the ammunition or components. Operators then retire to a protective distance, unlock control panel, and detonate the ammunition or component.

IV. EXECUTIVE SUMMARY

A RCRA Facility Assessment was conducted at the Atlantic Fleet Weapons Training Facility (LANT) including Camp García, the Eastern Maneuver Area and the Inner Range to identify solid waste management units (SWMUs) and other areas of concern (AOCs) and to assess the potential for release of hazardous wastes and hazardous constituents from these units to the environment. The description of SWMUs and AOCs and the assessment of potential for releases were based upon a Preliminary Review (PR) of existing information and a Visual Site Inspection (VSI) of the facility. Primary sources of existing information included the Region II office of the Environmental Protection Agency in New York and the Environmental Quality Board of Puerto Rico.

The Atlantic Fleet Weapons Training Facility includes approximately 14,500 acres on the eastern end of Vieques Island. The facility includes Camp García, the Eastern Maneuver Area, and the Inner Range. The facility is geographically located approximately seven miles east of Puerto Rico. Vieques Island is a long, narrow island, approximately 52 square miles in total area.

The U.S. Navy began using Vieques in conjunction with Naval Station Roosevelt Roads in the early years of World War II as a base for Allied fleets. Land was acquired in the eastern and western sectors of the island between 1941 and 1943. The LANT facility is operated by the U.S. Naval Station Roosevelt Roads (USNSRR) for naval training exercises and explosive ordnance disposal. Naval weapons training is conducted at the Inner Range located on the eastern tip of the island, while troop exercises are conducted at the Eastern Maneuver Area (EMA) in the western portion of the facility, southeast of Camp García. Although the facility occupies a total of approximately 14,500 acres, most of that area is used for training exercises. The facility employs no industrial or process operations and generation of wastes is limited to maintenance of vehicles and equipment and the disposal of explosives wastes. Wastes generated during maintenance activities include oils, lubricants, solvents, paints, batteries, and battery acid which are all disposed off-site. The explosive wastes are generated by the LANT facility as well as the Naval Ammunition Facility and U.S. Naval Station Roosevelt Roads and are disposed on-site by open burning in a RCRA interim status unit (SWMU#3).

The RFA resulted in the identification of 11 SWMUs and 8 AOCs. The units which presently handle wastes include the Waste Explosives Ordnance Detonation Range (SWMU#3), the Explosive Ordnance Firing Range (SWMU#9), and the Non-explosive Ordnance Firing Range (SWMU#11). Other wastes are temporarily accumulated in the Spent Battery Accumulation Areas (SWMUs #4 and #5) and the Waste Oil Accumulation Areas (SWMUs #6, #7, and #8). Domestic sewage is treated in the Sewage Treatment Lagoons (SWMU#10). Former waste management units include the Camp García Landfill (SWMU#1) and the Fuels Off-Loading Site (SWMU#2).

The primary units of concern include the closed Camp García Landfill (SWMU#1), the Fuels Off-Loading Site (SWMU#2), and the Detonation Ranges (SWMUs #3, #9, and #11) which all represent a potential for release to soil, groundwater and surface water. Further actions were suggested at 9 of the 11 SWMUs and at 2 AOCs. Further actions included soil sampling, surface water and sediment sampling, verification of unit integrity, and requests for additional information. The table summarizes the SWMUs and AOCs and suggestions for further action, if any, at each unit. This table provide additional descriptions of further actions which have been recommended and the basis for these recommendations.

SUMMARY OF SUGGESTED FURTHER ACTIONS

UNIT NUMBER	UNIT NAME	COMMENTS
1	Camp García Landfill	Soil sampling
2	Fuels Off-Loading Site	No further action
3	Waste Explosive Ordnance Detonation Range	Soil, sediment sampling
4	Spent Battery Accumulation Area	No further action
5	Spent Battery Accumulation Area	Secondary containment
6	Waste Oil and Paint Accumulation Area	Secondary containment
7	Waste Oil Accumulation Area	Secondary containment
8	Waste Oil Accumulation Area	Secondary containment

UNIT NUMBER	UNIT NAME	COMMENTS
9	Explosive Ordnance Firing Range	Sampling of soil and sediments
10	Sewage Treatment Lagoons	Determine presence of hazardous constituents
11	Non-explosive Ordnance Firing Range	Determine presence of hazardous constituents
A	Diesel Fuel Fill Pipe Area	Secondary Containment
B	Solid Waste Collection Units	No further action
C	Catch Basin for Hydraulic Oil	No further action
D	Clean-o-matic (Building 303)	No further action
E	Rags, adsorbent, and grease storage area (Building 303)	No further action
F	Rock Quarry	No further action
G	Pump station and chlorination building of sewage lagoons (Camp García)	No further action
H	Lubricating Oil Storage Areas	Secondary containment

A. SOLID WASTE MANAGEMENT UNITS (SWMUs)

1. UNIT NAME: Camp García Landfill
(Eastern Maneuver Area)
(Site No. 20) (Photos 1,2, and 3)

UNIT DESCRIPTION: This inactive unit is located on high ground approximately 3,000 to 4,000 feet north-northwest of Bahía di la Chiva (Blue Beach) and 1.5 to 2 miles east of Camp García. The unlined landfill serviced a population of approximately 150 individuals. This number was increased during maneuvers and other military exercises. A 5-ton dump truck was used to dispose of waste at the site. At least one trip per day was made to the site, five days per week. It has been estimated that between 1,800 and 3,120 tons of materials have been disposed over the 100 to 200 acre area.

The unit was closed in 1978 and a cap installed. In the mid-1980s, a gravel road was constructed down the approximate center of the former landfill.

This site was not included as a HRS "site" because it is not associated with CERCLA Sec. 101 contaminants.

DATE OF START-UP: The NACIP IAS report indicates that the landfill was in operation from approximately 1954 to 1978.

DATE OF CLOSURE: This unit has been inactive since 1978.

WASTES MANAGED: The wastes managed at this unit included paper, corrugated containers, cans and food packaging material, rags, scrap metal, and yard waste. All of the municipal solid waste from Camp García and the Inner Range were handled here.

RELEASE CONTROLS: This unit is presently capped and vegetated with a graded gravel road down the approximate center of the landfill. The unit is unlined.

HISTORY OF RELEASE: There were no documented releases identified with this unit. There were no signs of erosion or stressed vegetation evident at the time of the VSI. The site presently has a dense cover of pasture grasses.

2. UNIT NAME: Fuels Off-Loading Site
(Photos 4,5,6,7 and 8)

UNIT DESCRIPTION: This unit is the former site of four above-ground fuel storage tanks located off the south coast of Vieques at Camp García, east of Blue Beach. The two 20,000-gallon and two 30,000-gallon above-ground tanks were constructed for storage of fuel for naval equipment. The tanks were filled from a barge approximately every three months by pumping the fuel through an 8-inch submarine line to the tanks on shore. According to the NACIP IAS study, seawater was flushed from the hose at each refueling period, resulting in the discharge of approximately 1,000 gallons of fuel to the land and sea. This activity occurred for approximately 25 years; therefore, about 100,000 gallons of fuel were discharged over this time period.

This site was not included as a HRS "site" because it is not associated with CERCLA Sec. 101 contaminants.

DATE OF START-UP: The NACIP IAS report reports that the tanks began operation in 1953.

DATE OF CLOSURE: The NACIP IAS report states that the tanks were removed between 1978 and 1979.

WASTES MANAGED: This unit was used for storage of diesel fuel, unleaded gasoline, AVGAS, and JP-5 fuel. Wastes in the vicinity of the unit consisted of spilled fuels during unloading periods. Facility representatives stated that sludge from the tanks was removed by a private contractor for disposal on the main island of Puerto Rico. The ultimate disposition of the sludge is unknown.

RELEASE CONTROLS: These were above-ground metal tanks; otherwise, no release controls were identified with this unit.

HISTORY OF RELEASE: As discussed earlier, during refueling periods at Bahia de la Chiva (Blue Beach), it was necessary to flush the seawater from hoses. This resulted in the discharge of approximately 1,000 gallons of fuel to the land and sea per refueling period. The tanks were filled a maximum of four times per year for approximately 25 years. During the VSI, there were no visible signs of past releases to soil or adjacent surface water. The site of the former tanks is presently overgrown with grass and small shrubs. The only signs of activity at the location were a small piece of metal pipe and some cinder blocks.

3. UNIT NAME: Waste Explosive Ordnance Detonation Range

UNIT DESCRIPTION: This unit is an active RCRA regulated waste ordnance open burn/detonation range within the Inner Range section of the facility. The unit currently operates as a RCRA interim status unit and is regulated under Subpart X regulations. A Part B Permit Application had been submitted at the time of the VSI. The area is located approximately 150 yards south of the north shore of Vieques Island and approximately 100 yards north of the simulated airfield used by the firing range. For explosive ordnance disposal, bulldozers are used to dig a trench across the area. The waste ordnance is placed in the trench and detonated from a safe distance using an electrical detonator. The trench is then covered with soil. The EOD range is presently used for disposal of all waste ordnance from U.S. Naval Station Roosevelt Roads and the Naval Ammunition Facility.

STILL ACTIVE AS IMPACT AREA & RCRA REG. UNIT. CA & CLOSURE UPON RANGE CLOSURE

DATE OF START-UP: This unit is presently active.

WASTES MANAGED: The wastes managed at this unit include aged and inoperative ammunition and explosive items which require destruction (i.e., K054, D001, D002). All explosive waste from U.S. Naval Station Roosevelt Roads and the Naval Ammunition Facility are disposed of here.

RELEASE CONTROLS: There are no release controls identified with this unit. The area is swept (i.e., explosively) twice per year for live ordnance by an Explosive Ordnance Demolition team.

HISTORY OF RELEASE:

There were no documented releases identified from this unit. The adjacent surface waters of the Caribbean Sea are sampled as part of a NPDES permit. and the range was sampled during the NACIP Confirmation Study. This monitoring data was not readily available during the VSI and will, therefore, be requested as a suggested further action for this unit. The VSI team was not allowed direct access to this area during the VSI due to the potential existence of live munitions. As viewed from a nearby observation post the soil at the unit appeared bare and portions of the surrounding ordnance firing range were marked with impact craters.

4. UNIT NAME: Spill Battery Accumulation Area (Building 303, Camp García)

UNIT DESCRIPTION: This unit is an area in Building 303 at Camp García where Navy Seabees store spent batteries and battery acid for disposal. No batteries or battery acid were being stored at the time of the VSI. The spent batteries and acid are transported off-sites to U.S. Naval Station Roosevelt Roads on Puerto Rico and are eventually disposed of by a contractor. The acid from spent batteries is stored in a plastic container prior to off-site shipment.

DATE OF START-UP: The maintenance shop was built in the late 1960s and it is anticipated that the batteries have been stored in the building since that time.

DATE OF CLOSURE: This unit is presently active.

WASTES MANAGED: This unit is used to manage spent batteries or battery acid.

RELEASE CONTROLS: The unit is located inside a metal building on a concrete floor.

HISTORY OF RELEASE: There are no documented releases identified with this unit. At the time of the VSI, there were no batteries stored at the site. Facility personnel indicated the location where batteries were stored. The location appeared to be clean with no visible stains on the floor.

5. UNIT NAME: Spent Battery Accumulation Area (Inner Range)

UNIT DESCRIPTION: This unit is an area at the Inner Range where spent batteries and battery acid are stored prior to disposal. At the time of the VSI, the batteries were stored on a gravel driveway adjacent to the observation post. Facility personnel stated that the battery acid would eventually be emptied into a plastic container. Periodically, both the spent acid and batteries are transported off-site to U.S. Naval Station Roosevelt Roads in Puerto Rico for disposal by a contractor.

DATE OF START-UP: The date of start-up of the unit was uncertain.

DATE OF CLOSURE: This unit is presently active.

WASTES MANAGED: This unit is used to manage spent batteries and battery acid.

RELEASE CONTROLS: There are no release controls identified with this unit. The batteries were stored outdoors on a gravel driveway.

HISTORY OF RELEASES: There are no documented releases identified with this unit. At the time of the VSI, nine batteries were observed on a gravel driveway. No staining of soil or other signs of release were observed on the driveway or in the vicinity of the batteries.

6.	UNIT NAME:	Waste Oil and Paint Accumulation Area (Seabees, Camp García)
	UNIT DESCRIPTION:	The Seabees utilize this area for temporary storage of waste oil in 55-gallon drums and paint in small containers. This area includes a welded metal pipe stand for storage of two drums of lubricating oil and an adjacent grassy area where 55-gallon drums of waste oil and tires are stored. Waste materials are transported to U.S. Naval Station Roosevelt Roads on Puerto Rico for off-site disposal by a private contractor.
	DATE OF START-UP:	According to facility representatives, this unit has been in use for approximately 10 years.
	DATE OF CLOSURE:	This is an active unit.
	WASTES MANAGED:	This area is used to manage waste lubricating oils and several tires. Two drums of waste oil were located at the unit at the time of the VSI.
	RELEASE CONTROLS:	The waste oil and lubricants are stored in 55-gallons drums; otherwise, no release controls were identified with this unit.
	HISTORY OF RELEASE:	There were no documented releases identified at this unit. The waste oil and tires are stored on and above bare ground and spills of oil to the soil were observed during the VSI.

7. UNIT NAME: Waste Oil Accumulation Area (Marines, Camp García)

UNIT DESCRIPTION: This is a temporary waste oil storage area located near the maintenance shop (Building 303) at Camp García. The Marines use the area one per year during their three month training exercise at the Eastern Maneuver Area. The waste oil accumulation area included an open-top 55-gallon metal drum, a 25-gallon metal trash can and two metal drums split in half (and laying on their sides) for the storage of waste oil from the maintenance of Marine vehicles. The soil in this area was severely stained with waste oil. A Marine sergeant stated that they would add sand and dig up the contaminated soil prior to their departure. The sergeant further stated that the waste oil was to be placed in drums and transported to U.S. Naval Station Roosevelt Roads on Puerto Rico for disposal.

DATE OF START-UP: The area is used for three months each year in conjunction with Marine maneuvers at the Eastern Maneuver Area. The date the area was first used in this manner is unknown.

DATE OF CLOSURE: The Marines stated that the waste oil is removed at the end of maneuvers each year.

WASTES MANAGED: These units are used for the accumulation of waste oils from the maintenance of vehicles during maneuvers at the Eastern Maneuver Area.

RELEASE CONTROLS: A Marine sergeant stated that, at the end of maneuvers, the drums and the contaminated soil would be excavated and loaded into new 55-gallon drums and transported to U.S. Naval Station Roosevelt Roads in Puerto Rico. There are no release controls identified with this unit.

HISTORY OF RELEASE: During the VSI, the drums were observed to be full and the soil adjacent to the storage area was severely stained.

8. UNIT NAME: Waste Oil Accumulation Area (Inner Range)

UNIT DESCRIPTION: This unit is a drum storage area for waste lubricants and oil operated by the Navy. The unit is located outside of the generator building at the observation post on Cerro Matias. The drums of waste oil are stored on bare soil prior to transport to U.S. Naval Station Roosevelt Roads in Puerto Rico for contractor disposal. During the VSI, a small spill of lubricating oil was observed beneath one of the product barrels.

DATE OF START-UP: This unit has been in use for approximately 10 years.

DATE OF CLOSURE: This is an active unit.

WASTES MANAGED: This area is used to manage lubricating oils and waste oils.

RELEASE CONTROLS: There are no release controls identified with this unit.

HISTORY OF RELEASE: During the VSI, three drums of waste oil were being stored on bare soil. Stains were observed on the soil adjacent to the drums.

9.	UNIT NAME:	Explosive Ordnance Firing Range
	UNIT DESCRIPTION:	This area is located on the easte most end of Vieques Island and employed by the Navy as a li ordnance firing range for t Atlantic Fleet Weapons Train: Facility. Ships and aircraft a scored for accuracy with li ordnance using several targets the range. The Navy has a NPI permit allowing release or firing ordnance into the waters adjacent the area and the wetlands within the training area. Facility personnel stated that after a round is fired into the wetland, a facility employee obtains a water sample from a boat within 45 minutes. The sample is shipped on dry ice within 24 hours to the mainland for chemical analysis.
	DATE OF START-UP:	This unit has been in use since the start-up of the Inner Range in the early 1960s.
	DATE OF CLOSURE:	This is an active unit.
	WASTES MANAGED:	This area receives explosive ordnance from training exercises conducted by the Atlantic Fleet at the eastern end of Vieques Island. The ordnance may contain residual propellants and explosive materials.
	RELEASE CONTROLS:	There are no release controls identified with this unit.

HISTORY OF RELEASE:

The unit is used for training with live ordnance from aircraft and ships at sea. The land area, water, and wetlands are used as impact zones for the ordnance. During training exercises, surface water is sampled twice monthly. The results of the monitoring data were not available at the time of the VSI. This will, therefore, be requested as a suggested further action for this unit. At the time of the VSI, the area was being swept by an Explosive Ordnance Demolition team and could only be viewed from a distance. From the observation post, it could not be determined if any signs of release were visible.

10.	UNIT NAME:	Sewage Treatment Lagoons (Camp García)
	UNIT DESCRIPTION:	Camp García utilizes a two-stage lagoon system for treatment of domestic sewage. The system utilizes a series of four unlined lagoons, including two receiving and two polishing lagoons. The effluent from the final lagoons is discharged to land. The amount of domestic sewage generated a Camp García is limited due to the small population utilizing the facilities. A small contingent of Navy Seabees uses the facilities in the barracks full-time, and approximately 15 civilians use the sanitary facilities daily.
	DATE OF START-UP:	These lagoons have been in use since the adjacent pump station was installed in the early 1950s.
	DATE OF CLOSURE:	This is an active unit.
	WASTES MANAGED:	The lagoons are used for treatment of domestic sewage from approximately 45 people at the Seabee barracks and facility offices. It is unlikely, but also uncertain, that hazardous constituents are present in the waste. The facility does not add chemical treatments to the sewage.
	RELEASE CONTROLS:	There were no release controls identified with the unlined lagoons. The final effluent from the lagoons is discharged to the ground. There is no known sampling conducted near this unit.
	HISTORY OF RELEASE:	The lagoons discharge effluent to the soil through a pipeline system. There were no signs of uncontrolled or unintentional release in the vicinity of the unit.

11.	UNIT NAME:	Non-explosive Ordnance Firing Ra (Inner Range)
	UNIT DESCRIPTION:	This area is located west of observation post at Cerro Matías east of Camp Garcia. The area used for air target practice w non-explosive ordnance.
	DATE OF START-UP:	The firing range has been act since the 1960s.
	DATE OF CLOSURE:	This is an active unit.
	WASTE MANAGED:	This unit contains shells of non-explosive ordnance. It is unknown if hazardous constituents are present. However, based upon the types of ordnance used (e.g., smoke producing ordnance) and the presence of residual propellants, hazardous constituents may be present.
	RELEASE CONTROLS:	There are no release controls identified with this unit.
	HISTORY OF RELEASE:	There are no documented releases identified with this unit. This area was inaccessible at the time of the VSI.

B. AREAS OF CONCERN (AOCs)

1. UNIT NAME:	Diesel Fuel Fill Pipe Area (Observation Post - 1)
AREA OF CONCERN DESCRIPTION:	This is an area of base soil approximately 6 feet x 6 feet adjacent to a pipe used to fill diesel fuel into the underground storage tank at the observation post at Cerro Matías. According to facility representatives, this equipment has been in use for approximately 10 years. No release controls were observed to be associated with the area. During the VSI, the soil surrounding the fuel fill pipe appeared to be severely stained from past filling operations. Since the underground tank is located approximately 25 feet southwest and down-gradient from the fill pipe, it is unlikely that the stain are from tank seepage.

2. UNIT NAME: Solid Waste Collection Units

AREA OF CONCERN DESCRIPTION:

These units include wooden boxes, wooden trailers, and metal cans and dumpsters which are used to manage general refuse. During the VSI, a small wooden trailer was observed at the observation post at Cerro Matías. Facility personnel stated that the trailer and other containers are loaded with refuse until full and then transported off-site to the Vieques Island landfill for disposal.

3.	UNIT NAME:	Catch Basin for Hydraulic Oil (Camp García)
	AREA OF CONCERN DESCRIPTION:	This area is metal gutter, approximately 5 feet long and 6 inches wide, located beneath several containers of hydraulic oil on a rack. The gutter is designed to catch drips that occur when hydraulic oil is removed from the drums. The unit is located inside of Building 303 and is over a concrete floor. No sign of release was observed during the VSI.

4.	UNIT NAME:	Rags, Adsorbent, and Grease Storage Area in Building 303
	AREA OF CONCERN DESCRIPTION:	This area is located inside Building 303 and is a small area of the shop where several barrels of grease, rags, and adsorbent for spills are stored. Facility personnel stated that this was also the approximate area where spent batteries would be stored (SWMU#4). There were no visual signs of a release or spill to the floor observed during the VSI.

5. UNIT NAME: Rock Quarry (Camp García)

AREA OF CONCERN DESCRIPTION: This area is located southwest of the former Camp García landfill. The area is used by the Navy as a source of gravel for road building. During the VSI, several used tires and accumulated paper waste were observed to have been deposited at the quarry.

6.	UNIT NAME:	Lubricating Oil Storage Areas
	AREAS OF CONCERN DESCRIPTION:	Lubricating oil is stored in several areas at the facility. Two representative areas were observed during the VSI including the Seabees maintenance area (see SWMU#6) and the Marine maintenance area (see SWMU#7), both at Camp García. Each of these areas were approximately 6 feet x 6 feet and were located on bare soil. The areas appeared to be used for storage of 1 to 10 55-gallon drums. Stains were observed on the soil in the vicinity of the stored product drums during the inspection of the area.

7. UNIT NAME: Pump Station and Chlorination Building at Sewage Lagoons (Camp García)

AREA OF CONCERN DESCRIPTION: This unit was used for the pumping and chlorination of domestic sewage at Camp García during the 1950s and 1960s. The unit is partially below grade and is constructed of concrete. The use of the unit was completely stopped in 1978 when the activity of the base decreased. During the VSI, stains were observed at the top of the concrete unit, which indicated there may have been periodic events when the unit had overflowed; however, the grass adjacent to the unit did not appear to be severely stressed.

A. SOLID WASTE MANAGEMENT UNITS

1. UNIT NAME: Camp García Landfill

CONCLUSIONS:

Soil/Groundwater: There is a high potential for release to soil/groundwater from the unlined unit. However, it is unclear if hazardous constituents have been disposed of in the landfill.

Surface Water: There is a moderate potential for release to surface water, if hazardous constituents are present, given the close proximity of the unlined unit to surface water.

Air: There is a low potential for release to air since the unit is covered.

Subsurface Gas: There is a moderate to high potential for generation of subsurface gas since the unit is unlined and was used for disposal of municipal solid wastes.

SUGGESTED FURTHER ACTION:

Although states that no hazardous constituents were disposed of here, it is suggested that the Navy provide additional information to characterize the types of waste managed at the landfill. This information should include estimated volume of biodegradable waste, solvents, paints, and automotive fluids. This information should be used to determine the need for soil sampling and the potential for the presence of subsurface gas. If this information indicates that sampling is warranted, the investigation should include collection of a minimum of three soil borings at a depth that is at least equivalent to the depth of the unit and analysis for heavy metals and the semi-volatile fraction.

2. UNIT NAME: Fuels Off-Loading SitE

CONCLUSIONS: The migration of waste or accumulated liquids to the soil, groundwater or surface water is very low. No evidence of release was found during VSI. The exposure potential from this SWMU is considered minimal.

FURTHER ACTION: No further action is recommended.

3. UNIT NAME: Waste Explosive Ordnance Detonation Range

CONCLUSIONS:

Soil/Groundwater: There is a high potential for release to soil from this unit, given the fact that explosive wastes are burned on bare soil.

Surface Water: There is a moderate to high potential for release to surface water, given that the unit is located immediately adjacent to surface water, wastes are burned on bare soil, and there were no release controls identified with the unit.

Air: the unit is designed to release to air during burn events.

Subsurface Gas: There is a low potential for the generation of subsurface gas, since most of the waste is consumed during the burn.

SUGGESTED FURTHER ACTION:

The practice of thermal treatment, or open burning, of explosive waste is currently being scrutinized by the EPA, and the facility is now required to submit a permit application under Subpart X regulations. It is proposed that actions at these units ultimately be determined based upon the requirements of EPA regarding permitting and operation of the burn area.

In order to investigate releases to both soil and sediment, collection of soil and sediment samples is suggested with analyses to include an appropriate set of indicator parameters based upon knowledge of the explosives and propellants managed. Results of the soil and sediment sampling should be analyzed in conjunction with the analysis of surface water which is currently being performed.

4.	UNIT NAME:	Spent Battery Accumulation Area (Building 303, Camp García)
	CONCLUSIONS:	The migration of waste or accumulated liquids to the soil, groundwater or surface water is very low. No evidence of release was found during VSI. The exposure potential from this SWMU is considered minimal.
	FURTHER ACTION:	No further action is recommended.

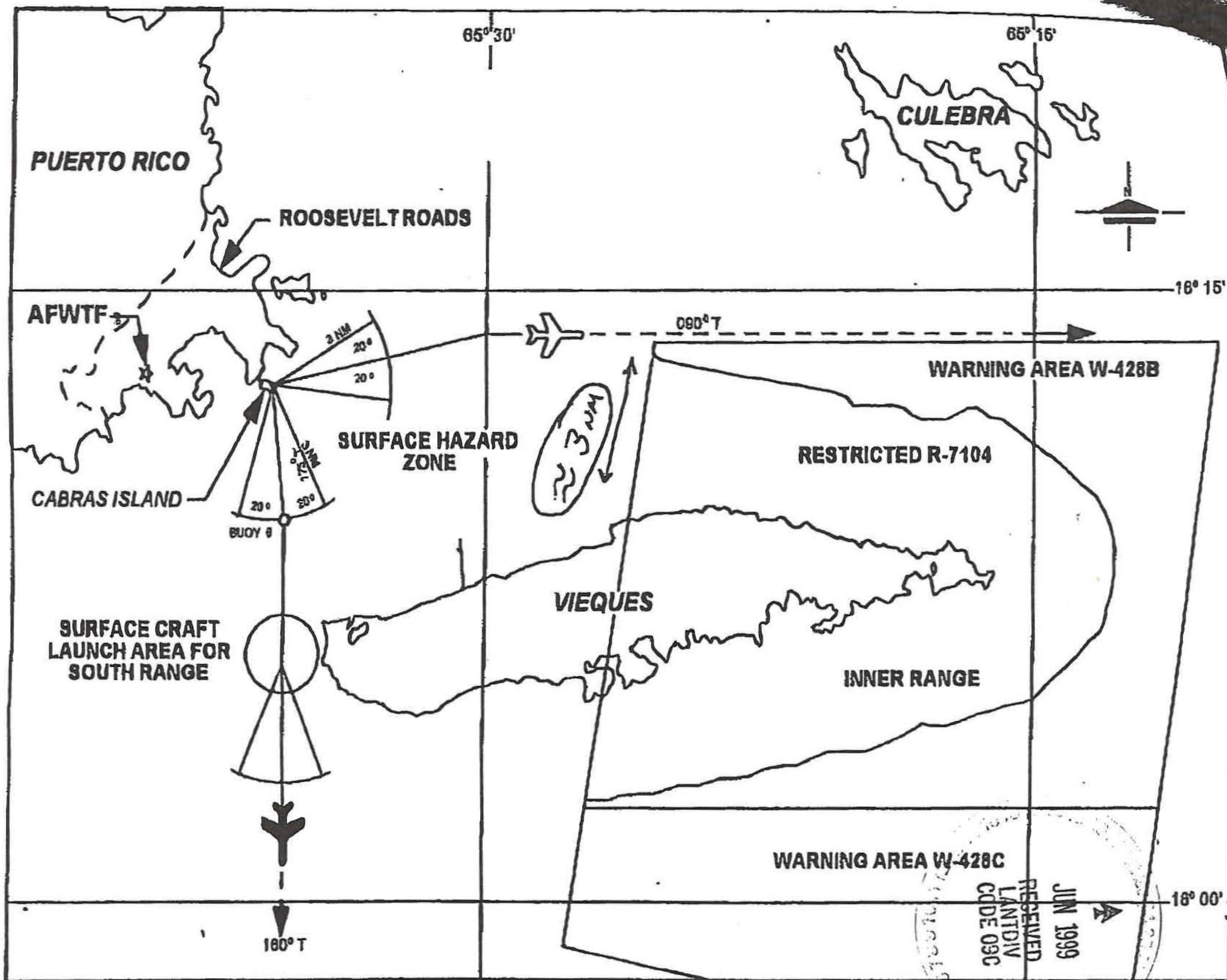


FIGURE 2 - 13 DRONE TARGET GROUND LAUNCH SITE

Fax to LCDR Young 904 542 2414
Dave Skeland 757 322 8181
Fm Wallmeyer

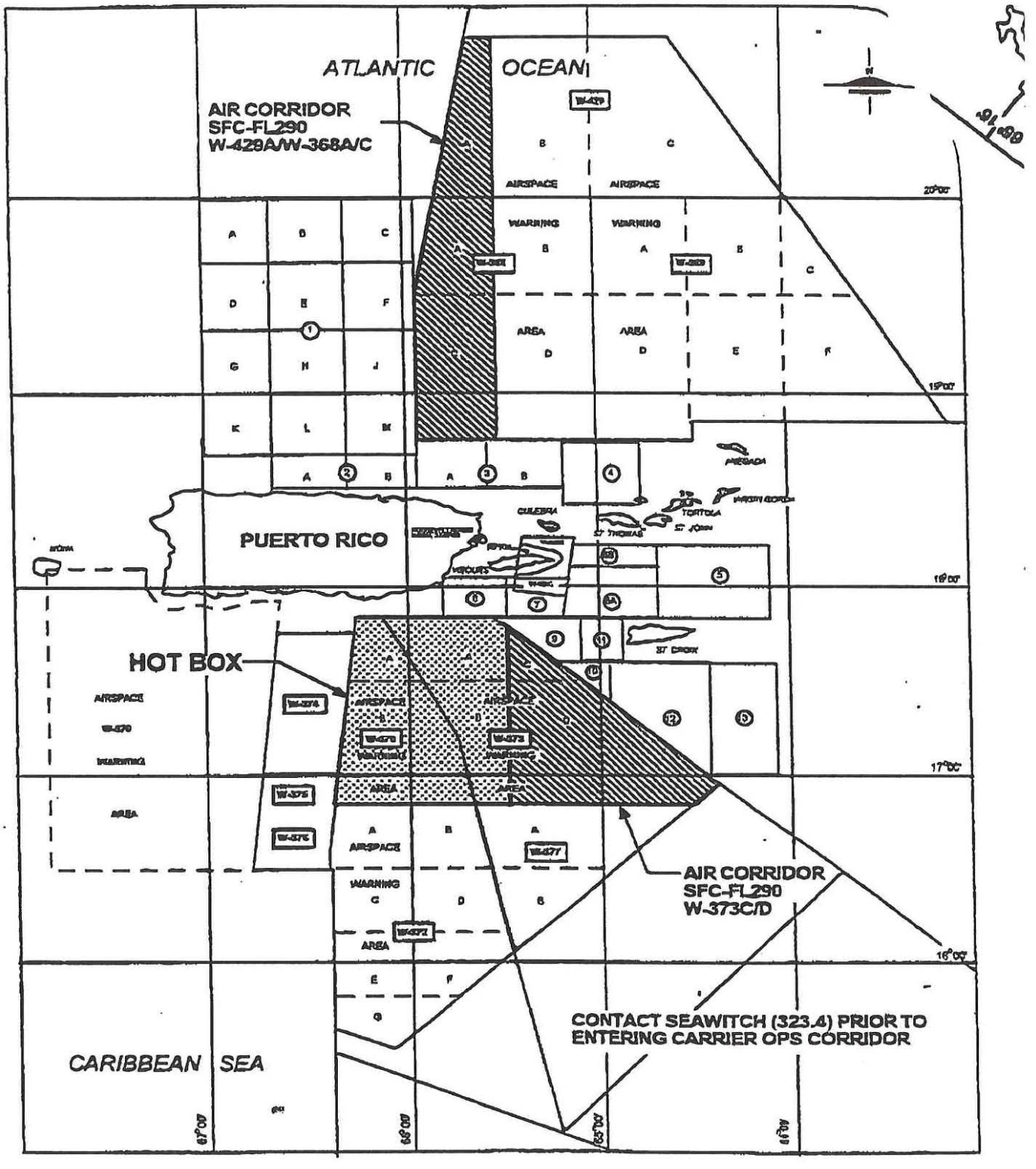


FIGURE 2 - 12
EXAMPLE OF COMMON CARRIER
OPS CORRIDORS UTILIZED/HOT BOX

Controlling agency. FAA. San Juan CERAP.
Using agency. The Adjutant General, Commonwealth of Puerto Rico.

R–7104 Vieques Island, PR
Boundaries. The airspace over Vieques Island and the surrounding waters beginning at lat. 18°02'38"N., long. 65°27'04"W.; to lat. 18°13'03"N., long. 65°25'26"W.; thence clockwise along the 3–nautical–mile limit from the shoreline to the point of beginning.
Designated Altitudes. Surface to FL 500.
Time of designation. Intermittent, 0600–2300 local time, daily; other times by NOTAM 24 hours in advance.
Controlling agency. FAA, San Juan ARTCC.
Using agency. Commanding Officer, Atlantic Fleet Weapons Training Facility, NS, Roosevelt Roads, PR.
AMENDMENTS 7/30/87 52 FR 21249 (Amended)

R–7105 Lajas, PR
Boundaries. That airspace within a 3–nautical–mile radius centered on lat. 17°58'38"N., long. 67°04'54"W.
Designated Altitudes. Surface to and including 15,000 feet MSL.
Times of designation. Continuous.
Controlling agency. FAA, San Juan CERAP.
Using agency. Puerto Rico Police Department.
AMENDMENTS 3/8/90 55 FR 1806 (Added)

§ 73.72 Guam

R–7201 Farallon De Medinilla Island Mariana Islands, GU
Boundaries. The area within a 3–nautical–mile radius of lat. 16°01'04"N., long. 146°04'39"E.
Designated Altitudes. Surface to FL 600.
Time of designation. As activated by NOTAM 12 hours in advance.
Controlling agency. FAA, Guam Center/RAPCON.
Using agency. Commander, Naval Forces, Marianas.

PG 8-60 = BOUNDRIES OF R-7104
8-128 = " " W428 B/C
8-144 = " " W370 A/B
8-145 = " " W373 A
FIGURE 2-6 = SOUTHERN OPERATING AREAS
(AFWTFINST 3120.1L)

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▶ 5

To USS CHUNGCK	From KEN DE ANGELO
Dept./Agency USS FIREBOLT	Phone # 365-5230/31
Fax # 365-4298	Fax # 5212

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

Using agency. Fleet Area Control and Surveillance Facility, Virginia Capes, Naval Air Station, Oceana, Virginia Beach.

W–387A Virginia Capes, VA

Boundaries. Beginning at lat. 37°04'54''N., long. 74°35'59''W.; to lat. 37°13'40''N., long. 72°39'59''W.; to lat. 36°42'09''N., long. 72°39'58''W.; to lat. 36°47'16''N., long. 74°35'59''W.; to the point of beginning.

Altitudes. Surface to but not including FL 240.

Times of use. Continuous.

Controlling agency. U.S. Navy, FACSFAC VACAPES

Using agency. U.S. Navy, FACSFAC VACAPES

CONTROLLING AND USING AGENCIES CHANGED 5/31/90

W–387B Virginia Capes, VA

Boundaries. Beginning at lat. 37°04'54''N., long. 74°35'59''W.; to lat. 37°13'40''N., long. 72°39'58''W.; to lat. 36°42'09''N., long. 72°39'58''W.; to lat. 36°47'16''N., long. 74°35'59''W.; to the point of beginning.

Altitudes. FL 240 to unlimited.

Times of use. Continuous.

Controlling agency. U.S. Navy, FACSFAC VACAPES

Using agency. U.S. Navy, FACSFAC VACAPES

CONTROLLING AND USING AGENCIES CHANGED 5/31/90

W–412 Santa Cruz Island, CA

Boundaries. Beginning at lat. 34°08'00''N., long. 119°40'03''W.; to lat. 33°59'15''N., long. 119°40'03''W.; to lat. 33°53'00''N., long. 120°07'03''W.; to lat. 33°49'00''N., long. 120°16'03''W.; to lat. 34°00'00''N., long. 120°16'04''W.; to lat. 34°08'00''N., long. 120°10'49''W.; to the point of beginning.

Altitudes. Surface to 3,000 feet MSL.

Times of use. Sunrise–sunset.

Controlling agency. FAA, Los Angeles ARTCC

Using agency. U.S. Navy, Commander, Naval Air Warfare Center Weapons Division, Point Mugu, CA

USING AGENCY CHANGED 11/11/93

W–428B Vieques Island, PR

Boundaries. Beginning at lat. 18°13'03''N., long. 65°25'26''W.; to lat. 18°13'38''N., long. 65°25'24''W.; to lat. 18°13'38''N., long. 65°10'09''W.; to lat. 18°02'38''N., long. 65°11'49''W.; to lat. 18°02'38''N., long. 65°27'04''W.; thence counterclockwise along the boundary of Restricted Area R–7104 to the point of beginning.

Altitudes. Surface to 50,000 feet MSL.

Times of use. Intermittent.

Controlling agency. FAA, San Juan CERAP

Using agency. Atlantic Fleet Weapons Training Facility, Naval Station, Roosevelt Roads, PR

W–428C Vieques Island, PR

Boundaries. Beginning at lat. 18°02'38''N., long. 65°27'04''W.; to lat. 18°02'38''N., long. 65°11'49''W.; to lat. 17°55'58''N., long. 65°12'49''W.; to lat. 17°59'08''N., long. 65°27'44''W.; to the point of beginning.

Altitudes. Surface to 50,000 feet MSL.

Times of use. Intermittent.

Controlling agency. FAA, San Juan CERAP

Using agency. Atlantic Fleet Weapons Training Facility, Naval Station, Roosevelt Roads, PR

W–429A Culebra, PR

Boundaries. Beginning at lat. 20°50'02''N., long. 65°36'56''W.; to lat. 20°50'02''N., long. 65°29'56''W.; to lat. 20°00'00''N., long. 65°30'00''W.; to lat. 20°00'00''N., long. 65°48'17''W.; to the point of beginning.

Altitudes. Surface to unlimited.

Times of use. Intermittent, normally sunrise to sunset.

Controlling agency. FAA, San Juan CERAP

Using agency. U.S. Navy, Atlantic Fleet Weapons Training Facility, Naval Station Roosevelt Roads, PR

ADDED 6/25/92

W–429B Culebra, PR

Boundaries. Beginning at lat. 20°50'02''N., long. 65°29'56''W.; to lat. 20°50'02''N., long. 64°59'56''W.; to lat. 20°00'00''N., long. 65°00'00''W.; to lat. 20°00'00''N., long. 65°30'00''W.; to the point of beginning.

Altitudes. Surface to unlimited.

Times of use. Intermittent, normally sunrise to sunset.

Controlling agency. FAA San Juan CERAP

Using agency. U.S. Navy, Atlantic Fleet Weapons Training Facility, Naval Station Roosevelt Roads, PR

ADDED 6/25/92

W–429C Culebra, PR

Boundaries. Beginning at lat. 20°50'02''N., long. 64°59'56''W.; to lat. 20°50'02''N., long. 64°34'56''W.; to lat. 20°02'02''N., long. 63°59'56''W.; to lat. 20°00'00''N., long. 64°00'00''W.; to lat. 20°00'00''N., long. 65°00'00''W.; to the point of beginning.

Altitudes. Surface to unlimited.

Times of use. Intermittent, sunrise to sunset.

Controlling agency. FAA, San Juan CERAP

Using agency. U.S. Navy, Atlantic Fleet Weapons Training Facility, Naval Station Roosevelt Roads, PR

ADDED 6/25/92

W–453 Gulfport, MS

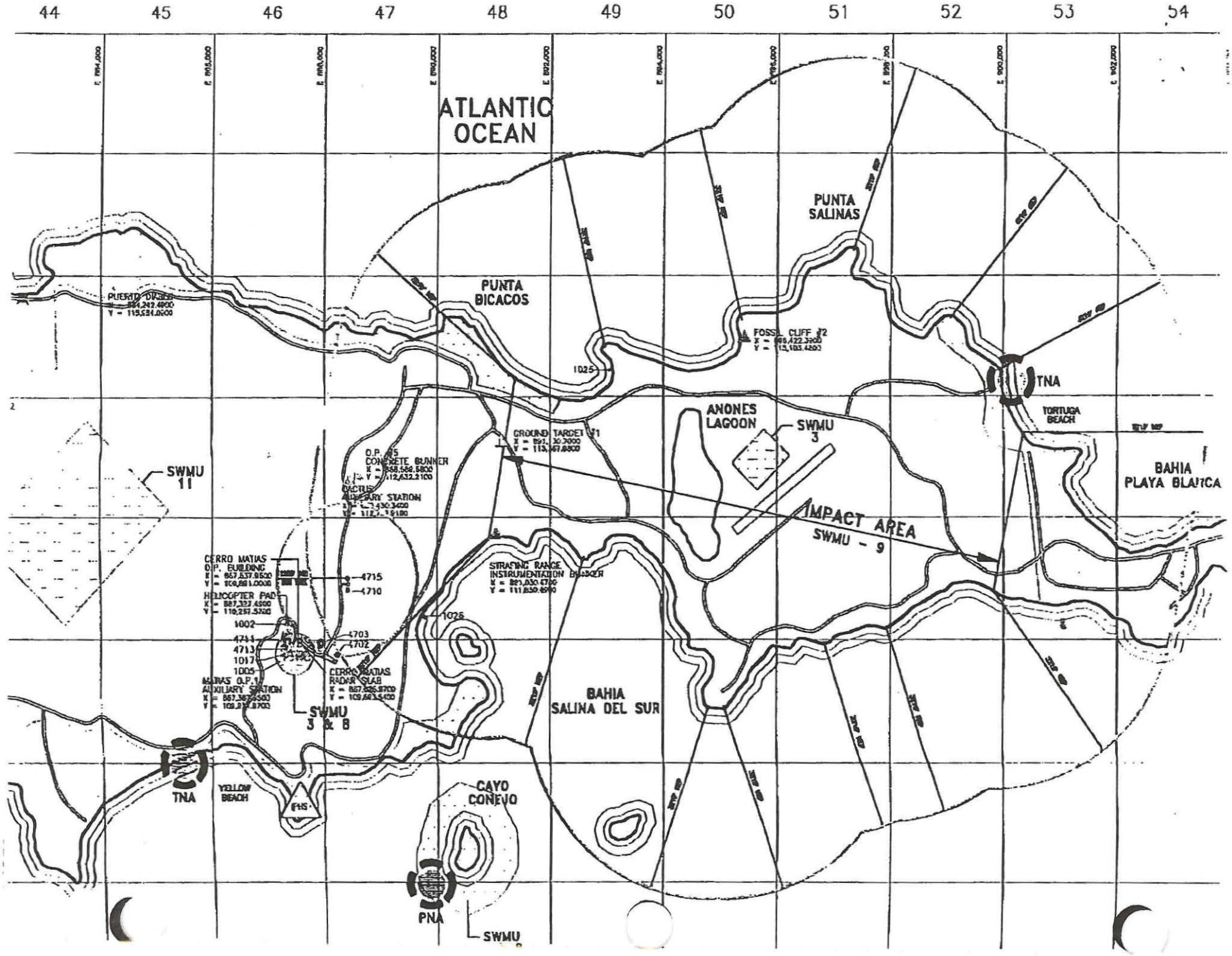
Boundaries. Beginning at lat. 30°09'16''N., long. 88°01'30''W.; to lat. 29°36'11''N., long. 88°01'30''W.; to lat. 29°42'51''N., long. 88°49'30''W.; thence 3 NM offshore of the Chandeleur Islands to lat. 30°06'01''N., long. 88°51'00''W.; to lat. 30°11'01''N., long. 88°41'40''W.; thence 3 NM from and parallel to the shoreline to the point of beginning.

Altitudes. Surface to FL 500.

Times of use. Intermittent, sunrise to sunset; other times by NOTAM.

Controlling agency. FAA, Houston ARTCC

Using agency. Commander, Air National Guard Training Site, Gulfport, MS



SHORE LINE
BUILDINGS
ROADS
AIRFIELD PAVEMENT
EXISTING NAVY PROPERTY BOUNDARY
NAVY PROPERTY BOUNDARY w/ SECURITY FENCE
FUTURE NAVY PROPERTY BOUNDARY
FENCE LINE
BENCH MARK ("X" = MONUMENT WAS DESTROYED)

LEGEND OF LAND USE RESTRICTIONS

EXPLOSIVE SAFETY QUANTITY DISTANCE (ESQD) ARC
MANGROVE
CONSERVATION ZONE
AIRFIELD PRIMARY SURFACE
AIRFIELD APPROACH/DEPARTURE ZONE
CULTURAL RESOURCE HISTORIC SITE
CULTURAL RESOURCE PRE-HISTORIC SITE
CULTURAL RESOURCE NRHP HISTORIC SITE
CULTURAL RESOURCE NRHP PRE-HISTORIC SITE
IR SITE
TNA – TURTLE NESTING AREA
PNA – PELICAN NESTING AREA
PRA – PELICAN ROOSTING AREA
MH – MANATEE HABITAT
PROPOSED CONSTRUCTION PROJECTS

1. GRID LINES ARE PART OF SYSTEM (NAD 27) WHERE PERPENDICULAR TO A CE (LONGITUDE 66° 26'00" W COORDINATE SYSTEM IS AND LATITUDE 17° 50'00" COORDINATE IS ZERO AN POSITIVE.
2. ALL BEARINGS REFER TO

NO.	
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2	U
1	C

LANTDIV

APPROVE

5. UNIT NAME: Spent Battery Accumulation Area (Inner Range)

CONCLUSIONS:

Soil/Groundwater: There is a high potential for release to soil since the batteries are stored on a gravel driveway with no release controls. The actual potential for release is based upon the integrity of each battery casing containing the acid.

Surface Water: There is no surface water in the near vicinity of the unit; therefore, there is a low potential for release to surface water.

Air: There is a low potential for release to air since the unit stores used batteries.

Subsurface Gas: There is a low potential for the generation of subsurface gas since the batteries are stored on the soil surface and volatile constituents should be lost to the atmosphere is a release occurs.

SUGGESTED FURTHER ACTION:

No staining or other signs of release were observed at the unit during the VSI; therefore, sampling and analysis are not suggested at this time. It is suggested, however, that an area with secondary containment be established for storage of the batteries and acid.

6. UNIT NAME: Waste Oil and Paint Accumulation Area (Seabees, Camp García)

CONCLUSIONS:

Soil/Groundwater: There is a high potential for release to soil/groundwater from this unit based on observed release of oily wastes to soil and the presence of waste oils, lubricants, and paints.

Surface Water: There is a moderate potential for release to surface water via runoff from the unit. The unit is located in close proximity to runoff ditches which drain to the Caribbean Sea.

Air: There is a low potential for release to air from the unit since the unit stores materials which are nonvolatile or only slightly volatile, and most storage is in drums with lids.

Subsurface Gas: There is a low potential for the generation of subsurface gas given that the unit does not manage highly volatile materials and that releases to soil are small and on the soil surface.

SUGGESTED FURTHER ACTION:

Given the amount of material released to the soil surface and the types of materials stored at the unit, no sampling and analyses are suggested at this time. A general cleanup of the area, however, would help reduce the potential for release. It is suggested that an area with release controls for storage of the waste materials be established and that procedures be developed to minimize spillage of product.

7. UNIT NAME: Waste Oil Accumulation Area (Marines Camp Garcia)

CONCLUSIONS:

Soil/Groundwater: There is a high potential for release to soil/ groundwater from this unit. Spilled waste oil was observed spilled on bare soil, and several containers of waste oil were seen to be full and overflowing.

Surface Water: There is a moderate potential for release to surface water via surface runoff. The unit is located in close proximity to runoff ditches which drain to the Caribbean Sea.

Air: The unit does not manage highly volatile compounds; thus, there is considered to be a low potential for a release to air.

Subsurface Gas: There is a low potential for the generation of subsurface gas given that the unit does not manage highly volatile materials and that releases to soil are to the soil surface.

SUGGESTED FURTHER ACTION:

Given the amount of material released to the soil surface and the types of materials stored at the unit, no sampling and analyses are suggested at this time. A general cleanup of the area, however, would help reduce the potential for more significant release. It is suggested that an area with release controls for storage of the waste materials be established and procedures be developed to minimize spillage of product.

8. UNIT NAME: Waste Oil Accumulation Area (Inner Range)

CONCLUSIONS:

Soil/Groundwater: There is a high potential for release to soil/ groundwater from this unit based upon observed stains on the soil. The unit is a storage area for waste oil and lubricants. The materials are stored on bare soil.

Surface Water: There is a moderate potential for release to surface water vis surface runoff. The unit is located in close proximity to runoff ditches which drain into the Caribbean Sea.

Air: The unit does not manage highly volatile materials; thus, there is considered to be a low potential for a release to air.

Subsurface Gas: There is a low potential for the generation of subsurface gas given that the unit does not manage highly volatile materials and releases are to surface soil.

SUGGESTED FURTHER ACTION:

Given the amount of material released to the soil surface and the types of materials stored at the unit, no sampling and analyses are suggested at this time. A general cleanup of the area, however, would help reduce the potential for more significant release. It is suggested an area with release controls for storage of the waste materials be established and that procedures be developed to minimize spillage of product.

9. UNIT NAME: Explosive Ordnance Firing Range

CONCLUSIONS:

Soil/Groundwater: There is a hi potential for release to soi groundwater from this unit. The unit is firing range for explosive ordnanc Explosive ordnance is released routine into the water and wetland of t Caribbean Sea. The facility does condu monitoring as part of their NPDES permi

Surface Water: There is a high potenti for release to surface water sir explosive ordnance is fired into the Caribbean Sea on a routine basis.

Air: There is a high potential for release to air during training exercises when exploding ordnance is active.

Subsurface Gas: The potential for the generation of subsurface gas is low given that most of the explosive ordnance is destroyed upon impact.

SUGGESTED FURTHER ACTION:

Further action suggested at this time includes continued monitoring under the conditions of the NPDES permit. Sampling of soil and sediments is suggested to supplement the surface water sampling program. In addition, it is suggested that the results of these monitoring activities be reviewed to determine if additional action, including environmental sampling, is warranted at the unit.

10. UNIT NAME: Sewage Treatment Lagoons

CONCLUSIONS:

Soil/Groundwater: The unit is unlined, therefore, it hazardous constituents are present, the potential for release is high.

Surface Water: The potential for release to surface water is considered moderate if hazardous constituents are present in the waste, since the units discharge effluent to the soil in the approximate vicinity of ditches which flow to surface water.

Air: The potential for a release to air is dependent upon the presence of volatile hazardous constituents in the waste.

Subsurface Gas: The potential for the generation of subsurface gas is considered high if hazardous constituents are present since the unit is unlined.

SUGGESTED FURTHER ACTION:

Further review of facility practices or sampling and analysis of the waste should be conducted to determine if hazardous constituents may be present in the waste. Additional sampling and analyses of soil, etc. may be suggested based upon review of this information.

11. UNIT NAME: Non-explosive Ordnance Firing Range

CONCLUSIONS:

Soil/Groundwater: There is a high potential for release to soil/ groundwater from this unit is hazardous constituents are present in the ordnance, since the ordnance is placed directly on the soil surface.

Surface Water: There is a moderate potential for release to surface water via surface runoff if hazardous constituents are present in the ordnance.

Air: There is a high potential for periodic release to air during training exercises of hazardous constituents are present in the ordnance.

Subsurface Gas: The potential for the generation of subsurface gas is low given that residual materials would be left at the surface and that most volatiles would be lost to the air during or shortly after impact.

SUGGESTED FURTHER ACTION:

The chemical characteristics of the ordnance fired into this range should be investigated to determine if hazardous constituents are present. Based upon this determination, soil sampling may be suggested to further investigate the potential for release to soil, groundwater, etc.

B. AREAS OF CONCERN

1. UNIT NAME: Diesel Fuel Fill Pipe (Inner Range)

CONCLUSIONS:

Soil/Groundwater: There is a high potential for release to soil/ groundwater from this unit. Frequent spillage from the fill pipe has occurred during refueling operations and soil in a 3-foot radius area around the pipe is stained.

Surface Water: There is a moderate potential for release to surface water via surface runoff. The unit is located in close proximity to runoff ditches which drain to the Caribbean Sea.

Air: There is a high potential for minor releases to air during filling of the tank. However, since this activity occurs outdoors, volatile emission should be quickly dispersed.

Subsurface Gas: There is a low potential for the generation of subsurface gas. Since spills have apparently occurred only to surface soil, the majority of volatile constituents should have been lost at that time.

SUGGESTED FURTHER ACTION:

Given the limited amount of fuel spilled to the soil, sampling and analysis of soil is not suggested at this time. A general cleanup of the area, however, would help reduce the potential of a release. It is further suggested that secondary containment be provided in the fill pipe area to collect spillage and that practices be amended to reduce the potential for release to soil. Furthermore integrity testing of the tank and fill pipe are suggested to investigate the potential for subsurface leaks, given the age of the components.

2. UNIT NAME: Lubricating Oil Storage Area

CONCLUSIONS:

Soil/Groundwater: There is a high potential for release to soil/ groundwater from this unit given that oily stains were observed on soil in the storage areas.

Surface Water: There is a moderate potential for release to surface water via surface runoff. The unit is located in close proximity to runoff ditches which drain to the Caribbean Sea; however, apparently only a small amount of material has been released.

Air: There is low potential for release to air since the area stores relatively non-volatile materials and the amounts of spilled materials are small.

Subsurface Gas: There is a low potential for the generation of subsurface gas given that spills have apparently occurred only to surface soil in the area, and the materials spilled are relatively nonvolatile.

SUGGESTED FURTHER ACTION:

Given the limited amount of materials spilled to the soil, sampling and analysis of soil is not suggested at this time. A general clean-up of the area, however, would help reduce the potential of a release. It is suggested that secondary containment be provided fc storage of the products and that handlin practices be amended to reduce th potential for release to soil.

HCV/eas

Forces Antilles, and such agencies as he may designate.

[14 FR 4552, July 21, 1949. Redesignated at 14 FR 5593, Sept. 13, 1949, and amended at 15 FR 6758, Oct. 6, 1950. Redesignated at 50 FR 42696, Oct. 22, 1985]

§ 334.1460 Atlantic Ocean and Vieques Sound, in vicinity of Culebra Island; bombing and gunnery target area.

(a) *The danger zone.* From Punta Resaca on the north coast of Culebra at latitude 18°20′12″, longitude 65°17′29″ to latitude 18°25′07″, longitude 65°12′07″; thence to latitude 18°26′31″, longitude 65°16′45″; thence to latitude 18°23′00″, longitude 65°24′30″; thence to the charted position of nun buoy "2" at latitude 18°20′19″, longitude 65°24′51″; thence to latitude 18°18′47″, longitude 65°24′35″; thence to latitude 18°15′30″, longitude 65°21′30″; thence to a point on the southeast coast of Cayo de Luis Pena at latitude 18°17′51″, longitude 65°19′41″; and thence to Punta Tamarindo on the west coast of Culebra at latitude 18°19′12″ longitude 65°19′22″.

(b) *The regulations.* (1) The danger zone is subject to use as a target area for bombing and gunnery practice. It will be open to navigation at all times except when firing is being conducted. At such times no surface vessels, except those patrolling the area, shall enter or remain within the danger area. Prior to conducting each firing or dropping of ordnance the danger area will be patrolled to insure that no watercraft are within the danger area. Any watercraft in the vicinity will be warned that practice firing is about to take place and advised to vacate the area.

(2) The regulations in this section shall be enforced by the Commander, Caribbean Sea Frontier, San Juan, Puerto Rico, and such agencies as he may designate.

(Sec. 7, 40 Stat. 266, (33 U.S.C. 1))

[13 FR 9530, Dec. 31, 1948. Redesignated at 14 FR 4904, Aug. 9, 1949, and amended at 28 FR 349, Jan. 12, 1963; 39 FR 27133, July 25, 1974; 44 FR 69298, Dec. 3, 1979. Redesignated at 50 FR 42696, Oct. 22, 1985]

§ 334.1470 Caribbean Sea and Vieques Sound, in vicinity of Eastern Vieques; bombing and gunnery target area.

(a) *The danger zone.* From Punta Conejo on the south coast of Vieques at latitude 18°06′30″, longitude 65°22′33″; thence to latitude 18°03′00″, longitude 65°21′00″; thence to latitude 18°03′00″, longitude 65°15′30″; thence to latitude 18°11′30″, longitude 65°14′30″; thence to latitude 18°12′00″, longitude 65°20′00″; and thence to Cabellos Colorados on the north coast of Vieques at latitude 18°09′49″, longitude 65°23′27″.

(b) *Regulations.* (1) It will be open to navigation at all times except when firing is being conducted. At such times no surface vessels, except those patrolling the area, shall enter or remain within the danger area. Prior to conducting each firing or dropping of ordnance the danger area will be patrolled to insure that no watercraft are within the danger area. Any watercraft in the vicinity will be warned that practice firing is about to take place and advised to vacate the area.

(2) The regulations will be enforced by the Commander, U.S. Naval Forces Caribbean, U.S. Naval Station, Roosevelt Roads, Puerto Rico, and such agencies and subordinate commands as he/she may designate.

(Sec. 7, 40 Stat. 266, (33 U.S.C. 1))

[39 FR 27133, July 25, 1974, as amended at 46 FR 29935, June 4, 1981. Redesignated at 50 FR 42696, Oct. 22, 1985]

§ 334.1480 Vieques Passage and Atlantic Ocean, off east coast of Puerto Rico and coast of Vieques Island; naval restricted areas.

(a) *The restricted areas.* (1) A strip, 1,500 yards wide, off the naval reservation shoreline along the east coast of Puerto Rico extending from Point Figuera south to Point Puerca, and thence west to Point Cascajo and the mouth of the Daguada River.

(2) A strip, 1,500 yards wide, off the naval reservation shoreline along the west end of Vieques Island extending from Caballo Point on the north shore, west around the breakwater to Point Arenas, and thence south and east to a point on the shoreline one mile east of

...site of the abandoned central at Playa Grande.

(3) A strip, 1,500 yards wide, off the south coast of Vieques Island extending from the entrance to Port Mosquito east to Conejo Point.

(4) An area inclosed by an arc with a radius of 3,000 yards centered on Cabras Island Lighthouse and extending from Point Puerca to Point Cascajo.

(b) *The regulations.* No vessel shall enter or remain within the restricted areas at any time unless on official business, except that fishing vessels may be permitted to anchor in Playa Blanca, passing through the restricted area described in paragraph (a)(1) of this section to and from anchorage on as near a north-south course as sailing conditions permit. Under no conditions will fishing be permitted in the restricted areas.

[13 FR 9564, Dec. 31, 1948. Redesignated at 50 FR 42696, Oct. 22, 1985]

§334.1490 Caribbean Sea, at St. Croix, V.I.; restricted areas.

(a) *The areas*—(1) *Area "A".* A triangular area bounded by the following coordinates:

Latitude	Longitude
17°44'42" N.	64°54'18" W.
17°43'06" N.	64°54'18" W.
17°44'30" N.	64°53'30" W.

(2) *Area "B".* A rectangular area bounded by the following coordinates:

Latitude	Longitude
17°41'42" N.	64°54'00" W.
17°41'42" N.	64°54'18" W.
17°41'18" N.	64°54'00" W.
17°41'18" N.	64°54'18" W.

(b) *The regulations.* (1) Anchoring in the restricted areas is prohibited with the exception of U.S. Government owned vessels and private vessels that have been specifically authorized to do so by the Commanding Officer, Atlantic Fleet Range Support Facility.

(2) The regulations in this paragraph shall be enforced by the Commanding Officer, Atlantic Fleet Range Support Facility, Roosevelt Roads, P.R., and such agencies as he may designate.

[34 FR 19030, Nov. 29, 1969. Redesignated at 50 FR 42696, Oct. 22, 1985]

PART 335—OPERATION TENANCE OF ARMY ENGINEERS CIVI PROJECTS INVOLVI CHARGE OF DREDG MATERIAL INTO WA U.S. OR OCEAN WA

Sec.
335.1 Purpose.
335.2 Authority.
335.3 Applicability.
335.4 Policy.
335.5 Applicable laws.
335.6 Related laws and Executive Orders.
335.7 Definitions.

AUTHORITY: 33 U.S.C. 1344; 33 U.S.C. 1413.

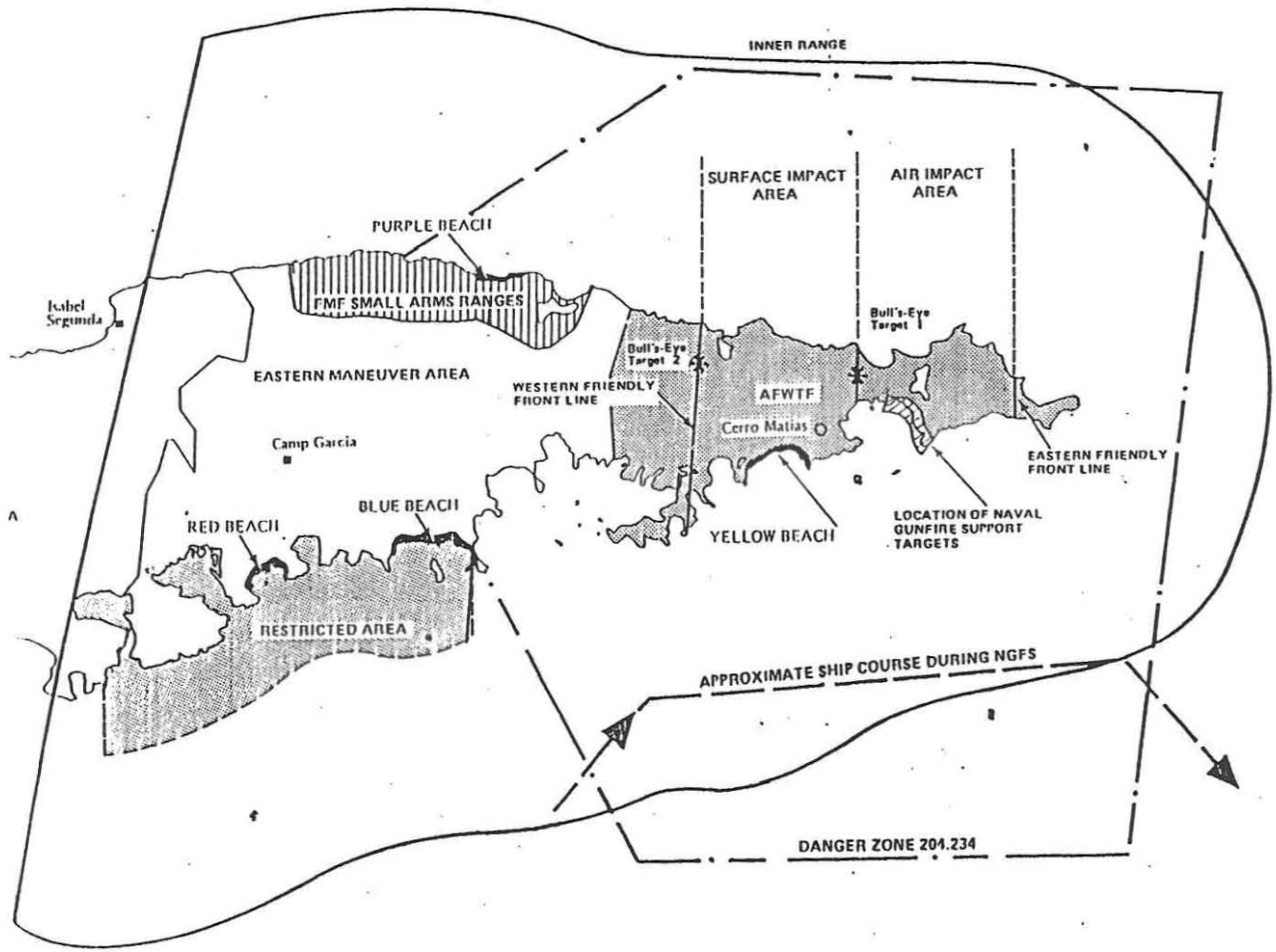
SOURCE: 53 FR 14911, Apr. 26, 1988, unless otherwise noted.

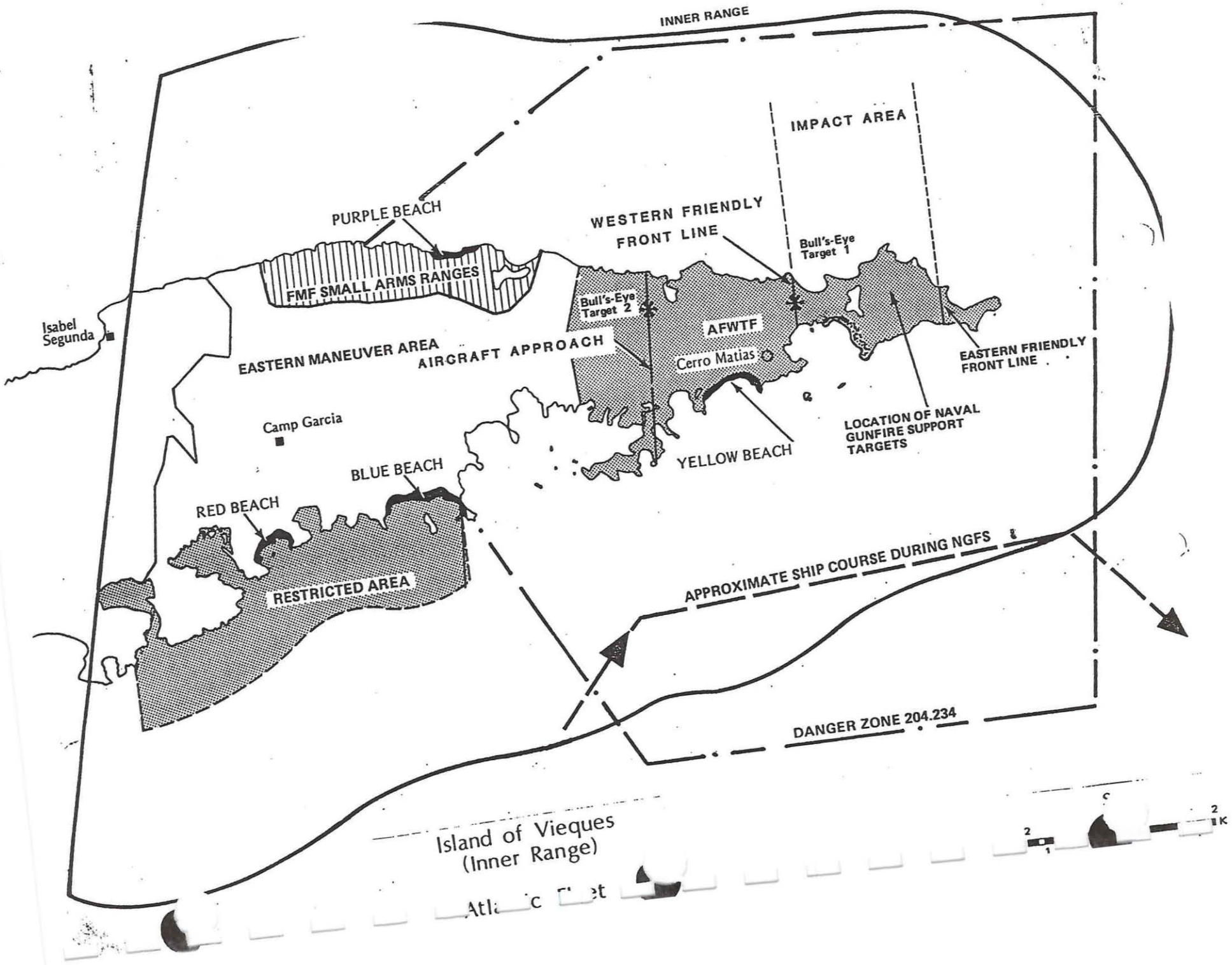
§335.1 Purpose.

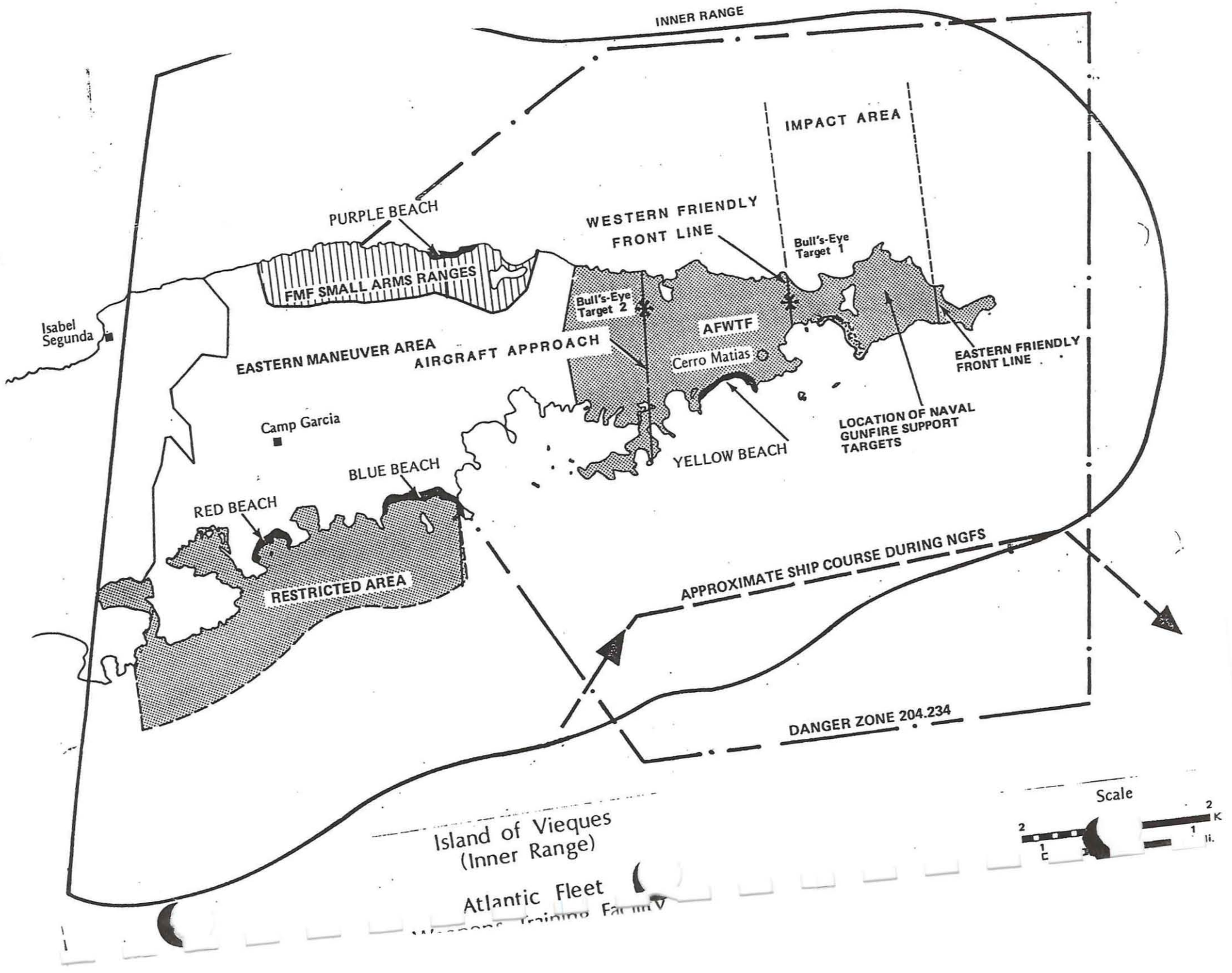
This regulation prescribes the practices and procedures to be followed by the Corps of Engineers to ensure compliance with the specific statutes governing Army Civil Works operations and maintenance projects involving the discharge of dredged or fill material into waters of the U.S. or the transportation of dredged material for the purpose of disposal into ocean waters. These practices and procedures should be employed throughout the decision/management process concerning methodologies and alternatives to be used to ensure prudent operation and maintenance activities.

§335.2 Authority.

Under authority delegated from the Secretary of the Army and in accordance with section 404 of the Clean Water Act of 1977 (CWA) and section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972, hereinafter referred to as the Ocean Dumping Act (ODA), the Corps of Engineers regulates the discharge of dredged or fill material into waters of the United States and the transportation of dredged material for the purpose of disposal into ocean waters. Section 404 of the CWA requires public notice with opportunity for public hearing for discharges of dredged or fill material into waters of the U.S. and that discharge sites can be specified through the application of guidelines developed by the


INNER RANGE
SURFACE IMPACT AREA
AIR IMPACT AREA
PURPLE BEACH
FMF SMALL ARMS RANGES
Isabel Segunda
EASTERN MANEUVER AREA
Bull's-Eye Target 2
Bull's-Eye Target 1
WESTERN FRIENDLY FRONT LINE
AFWTF
Cerro Matias
Camp Garcia
EASTERN FRIENDLY FRONT LINE
BLUE BEACH
RED BEACH
YELLOW BEACH
LOCATION OF NAVAL GUNFIRE SUPPORT TARGETS
RESTRICTED AREA
APPROXIMATE SHIP COURSE DURING NGFS
DANGER ZONE 204.234
N
Scale


INNER RANGE
IMPACT AREA
PURPLE BEACH
WESTERN FRIENDLY
FRONT LINE
Bull's-Eye
Target 1
FMF SMALL ARMS RANGES
Bull's-Eye
Target 2
AFWTF
Isabel
Segunda
EASTERN MANEUVER AREA
AIRCRAFT APPROACH
Cerro Matias
EASTERN FRIENDLY
FRONT LINE
Camp Garcia
LOCATION OF NAVAL
GUNFIRE SUPPORT
TARGETS
YELLOW BEACH
BLUE BEACH
RED BEACH
RESTRICTED AREA
APPROXIMATE SHIP COURSE DURING NGFS
DANGER ZONE 204.234
Island of Vieques
(Inner Range)
Atlantic Fleet


INNER RANGE
IMPACT AREA
PURPLE BEACH
WESTERN FRIENDLY
FRONT LINE
Bull's-Eye
Target 1
FMF SMALL ARMS RANGES
Bull's-Eye
Target 2
AFWTF
Isabel
Segunda
EASTERN MANEUVER AREA
AIRCRAFT APPROACH
Cerro Matias
EASTERN FRIENDLY
FRONT LINE
Camp Garcia
LOCATION OF NAVAL
GUNFIRE SUPPORT
TARGETS
YELLOW BEACH
BLUE BEACH
RED BEACH
RESTRICTED AREA
APPROXIMATE SHIP COURSE DURING NGFS
DANGER ZONE 204.234
Island of Vieques
(Inner Range)
Atlantic Fleet
Scale
2
K
1
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