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Preliminary Site Close Out Report
Barceloneta Landfill Site
Barceloneta, Puerto Rico

I. INTRODUCTION

The U.S. Environmental Protection Agency (EPA) has determined that all construction activities for the Barceloneta Landfill Site have been completed in accordance with *Close Out Procedures for National Priorities List Sites* (OSWER Directive 9320.2-09A-P). The ROD for the Site was issued on July 5, 1996. The selected remedy requires the capping of the three disposal areas by installing a low permeability cover system meeting the requirements of the RCRA subtitle D and Commonwealth of Puerto Rico regulations for landfill closure. This work was completed on August 30, 2000.

II. SUMMARY OF SITE CONDITIONS

Background

The Barceloneta Landfill, an inactive non-hazardous domestic and industrial waste disposal facility, is located in Barceloneta, Puerto Rico on the north coast of the island, approximately 20 miles due west of San Juan. The Landfill is about 4.5 kilometers south of the Town of Barceloneta in Florida Afuera Ward. The property which contains the Barceloneta Landfill is approximately 32.6 hectares (80.6 acres) in size and is owned by the Municipality of Barceloneta. The Landfill is surrounded by a tropical forest. The Quebrada Cimarrona, a tributary of the Rio Grande de Manatí, is located 0.8 kilometers north of the Landfill. A small residential area of approximately 150 residences in Barrio Bajura Adentro is located approximately one kilometer east of the Landfill. Approximately two kilometers north of the Landfill, in an area with more gentle topographic relief, there are a series of manufacturing facilities. The nearest village is Cruce Magueyes, located approximately two kilometers to west-north-west of the Landfill. The residences in the area of the Landfill are served by a public water supply system that uses ground water as a source.

The property contained three surface depressions which were used for waste disposal. These waste disposal areas are known as the northern, southern, and southeastern disposal areas. Each disposal area was located in a depression or "sumidero" (sinkhole) that is surrounded by conical limestone hills referred to as "mogotes". The three waste disposal areas cover about 15 acres. The northern disposal area is separated into two sections by an access road. The southern disposal area was also known as the Superfund disposal area or "El Superfondo". The northern and southern disposal areas were filled and inactive at the time of the 1996 Record of Decision (ROD). The southeastern disposal area remained active until December 31, 1998. Although the southern disposal area was known as the Superfund disposal area, all three disposal areas are covered by the Superfund National Priorities List (NPL) site listing and are addressed by this report.

The Barceloneta Landfill is located in a belt of rugged karst topography that extends along the north coast from 30 kilometers (19 miles) east of San Juan to the west of the island. In the vicinity of the Site, this belt is located from about one kilometer south of the coast to about 20 kilometers (12 miles) inland. North (seaward) of this rugged karst region is a belt of relatively flat coastal plain sediments. South (landward), the rugged karst terrain transitions into the central mountainous core of the island. Features of this karst landscape include numerous sumideros, steep scarp cliffs on the mogotes and adjoining ridges which surround the sumideros, and a lack of surface streams or drainage features associated with individual sumideros.

The Site is underlain by the northern limestone province of Puerto Rico which consists of blanket deposits, the Aymamon Limestone, the Aguada Limestone, the Cibao Formation, and the Lares Formation. Groundwater exists under unconfined conditions in the Aymamon and Aguada Limestones and under confined conditions in the Cibao and Lares Formations. Groundwater flow is to the north.

Groundwater in this area of the northern province discharges to the Rio Grande de Manatí (river) and the Cano Tiburones (wetlands) which are 2.7 kilometers (1.7 miles) north of the Site. Groundwater also feeds the Ojo de Guillo spring located 1 kilometer (0.6 miles) northeast of the Site.

The property on which the Barceloneta Landfill is located was purchased by the Municipality of Barceloneta during the early 1970s. Preparation of the Site for landfill use began in April 1972, and the landfill operations commenced in August 1973. Reportedly, the Landfill was initially approved to receive both municipal and industrial waste, but was restricted to only municipal waste disposal in 1975. However, disposal of industrial wastes appears to have continued past 1975. Specific dates of active filling in each of the three disposal areas are difficult to determine given the lack of detailed record keeping. The Puerto Rico Environmental Quality Board (EQB) has information which indicates that the Landfill (all three disposal areas) was used in the late 1970's for disposal of wastes which contained hazardous substances.

Personnel from EQB and the Department of Health conducted numerous inspections of the Site and listed various violations. These violations included: insufficient cover material; allowing refuse to burn; the presence of flies, rats and mosquitoes; allowing unlimited access to the Landfill; and, allowing people to inhabit structures in the Landfill.

The Site was proposed for inclusion on the NPL in December 1982, and was subsequently approved and listed as an NPL site in September 1983. In 1984, a Remedial Action Master Plan (RAMP) was prepared by an EPA contractor for the Site. Based on the RAMP, a Remedial Investigation and Feasibility Study (RI/FS) Work Plan was developed. In September 1990, a Consent Order was signed in which ten Settling Defendents (SDs) agreed to perform the RI/FS for the Site. Pursuant to the Work Plan, sampling of subsurface soils, ground water and surface water was completed. The first phase of the RI was completed in 1992 and the second phase of the RI field work was completed in January 1994. A final RI report was received by EPA in March 1995 and the streamlined Risk Assessment was completed in May 1995. An abbreviated Final FS was conducted in accordance

with EPA's Presumptive Remedy approach and was received by EPA in September 1995.

Consistent with EPA's Presumptive Remedy approach, EPA conducted a streamlined baseline Risk Assessment by comparing the levels of contaminants in ground water to MCLs. These levels were exceeded, indicating that the Landfill is a source of contamination to the ground water and therefore remedial measures are necessary to protect human health and the environment. EPA's Risk Assessment indicated that the levels of contaminants present in the ground water pose a relatively low long-term threat to the human health. However, if no action were to be taken with respect to the Landfill, the continued release of contaminants into ground water could potentially result in a greater risk at some point in the future. Therefore, based on the results of the Risk Assessment, it was determined that actual or threatened release of hazardous substances from this Site present a threat to public health, welfare, or the environment.

During the RD activities a new area of waste disposal was discovered at the Site outside the limits of the three waste cells delineated for closure in the ROD. The waste was located in a sinkhole which lies immediately to the east of the Superfund cell. In agreement with EPA & EQB, the SDs relocated this waste material and performed a clean closure. This waste was incorporated and capped with the waste in Superfund disposal area.

Remedial Construction Activities

On July 5, 1996, the Regional Administrator signed a Record of Decision (ROD) which called for the capping of the three disposal areas by installing a low permeability cover system meeting the requirements of the RCRA subtitle D and Commonwealth of Puerto Rico regulations for landfill closure. The ROD also called for long term ground water and surface water monitoring to evaluate the effectiveness of the cover system.

A September 30, 1997 Consent Decree (CD) memorialized a settlement whereby ten parties agreed to implement the remedy which was selected in the ROD. The SDs hired M&S Ingenieria y Ciencia Asociados who prepared remedial design plans and specifications, which EPA approved on September 17, 1999. On December 16, 1999, EPA approved the Remedial Action Work Plan and M&S Ingenieria y Ciencia Asociados as the Settling Defendants proposed remedial action contractor.

EPA approved early Remedial Actions to be carried-out prior to the final approval of the Remedial Design Report. These activities included the excavation and stockpiling of clay and the excavation and relocation of waste from the discovered waste area. These activities were started on September 7, 1999. The Remedial Action on-site construction started in January 24, 2000 and was completed on August 30, 2000.

On September 5, 2000, EPA and the State conducted a pre-final inspection and notified the Settling Defendants to proceed with the development of the draft Remedial Action (RA) Report. The draft RA Report is scheduled to be submitted to EPA on October 30, 2000. Punch list items identified during the pre-final inspection will be addressed in the final inspection. The final RA Report will be submitted to EPA in December 2000.

Nine groundwater monitoring wells were installed during the remedial investigation. Drinking water standards were occasionally exceeded for mercury, nickel, chromium, lead, and 1, 1-Dichloroethane. A thirty year groundwater monitoring program is part of the Operation & Maintenance Plan for this site. With the closure of the landfill, groundwater contaminant concentrations should decrease. When it can be demonstrated that groundwater concentrations will reach drinking water standards, a Final Close Out Report will be prepared and the site deleted from the National Priorities List.

No activities were conducted using EPA removal authority at this site.

The site property consists mainly of forested areas which provide a habitat for various plant, insect and animal species. In order to protect the landfill cap, trees will not be allowed to grow on the capped area. However, grasses will be permitted to grow and it is expected that the Landfill areas will be comparable to the surrounding ecology. No reuse is currently planned for the Landfill portion of the site.

III. DEMONSTRATION OF CLEANUP ACTIVITY QA/QC

The cap over the three disposal areas has been constructed in a manner consistent with the ROD and the final design documents. A QA/QC program was used in the development of the RD and throughout the RA. The QA/QC program was in conformance with EPA and Commonwealth of Puerto Rico standards. The Operation and Maintenance and Post Remedial Monitoring Manual is pending approval by EPA and the Commonwealth of Puerto Rico.

IV. ACTIVITIES AND SCHEDULE FOR SITE COMPLETION

The following activities will be completed according to the following schedule:

Task	Estimated Completion	Responsible Organization
Complete Punch List Items	October 2000	SDs
Complete Final Inspection	February 2001	EPA/EQB
Approve Remedial Action Report	March 2001	EPA/EQB/SDs
Implementation of Post Remedial Monitoring	October 2000	SDs
Five-year Review	December 2004	SDs/EQB/EPA
Start Semi-Annual Groundwater Monitoring Program	October 2005	SDs

Task	Estimated Completion	Responsible Organization
Implement Institutional Controls	October 2001	SDs/EQB/EPA
Five-year Review	November 2009	SDs/EQB/EPA
Complete Semi-Annual Groundwater Monitoring Program	October 2009	SDs
Approve Final Close Out Report	December 2010	EPA

V. SUMMARY OF REMEDIATION COSTS

The original cost estimate to implement the remedial action described in the ROD was $10.29 million. This cost included $7.88 million for construction and $2.4 million for the present worth of 30 years of operation and maintenance. The SDs reported that the construction contract award was $3.8 million. The final construction cost is not available at this time. It will be included in the Remedial Action Report. During construction there was an investigation and cleanup of areas outside of the disposal areas and the final footprint of the cells was larger than the size estimated in the RI/FS.

The ROD estimate for annual maintenance costs was $73,207. The current projected annual cost of maintenance is reported by the SDs to be approximately $245,000.

An EPA oversight bill was previously sent and paid. Another bill is being prepared. Oversight costs for both bills are currently estimated to be just over $200,000.

VI. FIVE-YEAR REVIEW

Hazardous substances remain at this site, within a containment area, restricting future site uses. Pursuant to Section 121(c) of CERCLA, EPA and/or the Commonwealth will review the selected site remedy no less often than every five years. The first five-year review will be conducted before January 2005 which is five years after the initiation of construction of this remedy.

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9/27/00
Date