RECORD OF DECISION

The Battery Recycling Company Superfund Site
Municipality of Arecibo, Puerto Rico

United States Environmental Protection Agency
Region 2
March 2024

704730

Declaration Statement

Site Name and Location

The Battery Recycling Company
Arecibo, Puerto Rico
Superfund Site Identification Number PRR000004655

Statement of Basis and Purpose

This Record of Decision (ROD) documents the U.S. Environmental Protection Agency's (EPA's) selection of the final remedy to address soil contamination and the interim remedy to address groundwater contamination at The Battery Recycling Company Superfund Site (Site). The soil and groundwater remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §§ 9601-9675, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. This decision is based on the Administrative Record file established for the Site.

The Department of Natural and Environmental Resources of Puerto Rico (DNER) was consulted on the remedy in accordance with CERCLA Section 121(f), 42 U.S.C § 9621(f), and it concurs with the selected remedy.

Assessment of the Site

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to the public health, welfare, or the environment.

Description of the Selected Remedy

This ROD addresses lead-contaminated soil found at three areas of concern: 1) a Residential Area located north of the Battery Recycling Company (BRC) property (BRC Property), 2) the Eastern Drainage Ditch, and 3) the BRC Property. In addition, it addresses groundwater contaminated with volatile organic compounds (VOCs) located underneath the BRC Property and extending approximately 6,000 feet north. It also addresses groundwater contaminated with lead and arsenic located underneath a portion of the Site.

Soil

The major components of the selected remedy for contaminated soil include the following:

- Demolition of the existing buildings, structures, sumps and foundations;
- Excavation of soil with concentrations exceeding remedial goals within the Residential Area;
- Excavation of soil with concentrations exceeding remedial goals in the Eastern Drainage Ditch;

- Excavation of soil with concentrations exceeding remedial goals at the BRC Property;
- Ex-situ treatment through stabilization of excavated soil using a phosphate-blended amendment to the soil;
- Containment of excavated/treated soil in an engineered repository covered with a geomembrane, the material and thickness of which will be determined during the remedial design (RD) phase;
- Post-excavation confirmatory sampling and analysis;
- Backfilling excavated areas with clean fill;
- Institutional controls (ICs) in non-residential areas in the form of community notifications and deed restrictions and/or notices to restrict the disturbance and/or usage of areas where hazardous substances, including lead and/or arsenic remain above levels that allow for unlimited use and unrestricted exposure or that would potentially compromise the implemented remedial action; and
- Long-term monitoring and maintenance including of the on-Site repository.

The total estimated present-worth cost of soil portion of the remedy is $17.7 million.

Groundwater

The major components of the selected interim remedy for the groundwater include the following:

- Annual groundwater monitoring to further evaluate natural attenuation, migration, and the effects of the soil remedy;
- ICs in the form of governmental controls such as existing Puerto Rico laws or regulations that serve to restrict the usage of contaminated groundwater by restricting well installation until the aquifer is restored to drinking water quality standards. ICs in the form of informational devices will also be implemented, such as advisories or notices published in newspapers and periodic letters sent to local government authorities on the need to limit water withdrawal or new construction unless appropriate vapor intrusion investigations are conducted and/or mitigation measures are undertaken.

The total estimated present-worth cost of the groundwater remedy is $1.56 million.

Consistent with EPA Region 2's *Clean and Green* policy, EPA will evaluate the use of sustainable technologies and practices with respect to implementation of all components of the selected remedy.

Declaration of Statutory Determinations

The selected remedy satisfies the statutory requirements for remedial actions set forth in Section 121 of CERCLA, 42 U.S.C. § 9621, as follows: 1) it is protective of human health and the environment; 2) it meets a level or standard of control of the hazardous substances, pollutants, and contaminants that at least attains the legally applicable or relevant and appropriate requirements under federal and state laws unless a statutory waiver is justified; 3) it is cost-effective; and 4) it utilizes permanent solutions and alternative treatment or resource recovery technologies to the maximum extent practicable. In addition, Section 121 of CERCLA, 42 U.S.C. § 9621, includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances as a principal element. The contaminated soil characterized as hazardous waste under the Resource Conservation and Recovery Act (RCRA) will be treated/stabilized for containment in an engineered repository at the BRC property. Therefore, the selected remedy satisfies the preference for treatment as a principal element.

The interim remedy for groundwater is protective of human health and the environment in the short-term and is intended to provide adequate protection until a final Site-wide groundwater remedy is selected.

The selected remedy will result in hazardous substances, pollutants, or contaminants remaining at the Site above levels that would otherwise allow for unlimited use and unrestricted exposure. As a result, in accordance with Section 121(c) of CERCLA, statutory reviews will be conducted no less often than once every five years to ensure that the selected remedy is protective of human health and the environment.

ROD Data Certification Checklist

The following information is included in the Decision Summary section of this ROD. Additional information can be found in the Administrative Record for the Site.

- Chemicals of concern and their respective concentrations may be found in the "Site Characteristics" section.
- Baseline risks represented by the chemicals of concern may be found in the "Summary of Site Risks" section.
- A discussion of remediation goals may be found in the "Remedial Action Objectives" section.
- Current and reasonably anticipated future land use assumptions are discussed in the "Current and Potential Future Site and Resource Uses" section.
- Estimated capital, annual operation, and maintenance (O&M) and total present worth costs are discussed in the "Description of Alternatives" section.
- Key factors that led to selecting the remedy (i.e., how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) may be found in the "Comparative Analysis of Alternatives" and "Statutory Determinations" sections.

Pat Evangelista

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Date: 2024.03.11 12:59:51 -04'00'

March 11, 2024

Pat Evangelista, Director
Superfund and Emergency Management Division
United States Environmental Protection Agency – Region 2

Date

Decision Summary

The Battery Recycling Company Superfund Site
Arecibo, Puerto Rico

United States Environmental Protection Agency
Region 2
March 2024

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Site Name, Location and Description

The Battery Recycling Company Superfund Site (Site) includes the property that was operated by The Battery Recycling Company, Inc. (BRC) located at State Road 2 kilometer (km) 72.2, Barrio Cambalache, Arecibo, Puerto Rico (BRC Property) (**Figure 1**). The BRC Property, which occupies approximately 16 acres, is bounded on three sides (north, east, and south) by agricultural or undeveloped land, and on the west side by PR-2. A former cattle pasture (Cattle Pasture Area), a land crab habitat in drainage pathways and canals that run toward the Caño Tiburones, and a residential neighborhood are located north of the BRC Property.

A hardware store and concrete block business are located on the opposite side of PR-2 to the west. There are 10 structures located on the BRC Property, referred to as Structures 1 through 9 and 1A, consisting of the following: Structure 1 (Administration), Structure 1A (Administration), Structure 2 (Process Building), Structure 3 (Waste Storage), Structure 4 (Wastewater Treatment Plant), Structure 5 (Storage), Structure 6 (Tank Farm), Structure 7 (Air Emission Stack, also referred to as the Bag House frame), Structure 8 (Waste Storage), and Structure 9 (Abandoned Tank). One large surface drainage feature at the BRC Property is a drainage ditch that runs west to east and bisects the BRC Property (hereinafter referred to as, BRC Property Drainage Ditch), which discharges into a deep drainage ditch (hereinafter referred to as, Eastern Drainage Ditch) to the east of the BRC Property that flows north toward the Caño Tiburones and ultimately to Arecibo Bay.

Agricultural and residential properties immediately adjacent to the BRC Property are summarized below (**Figure 2**).

Cattle Pasture Area: To the north of the BRC Property is a cleared agricultural area formerly used as pastureland for cattle. This area has always been vacant land. Cattle operations ceased in 2011. The area is bounded to the west by PR-2, the BRC Property to the south, residential houses and a land crab habitat in the drainage pathways and canals that run toward the Caño Tiburones to the north, and agricultural/cattle pastures to the north and east.

Eastern Forested Area: To the east of the BRC Property is a large area consisting of dense forested land. The Eastern Drainage Ditch runs along the western portion of this property, separating it from the BRC Property.

Southern Nursery Area: To the south of the BRC Property is an agricultural area used for a nursery. There is a fence line separating the property from the BRC Property.

Western Area: To the west of the BRC Property is a grassy and paved area that lies directly across from PR-2. On the opposite side of PR-2 are concrete block manufacturing and hardware store businesses, a church, an electric substation, an industrial property containing multiple buildings, an open field north of the industrial warehouse, and the Río Grande de Arecibo.

Residential Area: To the northwest of the BRC Property is a residential area in a cul-de-sac on the eastern side of PR-2. There are five residential structures within this area.

Site History

BRC was founded and began operations at the BRC Property in 1994 for the collection and recycling of lead-acid batteries. Until 2004, BRC performed small-scale battery breaking and lead smelting. Between 2004 and 2005, the facility expanded operations and became a large-scale secondary smelter. Operations at the facility ceased in 2014 and included breaking and sorting lead-acid batteries and refining the lead to be resold. The operations generated large quantities of battery acid and lead-contaminated waste. BRC's improper handling of hazardous materials and hazardous wastes led to high levels of lead contamination at and near the BRC Property.

Prior to BRC operations, the BRC Property was owned by the Puerto Rico Industrial Development Company (PRIDCO) from 1964 through 1982. PRIDCO leased the BRC Property to the Puerto Rico Chemical Company, Inc. (PRCC) for the manufacture of organic chemicals using o-xylene to produce fumaric acid and phthalic acid from 1966 until closure of the facility due to an explosion in 1979. PRCC was a wholly owned subsidiary of Hooker Chemical Corporation, which changed its name to Occidental Chemical Corporation (Occidental) on April 1, 1982. After the explosion in 1979, PRCC relinquished the property back to PRIDCO. The property was later sold by PRIDCO to Luis Figueroa, president of BRC, and his spouse Awilda Carrasquillo for the operations of BRC at the BRC Property. Currently, the BRC Property is owned by Luis Figueroa and Awilda Carrasquillo.

In November 1981, the Puerto Rico Environmental Quality Board (PREQB, now known as DNER) determined that a report provided by PRCC's contractor indicated groundwater contamination at the BRC Property. Between 1982 and 1983, investigations were conducted by EPA and the United States Geological Survey (USGS) of monitoring wells on the BRC Property and by EPA of monitoring wells nearby the BRC Property. The investigations indicated the presence of trichloroethylene (TCE), dichloroethane (DCE), 1,2 trichloroethylene, and vinyl chloride at the BRC Property and groundwater contamination nearby the BRC Property.

On September 30, 1986, EPA entered into an Administrative Order on Consent, Index Number II-RCRA-3013-60302*,* with Occidental, the findings of which documented the release of trichloroethylene (TCE), dichloroethane (DCE) and vinyl chloride during the PRCC operations at the Site. During and after PRCC operations, several spills of o-xylene were reported outside the BRC Property. Subsequent assessments by PREQB noted stressed vegetation east of the o-xylene tank, and east of the facility boundary. In the years following the 1979 explosion and plant shutdown, PREQB performed an inspection and found approximately 30,000 55-gallon containers of phthalic anhydride on the BRC Property in deteriorated condition, which were later removed. In addition, a large quantity of hazardous waste was observed inadequately stored, with liquid waste staining the ground surface. Groundwater sampling at the BRC Property detected elevated concentrations of 1,1- DCE, trans-1,2-DCE, toluene, trichloroethene, and vinyl chloride. Groundwater contamination was also found near the BRC Property.

After BRC began operating at the former PRCC facility, PREQB completed a preliminary assessment (January 1996) and EPA conducted a sampling investigation (January 1999) to evaluate the BRC Property. The 1999 investigation found arsenic at a maximum concentration of 10.6 milligrams per kilogram (mg/kg) in the soil of a ditch to the south of the BRC Property and lead at a maximum concentration of 117 mg/kg in the sediment of the wetland on the western portion of the BRC Property.

During the 1996 to 2004 timeframe, on numerous occasions PREQB found BRC to be out of compliance with Puerto Rico and federal laws and/or regulations, including operating without the required permits, improper storage of hazardous wastes, irregularities in waste management, spills, and violations of air emissions regulations. During the same timeframe, PREQB also received complaints of accumulations of batteries and solid wastes, discharges of battery acid to the soil and surface water of the adjacent river, bad odors including acid-like odors, and illegal dumping.

In April 2008, EPA collected surficial soil samples in an east-west aligned ditch along the northern fence line of the BRC Property that contained lead concentrations as high as 57,500 mg/kg. A 2010 sampling event in this area found lead concentrations up to 4,700 mg/kg, with an average lead concentration of 843 mg/kg. EPA RCRA compliance evaluation inspections in 2010 found improper storage and handling of hazardous materials and hazardous waste, significant spillage of particulate matter in several areas, and overflow of the stormwater/wastewater collection system into the Eastern Drainage Ditch and to other areas. The inspections showed that BRC was in violation of RCRA on several counts, including failure to make hazardous waste determinations on its solid waste, illegal disposal of hazardous waste, and failure to minimize risks (releases).

In November 2010, and April and May 2011, the Centers for Disease Control and Prevention tested some family members of BRC employees for blood lead levels. From each clinic that performed testing, 20–40% of samples collected from the susceptible population (children below 7 years of age and pregnant and lactating women) had lead levels above 10 micrograms per deciliter, EPA's blood lead level of concern at the time. Sampling of cars and homes of BRC employees indicated lead levels above 40 micrograms per square foot ($\mu g/ft^2$), with some vehicles measuring above 100,000 $\mu g/ft^2$. The contamination pathway transport was believed to be the transfer of lead-contaminated dust in the employees' boots and uniforms from the BRC Property to the employees' cars and homes. On June 7, 2011, EPA entered into a CERCLA Settlement Agreement and Order on Consent, Index Number-02-2011-2010, for BRC to conduct removal activities at the Site including, but not limited to, removing lead contamination from the adjacent cattle pasture area, from the vehicles and homes of BRC employees, and instituting decontamination measures at the BRC Property to mitigate the migration of contamination from the facility on employee clothing.

In 2011 and 2012, EPA conducted removal assessments of residential properties and vehicles belonging to current and former BRC employees. The first phase of the removal assessments in June 2011 resulted in removal actions at residential properties and vehicles containing lead contamination. The second phase included the reassessment of properties and vehicles that were previously cleaned up and further removal response for those with remaining elevated lead levels.

From August through October 2011, PREQB collected soil, sediment, and aqueous samples from the BRC Property and other properties within a 1-mile radius. Elevated lead levels above the soil screening level (400 mg/kg) were detected in several areas at the BRC Property and on surrounding properties.

In 2014, BRC shut down operations at the Site. EPA took over removal activities at the Site. In 2015, EPA further investigated the cattle field to the north of the BRC facility using a portable X-ray fluorescence (XRF) elemental analyzer to delineate lead contamination and identify areas for excavation and removal. The excavation and removal from those areas were thereafter performed by EPA. Following the 2015 removal activities, post-excavation sampling confirmed that all lead contamination was removed from the excavated area. In September 2015, EPA conducted additional XRF screening of samples collected from the northeastern corner of the BRC Property and the BRC Property Drainage Ditch, which indicated the presence of lead in both areas, with concentrations generally greater than 800 mg/kg and as high as 88,800 mg/kg.

In November 2015, aqueous samples of runoff flowing through the BRC Property Drainage Ditch and off the BRC Property showed the presence of lead at levels as high as 1.9 milligrams per liter (mg/L). In addition, EPA collected samples from two slag storage areas at the BRC Property where piles of furnace slag and other solid waste from operations were kept in open-air structures. The waste piles in these structures were not covered or kept within bermed areas and were subject to erosion by wind and water. Waste material had spilled out onto the open ground, and staining was visible throughout the ground surface near both piles. The analytical results showed that both waste piles contained elevated levels of arsenic, cadmium, and lead.

A removal assessment of the BRC Property was conducted by Weston, on behalf of EPA Region 2's Removal Action Branch, in two phases from January through March 2016. As part of the Phase I soil investigation, EPA advanced soil borings and collected soil samples for lead screening throughout the property but not within the on-property building footprints. XRF screening, with laboratory confirmation samples, showed that lead was present above the Removal Management Level (RML) of 800 mg/kg throughout the BRC Property. All areas of the BRC Property were affected, including bare soil areas, vegetated areas, asphalt, and gravel covered areas, and the BRC Property Drainage Ditch. In some areas, contamination was shown to extend to depths of 3 feet or more below ground surface (bgs). In March 2016, the Phase II multimedia sampling event was completed at the Site, which included the collection of aqueous, solid waste, wipe, and microvac (vacuumed) samples from within BRC Property structures. Based on the analytical results collected from sumps and Structure Nos. 1, 1A, 2, 4, and 7, extensive lead contamination was documented throughout these areas of the BRC Property.

DNER manages the collection and analysis of lead samples at two air monitoring stations within one-quarter mile of the BRC Property; both stations are predominantly downwind from the BRC Property. The lead sampling stations are operated on a year-round basis, and the measurements are sent quarterly to EPA's Air Quality System (AQS). From 2011 to 2015, the stations downwind of the BRC Property repeatedly showed lead concentrations that exceed the National Ambient Air Quality Standard of 0.15 micrograms per cubic meter ($\mu g/m^3$), including the highest lead reading in the entire AQS database for calendar year 2013 (8.216 $\mu g/m^3$). Air quality modeling by PREQB showed that the BRC Property was the primary source causing the high lead concentrations at the downwind monitoring stations and that the contribution by other lead emission sources in the area was insignificant.

There are 147 residents and workers within one-quarter mile of the BRC Property that were considered subject to air releases above regulatory guidelines. Within four miles of the BRC Property there are more than 50,000 people; commercial agricultural enterprises, including a cattle pasture to the north and a palm tree farm and garden center to the south; 2,900 acres of wetlands; and several other sensitive environments.

On May 13, 2016, EPA issued CERCLA Administrative Order, Index Number 02-2016-2022, to BRC and the BRC Property owners, Luis Figueroa and Awilda Carrasquillo Encarnacion, requiring that they refrain from: removing equipment or assets from the Site that are or may be contaminated; excavating, moving or constructing upon the soil; dismantling or decontaminating equipment or assets without prior approval and oversight from EPA; causing any waste oil or other liquids that may contain hazardous substances to be released at the Site; and taking any other actions, including disposal activities that may result in the release of hazardous substances. EPA's Region 2 Removal Program demobilized from the BRC property in August 2022 following the gross decontamination of buildings and equipment at the BRC property.

In 2016, EPA prepared a Hazard Ranking System Report to document the results of EPA's investigations and its determination to include the Site on its National Priorities List (NPL). EPA added the Site to the NPL on August 3, 2017.

Highlights of Community Participation

At the completion of the Remedial Investigation/Feasibility Study (RI/FS), EPA prepared a Proposed Plan presenting remedial alternatives for soil as well as EPA's preferred remedy soil and interim remedy for groundwater. The Proposed Plan and supporting documentation to address soil and groundwater contamination at the Site were released to the public for comment on August 15, 2023. The Proposed Plan and the Administrative Record files were made available to the public online at http://www.epa.gov/superfund/battery-recycling-company , and the Administrative Record files were also made available at the US EPA Region 2 Caribbean Environmental Protection Division, City View Plaza II- Suite 7000, Road PR-165, KM 1.2, Guaynabo; Department of Natural and Environmental Resources of Puerto Rico, 1375 Ponce de Leon Ave., San Juan; Arecibo's City Hall, Jose de Diego Ave., Arecibo, Puerto Rico and US EPA Records Center Region 2, 290 Broadway, 18th Floor, New York, New York.

On August 15, 2023, EPA published a Public Notice in the Primera Hora newspaper that contained information about the public comment period, the public meeting for the Proposed Plan, and the availability of the administrative record file for the Site. The comment period closed on October 16, 2023.

On August 29, 2023, EPA held a public meeting to discuss the findings of the Site RI/FS and present the preferred alternative for addressing the soil and the groundwater contamination. Comments received during the public meeting and the public comment period are included in the Responsiveness Summary (Appendix IV).

Scope and Role

The Site is being addressed as one operable unit. The overall remediation strategy for the Site is to prevent human and ecological exposure to elevated levels of Site-related contaminants found in the soil and groundwater at the Site. This ROD addresses the remedy for the contaminated soil, and the interim remedy for the groundwater contamination. The soil remedy is the final planned remedial action for the Site. A final action for the groundwater plume will be determined in the future.

Site Characteristics

Physical Setting

The Site is located on the coastal and alluvial deposits of the Río Grande de Arecibo floodplain, approximately 0.5 miles east of the Río Grande de Arecibo, and approximately 2.75 miles north of where the north-flowing river emerges from the mountains to the south. The floodplain and river continue for approximately 1.5 miles north of the Site before discharging to the Arecibo Bay of the Atlantic Ocean on Puerto Rico's north coast. The BRC Property is at an elevation of about 15 to 20 feet above mean sea level with the eastern half of the property sloping to the east and the western boundary of the property being State Road PR-2, which sits topographically higher than the land on either side (**Figure 1**). However, during extreme weather events some areas of the Site may flood.

Geology and Hydrogeology

The Site is located in the north-central coast of Puerto Rico and is within the North Coast Limestone Province. The geologic setting includes alluvial deposits of the Río Grande de Arecibo floodplain deposited above the limestone formations that form the bedrock. Caliche, a carbonate-cemented alluvium, is found in the shallow fill material at the Site. The bedrock aquifer at the Site is in the Aymamon Limestone, which is part of the North Coast Limestone aquifer system. The limestone was not encountered during the site investigation.

The unconfined alluvial aquifer at the Site extends from the water table, approximately 8 to 20 feet bgs, to the bedrock surface at approximately 130 feet bgs. The alluvial aquifer consists of discontinuous sands, silts, and clay layers of varying thickness and most of the unit is silt and clay. The silt and clay units in the aquifer have low transmissivity and the groundwater gradient is low. Overall, regional groundwater flow is northward toward the coast, with localized flow toward the Río Grande de Arecibo and Caño Tiburones.

Surface Hydrology

The BRC Property is located on relatively flat terrain with a slope that drains toward the northern/northeastern part of the Site. In the central-eastern part of the BRC Property, there is an open channel stormwater drainage swale, the BRC drainage ditch, which is approximately 1 to 2 feet deep, and which runs from west to east and divides the eastern part of the BRC Property. Based on the topography of the BRC Property, most stormwater on the eastern half of the property collects in this swale. The BRC drainage ditch flows into a former irrigation ditch (Eastern Drainage Ditch), which runs south to north along the eastern boundary of the BRC Property (**Figure 5**).

Historically, water within the Eastern Drainage Ditch likely flowed north through a series of irrigation channels discharging into the Caño Tiburones south canal, eventually reaching Arecibo Bay. Currently, this ditch extends approximately 3,000 feet adjacent to and north of the BRC Property. Water was not observed flowing in the Eastern Drainage Ditch during EPA's investigations, and it appears to currently act as a collection point for runoff to infiltrate, rather than directing flow to the north. Another drainage ditch is present at the southern edge of the eastern part of the BRC Property, potentially discharging into the Eastern Drainage Ditch.

Nature and Extent of Contamination

During EPA's Removal Actions and RI/FS, lead was detected in BRC's building materials/structures, soil beneath the BRC property, Cattle Pasture Area, Eastern Drainage Ditch and Residential Area to the north of the BRC Property. Inorganics (lead, antimony, arsenic, chromium, and copper) were detected mostly in the soil beneath the BRC Property and on the Eastern Drainage Ditch and are co-located with lead.

The primary Site-related contaminants (SRCs) are inorganics and chlorinated volatile organic compounds (VOCs) (TCE, cis-1,2-DCE, and vinyl chloride). These contaminants are present in the following media, as applicable:

Building Materials – Wipe, vacuumed-dust, concrete chip, solid waste, and aqueous waste samples collected during the 2016 and 2019 investigations found lead dust contamination throughout many of the process buildings, structures, equipment, and waste present at the BRC Property at concentrations greater than the EPA Site-Specific Action Level for lead. Solid waste and aqueous samples collected from on-site sumps and lagoons contained lead, antimony, arsenic, cadmium, cobalt, and thallium at concentrations greater than the EPA RMLs.

BRC Property Soil and Sediment – Lead was found at concentrations greater than 800 mg/kg throughout most of the BRC Property in surface soil (0–1 feet bgs), including soil underneath on-site structures. Lead concentrations below the top foot of soil were generally found at concentrations less than 800 mg/kg. However, in source areas where acid was likely discharged to, elevated lead concentrations were detected to a maximum of 8 to 12 feet bgs. The highest concentrations (greater than 5,000 mg/kg) were found near the former production (Structure 2) and slag/battery storage (Structure 3) areas. In the BRC drainage ditch, lead concentrations were greater than 800 mg/kg, down to 4 feet bgs.

Concentrations of the other primary SRCs (antimony, arsenic, chromium, and copper) were also frequently greater than the RI screening criteria, site-specific background values (SSBVs), and EPA Regional Screening Levels (RSLs) in surface soil on the BRC Property, specifically in the production and storage areas and in the Eastern Drainage Ditch. Near source areas, primary SRC concentrations greater than the criteria were found in deeper soil. Generally, the distribution of primary SRCs followed a similar distribution to that of lead.

Off-Property Soils and Sediment **-** Lead contamination in soil outside of the BRC Property was detected in the Eastern Drainage Ditch, soil adjacent to the ditch within the Eastern Forested Area, and soil immediately north of the facility in the Cattle Pasture Area and Residential Area. The highest concentrations of lead were present in the Eastern Drainage Ditch at the confluence with the BRC drainage ditch.

Lead concentrations in soil and sediments greater than 800 mg/kg are present in the Eastern Drainage Ditch and associated low-lying areas adjacent to the BRC Property at an overall length of approximately 2,000 feet. Soil and sediments at the bottom of the ditch contained the highest lead concentrations; lead concentrations decreased in soil and sediments moving up the bank of the ditch, significantly decreasing within the first 5 to 10 feet laterally away from the ditch. Lead contamination is generally limited to the top foot of soil and sediment. A minimal amount of contamination is present in the Eastern Forested Area, in low-lying areas associated with the Eastern Drainage Ditch, and in some areas at the top of the bank immediately adjacent to the Eastern Drainage Ditch. This contamination may be attributable to clearing, dumping, or tracking during construction activities.

Generally, concentrations of other primary SRCs (antimony, arsenic, chromium, and copper) in the off-BRC Property areas were found at concentrations greater than SSBVs within the Eastern Drainage Ditch and adjacent areas. Elevated primary SRC concentrations are co-located with elevated lead concentrations, with the highest concentrations in the soil and sediments in the area where the BRC drainage ditch would discharge into the Eastern Drainage Ditch.

Lead contamination was previously present in the southernmost part of the Cattle Pasture Area. However, following excavation conducted under a removal action, sampling showed that the remaining contamination is limited to soil immediately adjacent to the BRC Property exit road.

Five surficial samples (0–1inch bgs) were collected from each of the five residential properties for a total of 25 samples, with just one sample with a concentration above 400 mg/kg. Only 2 of the 25 samples exceeded 200 mg/kg. In addition, five soil samples (0–1 foot bgs) were collected from each of the five residential properties and sent to the laboratory. The XRF lead concentrations from these samples were similar to the laboratory results, with just one sample above 400 mg/kg. Like the surficial samples, only 2 of these 25 samples had XRF lead concentrations above 200 mg/kg. Laboratory confirmation samples found similar concentrations with a maximum concentration of 358 mg/kg at one location (Property 4). Five-point composite samples were also collected from each residence and showed similar results. Overall, the lead concentrations in the residential area soils were low, with the exception of the soil in Property 4. This property is the closest to PR-2. However, the samples collected from the other residences adjacent to State Road PR-2 were not as elevated.

Additionally, lead concentrations in the soil and sediments within the southern nursery area and the western area were below 200 mg/kg. Lead and other primary SRCs were not detected at concentrations greater than RI screening criteria or SSBVs in the sediments of the Río Grande de Arecibo or within the other ditches to the northeast of the BRC Property.

Groundwater - During the RI/FS, EPA took three rounds of groundwater samples. Total lead concentrations exceeded the RI groundwater screening criterion of 15 micrograms per liter (μg/L) in one well during Round 1 and three wells during Round 3. Dissolved lead did not exceed the RI groundwater screening criterion in any of the samples during all three rounds of sampling: it was detected in 19 of 53 samples, at concentrations ranging from 0.17 to 11 μg/L. In Round 3, except for one well, all the samples with elevated total lead concentrations had low or no detections of dissolved lead, suggesting the total concentrations observed in those samples were related to particulates (turbidity) in the samples.

Total arsenic concentrations exceeded the screening criterion (10 μg/L) in five wells, ranging from 10.2 to 19.1 μg/L during Rounds 1, 2, and 3, with a maximum concentration of 19.1 μg/L during Round 3. Dissolved arsenic concentrations exceeding the screening criteria were similar during all rounds, ranging from 10.3 to 19.6 μg/L, with the maximum concentration in Rounds 1 and 3, and a maximum of 14.9 μg/L during Round 2.

Chlorinated VOCs found at concentrations greater than the RI screening criteria in monitoring well and groundwater screening samples include TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride. Of these chlorinated VOCs, cis-1,2-DCE and vinyl chloride were found most frequently and were extensive. The chlorinated VOC contamination is present in groundwater below and downgradient of the BRC Property between 16.5 and 73 feet bgs. Data indicates that the source of groundwater contamination is on the BRC Property with contamination migrating downgradient in alignment with the measured potentiometric surface. This distribution pattern suggests the contamination is migrating via advection from a source, and remnant contaminant mass is sorbed to low permeability silt and clay. The maximum concentrations of cis-1,2-DCE (3,500 µg/L in Round 1) and vinyl chloride (350 µg/L in Round 3) were detected in well MW-8, which is located along the northern BRC Property line, downgradient of Structure 3 (the former slag pile storage building). Chlorinated VOC contamination was not detected in a groundwater screening sample collected upgradient of the apparent source area. The cis-1,2-DCE plume is approximately 3,500 feet in length and the vinyl chloride plume is approximately 6,000 feet in length (**Figure 4**).

TCE is believed to have been the parent source of the chlorinated VOC contamination at the Site. The presence of degradation byproducts (i.e., cis-1,2-DCE and vinyl chloride) of TCE indicates that biodegradation is occurring or had occurred at some point in the past. TCE dechlorination to trans-1,2-DCE was also observed within the plume. Ethene/ethane have been detected along the plume, indicating that complete dechlorination has occurred.

The dechlorination products and redox conditions at the Site show there is adequate evidence for anaerobic biodegradation of chlorinated organics within the plume. Chloride can be progressively dechlorinated by microbes via reductive dechlorination in the dissolved phase via the following pathway: TCE → cis-1,2-DCE → vinyl chloride → ethene and carbon dioxide. When TCE is degraded to DCE, the cis isomer (cis-1,2-DCE) is predominant over the trans isomer (trans-1,2-DCE). The majority of the reductive dechlorination pathway requires an anaerobic environment. However, while degradation of vinyl chloride can occur slowly in an anaerobic groundwater, it occurs more quickly in an aerobic environment.

Surface Water - Lead was not found in surface water at concentrations greater than the RI surface water screening criteria. The only primary SRC found above the RI surface water screening criteria was copper, found at concentrations greater than the criteria in one sample.

Current and Potential Future Land Use and Resources Uses

Land Use

The primary land uses near the Site are agricultural, residential, and commercial. There are a few private wells located within a 4-mile radius of the Site, but none are located to the north or downgradient from the Site according to regional groundwater flow. The nearest private well is located within a 0.5- to 1-mile radius of the Site. There are no residences, schools, or day care centers within 200 feet of the BRC Property. The nearest residential area, consisting of five residences, is located approximately 1,000 feet northwest of the BRC Property. Approximately 55,721 residents, 22,580 wetland acres, and state- and federal-listed endangered species are located within a 4-mile radius of the Site.

As discussed above, the selected remedy for soil and selected interim remedy for groundwater should not result in adverse impacts to environmental resources that would affect low-income, minority populations living within the vicinity of, or using, the Site because of its location that is relatively secluded with mostly industrial and agricultural zoning.

Summary of Site Risks

As part of the RI/FS, EPA conducted a baseline risk assessment to estimate the current and future effects of contaminants on human health and the environment. A baseline risk assessment is an analysis of the potential adverse human health and ecological effects of releases of hazardous substances from a Site in the absence of any actions or controls to mitigate such releases, under current and future land uses. The baseline risk assessment includes a human health risk assessment (HHRA) and an ecological risk assessment or screening-level ecological risk assessment (SLERA). It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the results of the baseline risk assessment for the Site.

Human Health Risk Assessment

A **four-step** process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario:

1. *Hazard Identification* uses the analytical data collected to identify the contaminants of potential concern (COPC) at the Site for each medium, with consideration of a number of factors explained below;
2. *Exposure Assessment* estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways by which humans are potentially exposed;
3. *Toxicity Assessment* determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response); and

Risk Characterization summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks. The risk characterization also identifies contamination with concentrations which exceed acceptable levels, defined by the National Contingency Plan (NCP) as an excess lifetime cancer risk greater than $1 \times 10^{-6} – 1 \times 10^{-4}$ or a Hazard Index greater than 1.0; contaminants at these concentrations are considered COCs and are typically those that will require remediation at the Site. Also included in this section is a discussion of the uncertainties associated with these risks.

<u>Hazard Identification</u>

In this step, COPCs in each medium were identified based on such factors as toxicity, frequency of occurrence, fate and transport of the contaminants in the environment, concentrations, mobility, persistence and bioaccumulation. The HHRA began with selecting COPCs in various media (i.e., surface soil, subsurface soil, sediment, surface water, and groundwater) that could potentially cause adverse effects in exposed populations. COPCs are selected by comparing the maximum detected concentrations of each chemical identified with local and federal risk-based screening values.

The COPC screening was conducted separately for each medium of interest in the BHHRA. COPCs not considered to be site-related or at concentrations similar to background are carried through the quantitative portion of the BHHRA but not identified as primary COPCs (i.e., COCs) for the Site. A comprehensive list of all COPCs can be found in the BHHRA in the administrative record. Only site related risk-driving COCs, or those chemicals exceeding risk and hazard thresholds, are included in **Table 1**.

<u>Exposure Assessment</u>
Consistent with Superfund policy and guidance, the HHRA assumes no remediation or institutional controls to mitigate or remove hazardous substance releases. Cancer risks and noncancer hazard indices were calculated based on an estimate of the reasonable maximum exposure (RME) expected to occur under current and future conditions at the Site. The RME is defined as the highest exposure that is reasonably expected to occur at a Site.

The Site includes a mix of residential and commercial zoning. All residents are currently connected to a public drinking water supply (PRASA). For purposes of the HHRA, the Site was divided into five separate exposure areas with similar anticipated current. These exposure areas included the Residential Area (comprised of five parcels, known as Properties 1 to 5), Cattle Pasture/Eastern Forested Area, Land Crab Habitat, Rio Grande Arecibo, Western Area/Southern Nursery. Based on current zoning and anticipated future use, the risk assessment focused on a variety of current and future possible receptors, which include:

- Resident (Adult and Child [birth to < 6 years of age]) in the Residential Area (comprised of five parcels known as Properties 1 through 5) to the north of the BRC Property: incidental ingestion of and dermal contact with surface soil and inhalation of particulates and volatiles released from surface soil.
- Trespasser (Adolescent [12 to < 18 years of age]) in the Cattle Pasture/Eastern Forested Area: incidental ingestion of and dermal contact with surface soil and particulates and volatiles released from surface soil.
- Recreational Users (Older Child [6 to <18 years of age]) in Cattle Pasture/Eastern Forested Area ditches: incidental ingestion of and dermal contact with ditch surface soil inhalation of particulates and volatiles released from surface soil as well as dermal contact while wading in surface water.
- Recreational User (Crabber) (Adolescent [12 to <18 years of age]) at the Río Grande de Arecibo: dermal contact while wading in surface water and ingestion and dermal contact while wading in sediment.
- Commercial Worker (Adult) in the Western Area/Southern Nursery Area: incidental ingestion of and dermal contact with surface soil and inhalation of particulates and volatiles released from surface soil.

For the future land use only scenarios, the HHRA evaluated the following populations in the BRC property, Cattle Pasture/Eastern Forested Area, Western Area/Southern Nursery Area and/or the Land Crab Habitat.

- Resident (Adult and Child [birth to < 6 years of age]) in the BRC Property, Cattle Pasture/ Eastern Forested Area, or Western Area/Southern Nursery Area: incidental ingestion of and dermal contact with surface soil and inhalation of particulates and volatiles released from surface soil.
- Commercial Worker (Adult) at the BRC Property: incidental ingestion of and dermal contact with surface soil and inhalation of particulates and volatiles released from surface soil.
- Agricultural Worker (Adult) at the BRC Property, Cattle Pasture/Eastern Forested Area, or Western Area/Southern Nursery Area: incidental ingestion of and dermal contact with surface soil and inhalation of particulates and volatiles released from surface soil.
- Recreational User (Crabber) (Adolescent [12 to < 18 years of age]) in the Land Crab Habitat: incidental ingestion of and dermal contact with surface soil and inhalation of particulates and volatiles released from surface soil as well as dermal contact while wading in surface water.
- Construction Worker (Adult) at the BRC Property: incidental ingestion of and dermal contact with surface/subsurface soil and inhalation of particulates and volatiles released from surface/subsurface soil.
- Residential Water User (Adult and Child [birth to < 6 years of age]): ingestion of and dermal contact with groundwater or inhalation of volatile chemicals in groundwater while bathing or showering.
- Worker Water User (Adult): ingestion and dermal contact while using tap water at work.

A summary of all the exposure pathways considered in the HHRA can be found in **Table 2**. Typically, exposures are evaluated using a statistical estimate of the exposure point concentration, which is usually an upper bound estimate of the average concentration for each contaminant, but in some cases may be the maximum detected concentration. A summary of the exposure point concentrations for the COCs in groundwater can be found in **Table 1**, while a comprehensive list of the exposure point concentrations for all COPCs can be found in the HHRA.

Toxicity Assessment

In this step, the types of adverse health effects associated with contaminant exposures and the relationship between the magnitude of exposure and the severity of adverse health effects were determined. Potential health effects are contaminant-specific and may include the risk of developing cancer over a lifetime or noncancer health effects, such as changes in the normal functions of organs within the body (e.g., changes in the effectiveness of the immune system). Some contaminants can cause both cancer and noncancer health effects.

Under current EPA guidelines, the likelihood of carcinogenic risks and noncarcinogenic hazards due to exposure to site chemicals are considered separately. Consistent with current EPA policy, it was assumed that the toxic effects of the site-related chemicals would be additive. Thus, cancer and noncancer risks associated with exposures to individual COPCs were summed to indicate the potential risks and hazards associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Toxicity data for the human health risk assessment were provided by the Integrated Risk Information System (IRIS) database, the Provisional Peer Reviewed Toxicity Database (PPRTV), or another source that is identified as an appropriate reference for toxicity values consistent with EPA's directive on toxicity values. This information is presented in **Table 3** (non-carcinogenic toxicity data summary) and **Table 4** (cancer toxicity data summary). Additional toxicity information for all COPCs is presented in the HHRA.

Risk Characterization

This step summarized and combined outputs of the exposure and toxicity assessments to provide a quantitative assessment of Site risks. Exposures were evaluated based on the potential risk of developing cancer and the potential for noncancer health hazards.

Noncarcinogenic risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and benchmark comparison levels of intake (reference doses, reference concentrations). Reference doses (RfDs) and reference concentrations (RfCs) are estimates of daily exposure levels for humans (including sensitive individuals) which are thought to be safe over a lifetime of exposure. The estimated intake of chemicals identified in environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) is compared to the RfD or the RfC to derive the hazard quotient (HQ) for the contaminant in the particular medium. The HI is obtained by adding the HQs for all compounds within a particular medium that impacts a particular receptor population.

The HQ for oral and dermal exposures is calculated as below. The HQ for inhalation exposures is calculated using a similar model that incorporates the RfC, rather than the RfD.

HQ = Intake/RfD

Where: HQ = hazard quotient
Intake = estimated intake for a chemical (mg/kg-day)
RfD = reference dose (mg/kg-day)

The intake and the RfD will represent the same exposure period (i.e., chronic, subchronic, or acute).

As previously stated, the HI is calculated by summing the HQs for all chemicals for likely exposure scenarios for a specific population. An HI greater than 1 indicates that the potential exists for noncarcinogenic health effects to occur as a result of site-related exposures, with the potential for health effects increasing as the HI increases. When the HI calculated for all chemicals for a specific population exceeds 1, separate HI values are then calculated for those chemicals which are known to act on the same target organ. These discrete HI values are then compared to the acceptable limit of 1 to evaluate the potential for noncarcinogenic health effects on a specific target organ. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

A summary of the non-carcinogenic hazards associated with these chemicals for each exposure pathway is in **Table 5**. For exposure to surface soil, the total noncancer hazard index for child residents at residential properties 1-5 and the Western Area/Southern Nursery Area as well as for construction workers at the BRC Property exceeded the EPA's acceptable threshold of 1 but did not when broken down by individual target organ/effect. The noncancer hazard index was above EPA's threshold of 1 for future child (40) and adult (24) residential groundwater users, primarily driven by cis-1,2-DCE, trans-1,2-DCE, vinyl chloride, arsenic, and lead, and for future worker groundwater users (15) which was primarily driven by cis-1,2-DCE. The noncancer hazards for recreational users potentially exposed to contaminants in surface water in the Land Crab Habitat and for recreational users wading in the surface water or sediment of the Río Grande de Arecibo did not exceed the respective EPA thresholds.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogen, using the cancer slope factor (SF) for oral and dermal exposures and the inhalation unit risk (IUR) for inhalation exposures. Excess lifetime cancer risk for oral and dermal exposures is calculated from the following equation, while the equation for inhalation exposures uses the IUR, rather than the SF:

Risk = LADD x SF

Where: Risk = a unitless probability (1 x 10-6) of an individual developing cancer
LADD = lifetime average daily dose averaged over 70 years (mg/kg-day)
SF = cancer slope factor, expressed as [1/(mg/kg-day)]

These risks are probabilities that are usually expressed in scientific notation (such as 1×10^{-4}). An excess lifetime cancer risk of 1×10^{-4} indicates that one additional incidence of cancer may occur in a population of 10,000 people who are exposed under the conditions identified in the assessment. Again, as stated in the National Contingency Plan, the acceptable risk range for site-related exposure is 1×10^{-6} to 1×10^{-4}.

As shown in **Table 6**, consistent with EPA guidance, the cancer risks for the resident adult and child are combined to account for an excess, lifetime cumulative cancer risk. The cancer risks associated with surface soil exposure exceeded the EPA acceptable range of 1×10^{-6} to 1×10^{-4} for future residents (1×10^{-3}) and agricultural workers (3×10^{-4}) at the BRC Property. The cancer risks associated with surface soil were equal to the upper end of the EPA acceptable range (i.e., 1×10^{-4}) for current/future residents at Properties 3 and 5 and for future residents in the Cattle Pasture/Eastern Forested Area. Elevated potential cancer risks for soil exposures were primarily due to arsenic and chromium in surface soil. The cancer risk for chromium may be overestimated because it was assumed that all the chromium is in the more toxic hexavalent form and there is no evidence that hexavalent chromium was involved with historic Site operations as opposed to the less toxic trivalent form. The cancer risks exceeded the EPA acceptable range of 1×10^{-6} to 1×10^{-4} for hypothetical future residential (2×10^{-2}) and worker (7×10^{-4}) groundwater users, and the elevated cancer risks were primarily driven by vinyl chloride. The cancer risks for recreational users potentially exposed to contaminants in surface water in the Land Crab Habitat and for recreational users wading in the surface water or sediment of the Río Grande de Arecibo did not exceed the respective EPA thresholds.

Lead evaluation - Lead was selected as a COPC in soil, sediment (evaluated as ditch surface soil), and groundwater based on the maximum detected concentrations exceeding screening levels. Since there are no published quantitative toxicity values for lead, it is not possible to evaluate cancer and noncancer risk estimates from lead using the same methodology as the other COPCs. Consistent with EPA guidance, exposure to lead was evaluated separately from the other contaminants using blood lead modeling. The risk reduction goal for lead in soil at the Site is to limit to 5% or less the probability of a child's or developing fetus' PbB from exceeding 5 µg/dL. The Integrated Exposure Uptake Biokinetic (IEUBK) model was used to assess residential exposures to lead in surface soil and groundwater and older child recreational user exposures to lead in ditch surface soil. The Adult

Lead Model (ALM) model was used to assess trespasser and worker exposures to lead in surface soil, ditch surface soil, and surface/subsurface soil. As shown in **Table 7**, The IEUBK model indicated that the percentage of a hypothetical population exceeding the blood lead level reference value of 5 µg/dL was elevated for the following exposure scenarios: current/future residential exposures to surface soil at the Residential Area Property 4 (7.5%), future residential exposures to surface soil at the BRC Property (98.4%), future recreational user exposures to surface soil in the ditches at the Cattle Pasture/Eastern Forested Area (18.7%), and future residential exposures to groundwater used as tap water (18.1%). Similarly, the ALM model predicted that 36% of commercial workers, 76% of agricultural workers and 85% of construction workers would exceed the risk reduction goal at the BRC Property.

Vapor intrusion evaluation - If properties over the VOC groundwater plume (i.e., BRC Property and Cattle Pasture/Eastern Forested Area) are reoccupied or developed for residential or commercial use, future residents or workers may be exposed to volatile COPCs via vapor intrusion from groundwater to indoor air. To assess the potential for this pathway to be complete, groundwater monitoring well data from all shallow monitoring wells were compared to the appropriate exposure scenario (either residential or commercial) of EPA vapor intrusion screening levels (VISLs) based on a target cancer risk of $1x10^{-6}$ and a target noncancer hazard quotient of 1. Groundwater concentrations of three chemicals (i.e., vinyl chloride, TCE, and trans-1,2-DCE) exceeded the residential VISLs. Vinyl chloride was the only chemical that also exceeded the commercial VISL. Therefore, these chemicals (i.e., vinyl chloride, TCE, and trans-1,2-DCE) are present at concentrations in groundwater that have the potential to migrate into buildings should the buildings at BRC be reoccupied or if areas within the confines of the plume are developed for residential or commercial use in the future.

In summary, elevated potential cancer risks and/or noncancer hazards were identified for future residential and nonresidential uses of the BRC Property, as well as for future use of groundwater as tap water. Lead was evaluated separately from other COPCs, using models that predict blood lead levels, and elevated risks were identified for current/future residential exposures at the Residential Area – Property 4, future residential and nonresidential uses of the BRC Property, future recreational use of the Cattle Pasture/Eastern Forested Area ditches, and future use of groundwater as tap water. In addition, based on vapor intrusion screening evaluation, three chemicals (i.e., vinyl chloride, TCE, and trans-1,2-DCE) are present at concentrations in groundwater that have the potential to migrate into buildings at levels that could cause inhalation risks if the BRC Property or other areas impacted by the groundwater plume are redeveloped for residential or commercial use.

Uncertainties -The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling
- exposure parameter estimation
- toxicological data.

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the risk assessment provides upper-bound estimates of the risks to populations near the site and is highly unlikely to underestimate actual risks related to the site.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the risk assessment report.

Ecological Risk Assessment

A screening level ecological risk assessment (SLERA) was conducted for the Site to determine the potential for risk to ecological receptors based upon exposure to contaminants in soil, sediment, and surface water. Site media concentrations were compared to ecological screening levels (ESLs) as an indicator of the potential for adverse effects to ecological receptors. Furthermore, potential for risk to seven surrogate receptors representative of avian and mammalian communities (herbivorous birds, invertivorous birds, carnivorous birds, herbivorous mammals, herbivorous flying mammals, invertivorous mammals, and invertivorous flying mammals) that are assumed to use the Site were addressed through food chain exposure models. A complete summary of all exposure scenarios can be found in the SLERA.

Summary of Ecological Risk Summary

Based on the results of the food chain modeling performed and an evaluation of the frequency and magnitude of ESL and background exceedances, the majority of risk was attributed to lead, antimony, cadmium, and chromium in the Eastern Drainage Ditch, select locations in the Eastern Forested Area adjacent to the ditch and the eastern side of the BRC Property. Furthermore, despite the exceedances noted within the BRC Property, western area, southern nursery area, and residential area, only the ditches on the eastern side of the property, which are connected to where the source material was used in the facility, contain valuable ecological habitat (refer to **Figure 2**). There is some limited habitat in the northern cow pasture, which includes the land crab habitat, however, this area was determined to not be influenced by the BRC Property due to drainage pathways and distance from the facility.

Through screening surface water results from the Rio Grande de Arecibo and the drainage ditches leading to the Caño Tiburones wetland, several inorganics were determined to potentially pose risk to ecological receptors. However, upon further review of the frequency and magnitude of these detections, as well as their locations relative to the BRC Property, it was determined that none of these compounds were considered COPECs related to previous operations at the BRC facility. Sporadic ESL exceedances of these metals do not pose significant risk.

Potentially site-related sediment was collected from the downstream section of Río Grande de Arecibo, and arsenic, chromium, copper, lead, vanadium, and zinc were analyzed using XRF. The maximum and average potentially site-related concentrations of copper and chromium exceeded the ESLs, but the concentrations did not exceed background, indicating that these metals are not site-related. There is no ESL for vanadium, but the maximum background concentration exceeded the maximum site concentration, indicating that vanadium is not site-related. Although the maximum concentrations for arsenic, lead and zinc exceeded both the ESL and background, the average XRF results for potentially site-related (downstream) sediment did not exceed them. The results do not indicate any significant site-related contamination from release at the BRC Property.

A post-SLERA addendum was prepared for the Eastern Drainage Ditch area focusing on the most sensitive receptor (herbivorous birds, the Common Ground Dove [*Columbina passerina*]) and lead (a primary risk driver). Although chromium, cadmium, lead, and antimony were identified as contributing to elevated risk, it was determined that chromium, cadmium, and antimony were collocated with lead; therefore, the addendum focused on lead. This post-SLERA addendum derived a preliminary remediation goal (PRG) for lead by refining the food chain exposure models to determine the soil concentration of lead that would be protective of populations of herbivorous birds.

In summary, inorganic contaminants pose risk to ecological receptors; the distribution of the metals exceedances in soil suggests potential risks are primarily driven by metal concentrations in the Eastern Drainage Ditch and the eastern side of the BRC Property

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in the ROD, may present an imminent and substantial endangerment to the public health, welfare, or the environment.

Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered (TBC) criteria, other guidance, and Site-specific risk-based levels. According to the NCP and RI/FS guidance, RAOs should include chemicals of concern (COCs), exposure routes, and receptors. RAOs were developed for soil and groundwater.

Section 121(d) of CERCLA, as amended, requires that any remedial action must, at a minimum, achieve overall protection of human health and the environment and comply with ARARs. The selected groundwater action will be an interim remedy rather than a final Site-wide remedy in order to prevent exposure while groundwater exceeds drinking water standards and will allow EPA to further evaluate attenuation, migration, and the effects of the soil remedy.

The RAOs are as follow:

Soil:

- RAO 1: Prevent human exposure to contaminated soil via ingestion and inhalation that poses an unacceptable risk.
- RAO 2: Prevent exposure to contaminated soil by ecological receptors (via direct contact, ingestion, and uptake into the food chain) that poses an unacceptable risk.
- RAO 3: Prevent the migration of contaminated soil to surface water, sediment, and groundwater.

Groundwater:

- RAO 4: Prevent human exposure via direct contact, ingestion, or inhalation of vapors to contaminated groundwater at concentrations that pose an unacceptable risk.

Groundwater modeling of Site conditions estimates that natural attenuation, even with the addition of active treatment, as evaluated in the FS, might take several centuries to restore the groundwater. As such, an RAO specific to restoration of groundwater was not developed for this selected interim remedy.

Remediation Goals

EPA has established remediation goals (RGs) which it will use to remediate contaminated soil at the Site. The RGs for soil are identified in **Table 8**. RGs were developed for the COCs identified to aid in defining the extent of the contaminated media requiring remedial action. RGs are generally chemical-specific remediation goals for each medium and/or exposure route that are established to protect human health and the environment. They can be derived from applicable or relevant and appropriate requirements (ARARs), risk-based levels (human health and ecological), and from comparison to background concentrations, where available.

Chromium, antimony, and cadmium are also ecological contaminants of concern in Site soil, but no RGs for these metals were developed because they are co-located with lead. The human health risk-based RG for the Eastern Drainage Ditch is based on future recreational use of that area. Additionally, the ecologically-derived RG for the Eastern Drainage Ditch of 134 mg/kg is based on exposure to lead by the Common Ground Dove. This will be used as a secondary goal to ensure the average concentration of 134 mg/kg is achieved within the Eastern Drainage Ditch soil. For lead in residential soils, a two-tiered approach whereby the average lead concentration across the surface of the remediated area must be at or below 200 mg/kg, with no single concentration above 400 mg/kg, which corresponds to a typical (or hypothetical) child or group of similarly exposed children having an estimated risk of no more than 5 percent of the population exceeding a blood lead level of 5 µg/dL. This approach is in recognition of a lead risk reduction goal consistent with recent toxicological findings related to lead. For lead on the BRC Property, a human health risk-based RG based on future commercial use of soil was developed based on default ALM parameters at a target PbB of 5 µg/dL and a soil/dust ingestion rate of 67 mg/day for an outdoor worker.

Though RGs were not developed for groundwater, RI screening criteria based on the lower of the chemical-specific applicable or relevant and appropriate requirements or ARARs (e.g., Puerto Rico Water Quality Standards and federal maximum contaminant levels (MCLs), as well as regional screening levels (RSLs), were used to aid in defining the extent of contaminated media and will be used to evaluate groundwater data collected in the future. The RI Screening Criteria for groundwater are listed in **Table 9**.

In addition, the vapor intrusion screening levels for TCE and vinyl chloride of 1.18 µg/L and 0.15 µg/L respectively will be used to determine if vapor intrusion poses a concern in the future.

Description of Remedial Alternatives

Soil Remedial Alternatives

CERCLA Section 121(b)(1), 42 U.S.C § 9621(b)(1), requires that each selected Site remedy be protective of human health and the environment, be cost-effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, CERCLA Section 121(b)(1) includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances. CERCLA Section 121(d), 42 U.S.C.§9621(d), specifies that a remedial action must require a level or standard of control of the hazardous substances, pollutants, and contaminants which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA Section 121(d)(4), 42 U.S.C.§9621(d)(4).

Potentially applicable technologies were identified and screened with emphasis on the effectiveness of the remedial action. Those technologies that passed the initial screening were then assembled into remedial alternatives. In addition, the no-action alternative was evaluated. The timeframes below for construction do not include the time for designing the remedy or the time to procure necessary contracts.

This section summarizes the five soil alternatives that were developed and considered to address the contamination at the Site. A detailed descriptions of the remedial alternatives for addressing the contamination associated with the Site can be found in the Feasibility Study (FS) Report. To facilitate the presentation and evaluation of the alternatives, the alternatives in the FS Report were reorganized in this ROD to formulate the remedial alternatives discussed below.

Description of Common Elements for Soil

An RD would be conducted that would provide the detailed approaches and refined cost estimates of the remedial action for the contaminated soil. As part of the RD, a treatability study and Pre-design Investigation (PDI) will be conducted to collect soil samples and refine the target remediation area. Common elements are assumed to be included as part of each soil remedial alternative. The following common elements do not apply to the no action alternative.

Institutional Controls – ICs (*e.g.*, community notifications and deed restrictions and/or notices) would restrict the disturbance and/or usage of areas where hazardous substances, including lead and/or arsenic remain above levels that would allow for unlimited use and unrestricted exposure (UU/UE) or that would potentially compromise the implemented remedial action. ICs would not be employed in residential areas because they would not be necessary. ICs are only assumed under Alternatives S2A, S2B, S3, and S4.

Residential Soil – Contaminated soil within the Residential Area would be removed for disposal either on-Property or off-Property under all soil alternatives. The extent of removal would target lead concentrations greater than the RG of 400 mg/kg to achieve an average below 200 mg/kg, resulting in unrestricted use for the Residential Area consistent with the two-tier approach described above. Contaminated soil generated within the Residential Area would be classified as nonhazardous solid waste.

Building/Structure Demolition – The BRC Property is currently inactive and unoccupied with several standing buildings/structures (**Figure 3**). During the RI, sample results indicated elevated levels of contamination in the soil beneath several of the buildings/structures. Most buildings/structures would be demolished to facilitate access to contaminated soil beneath them for remediation. Additionally, some of the existing structures, equipment and building materials are unusable due to high levels of lead on them. If left unattended, the structures and remaining equipment will deteriorate increasing the likelihood of further release to the environment. Debris from demolished buildings/structures would be decontaminated and would be disposed of as nonhazardous waste at an off-Site permitted disposal facility within Puerto Rico. As indicated in Figure 5, there are two buildings (Structures 1 and 1A) that were used as office buildings and are not believed to be located over contaminated material or contain high levels of lead in the building materials. If these buildings can be preserved, they will be. Building/structure demolition and foundation removal is assumed under Alternatives S3, S4, and S5. Under Alternatives S2A and S2B, structures would be demolished, but the foundations would remain in place. Debris from demolished buildings/structures would be decontaminated and would be disposed of or recycled as nonhazardous waste at an off-Site permitted disposal facility within Puerto Rico. Structures and asphalted areas cover approximately 50% of the 16-acre BRC Property.

Monitoring – For all alternatives except for S5, long-term monitoring and maintenance would be undertaken, particularly of any containment system. Remedial alternatives presented for contaminated soil are expected to prevent further migration of contaminated soil to groundwater. Following the soil remedy, the groundwater monitoring program under the interim groundwater remedy would also assist in ensuring the soil remedy is effective.

Alternative S1– No Action

Total Capital Cost: $0
Annual O&M: $0
Total Present Net Worth: $0
Estimated Construction Timeframe: 0 years
No remedial actions would be conducted under the No Action alternative. The No Action alternative was retained in accordance with the NCP to serve as a baseline for comparison with the other alternatives.

Alternative S2A – Capping In-Place of Contaminated Soil, Selective Excavation and Off-Site Disposal

Total Capital Cost: $ 8.4 million
Annual O&M: $ 23,000
Total Present Net Worth: $8.7 million
Estimated Construction Timeframe: 1 year

Under this alternative, contaminated soil within the **Residential Area** would be excavated and disposed of as nonhazardous waste at an off-site permitted commercial disposal facility.

Contaminated soil exceeding the RGs outside the footprint of buildings/structures and asphalt pavements of the **BRC Property** would be contained by capping in-place through the construction of an exposure barrier. An exposure barrier would be constructed predominantly using soil. The thickness of the representative exposure barrier is assumed to be 24 inches (18 inches of common clean fill [subsoil] and 6 inches of growth media overlying geotextile as a demarcation layer). Soil material for the cover construction would be procured from a nearby commercial source identified during the RD phase of the remedy. Imported soil (clean fill) material would be sampled before placement to confirm the material is free of contaminants (i.e., below RGs). The six inches of growth media may be amended, if necessary, to support the seed for revegetation. Grading of certain parts of the area may be required if current grading does not ensure drainage eastward toward the Eastern Drainage Ditch, maintaining existing drainage patterns. The assumed materials and thicknesses would be refined, if necessary, during the RD process. For the purposes of the cost estimate, regular monitoring including inspections and vegetation maintenance would be performed after the remedy is implemented.

Under this alternative, walls, roofs, and ancillary equipment would be demolished or removed, as applicable, and the concrete slabs of buildings/structures and asphalt pavement would be resurfaced to provide adequate in-place containment of underlying contaminated soil exceeding the RGs. A minimum of six inches of asphalt and four inches of concrete would be installed over existing asphalt pavement areas and the concrete slabs of buildings/structures, respectively.

Capping in-place of soil exceeding RGs within the **Eastern Drainage Ditch** would be achieved through placement of an armored cover. An armored cover would be constructed predominantly using rock material (riprap or gravel). The thickness of the representative armored cover would be about 18 inches. Before placement of the armored cover, the Eastern Drainage Ditch would be cleared of existing vegetation and graded to ensure drainage toward the northerly direction. A geotextile material would be installed to stabilize the drainage ditch slopes and to serve as the bedding layer for the rock material. The assumed materials and thicknesses would be refined, if necessary, during the RD process. Clean rock material (gravel or riprap) required for the construction of cover would be procured from a nearby commercial source.

Alternative S2B – Capping In-Place of Contaminated BRC Soil, Excavation and Off-site Disposal of Eastern Drainage Ditch Material, On-Site Containment of Residential Soil

Total Capital Cost: $ 9.7 million
Operation and Maintenance: $15,000 per year
Total Present Worth: $10 million
Estimated Construction Timeframe: 1 year

Under this alternative, capping in-place of contaminated soil would be performed within the **BRC Property** as described in Alternative S2A. Excavated contaminated soil from the **Residential Area** would be placed within the BRC Property for on-site containment and capped with an exposure barrier, similar to S2A, consisting of clean fill, geotextile, and growth media. The capped contaminated soil would be graded to ensure water runoff drains eastward toward the Eastern Drainage Ditch, maintaining existing drainage patterns.

Contaminated soil within the **Eastern Drainage Ditch** would be excavated for off-Site disposal. Approximately 25% of the excavated contaminated soil is assumed to be characterized as potentially hazardous waste for the purpose of treatment and disposal. The volume of contaminated soil characterized as hazardous waste generated would be treated/stabilized using phosphate-blended amendment and would be disposed of as nonhazardous waste at an off-site permitted commercial disposal facility. The remaining excavated contaminated soil volume would be disposed of as nonhazardous waste at an off-site permitted commercial disposal facility Confirmation soil samples would be collected from the sidewalls and bottom of the excavation. After the excavation and collection of confirmed soil samples, the excavated area would be graded to provide positive drainage. A 6-inch surface layer of growth media would be placed for revegetation. The growth media may be amended, if required, to support the seed for revegetation. Before establishment of vegetation, an erosion control blanket would be placed to limit erosion and prevent erosional damage. Imported fill would be sampled before placement to confirm the material is free of contaminants (i.e., below RGs).

Alternative S3 – In-Situ Treatment of Contaminated Soil, Excavation and Off-site Disposal of Eastern Drainage Ditch Material and Residential Soil

Total Capital Cost: $20.1 million
Annual O&M: $7,000
Total Present Net Worth: $20.3 million
Estimated Construction Timeframe: 1 year

Under this alternative, contaminated soil within the **Eastern Drainage Ditch** and **Residential Area** would be excavated and disposed of at an off-Site permitted disposal facility within Puerto Rico, similar to Alternative S2B. Post-excavation samples would be collected from the excavated area to confirm that the remaining soil do not exceed the RGs.

Buildings/structures and asphalt pavement located within the BRC Property would be demolished to facilitate access to the contaminated soil beneath them.

Under this alternative, contaminated soil located within **BRC Property** would receive in-situ treatment. The in-situ treatment is assumed to be stabilization/solidification and/or biologically mediated stabilization using bacteria that produce calcium carbonate (CaCO3). In-situ treatment would reduce the bioavailability (and thus toxicity) and mobility of the contaminants within the contaminated soil. During the RD phase, a Site-specific treatability study would be conducted to determine the effectiveness of the treatment technology in the environment of the Site.

It is anticipated that phosphate-blended amendment would be roto-tilled into the contaminated soil to a depth of 1 feet bgs. For contaminated soil in the intervals between depths of 1 to 4 feet and 4 to 8 feet, other mechanical methods such as hydraulic excavators and/or auger mixing would be used for in situ phosphate-blended amendment mixing. After in-situ treatment, the treated area would be allowed to stabilize for a few days and a soil cover with a thickness of 6 inches would be placed to support vegetation (6 inches of growth media). The 6 inches of growth media may be amended, if required, to support the seed for revegetation. Grading of certain portions of the area may be required to ensure positive drainage eastward toward the eastern drainage ditch, maintaining existing natural drainage patterns.

Alternative S4 – Excavation of Contaminated Soil, Ex Situ Stabilization and On-site Containment

Total Capital Cost: $ 17.5 million
Annual O&M: $9,000
Total Present Net Worth: $17.7 million
Estimated Construction Timeframe: 1.5 years

Contaminated soil within the **BRC Property** would be excavated for on-site containment in an engineered repository that would be constructed within the BRC Property boundaries. Under this alternative, contaminated soil within the **Residential Area** would also be excavated for on-site containment in the engineered repository. It is assumed that 50 percent of the total excavated contaminated soil generated would be characterized as hazardous waste. The contaminated soil characterized as hazardous waste would be treated/stabilized using phosphate-blended amendment for containment in an on-site engineered repository that would be constructed within the BRC Property. The rest of the excavated contaminated soil volume is assumed to be characterized as nonhazardous waste and would not require treatment/stabilization before containment. Contaminated soil within the footprint of the engineered repository would not be excavated since the construction of the engineered repository would cover the contaminated soil in-place.

Contaminated soil in the **Eastern Drainage Ditch** would be excavated similar to Alternative S2B for on-Site containment in an engineered repository that would be constructed within the BRC Property.

Based on the volume of contaminated soil requiring consolidation, the estimated footprint and location of an on-site repository is illustrated on **Figure 5.** The repository is assumed to be located in the northeastern corner of the BRC Property with an approximate footprint of 3 acres and an approximate height of 12 feet. It is assumed that the repository would be designed and constructed to ensure stormwater drains eastward toward the Eastern Drainage Ditch, maintaining the existing drainage patterns of the BRC Property. During the RD phase, the location of the repository on the BRC Property would be refined. In addition, multiple smaller repositories could also be developed.

Alternative S5 – Excavation of Contaminated Soil and Off-Site Disposal

Total Capital Cost: $ 37.7 million
Annual O&M: $0
Total Present Net Worth: $37.7 million
Estimated Construction Timeframe: 1.5 years

Alternative S5 would involve excavation of contaminated soil at the **BRC Property**, the **Eastern Drainage Ditch**, and the **Residential Area** followed by off-Site disposal. Contaminated soil would be transported and disposed of at an off-Site permitted commercial disposal facility within Puerto Rico. All buildings/structures and asphalt pavement located within the BRC Property would be demolished to facilitate access to the contaminated soil beneath them.

Soil at the BRC Property with lead concentrations greater than or equal to the RG of 800 mg/kg (i.e., based on non-residential industrial use/worker direct contact) would be addressed. ICs to limit the BRC Property to commercial use would be implemented for this alternative because soil with lead concentrations equal to 800 mg/kg would remain above levels that allow for unlimited use and unrestricted exposure. Part of the excavated contaminated soil at the BRC Property and the Eastern Drainage Ditch is assumed to be characterized as hazardous waste for the purpose of treatment and disposal. Excavated contaminated soil characterized as hazardous waste, which would be stabilized as described in Alternative S4, and contaminated soil characterized as potentially nonhazardous waste, would be loaded, and transported for disposal at an off-Site permitted disposal facility(ies) within Puerto Rico.

Interim Remedial Alternative for Contaminated Groundwater

Groundwater modeling of Site conditions estimates that natural attenuation, even with the addition of active treatment, as evaluated in the FS, might take several centuries to restore the groundwater. The presence of silt and clay at the Site and the length of the vinyl chloride plume may result in a longer VOC degradation period. Therefore, a groundwater monitoring program and ICs would be employed as an interim remedy, to both further assess the decline of hazardous substances including arsenic, lead, and VOCs, and to ensure that receptors are protected.

Annual sampling would be performed to collect data and perform a statistical analysis of contaminant concentrations in individual wells. In addition, collected data would be used to assess natural attenuation, migration, and the effects of the soil remedy. For cost estimating purposes, the monitoring program is assumed for 30 years. Wells would be sampled for VOCs, arsenic, lead, geochemical parameters (i.e., nitrate/nitrite, sulfate, sulfide, ammonia, alkalinity, chloride, ferrous iron, methane, ethane, ethene, and total organic carbon), and field parameters. A PDI will be performed to determine if additional monitoring wells should be installed at the Site and to verify the absence of VOC source material in the vadose zone.

The preferred soil remedy is anticipated to decrease arsenic and lead in groundwater. Although, there are no drinking water wells in the area of contamination (groundwater plume), ICs would be relied upon to prevent exposure. ICs would include governmental controls such as existing Puerto Rico laws or regulations that would serve to restrict the usage of contaminated groundwater by restricting well installation. ICs in the form of informational devices would also be implemented, such as advisories or notices published in newspapers and periodic letters sent to local government authorities. The advisories would explain the need to limit water withdrawal or new construction unless appropriate vapor intrusion investigations are conducted and/or mitigation measures are undertaken.

The total estimated present-worth cost for this interim groundwater action is $1.56 million.

Comparative Analysis of Alternatives

In selecting the remedy, EPA considered the factors set out in Section 121 of CERCLA, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial response measures pursuant to the NCP, 40 CFR §300.430(e)(9), and OSWER Directive 9355.3-01. The detailed analysis consists of an assessment of each of the individual response measures per remedy component against each of Nine Evaluation Criteria and a comparative analysis focusing upon the relative performance of each response measure against the criteria. The first two criteria, Overall Protection of Human Health and the Environment and Compliance with Applicable or Relevant and Appropriate Requirements (ARARs), are known as “threshold criteria” because they are the minimum requirements that each response measure must meet in order to be eligible for selection as a remedy. Criteria 3 through 7, are known as "primary balancing criteria." These criteria are factors by which tradeoffs between response measures are assessed so that the best options will be chosen, given site-specific data and conditions. Furthermore, criteria 8 and 9, are called "modifying criteria" because new information or comments from the state or the community on the Proposed Plan may modify the preferred response measure or cause another response measure to be considered.

This section of the ROD summarizes the relative performance of each alternative for soil against the following Nine Evaluation Criteria, noting how it compares to the other options under consideration. A summary of the comparative analysis of the selected remedy for soil is presented in **Table 13**, Appendix I and Section 7 of the FS.

Comparative Analysis of Soil Alternatives

1. **Overall Protection of Human Health and the Environment -** *Addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls*.

Of the six remedial alternatives, only the no action alternative (i.e., Alternative S1) would fail to provide protection of human health and the environment. Alternatives S2A, S2B, S3, S4, and S5 would be protective of human health and the environment and would achieve the RAOs. Alternatives S2A, S2B, S3, S4, and S5 would achieve the RAOs through a combination of excavation, treatment, disposal and containment.

Alternatives S2A, S2B, S3, S4, and S5 would be protective of human health and the environment and would achieve the RAOs. For all alternatives (except Alternative S1), the potential for human and ecological exposure (from ingestion or inhalation of lead and other co-located metals) would be reduced through remedial actions (contaminant, removal and/or isolation) and implementation of and adherence to ICs to achieve RAOs 1 and 2.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) – *Addresses whether a remedy would meet all the applicable or relevant and appropriate requirements of other federal and state environmental statutes and regulations or provide grounds for invoking a waiver. Other federal or state advisories, criteria, or guidance are TBCs. While TBCs are not required to be adhered to by the NCP, the NCP recognizes that they may be very useful in determining what is protective or how to carry out certain actions or requirements.*

Alternative S1 fails to be compliant with ARARs because no action would be taken to address contaminated soil. Remedial action implemented under the remaining alternatives (Alternatives S2A, S2B, S3, S4, and S5) would comply with or meet the chemical-, location-, and action-specific ARARs identified for the soil portion of the Site remedy.

Chemical-specific ARARs for air would be pertinent to Alternatives S2A, S2B, S3, S4, and S5. Compliance with air quality ARARs would be attained through implementation of best management practices (BMPs), including erosion and dust suppression measures. Air monitoring would be used during intrusive work to monitor dust that could impact the surrounding community.

Location-specific ARARs for Alternatives S2A, S2B, S3, S4, and S5 relate to work potentially affecting threatened or endangered species and work performed within or adjacent to floodplains and or wetlands. Actions would be carried out in a manner to avoid adversely affecting these species and water resources.

Action-specific ARARs would be pertinent for Alternatives S2A, S2B, S3, S4, and S5. Compliance with Land Disposal Restrictions (LDRs) would be required for those alternatives that include excavation and off-site disposal. Compliance would be attained through the characterization of waste generated during the excavation of contaminated soil. If characteristic hazardous waste is in fact generated, LDRs would be met prior to disposal. Actions under each alternative will be carried out in a manner that will comply with all substantive requirements of the various statutes and implementing regulations.

A complete list of ARARs can be found in **Tables 10 to 12** in Appendix I of this ROD.

3. Long-Term Effectiveness and Permanence - *Refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.*

Alternative S1 fails to provide long-term effectiveness and permanence since no remedial action would be taken. Under Alternatives S2A, S2B, S3, and S4, contaminated soil would remain on-Site but long-term effectiveness and permanence would be achieved through disposal at an appropriate facility and/or isolation (containment and/or stabilization) of contaminants within the contaminated soil. Under Alternatives S2A, S2B, S3, and S4, contaminated soil would be left in place to differing degrees, and these alternatives would require monitoring and maintenance to ensure effectiveness over the long term. The magnitude of residual risks from the Eastern Drainage Ditch would be eliminated through removal of contaminated soil from the Eastern Drainage Ditch under Alternatives S2B, S3, S4, and S5. Under all Alternatives other than Alternative S1, the magnitude of residual risks from residential soil would be eliminated through removal of contaminated soil.

For Alternative S2A, the magnitude of residual risks from the BRC Property would be reduced because all contaminated soil within the BRC Property and the Eastern Drainage Ditch would be contained at the BRC Property, under a cap, as long as the cap is maintained. Nevertheless, the exposure pathways to humans and ecological receptors would be limited by the physical isolation of contaminated soil by a properly engineered in-place containment system. For Alternative S2B, the magnitude of residual risks from the BRC Property would be similar to Alternative S2A, but residual risks for the Eastern Drainage Ditch would be eliminated through removal of contaminated soil.

For Alternative S3, the magnitude of residual risks would be reduced through chemical isolation through solidification within the BRC Property. The entire volume of contaminated soil would be treated to reduce the bioavailability (and thus toxicity) or mobility of the contaminants while leaving the contaminated soil in place, reducing the exposure to humans and ecological receptors. But long-term effectiveness and permanence of the in-situ stabilized soil depends on long-term, maintenance, monitoring and inspection to measure the effectiveness of reduced bioavailability of the contamination.

For Alternative S4, most of the contaminated soil at the BRC Property would be excavated, treated, and then placed in an engineered repository at the BRC Property. Although the excavated contaminated soil would be disposed of in the repository under a cover, it could pose an exposure or migration risk if the engineered cover was compromised or not maintained. Long-term maintenance, monitoring and ICs would need to be implemented to protect the implemented remedy. Outside the footprint of the engineered repository, Alternative S4 would provide long-term effectiveness and permanence by a complete excavation and reducing the area to be maintained. Therefore, long-term effectiveness is greater than Alternatives S2A, S2B, or S3. In addition, Alternative S4 would provide favorable conditions for redevelopment.

Alternative S5 would provide long-term effectiveness and permanence by a complete excavation and off-site disposal of contaminated soil. Therefore, long-term effectiveness of S5 is greater than Alternatives S2A, S2B, S3, or S4.

In addition, the covers placed over contaminated soil under Alternatives S2A and S2B could be more susceptible to the effects of climate (i.e., increasing frequency of severe storms and flooding) as compared to the smaller footprint of cover installed at the on-site disposal repository under Alternative S4, if not properly installed, monitored, and maintained over the long term.

Overall, for Alternatives S2A, S2B, S3, and S4, long-term effectiveness and permanence would be achieved through implementation of BMPs, periodic inspections, long-term post-construction monitoring, maintenance, and repair as necessary to maintain the integrity of the engineering controls. ICs would also require monitoring and maintenance in perpetuity (except Alternative S5) to help ensure the long-term integrity of the remedy. However, Alternatives S2A, S2B, and S3 would require that ICs cover a larger area of the BRC Property for the cap/containment area than for S4, which would allow for greater redevelopment at the BRC Property.

4. Reduction of Toxicity, Mobility, or Volume through Treatment r*efers to the anticipated performance of the treatment technologies that may be included as part of a remedy.*

Alternatives S1 and S2A fail to provide a reduction of toxicity, mobility, or volume through treatment since treatment is not a component of these alternatives. Alternative S3 would meet the statutory preference for treatment as a principal element because it would include in-situ treatment of soil within the BRC Property, which would reduce the bioavailability (and thus toxicity) or mobility while leaving the contaminated soil in place. In addition, Alternatives S2B and S3 include ex-situ stabilization of excavated contaminated soil from the Eastern Drainage Ditch using reagents that would result in reducing the bioavailability (and thus toxicity) and mobility of contaminants within the excavated soil.

Alternatives S4 and S5 include ex-situ treatment (stabilization) of a portion of excavated contaminated soil, which involves using reagents that would result in reducing the bioavailability (and thus toxicity) and mobility of contaminants within the excavated soil. This process of physically and chemically isolating them may increase the volume of soil.

5. Short-Term Effectiveness *addresses the period needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.*

Alternative S1 would not pose short-term risks to the community or workers, and there would be no adverse environmental impacts since no remedial action would be taken. Alternatives S2A, S2B, S3, S4, and S5 involve the import of clean fill material (soil and rock/riprap) for remedy construction purposes (cover construction and excavation backfill). Therefore, truck traffic would have a short-term risk to the community and the workers.

For Alternatives S3, S4, and S5, there would be short-term risks due to a significant increase in truck traffic because of the transport and handling of the excavated contaminated soil for off-Site disposal in addition to the import of clean fill material for excavation backfill. Alternative S4 would have additional short-term impacts to workers, because of potential safety hazards during the construction of an engineered repository. Alternatives S3, S4, and S5 involve extensive demolition and off-Site disposal of buildings/structures within the BRC Property as compared to the Alternatives S2A and S2B, posing a short-term risk to workers because of the operation of heavy equipment and dust generated from construction debris. Short-term risks to workers would be mitigated through safety measures such as personal protective equipment (PPE) (e.g., steel toe boots), dust control measures, work zones, and other safety practices. Fire-prevention protocols and techniques (e.g., planning, specified work time frames, fire watches) would be implemented to protect workers and the community and to prevent adverse environmental impacts. Impacts from noise would be mitigated by implementing appropriate construction work hours. Air emissions from construction and hauling activities could lead to short-term environmental impacts to unimpacted areas. Dust control and erosion control measures/BMPs would be implemented as appropriate to minimize impact. Using low-emissions equipment and selecting resources and treatment materials carefully would minimize short-term environmental impacts.

The estimated durations for construction of Alternatives S2A, S2B, and S3 are approximately 1 year and the durations for Alternatives S4 and S5 are approximately 1.5 years. Thus, the short-term impact on the community, workers, and the environment would be somewhat greater for Alternatives S4 and S5 as compared to Alternatives S2A, S2B, and S3.

6. Implementability *addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.*

Alternative S1 would be the easiest to implement, both technically and administratively, because it involves no action. Alternatives S3, S4, and S5 involve modification to the BRC Property including demolition of existing buildings/structures and earth moving. These activities, along with other remedial components would have greater technical implementability challenges compared to Alternatives S2A and S2B, which involve capping in-place of BRC Property contaminated soil, limited demolition of existing buildings/structures, and asphalt pavement as part of the in-place containment system.

For Alternative S4, in general, the demolition of existing buildings/structures, engineered repository construction, ICs, and long-term O&M would require coordination between EPA and various Puerto Rico regulatory entities. Puerto Rico and EPA offices regulating land disposal would consult regarding the implementation of Alternatives S4 and S5. Technical feasibility also differs between Alternatives S2A, S2B, S3, S4, and S5 in terms of implementation because of the volumes of material to be disposed. Under Alternatives S2A, S2B, S3, S4, and S5, approximately 380 bank cubic yards (BCY), 4,140 BCY, 4,520 BCY, 0 BCY, and 56,940 BCY, respectively, of contaminated soil would require off-Site disposal. Under Alternatives S2A and S2B, approximately 18,200 tons of buildings/structures demolition material as compared to Alternatives S3, S4, and S5, where approximately 65,720 tons of buildings/structures demolition material would require off-site disposal. Difficulties may be encountered, because of the limited number of disposal facilities within Puerto Rico. For Alternative S3, in-situ treatment technologies (stabilization/solidification) would require bench tests and treatability studies to optimize the performance of the treatment method. In-situ treatment technologies are commercially available. Those that involve proprietary technology may not be readily available within Puerto Rico, thus requiring longer-term planning and greater coordination. Materials, services, and equipment (earthmoving equipment) necessary for construction are readily commercially available. Under Alternatives S2A, S2B, and S4, implementation of long-term monitoring for containment failure would be relatively straightforward as compared to the monitoring of the in-situ treatment under Alternative S3. Specialized equipment and construction staff would be required for Alternative S3.

7. Cost *includes estimated capital, O&M, and net present worth costs.*

Present value costs for all remedial alternatives for soil were evaluated over a 30-year period (Years 0 through 30) except for Alternative S5, which does not require monitoring. **Table 7.1**, below, provides a summary of the present value costs for remedial alternatives. Appendix G of the FS presents the cost summary for all remedial alternatives. A 7% discount rate was used to estimate the costs for each alternative.

Table 7.1 – Present Value of the Remedial Alternatives for Soil

Remedial Alternative	Present Value Cost
Alternative S1	$0
Alternative S2A	$8,700,000
Alternative S2B	$9,940,000
Alternative S3	$20,330,000
Alternative S4	$17,700,000
Alternative S5	$37,730,000

8. State Acceptance *indicates whether based on its review of the RI/FS reports and the Proposed Plan, the state or territory supports, opposes, and/or has identified any reservations with the selected response measure.*

The Puerto Rico Department of Natural and Environmental Resources concurs with the selected remedy. A letter of concurrence is attached in Appendix X.

9. Community Acceptance *summarizes the public's general response to the response measures described in the Proposed Plan and the RI/FS reports. This assessment includes determining which of the response measures the community supports, opposes, and/or has reservations about.*

EPA requested input from the community on the remedial response measures proposed for the Site. Oral comments presented at the virtual public meeting were recorded. Written comments were received. A request for an extension of the public comment period was requested. The Responsiveness Summary addressing all public comments received by EPA during the public comment period is provided in Appendix IV. Overall, the community members, elected officials and stakeholders were in favor of EPA's selected remedy for soil and groundwater.

Principal Threat Waste

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (40 C.F.R. § 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for the migration of contamination to groundwater, surface water, or air, or act as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be contained in a reliable manner or would present a significant risk to human health, or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of alternatives, using the remedy selection criteria described above. The manner in which principal threat wastes are addressed provides a basis for making a statutory finding as to whether the remedy must employ treatment as a principal element.

The concept of principal threat and low-level threat waste is applied on a site-specific basis when characterizing source material. Throughout the Site, and particularly in the Eastern Drainage Ditch and BRC Property, elevated concentrations of Site-related lead were detected that exceed the RG of 800 mg/kg, with the maximum being 97,900 mg/kg. As discussed in HHRA Section, above, modeling predicts all receptors on the BRC Property would significantly exceed EPA's goal of limiting to 5% or less the probability of a child's or developing fetus' PbB from exceeding 5 µg/dL. Additionally, approximately 50 percent of the soil contaminated with lead is considered hazardous based on its toxicity and leachability and would require treatment for off-Site disposal under RCRA. If left unaddressed, soil that is highly contaminated with lead would serve as a continued source of contamination to other media through wind entrainment, stormwater runoff, and infiltration from precipitation. Therefore, lead contamination in soil fits the definition of principal threat waste and would require treatment.

Selected Remedy

Based upon the requirements of CERCLA, the results of the Site investigations, the detailed analysis of the response measures, and public comments, EPA has determined that Alternative S4, Excavation of Contaminated Soil, Ex Situ Stabilization and On-site Containment is the appropriate remedy for the contamination found in the soil at the BRC Property, Eastern Drainage Ditch and Property 4 in the Residential Area because it best satisfies the requirements of Section 121 of CERCLA, 42 U.S.C. § 9621, and provides the best balance of tradeoffs among the remedial alternatives with respect to the NCP's nine evaluation criteria, 40 CFR §300.430(e)(9). Based upon the requirements of CERCLA, the results of the Site investigations, the detailed analysis of the response measures, and public comments, EPA has determined that groundwater monitoring and institutional controls as described in the Proposed Plan is the appropriate interim remedy for the contamination found in the groundwater at the Site until a final groundwater remedy is selected by EPA.

Description of the Selected Remedy

This ROD addresses lead-contaminated soil found at three areas of concern: 1) a Residential Area located north of the Battery Recycling Company (BRC) property (BRC Property), 2) the Eastern Drainage Ditch, and 3) the BRC Property. In addition, it addresses groundwater contaminated with volatile organic compounds (VOCs) located underneath the BRC Property and extending approximately 6,000 feet north. It also addresses groundwater contaminated with lead and arsenic located underneath a portion of the Site.

Soil

The major components of the selected remedy for contaminated soil include the following:

- Demolition of the existing buildings, structures, sumps and foundations;
- Excavation of soil with concentrations exceeding remedial goals within the Residential Area;
- Excavation of soil with concentrations exceeding remedial goals in the Eastern Drainage Ditch;
- Excavation of soil with concentrations exceeding remedial goals at the BRC Property;
- Ex-situ treatment through stabilization of excavated soil using a phosphate-blended amendment to the soil;
- Containment of excavated/treated soil in an engineered repository covered with a geomembrane, the material and thickness of which will be determined during the remedial design (RD) phase;
- Post-excavation confirmatory sampling and analysis;
- Backfilling excavated areas with clean fill;
- ICs in non-residential areas in the form of community notifications and deed restrictions and/or notices to restrict the disturbance and/or usage of areas where hazardous substances, including lead and/or arsenic remain above levels that allow for unlimited use and unrestricted exposure or that would potentially compromise the implemented remedial action; and
- Long-term monitoring and maintenance including of the on-Site repository.

The total estimated present-worth cost of soil portion of the remedy is $17.7 million.

Groundwater

The major components of the selected interim remedy for the groundwater include the following:

- Annual groundwater monitoring to further evaluate natural attenuation, migration, and the effects of the soil remedy;
- ICs in the form of governmental controls such as existing Puerto Rico laws or regulations that serve to restrict the usage of contaminated groundwater by restricting well installation until the aquifer is restored to drinking water quality standards. ICs in the form of informational devices will also be implemented, such as advisories or notices published in newspapers and periodic letters sent to local government authorities on the need to limit

water withdrawal or new construction unless appropriate vapor intrusion investigations are conducted and/or mitigation measures are undertaken.

The total estimated present-worth cost of the groundwater remedy is $1.56 million.
Consistent with EPA Region 2's *Clean and Green* policy, EPA will evaluate the use of sustainable technologies and practices with respect to implementation of all components of the selected remedy.

Summary of Estimated Remedy Costs

The estimated present-worth cost for the selected interim groundwater action is $1.56 million and for the soil action is $17.7 million, for a total present-worth cost of $19,260,000. This is an engineering cost estimate that is expected to be within the range of plus 50 percent to minus 30 percent of the actual project cost. Changes to the cost estimate can occur as a result of new information and data collected during the design of the remedy. Additional detail regarding the costs can be found in Appendix G of the FS Report.

Summary of the Rationale for the Selected Remedy

Alternative S4, is the selected remedy for soil because it is readily implementable, would provide greater permanence as compared to the other capping alternatives and is expected to achieve substantial and long-term risk reduction through treatment of hazardous substances including arsenic and lead in soil. This selected remedy includes excavation, treatment/stabilization and containment of source material associated with the principal threat waste. The exposure pathways to human and ecological receptors would be addressed by excavating soil exceeding RGs from areas outside the footprint of the engineered repository, treatment/stabilization, and placement in an engineered repository to be constructed at the BRC Property. Post-construction monitoring would be implemented to ensure the integrity of the remedy.

Alternatives S3, S4 and S5 would all result in reducing toxicity and mobility of contaminants within the soil. However, when compared to S5, Alternative S4 has fewer short-term impacts from truck traffic (e.g., emissions), while still allowing most of the Site to be available for reuse, at a lower cost - $17.7 million compared to $37.7 million for Alternative S5. Additionally, Alternative S4 is more implementable than Alternative S3.

The selected interim remedy for groundwater includes a monitoring program and ICs to prevent exposure in the near-term. This interim remedy allows EPA to further evaluate attenuation, migration, and the effects of the soil remedy until a final remedy for groundwater is selected. Based on information currently available, EPA believes that this interim action is protective of human health and the environment until a final remedy is implemented for the groundwater at the Site. Although this interim action is not intended to address fully the statutory mandates, it will limit use or access to groundwater, thereby reducing human risks associated with exposure and achieving the interim groundwater RAO.

Based upon the information currently available, EPA believes the selected remedy for soil meets the threshold criteria (protection of human health and the environment and compliance with ARARs) and provides the best balance of tradeoffs compared to the other alternatives with respect to the balancing criteria.

Expected Outcomes of the Selected Remedy

The results of the HHRA and SLERA indicate that the contaminated soil at the BRC Property, the Eastern Drainage Ditch, and the residential property (Property 4) present current and/or potential future unacceptable exposure risks. Under the selected soil remedy, these potential risks to human and ecological receptors will be addressed.

The selected interim groundwater remedy includes a groundwater monitoring program and ICs to prevent exposure in the short-term. This interim remedy allows EPA to further evaluate attenuation, migration, and the effects of the soil remedy until a final remedy for groundwater is selected. It will limit use or access to groundwater, thereby reducing risks associated with exposure and achieving the interim groundwater RAO.

Statutory Determinations

Section 121(b)(1) of CERCLA, 42 U.S.C. § 9621(b)(1), mandates that a remedial action must be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) of CERCLA, 42 U.S.C. § 9621(b)(1), also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity or mobility of the hazardous substances, pollutants, or contaminants at a site. Section 121(d) of CERCLA, 42 U.S.C. § 9621(d), further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified pursuant to Section 121(d)(4) of CERCLA, 42 U.S.C. § 9621(d)(4).

EPA has determined that the selected remedy complies with the CERCLA and NCP provisions for remedy selection, meets the threshold criteria, and provides the best balance of tradeoffs among the alternatives with respect to the balancing and modifying criteria. The following sections discuss how the selected remedy meets those statutory requirements.

Protection of Human Health and the Environment

The selected soil remedy, Alternative S4, will provide a greater degree of protection for human health and the environment through the full excavation, treatment and disposal of all contaminated soil located outside the footprint of the engineered repository. The excavated areas will be backfilled with clean fill. The selected remedy will eliminate all significant direct contact risks to human and ecological receptors associated with contaminated soil in the BRC Property, Eastern Drainage Ditch, and Residential Area. This action will result in the reduction of exposure levels to acceptable risk levels within or below EPA's generally acceptable risk range of 10^{-4} to 10^{-6} for carcinogens and an HI below 1 for noncarcinogens. Any short-term risks to human health and the environment associated with implementation will be mitigated by developing a robust health and safety plan.

The selected groundwater remedy, Monitoring Program and ICs, will provide a high degree of protection of human health and the environment through institutional controls and the implementation of a long-term monitoring program. The ICs will restrict the use of groundwater within the area of groundwater contamination. This action, along with the soil remedy, will result in the reduction of exposure to acceptable risk levels within or below EPA's generally acceptable risk range of 10^{-4} to 10^{-6} for carcinogens and below a HI of 1.0 for noncarcinogens. Implementation of the selected remedy will not pose any unacceptable short-term risks to human health and the environment.

Compliance with ARARs

The selected remedy will comply with chemical- location- and action-specific ARARs for all media except with regard to chemical-specific ARARs for groundwater.

EPA and Puerto Rico have promulgated health-based protective MCLs and standards that are enforceable standards for various groundwater contaminants (chemical-specific ARARs). However, because the selected groundwater remedy is an interim action, it is not expected to comply with following the chemical-specific ARARs:

- Safe Drinking Water Act (42 USC 300(f), et seq.) National Primary Drinking Water Standards, MCLs for Organic Contaminants at 40 CFR Parts 141.61, MCLs for Inorganic Contaminants at 40 CFR 141.62, Maximum Contaminant Level Goals (MCLGs) for Organic Contaminants at 40 CFR 141.50, and MCLGs for Inorganic Contaminants at 40 CFR 141.51
- Puerto Rico Water Quality Standards (WQS), Environmental Public Policy Act, Law No. 416 - 2004, as amended and implementing regulations at Regulation #9079 (August 2022).

A final remedy for groundwater will be selected after further investigation and implementation of the soil remedy.

A full list of the ARARs, TBCs and other guidance related to the selected remedy is presented in **Tables 10 to 12** of Appendix I of this ROD.

Cost Effectiveness

EPA has determined that the selected remedy for soil and interim remedy for groundwater are cost-effective and represent a reasonable value. For the selected soil remedy, overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility or volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The overall effectiveness of the selected soil remedy has been determined to be proportional to the costs, and the selected remedy therefore represent reasonable value. A detailed estimate of the costs associated with Soil Alternative S4 and the interim groundwater remedy is provided in **Table 14** and **Table 15,** respectively.

Utilization of Permanent Solutions and Alternative Treatment Technologies

EPA has determined that the selected soil remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the selected soil remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element, and state and community acceptance. The selected remedy will provide adequate long-term control of risks to human health and the environment through eliminating and/or preventing exposure to the contaminated soil.

No permanent solutions or alternative treatment technologies will be implemented as part of the interim remedy for groundwater, though they may be associated with the final remedy.

Preference for Treatment as a Principal Element

The contaminated soil characterized as RCRA hazardous Waste will be treated/stabilized for containment in an engineered repository at the BRC Property. Therefore, the selected remedy satisfies the preference for treatment as a principal element.

The selected interim remedy for groundwater does not include a treatment component.

Five-Year Review Requirements

The selected remedy will result in hazardous substances, pollutants, or contaminants remaining at the Site above levels that would otherwise allow for unlimited use and unrestricted exposure. As a result, in accordance with Section 121(c) of CERCLA, statutory reviews will be conducted no less often than once every five years to ensure that the selected remedy is protective of human health and the environment.

Documentation of Significant Changes

The Proposed Plan for the Site was released for a public comment period on August 15, 2023. A 30-day extension to the public comment period was approved, and it closed on October 16, 2023.

The Proposed Plan Identified Alternative S4, Excavation of Contaminated Soil, Ex-Situ Stabilization and On-Site Containment, as the final remedy for soil and a monitoring program and ICs as an interim remedy for the groundwater at the Site.

EPA considered all written and verbal comments submitted during the public comment period. Upon review of these comments, it was determined that no significant changes to the remedy, as it was originally identified in the Proposed Plan, were necessary. The comments are addressed in the Responsiveness Summary in Appendix IV.

EPA is providing minor clarifications with regard to three aspects of the Proposed Plan and the final ROD as follows:

(1) Since the risk assessment for the Site was performed, EPA released new guidance for lead in residential soils: "Updated Residential Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities," which can be found at https://www.epa.gov/system/files/documents/2024-01/olem-residential-lead-soil-guidance-2024_signed_508.pdf. The risk assessment including for lead and the subsequent RGs for lead described in the ROD are consistent with this new guidance.

(2) The Proposed Plan indicated that buildings/structures would be demolished to facilitate access to contaminated soil beneath them for remediation. As indicated in Figure 5 of the ROD, there are two buildings (Structures 1 and 1A) that were used as office buildings and

are not believed to be located over contaminated material or contain high levels of lead in the building materials. If these buildings can be preserved, they will be.

(3) The Proposed Plan did not indicate the disposal location of the residential property soil to be addressed under the S4 preferred alternative. As indicated in the FS, this small quantity of soil (380 BCY) is expected to be disposed of in the engineered repository at the BRC Property.

APPENDIX I
Figures and Tables

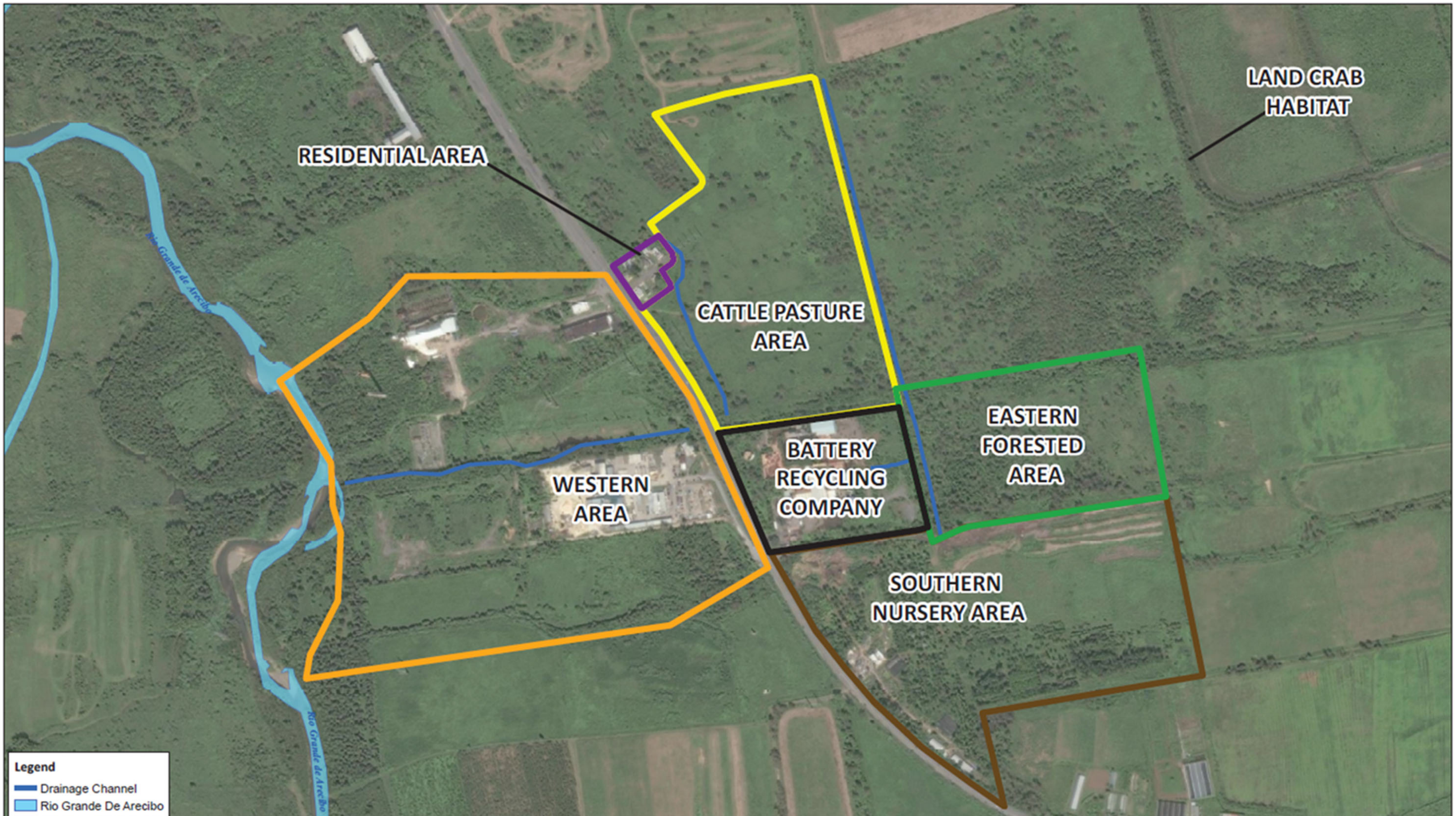
Battery Recycling Company Property

N

0 1,000 2,000 4,000 Feet

1 inch = 2,000 feet

Figure 1
Site Location Map
Battery Recycling Company Superfund Site
Arecibo, Puerto Rico



EPA

N

1 inch = 500 feet

0 250 500 1,000 Feet

Figure 2
BRC Property and Surrounding Areas
Battery Recycling Company Superfund Site
Arecibo, Puerto Rico

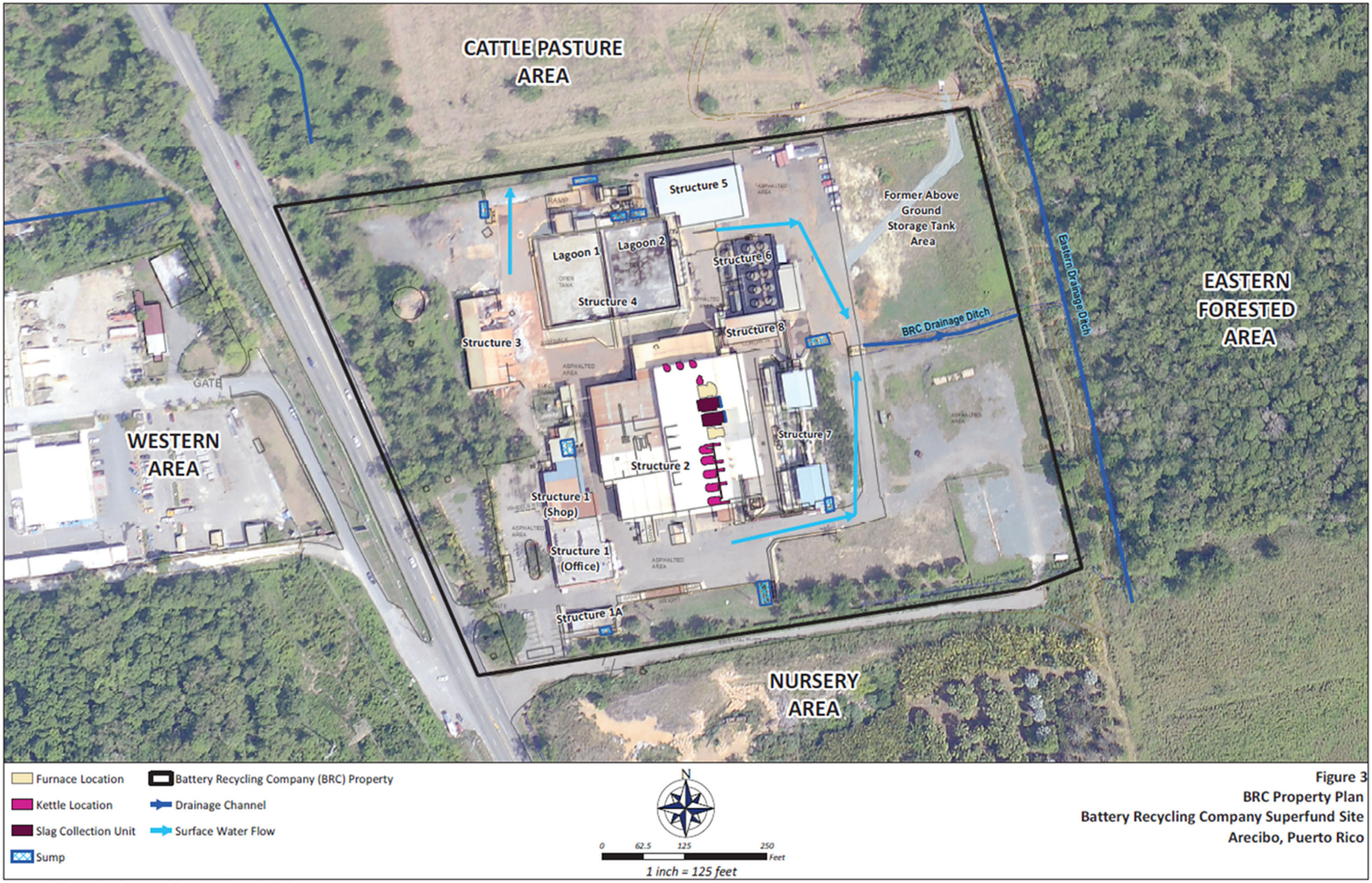
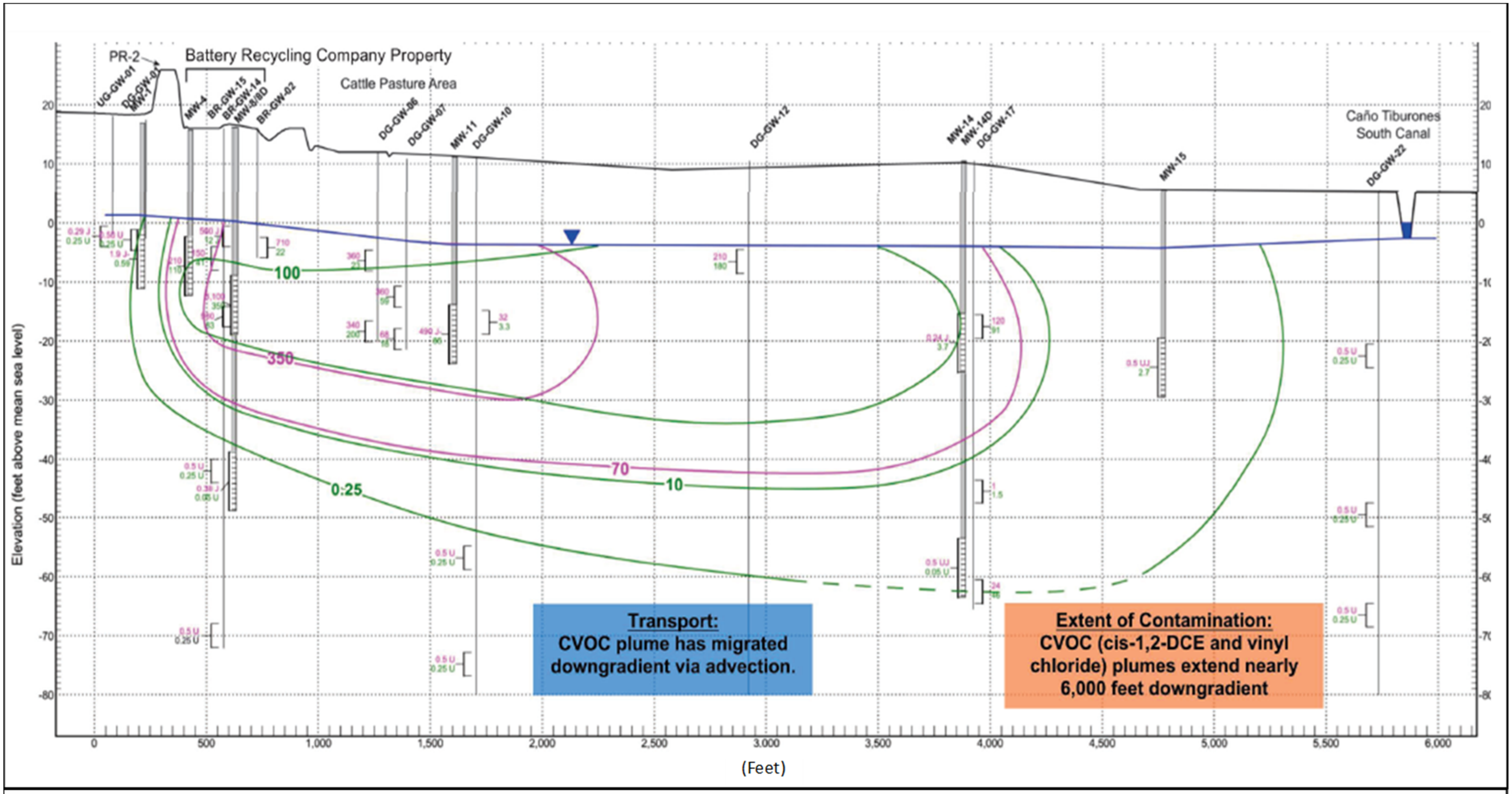


Figure 3
BRC Property Plan
Battery Recycling Company Superfund Site
Arecibo, Puerto Rico

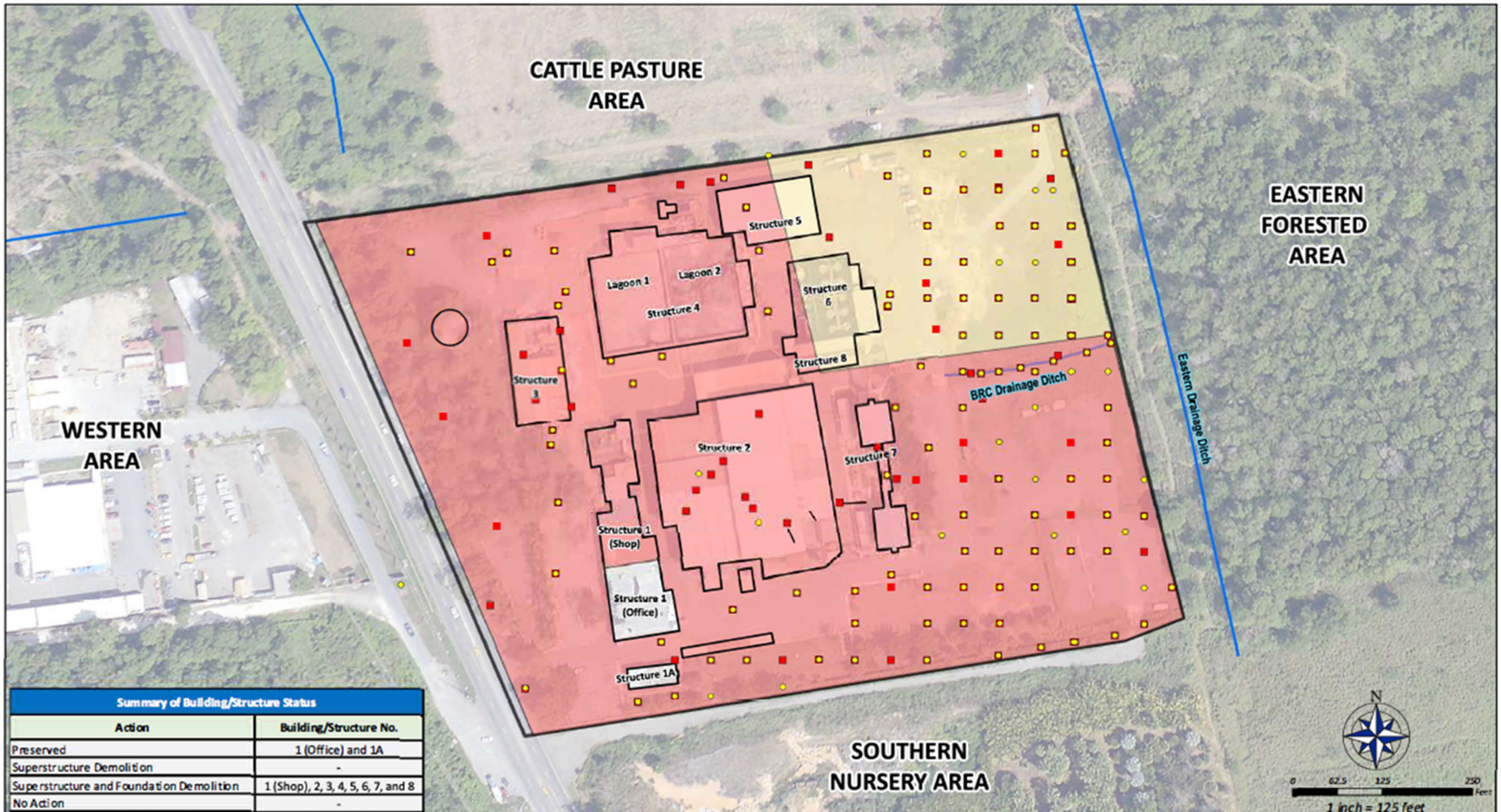


Cis-1,2-DCE Isoconcentration Contour (Dashed Where Inferred) µg/L

Vinyl Chloride Isoconcentration Contour (Dashed Where Inferred) µg/L

EPA

Figure 4
Extent of Groundwater Contamination
Battery Recycling Company Superfund Site
Arecibo, Puerto Rico



Summary of Building/Structure Status	
Action	**Building/Structure No.**
Preserved	1 (Office) and 1A
Superstructure Demolition	-
Superstructure and Foundation Demolition	1 (Shop), 2, 3, 4, 5, 6, 7, and 8
No Action	-

Battery Recycling Company Property
Drainage Channel
Building

Locations Exceeding Lead and Arsenic PRGs:
BRC Property Soil (0 to 1 ft bgs) Arsenic: ≥ 5.8 mg/kg
BRC Property Soil (0 to 1 ft bgs) Lead: ≥ 800 mg/kg
Extent of Excavation of Contaminated Soil within BRC Property (0 to 1 ft bgs)
Extent of On-Site Disposal Repository

Figure 5
Remedial Alternative S4 - BRC Property
Extent of Excavation - 0 to 1 FT BGS
Battery Recycling Company Superfund Site
Arecibo, Puerto Rico

Table 1
Summary of Contaminants of Concern and Medium-Specific Exposure Point Concentrations
Battery Recycling Company Superfund Site
Arecibo, Puerto Rico

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Residential Area

Exposure Point	Contaminant of Concern	Concentration Detected		Concentration Units	Frequency of Detection			Exposure Point Concentration (EPC)[1]	EPC Units	Statistical Measure[1]
		Min	Max							
Resident Property 1	Arsenic	3.4 J	3.4 J	mg/kg	1	/	1	3	mg/kg	Comp (<5 samples)
	Chromium	22 J	22 J	mg/kg	1	/	1	22	mg/kg	Comp (<5 samples)
Resident Property 2	Arsenic	4.7	4.7	mg/kg	1	/	1	5	mg/kg	Max (Result from the composite sample)
	Chromium	24.6	24.6	mg/kg	1	/	1	25	mg/kg	Max (Result from the composite sample)
Resident Property 3	Arsenic	7.5	7.5	mg/kg	1	/	1	8	mg/kg	Max (Result from the composite sample)
	Chromium	27.2	27.2	mg/kg	1	/	1	27	mg/kg	Max (Result from the composite sample)
Resident Property 4	Arsenic	4.2 J	4.2 J	mg/kg	1	/	1	4	mg/kg	Max (Result from the composite sample)
	Chromium	26.5 J	26.5 J	mg/kg	1	/	1	27	mg/kg	Max (Result from the composite sample)
Resident Property 5	Arsenic	4.9	4.9	mg/kg	1	/	1	4.9	mg/kg	Max (Result from the composite sample)
	Chromium	30	30	mg/kg	1	/	1	30	mg/kg	Max (Result from the composite sample)

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Ditch Surface Soil in Cattle Pasture/Eastern Forested Area; Surface Soil in Western Area/Southern Nursery Area; Surface/Subsurface Soil at BRC Property

Exposure Point	Contaminant of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration (EPC)[1]	EPC Units	Statistical Measure[1]
		Min	Max					
Resident Property 1	Arsenic	3.4 J	3.4 J	mg/kg	1 / 1	3	mg/kg	Comp (<5 samples)
	Chromium	22 J	22 J	mg/kg	1 / 1	22	mg/kg	Comp (<5 samples)
Resident Property 2	Arsenic	4.7	4.7	mg/kg	1 / 1	5	mg/kg	Max (Result from the composite sample)
	Chromium	24.6	24.6	mg/kg	1 / 1	25	mg/kg	Max (Result from the composite sample)
Resident Property 3	Arsenic	7.5	7.5	mg/kg	1 / 1	8	mg/kg	Max (Result from the composite sample)
	Chromium	27.2	27.2	mg/kg	1 / 1	27	mg/kg	Max (Result from the composite sample)
Resident Property 4	Arsenic	4.2 J	4.2 J	mg/kg	1 / 1	4	mg/kg	Max (Result from the composite sample)
	Chromium	26.5 J	26.5 J	mg/kg	1 / 1	27	mg/kg	Max (Result from the composite sample)
Resident Property 5	Arsenic	4.9	4.9	mg/kg	1 / 1	4.9	mg/kg	Max (Result from the composite sample)

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Contaminant of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration (EPC)[1]	EPC Units	Statistical Measure[1]
		Min	Max					
Groundwater	cis-1,2-DCE	0.2	3500	µg/L	30 / 33	966	µg/L	95% Gamma Adjusted KM-UCL (n<50)
Groundwater	trans-1,2-DCE	0.083	230	µg/L	27 / 33	78	µg/L	95% Gamma Adjusted KM-UCL (n<50)
Groundwater	Arsenic	0.91	19.1	µg/L	32 / 33	9.7	µg/L	95% Student's-t UCL
Groundwater	Vinyl chloride	0.65	350	µg/L	26 / 33	98	µg/L	95% Gamma Adjusted KM-UCL (n<50)

Footnotes:
(1) The exposure point concentration (EPC) is the lower of the maximum or 95% upper confidence limit (UCL) of the arithmetic mean unless indicated otherwise.The most appropriate statistical measure (UCL) is chosen from those ProUCL suggests based on the distribution of the dataset and ProUCL guidance. More information on ProUCL outputs are provided in Appendix C of human health risk assessment (HHRA).

Definitions:
UCL= upper confidence limit
Max = maximum detected concentration
Comp = result from the composite sample from this property represents the mean concentration across the yard (the detected concentration from the single composite sample was selected as the exposure point concentration)
KM = Kaplan-Meier
mg/kg = milligram per kilogram
µg/L = microgram per liter
J = qualifier for estimated value

Table 2
Selection of Exposure Pathways

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor (Age)	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/Future	Soil	Surface Soil (0 to 1 inch bgs)	Residential Area Properties 1 through 5	Resident	Adult and Child (birth to <6yrs old)	Incidental Ingestion	Quant	Residents located to the north of the site may come into contact with contaminants in their yards. Samples analyzed for target analyte list (TAL) inorganics only (no organic analyses performed).Properties will be evaluated separately.
						Dermal Contact	Quant	
						Inhalation (Particulates)	Quant	
		Surface Soil (0 to 1 foot bgs)	Cattle Pasture/Eastern Forested Area	Trespasser	Adolescent (12 to <18 yrs old)	Incidental Ingestion	Quant	Cattle Pasture north of the site is not currently in use for cattle grazing. Occasionally, the property is mowed. Eastern Forested Area is adensely vegetated area to the east of theproperty. Samples collected from these two areas are being grouped together for evaluation in the HHRA for anadolescent trespasser,a more conservative receptor assumption than a worker mowing the pasture.
						Dermal Contact	Quant	
						Inhalation (Vapors)	Quant	
						Inhalation (Particulates)	Quant	
			Western Area/ Nursery Area	Commercial Worker	Adult	Incidental Ingestion	Quant	Western Area is currently used as a lumberyard/hardwarestore. A nursery (large palm trees have been observed on property) and a garden center are located within the Southern Nursery Area.Workers may come in to contact with contaminants in surface soil during the execution of outside work activities. These two areas with similar activities are grouped together for evaluation in the HHRA.
						Dermal Absorption	Quant	
						Inhalation (Vapors)	Quant	
						Inhalation (Particulates)	Quant	
		Surface Soil (0 to 2 foot bgs)	Land Crab Habitat	Recreational User (crabbing)	Adolescent (12 to <18 yrs old)	Incidental Ingestion	Quant	This are a is a marshy area and is not easily accessible, however individuals have been observed visiting the area for crabbing(i.e., recreational users).There is a potential for recreational user to encounter contaminated soil in this area.
						Dermal Contact	Quant	
						Inhalation (Vapors)	Quant	
						Inhalation (Particulates)	Quant	
		Ditch Surface Soil(0 to 0.5 foot bgs)	Cattle Pasture/Eastern Forested Area	Trespasser	Adolescent (12 to <18 yrs old)	Incidental Ingestion	Quant	Trespassers may come into contact with contaminated surface soil in.
						Dermal Contact	Quant	
	Surface Water	Surface Water	Rio Grande de Arecibo	Recreational User (wading)	Adolescent (12 to <18 yrs old)	Incidental Ingestion	Qual	The depth of the Rio Grande de Arecibo where samples were collected ranges from 1 -10 feet. Swimming is not expected because water flow is rapid in this portion of the river.Wading may occur.Recreational users may contact surface water but the potential for incidental ingestion is expected to be very limited.
						Dermal Contact	Quant	
			Land Crab Habitat	Recreational User (crabbing)	Adolescent (12 to <18 yrs old)	Incidental Ingestion	Qual	This area is a marshy area and is not easily accessible,however individuals have been observed visiting the area for crabbing(i.e., recreationalusers). Recreationalusers may contact surface water but the potential for incidental ingestion is expected to be very limited.
						Dermal Contact	Quant	
	Sediment	Sediment	Rio Grande de Arecibo	Recreational User (wading)	Adolescent (12 to <18 yrs old)	Incidental Ingestion	Qual	Wading may occur in the Rio Grande de Arecibo.Only field XRF data is available for sediment and evaluated qualitatively.
						Dermal Contact	Qual	
			BRC Property	Commercial Worker	Adult	Incidental Ingestion	Quant	Future workers may come intocontact with contaminants in soil. Structures generally are built as slab on grade with nobasements,so mixing of surface and subsurface soil across site during redevelopment is not assumed.
						Dermal Absorption	Quant	
						Inhalation (Vapors)	Quant	
						Inhalation (Particulates)	Quant	
				Resident	Adult and Child (birth to <6yrs old)	Incidental Ingestion	Quant	Future hypothetical residents may come into contact with contaminants in soil.Structures generally are built as slab on grade with no basements,so mixing of surface and subsurface soil across site during redevelopment is not assumed.
						Dermal Absorption	Quant	
						Inhalation (Vapors)	Quant	
						Inhalation (Particulates)	Quant	
				Agricultural Worker	Adult	Incidental Ingestion	Quant	Future hypothetical agricultural workers may come into contact with contaminants in soil.
						Dermal Absorption	Quant	

Future	Soil	Surface Soil (0 to 1 ft bgs)				Inhalation (Vapors)	Quant	
						Inhalation (Particulates)	Quant	
			Cattle Pasture/Eastern Forested Area	Resident	Adult and Child (birth to <6yrs old)	Incidental Ingestion	Quant	Future hypothetical residents may come intoc contact with contaminants in soil.Structures generally are built as slab on grade with no basements,so mixing of surface and subsurface soil across property during redevelopment is not assumed.
						Dermal Absorption	Quant	
						Inhalation (Vapors)	Quant	
						Inhalation (Particulates)	Quant	
				Agricultural Worker	Adult	Incidental Ingestion	Quant	Future hypothetical agricultural workers may come into contact with contaminants in soil.
						Dermal Absorption	Quant	
						Inhalation (Vapors)	Quant	
						Inhalation (Particulates)	Quant	
			Western Area/Nursery Area	Resident	Adult and Child (birth to <6yrs old)	Incidental Ingestion	Quant	Future hypothetical residents may come in to contact with contaminants in soil.Structures generally are built as slab on grade with no basements, so mixing of surface and subsurface soil across property during redevelopment is not assumed.
						Dermal Absorption	Quant	
						Inhalation (Vapors)	Quant	
						Inhalation (Particulates)	Quant	
				Agricultural Worker	Adult	Incidental Ingestion	Quant	Future hypothetical agricultural workers may come into contact with contaminants in soil.
						Dermal Absorption	Quant	
						Inhalation (Vapors)	Quant	
						Inhalation (Particulates)	Quant	
		Ditch Surface Soil (0 to 0.5 foot bgs)	Cattle Pasture/Eastern Forested Area	Recreational User	Older Child (6 to <18 yrs old)	Incidental Ingestion	Quant	Future nearby residents may come into contact with contaminated surface soil in drainage pathways while visiting these areas.
						Dermal Contact	Quant	
		Surface/ Subsurface Soil (0-8 feet bgs)	BRCProperty	Construction Worker	Adult	Incidental Ingestion	Quant	Future workers may come intocontact with contaminants in soil. Structures generally are built as slab on grade with nobasements,so mixing of surface and subsurface soil across site during redevelopment is not assumed. Soil depth of 8ft is aconservative assumption.
						Dermal Absorption	Quant	
						Inhalation (Vapors)	Quant	
						Inhalation (Particulates)	Quant	
	Groundwater	Groundwater	TapWater	Worker	Adult	Ingestion	Quant	Under these scenario that a well for tap water is installed in the future, future commercial or agricultural workers may be exposed to groundwater via ingestion and dermal contact while at work.
						Dermal Contact	Quant	
				Resident	Adult and Child (birth to <6yrs old)	Ingestion	Quant	Under the scenario that a well for drinking water is installed in the future, hypothetical future residents may be exposed to groundwater via ingestion,dermal contact,and inhalation while bathing/showering.
						Dermal Contact	Quant	
						Inhalation	Quant	
		IndoorAir	IndoorAir	Worker	Adult	Inhalation	Qual	Workers in buildings above the groundwater plume may be exposed to contaminants in indoor air via vapor intrusion.Groundwater concentrations from shallow wells are screened against commercial vapor intrusion screening levels.
				Resident	Adult and Child (birth to <6yrs old)	Inhalation	Qual	Residents in houses above the groundwater plume may be exposed to contaminants in indoor air via vapor intrusion.Groundwater concentrations from shallow wells are screened against residential vapori ntrusion screening levels.

Definitions:
bgs = below ground surface
Quant = quantitative
Qual = qualitative

Table 3
Non-Carcinogenic Toxicity Data Summary

Pathway: Ingestion/Dermal

Contaminant of Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Absorp. Efficiency (Dermal)	Adjusted RfD (Dermal)	Adj. Dermal RfD Units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfD Target Organ	Dates of RfD*
cis-1,2-DCE	Chronic	0.002	mg/kg-day	1	0.002	mg/kg-day	Kidney	3000	IRIS	5/18/2022
trans-1,2-DCE	Chronic	0.02	mg/kg-day	1	0.02	mg/kg-day	Immune System	3000	IRIS	5/18/2022
Vinyl chloride	Chronic	0.003	mg/kg-day	1	0.003	mg/kg-day	Liver	30	IRIS	5/18/2022
Lead	Chronic	NA	NA	1	NA	NA	Nervous System/Developmment	NA	IRIS	5/18/2022
Arsenic	Chronic	0.0003	mg/kg-day	1	0.0003	mg/kg-day	Skin	3	IRIS	5/18/2022
Chromium+	Chronic	0.003	mg/kg-day	0.025	7.5E-05	mg/kg-day	GI Tract	300	IRIS	5/18/2022

Pathway: Inhalation

Contaminant of Concern	Inhalation RfC	Inhalation RfC Units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfD Target Organ	Dates of RfC*
cis-1,2-DCE	NA	NA	NA	NA	NA	NA
trans-1,2-DCE	0.04	mg/m^3	Immune System	3000	PPRTV	9/1/2020
Vinyl chloride	0.08	mg/m^3	Liver	30	ATSDR	5/18/2022
Lead	NA	NA	NA	NA	NA	NA
Arsenic	1.5E-05	mg/m^3	Developmental/Cardiovascular System/ Nervous System/Lung/Skin	30	Cal/EPA	5/18/2022
Chromium+	1.0E-04	mg/m^3	Lung	300	IRIS	5/18/2022

Footnotes:
The oral RfDs are taken from the USEPA Regional Screening Levels (RSLs) table, which gathers toxicity reference values from multiple sources using an established hierarchy. The absorbed RfD for dermal is calculated by the following equation: RfD-oral x GIABS. USEPA recommends that the oral RfD should not be adjusted to estimate the absorbed dose for compounds when the absorption efficiency is greater than 50%.
The inhalation RfCs are taken from the USEPA Regional Screening Levels (RSLs) table, which gathers toxicity reference values from multiple sources using an established hierarchy.
*Date shown for IRIS is the date IRIS was searched. http://www.epa.gov/iris/; Date shown for Cal/EPA is the date Cal/EPA website was searched. https://oehha.ca.gov/chemicals/; Date shown for ATSDR is the date ATSDR website was searched. https://www.atsdr.cdc.gov/substances/; Date shown for other sources is the publication date.
+Based on Chromium (VI)

Definitions:
IRIS = Integrated Risk Information System

PPRTV = Provisional Peer Reviewed Toxicity Values
ATSDR = Agency for Toxic Substances and Disease Registry
Cal/EPA = California Environmental Protection Agency
mg/kg-day = milligrams per kilogram per day
mg/m^3 = milligrams per cubic meters
NA = not available
RfC = reference concentration
RfD = reference dose

Table 4
Cancer Toxicity Data Summary

Pathway: Ingestion/ Dermal

Contaminant of Concern	Oral Cancer Slope Factor	Units	Adjusted Cancer Slope Factor (for Dermal)	Slope Factor Units	Weight of Evidence/Cancer Guideline[1]	Source	Date*
cis-1,2-DCE	NA	NA	NA	NA	NA	IRIS	5/18/2022
trans-1,2-DCE	NA	NA	NA	NA	NA	IRIS	5/18/2022
Vinyl chloride	0.72	$(mg/kg\text{-}day)^{-1}$	0.72	$(mg/kg\text{-}day)^{-1}$	A	IRIS	5/18/2022
Lead	NA	NA	NA	NA	B2	IRIS	5/18/2022
Arsenic	1.5	$(mg/kg\text{-}day)^{-1}$	1.55	$(mg/kg\text{-}day)^{-1}$	A	IRIS	5/18/2022
Chromium+	0.5	$(mg/kg\text{-}day)^{-1}$	20	$(mg/kg\text{-}day)^{-1}$	D	Cal/EPA	9/20/2013

Pathway: Inhalation

Contaminant of Concern	Unit Risk	Units	Weight of Evidence/Cancer Guideline[1]	Source	Date*
cis-1,2-DCE	NA	NA	NA	IRIS	5/18/2022
trans-1,2-DCE	NA	NA	NA	IRIS	5/18/2022
Vinyl chloride	4.4E-06	$(\mu g/m^3)^{-1}$	A	IRIS	5/18/2022
Lead	NA	NA	B2	IRIS	5/18/2022
Arsenic	4.3E-03	$(\mu g/m^3)^{-1}$	A	IRIS	5/18/2022
Chromium+	1.2E-02	$(\mu g/m^3)^{-1}$	A	IRIS	5/18/2022

Footnotes:
(1) Weight of evidence information obtained from IRIS. Categories are as follows:
A = Human carcinogen
B1 = Probable human carcinogen - indicates that limited human data are available
B2 = Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C = Possible human carcinogen
D = Not classifiable as human carcinogen
*Date shown for IRIS is the date IRIS was searched. http://www.epa.gov/iris/; Date shown for Cal/EPA is the date Cal/EPA website was searched. https://oehha.ca.gov/chemicals/
+Based on Chromium (VI)

Definitions:
Cal/EPA = California Environmental Protection Agency
IRIS = Integrated Risk Information System
IUR = inhalation unit risk
NA = Not available
(mg/kg-day)-1 = per milligrams per kilogram per day
$(\mu g/m^3)^{-1}$ = per micrograms per cubic meter
SF = slope factor

Table 5
Risk Characterization Summary - Non-Carcinogens

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child/Lifetime

Medium	Exposure Medium	Exposure Point	Contaminant Of Concern	Primary Target Organ(s)	Non-Carcinogenic Hazard Quotient			
					Ingestion	Dermal Contact	Inhalation	Exposure Routes Total
Surface Soil	Surface Soil	Residential Properties 1-5	Arsenic	Skin	0.09	0.01	2.00E-04	0.1
			Chromium	GI Tract	0.09	NA	2.00E-04	0.1
Total Hazard Index (HI) Across All Media at Each Residential Property[1]=								**2***

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Lifetime

Medium	Exposure Medium	Exposure Point	Contaminant Of Concern	Primary Target Organ(s)	Non-Carcinogenic Hazard Quotient			
					Ingestion	Dermal Contact	Inhalation	Exposure Routes Total
Surface Soil	Surface Soil	Cattle Pasture/Eastern Forested Area	Arsenic	Skin	0.2	0.02	0.0004	0.2
			Chromium	GI Tract	0.1	NA	0.0002	0.1
Total Hazard Index (HI) Across All Media[1]=								**5**

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Lifetime

Medium	Exposure Medium	Exposure Point	Contaminant Of Concern	Primary Target Organ(s)	Non-Carcinogenic Hazard Quotient			
					Ingestion	Dermal Contact	Inhalation	Exposure Routes Total
Surface Soil	Surface Soil	Western Area/Southern Nursery Area	Arsenic	Skin	0.2	0.03	0.0004	0.3
			Chromium	GI Tract	0.1	NA	0.0002	0.1
Total Hazard Index (HI) Across All Media[1]=								**2***

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Lifetime

Medium	Exposure Medium	Exposure Point	Contaminant Of Concern	Primary Target Organ(s)	Non-Carcinogenic Hazard Quotient			
					Ingestion	Dermal Contact	Inhalation	Exposure Routes Total
Surface Soil	Surface Soil	BRC Property	Arsenic	Skin	0.5	0.06	0.0009	0.6
			Chromium	GI Tract	2.0	NA	0.003	2.0
Total Hazard Index (HI) Across All Media[1]=								**7**

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Contaminant Of Concern	Primary Target Organ(s)	Non-Carcinogenic Hazard Quotient			
					Ingestion	Dermal Contact	Inhalation	Exposure Routes Total
Surface Soil	Surface Soil	BRC Property	Arsenic	Skin	0.2	0.03	0.1	0.3
			Chromium	GI Tract	0.2	NA	0.1	0.3
Total Hazard Index (HI) Across All Media[1]=								**5***

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child (0-6 years)

Medium	Exposure Medium	Exposure Point	Contaminant Of Concern	Primary Target Organ(s)	Non-Carcinogenic Hazard Quotient			
					Ingestion	Dermal Contact	Inhalation	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Arsenic	Skin	2.0	0.007	NA	2
			Chromium	None reported at RfD	0.30	0.05	NA	0.3
			Vinyl chloride	Liver	2.0	0.1	0.9	3
			cis-1,2-DCE	Kidney	20	3.0	NA	30.0
			trans-1,2-DCE	Immune System	0.2	0.02	1.0	2
Total Hazard Index (HI) Across All Media[1]=								**40**

Scenario Timeframe: Future Receptor Population: Resident Receptor Age: Adult								
Medium	**Exposure Medium**	**Exposure Point**	**Contaminant Of Concern**	**Primary Target Organ(s)**	**Non-Carcinogenic Hazard Quotient**			
					Ingestion	**Dermal Contact**	**Inhalation**	**Exposure Routes Total**
Groundwater	Groundwater	Tap Water	Arsenic	Skin	1.0	0.005	NA	1
			Chromium	None reported at RfD	0.2	0.03	NA	0.2
			Vinyl chloride	Liver	1.0	0.08	0.7	2
			cis-1,2-DCE	Kidney	10	2.0	NA	20
			trans-1,2-DCE	Immune System	0.1	0.01	1.0	1
Total Hazard Index (HI) Across All Media[1]=								**24**
Scenario Timeframe: Future Receptor Population: Worker Receptor Age: Adult								
Medium	**Exposure Medium**	**Exposure Point**	**Contaminant Of Concern**	**Primary Target Organ(s)**	**Non-Carcinogenic Hazard Quotient**			
					Ingestion	**Dermal Contact**	**Inhalation**	**Exposure Routes Total**
Groundwater	Groundwater	Tap Water	Arsenic	Skin	0.7	0.0001	NA	0.7
			Chromium	None reported at RfD	0.1	0.0009	NA	0.1
			Vinyl chloride	Liver	0.7	0.004	NA	0.7
			cis-1,2-DCE	Kidney	10	0.1	NA	10
			trans-1,2-DCE	Immune System	0.1	0.001	NA	0.08
Total Hazard Index (HI) Across All Media[1]=								**15**

Footnotes:
(1) The HI represents the summed HQs for all chemicals of potential concern at the site, not just those requiring remedial action (i.e., the contaminants of concern [COCs]) which are shown in this table. For residents, the noncancer hazard index shown is for a child, as there were elevated hazard indices only for child resident. The hazard index for the adult and child resident was evaluated separately.
*The noncancer hazard does not exceed 1 based upon a breakdown by individual target organ/effect.

Definitions:
NA = not applicable
RfD = reference dose

Table 6
Risk Characterization Summary - Carcinogens

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child/Adult Lifetime

Medium	Exposure Medium	Exposure Point	Contaminant Of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Property 3	Arsenic	1E-05	8.00E-09	1.00E-06	1E-05
			Chromium	9E-05	2.00E-07	NA	9E-05
						Exposure Medium Total[1]=	**1E-04**
						Total Excess Cancer Risk Across All Media=	**1E-04**
Surface Soil	Surface Soil	Property 5	Arsenic	6.00E-06	6.00E-09	9.00E-07	7E-06
			Chromium	1E-04	3.00E-07	NA	1E-04
						Exposure Medium Total[1]=	**1E-04**
						Total Excess Cancer Risk Across All Media=	**1E-04**

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult Lifetime

Medium	Exposure Medium	Exposure Point	Contaminant Of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	Cattle Pasture/Eastern Forested Area	Arsenic	1E-05	9E-09	1E-06	1E-05
			Chromium	9.00E-05	2E-07	NA	9E-05
						Exposure Medium Total[1]=	**1E-04**
						Total Excess Cancer Risk Across All Media=	**1E-04**

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult Lifetime

Medium	Exposure Medium	Exposure Point	Contaminant Of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	BRC Property	Arsenic	3E-05	2E-08	4E-06	3E-05
			Chromium	1.00E-03	3E-06	NA	1E-03
						Exposure Medium Total[1]=	**1E-03**
						Total Excess Cancer Risk Across All Media=	**1E-03**

Scenario Timeframe: Future
Receptor Population: Agricultural Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Contaminant Of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil	Surface Soil	BRC Property	Arsenic	2E-05	1E-08	4E-06	3E-05
			Chromium	3.00E-04	6E-07	NA	3E-04
						Exposure Medium Total[1]=	**3E-04**
						Total Excess Cancer Risk Across All Media=	**3E-04**

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult Lifetime

Medium	Exposure Medium	Exposure Point	Contaminant Of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Arsenic	2E-04	NA	1E-06	2E-04
			Chromium	3.00E-04	NA	7.00E-05	4E-04
			Vinyl chloride	5.00E-03	1E-02	4.00E-04	2E-02
			cis-1,2-DCE	NA	NA	NA	NA
			trans-1,2-DCE	NA	NA	NA	NA
						Exposure Medium Total[1]=	**2E-02**
						Total Excess Cancer Risk Across All Media=	**2E-02**

Scenario Timeframe: Future
Receptor Population: Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Contaminant Of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Arsenic	1E-04	NA	2E-08	1E-04
			Chromium	6.00E-05	NA	5.00E-07	6E-05
			Vinyl chloride	5.00E-04	NA	3.00E-06	5E-04
			cis-1,2-DCE	NA	NA	NA	NA
			trans-1,2-DCE	NA	NA	NA	NA
	Exposure Medium Total[1]=						**7E-04**
Total Excess Cancer Risk Across All Media=							**7E-04**

Footnotes:
(1) The carcinogenic risk represents the summed carcinogenic for all chemicals of potential concern at the site, not just those requiring remedial action (i.e., the contaminants of concern [COCs]) which are shown in this table. For residents, cancer risk is based on an age-adjusted scenario combining child and adult exposures. Carcinogenic risks for child and adult are combined to represent cumulative lifetime cancer risks.

Definitions:
NA = not applicable

Table 7
Summary of Lead Model Results

Scenario Time Frame	Exposure Area	Receptor	Lead Model Used	Exposure Medium	Exposure Point Concentration Used in Model	Percent of Population Predicted to have PbB >5µg/dL
Current/Future	Residential Area Property4	Child Resident	IEUBK	surface soil	240 mg/kg	7.5%
	Cattle Pasture/Eastern Forested Area	Trespasser (Adolescent[12to<18years])	ALM	ditch surface soil	1,612 mg/kg	2.0%
Future	BRC Property	Child Resident	IEUBK	surface soil	2,720 mg/kg	98.4%
		Commercial Worker	ALM	surface soil	2,720 mg/kg	36.2%
		Agricultural Worker	ALM	surface soil	2,720 mg/kg	76.1%
		Construction Worker	ALM	surface/subsurface soil	3,345 mg/kg	85.1%
	Cattle Pasture/Eastern Forested Area	Child Resident	IEUBK	surface soil	170.2 mg/kg	3.5%
	Cattle Pasture/Eastern Forested Area	Recreational User (OlderChild [6to<18years])	IEUBK	ditch surface soil	630.8 mg/kg	18.7%
	Western Area/Southern Nursery Area	Child Resident	IEUBK	surface soil	161 mg/kg	3.10%
	Groundwater Plume	Water User Child Resident	IEUBK	groundwater	12.4 ug/L	18.1%

Footnotes:
ALM = Adult Lead Methodology (version date 06/14/2017)
IEUBK Model = Integrated Exposure Uptake Biokinetic model for lead in children (IEUBKwin Version 2)
PbB = blood lead level
mg/kg = milligrams per kilogram
µg/L = micrograms per liter
% = percent

Table 8
Identification of Soil Remediation Goals for Lead
Battery Recycling Company Superfund Site
Arecibo, Puerto Rico

Area of Concern	Potential Chemical of Concern Based on HHRA	CAS No.	Site Soil Data: Maximum Detected Concentration (mg/kg)	Site Soil Data: Site-Specific Background 95% UCL Concentrations (mg/kg)	Soil Screening Levels (TBCs): EPA Region 2 Screening Level (mg/kg)		Soil Screening Levels (TBCs): EPA Regional Screening Level (mg/kg)		HHRA Risk-Based Target Level (mg/kg)		RG (mg/kg)
BRC Property	Lead	7439-92-1	14,400	13.02	800	a	800	a	1,050	b	**800**
	Arsenic	7440-38-2	233	1.971	NA		5.8				**5.8**
Eastern Drainage Ditch*	Lead	7439-92-1	3,910	13.02	200		400	d	355	c	**355**
Residential Area - Property 4	Lead	7439-92-1	240	13.02	200		400	d	200	e	**200**[f]

Notes:

a: Screening level for commercial/industrial soil developed using the default ALM parameters at a target PbB of 5 µg/dL and a soil/dust ingestion rate of 67 mg/day for an outdoor worker.

b: Soil concentration associated with 5% probability that fetal blood lead level exceeds 5 ug/dL for commercial workers, based on EPA's Adult Lead Methodology (ALM) model and default parameters

c: The HHRA evaluated exposure to soils in the Eastern Ditch for future older child (6-7 yrs) and adolescent (7-18 yrs) recreational users, assuming that residential development could expand in the future in the northern cow pasture or Eastern Forested Area adjacent to the ditch. Using the IEUBK model for the 6-7 year old (72-84 months) and default parameters yields a risk-based target level of 355 mg/kg.

d: Screening level for residential soil. Since the risk assessment was performed, EPA released new guidance for lead in residential soils: "Updated Residential Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities," which can be found at https://www.epa.gov/system/files/documents/2024-01/olem-residential-lead-soil-guidance-2024_signed_508.pdf. EPA now uses a Regional Screening Level of 200 mg/kg.

e: Value associated with less than 5% of exposed child population having blood lead level of 5 ug/dL, based on IEUBK Model Version 2 using default parameters

f: To achieve a lead risk reduction goal consistent with recent toxicological findings, the average lead concentration across the surface of the remediated area must be at or below 200 mg/kg, with no single point above 400 mg/kg, which corresponds to a child blood lead level of 5 µg/dL

* chromium, antimony, and cadmium also posed ecological risk in the Eastern Drainage Ditch, but no RG was developed because they are collocated with lead

Acronyms:

CAS No. - Chemical Abstract Service Number
COPEC chemical of potential ecological concern
EPA - United States Environmental Protection Agency
Integrated Exposure Uptake Biokinetic model (Version 2) for lead in children developed by EPA
mg/kg - milligram per kilogram
NA - not applicable

Table 9
Screening Levels for Groundwater
The Battery Recycling Company Superfund Site
Arecibo, Puerto Rico

Potential Chemical of Concern Based on Risk Assessments	CAS Number	Site Groundwater Data		Groundwater ARARs		Groundwater TBCs	Screening Levels (µg/L)
		Exposure Point Concentration used in HHRA (µg/L)(1)	Maximum Detected Concentration (µg/L)	Puerto Rico Water Quality Standard for SG Groundwater (µg/L)(2)	National Primary Drinking Water Regulations MCL/AL (µg/L)(3)	Human Health Residential Vapor Intrusion Screening Level (µg/L)(4)	
Volatile Organic Compounds							
1,2-Dichloroethene, cis-	156-59-2	966	3,500	NL	70	NA	**70**
1,2-Dichloroethene, trans-	156-60-5	78	230	100	100	NA	**100**
Trichloroethene	79-01-6	0.75	3.5	5	5	1.19	**5**
Vinyl Chloride	75-01-4	98	350	0.22	2	0.147	**0.22**
Inorganic Chemicals							
Arsenic	7440-38-2	9.7	19.1	10	10	NA	**10**
Lead	7440-38-2	12.4	194	15	15	NA	**15**

Notes:

(1) HHRA exposure point concentration is the 95% upper confidence limit on the mean of data from monitoring wells in the core of the plume.

(2) Commonwealth of Puerto Rico, Office of the Governor, Environmental Quality Board, effective June 11, 2019, Puerto Rico Water Quality Standards Regulation. Screening values are based on water quality standards for Class SG groundwater. Class GS ground water is intended for use as source of drinking water supply and agricultural uses including irrigation. Also includes groundwater that flow into coastal, surface, and estuarine waters and wetlands.
(https://www.epa.gov/wqs-tech/water-quality-standards-regulations-puerto-rico)

(3) EPA National Primary Drinking Water Standards, 40 CFR 141 as summarized in EPA 822-F-18-001, March 2018.
(https://www.epa.gov/dwstandardsregulations/2018-drinking-water-standards-and-advisory-tables)

(4) EPA's vapor intrusion screening levels (VISLs) for residential indoor air (target cancer risk = 1×10^{-6}, target hazard quotient = 1), VISL calculator (May 20, 2022)

Acronyms:

AL - action level (drinking water standard for lead)
ARAR - Applicable or Relevant and Appropriate Requirement
CAS Number - Chemical Abstract Service Number
EPA - United States Environmental Protection Agency
HHRA - human health risk assessment
MCL - maximum contaminant level (drinking water standards for chemicals other than lead)
NA - not applicable. This chemical was not identified as a possible chemical of concern for the vapor intrusion pathway.
NL - not listed or chemical name listed but no value available
PRG - preliminary remediation goal
µg/L - microgram per liter

Table 10
Chemical-Specific ARARs, TBCs, and Other Guidance
The Battery Recycling Company Superfund Site
Arecibo, Puerto Rico

Medium	Citation(s)	Requirements	Determination
Federal Chemical-Specific			
Air	Clean Air Act, 42 USC 7401, et. seq. and implementing regulations: National Ambient Air Quality Standards (NAAQS): 40 CFR 50.6; (PM 10); 40 CFR 50.7 (PM 2.5); and 40 CFR 50.12 (Lead).	Establishes national primary and secondary ambient air quality standards for PM 10, PM 2.5, and lead emissions to air.	**ARAR- Applicable**
Groundwater	Safe Drinking Water Act (42 USC 300(f), et seq.) National Primary Drinking Water Standards, MCLs for Organic Contaminants at 40 CFR Parts 141.61, MCLs for Inorganic Contaminants at 40 CFR 141.62, Maximum Contaminant Level Goals (MCLGs) for Organic Contaminants at 40 CFR 141.50, and MCLGs for Inorganic Contaminants at 40 CFR 141.51	Establishes MCLs for chemicals in drinking water distributed in public water systems. In addition, MCLGs are identified which are health-based goals established at levels at which no known or anticipated adverse effects on the health of persons occur and which allow an adequate margin of safety.	**ARAR- Applicable**
Surface water	Clean Water Act, 33 U.S.C. § 1313 and § 1314 (Sections 303(c) and 304(a)), and Implementing Regulations 40 CFR 131.11	Establishes requirements to protect existing and attainable use or uses of the receiving waters and federal water quality criteria (FWQC) for based on protection of human health and protection of aquatic life.	**ARAR- Applicable**
Puerto Rico Chemical-Specific			
Groundwater or surface water	Puerto Rico Water Quality Standards (WQS), Environmental Public Policy Act, Law No. 416 - 2004, as amended and implementing regulations at Regulation #9079 (August 2022)	Establishes WQS to preserve, maintain, and enhance the quality of the waters of Puerto Rico and regulates any discharge of any pollutant to the waters of Puerto Rico. WQS and use classifications are promulgated for the protection of the uses assigned to coastal, surface, estuarine, wetlands, and groundwaters of Puerto Rico. WQS for Puerto Rico groundwaters are based on protection of surface water.	**ARAR-Applicable**
Air	The Control of Atmospheric Pollution Regulation Puerto Rico Environmental Quality Board (PREQB) Regulation #5300 (Amended by PREQB #s 5812, 6302, 6303, 6824, 6630, 7985, and 8484)	Establishes requirements that govern the emission of contaminants into the ambient atmosphere.	**ARAR-Applicable**

Table 11
Location-Specific ARARs, TBCs, and Other Guidance
The Battery Recycling Company Superfund Site
Arecibo, Puerto Rico

Location	Citation(s)	Requirements	Determination
Federal Location-Specific			
Archaeological or historical artifacts within remediation work areas	Preservation of Historical and Archeological Data 54 U.S.C. §§ 312501-312504, 312506-312508 and implementing regulations at 43 CFR 7	Establishes requirements for the evaluation and preservation of historical and archaeological data, which may be destroyed through alteration of terrain as a result of a federal construction project or a federally licensed activity or program.	**ARAR Relevant and Appropriate**
Wetlands/water bodies within remediation work areas	Fish and Wildlife Coordination Act 16 U.S.C. §662 and §663, and Implementing Regulations 50 CFR 83	Requires coordination with federal and state agencies for federally funded projects to ensure that any modification of any stream or other water body adequately protects of fish and wildlife resources.	**ARAR-Applicable**
Habitat for federally endangered or threatened species within remediation work areas	Endangered Species Act, 16 USC §1536(a)(2) and implementing regulations at 50 CFR. 17.11 and 17.12 (Endangered and Threatened Wildlife/Endangered and Threatened Plants) and 50 CFR 17.95 (Critical Habitat- Fish and Wildlife)	Provides that federal activities do not jeopardize the continued existence of any threatened or endangered species. Requires consultation with the U.S. Fish and Wildlife Service to identify the possible presence of protected species or habitat.	**ARAR-Relevant and Appropriate**
Floodplains within or near remediation work areas	Floodplain Management Regulations. 44 CFR 9; 40 CFR Part 6 Appendix A	Requires federal agencies to avoid long- and short-term impacts associated with the occupancy and modification of floodplains.	**Relevant and Appropriate ARAR/TBC/Other Guidance**
Wetlands within or near remediation work areas	Protection of Wetlands Regulations at 40 CFR Part 6 Appendix A	Requires federal agencies to minimize the destruction, loss, or degradation of wetlands and preserve and enhance the natural and beneficial values of wetlands.	**ARAR-Applicable**
Puerto Rico Location-Specific			
Critical/essential habitat located within remediation work areas	Regulation to Govern Vulnerable and Endangered Species, PRDNER Regulation #6766	Requires efforts to identify, conserve, and preserve vulnerable and endangered species and their critical natural habitats and promote the spread and survival of vulnerable or endangered species.	**ARAR-Relevant and Appropriate**
Discovery of archaeological materials or objects during a remedial action	Institute of Puerto Rican Culture (ICP) Regulation #8932	Regulates archaeological evaluation of construction and development projects. Provides for an analysis of any recovered archeological material or object identified.	**ARAR-Relevant and Appropriate**

Table 12
Action-Specific ARARs, TBCs, and Other Guidance
The Battery Recycling Company Superfund Site
Arecibo, Puerto Rico

Action	Citation(s)	Requirements	Determination
Federal Action-Specific			
Onsite disposal of hazardous waste	RCRA Subtitle C, 42 U.S.C §6901 and Implementing Regulations 40 CFR Part 264.552Corrective Action Management Units (CAMU)	The statute and regulations place restrictions on facilities managing CAMU-eligible waste (264.552)	**ARAR--Applicable**
Disposal of hazardous waste	RCRA Subtitle C, 42 U.S.C §6901 and Implementing Regulations 40 CFR Part 268, Subparts C and D (Land Disposal Restrictions [LDRs]) and Part 261.11 Criteria for listing hazardous waste.	The statute and regulations place specific restrictions (concentration or treatment) on RCRA hazardous wastes prior to their placement in a land disposal unit. Hazardous wastes, characterized under 261.11 and subject to LDR regulations after generation must meet all applicable treatment standards prior to land disposal. The treatment standard table (40 CFR 268.40) applies to all hazardous wastes. Under 40 CFR 268.48, wastes would need to meet the universal treatment standards (UTS) for underlying hazardous constituents.	**ARAR-Applicable**
Discharge of stormwater and/or dewater to streams from a remedial action	Clean Water Act 33 U.S.C. 1342, et seq. and implementing regulation 40 CFR 122 (National Pollutant Discharge Elimination System) Subpart C (Permit Conditions)	For discharge of effluent, WQS must be met through use of the best available technology and best management practices. Section 122.26 establishes discharge regulations for stormwater. Section 122.44 establishes effluent limitations and standards for discharges.	**ARAR-Applicable**
Puerto Rico Action-Specific			
Generation of hazardous waste during a remedial action	Regulation for the Control of Hazardous Solid Waste PREQB Resolution R-97-39-3	Establishes standards for the management and disposal of hazardous wastes.	**ARAR-Applicable**
Generation of non-hazardous solid waste during a remedial action	Regulation for the Control of Non-Hazardous Solid Waste, PREQB Regulation #5717	Regulates the handling, storage, transportation, processing, and disposal of non-hazardous solid waste.	**ARAR-Applicable**
Generation of noise during a remedial action	Regulation for the Prevention and Control of Noise Pollution, PREQB Regulation #8019	Establishes standards and requirements to control, reduce, or eliminate noise that might be harmful to health and disturb the public well-being.	**ARAR- Applicable**
Erosion of soil and sediment during a remedial action	Regulation for the Control of Erosion and Prevention of Sedimentation, PREQB Regulation #5754	This regulation establishes standards and requirements to control, reduce, or eliminate soil erosion during construction.	**ARAR-Applicable**
Demolition, removal, or other alterations of buildings with lead-based paint during a remedial action	Regulation for the Control of Lead-based Paint Abatement and Renovation Activities, PRDNER Regulation #9098	Establishes minimum cleanup, maintenance, management, and disposal requirements to prevent human health and ecological risk.	**ARAR-Applicable**

Action	Citation(s)	Requirements	Determination
Seeding or installation of vegetation during a remedial action	Regulation to Govern the Conservation and Management of Wildlife, Exotic Species and Hunting in Puerto Rico, PRDNER Regulation #6765, Appendix 2	Prohibits the importation and introduction of invasive plant species. A list of prohibited plants is included in Appendix 2.	**ARAR-Applicable**

ARAR - Applicable or Relevant and Appropriate Requirement	CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
CFR – Code of Federal Regulations	EPA - U.S. Environmental Protection Agency
LDR – Land disposal Restriction	PREQB - Puerto Rico Environmental Quality Board
PRDNER - Puerto Rico Department of Natural and Environmental Resources	RSL - Regional Screening Level
RCRA - Resource Conservation and Recovery Act	SIP - State Implementation Plan
SSL - Soil Screening Level	USC - U.S. Code
TBCs - To-be-considered advisories, criteria, or guidance	
WQS - Water Quality Standards	

Table 13
Summary of Comparative Analysis of Remedial Alternatives for Contaminated Soil
Battery Recycling Company Superfund Site, Arecibo, Puerto Rico

Remedial Alternatives	Threshold Criteria [1]		Balancing Criteria					
	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume through Treatment	Short-Term Effectiveness	Implementability	Present Value Cost (Dollars) [2]	
Contaminated Soil								
Alternative S1 – No Action [3]	–	–	None	None	None	High	$0	None
Alternative S2A – Capping In-Place of Contaminated Soils, Selective Excavation and Off-Site Disposal	+	+	Low to Moderate	None	Moderate	Moderate to High	$8,700,000	Low to Moderate
Alternative S2B – Capping In-Place of Contaminated Soils, Selective Excavation, On-Site Containment, and Off-Site Disposal	+	+	Moderate	Low to Moderate	Moderate	Moderate	$9,940,000	Low to Moderate
Alternative S3 – In Situ Treatment of Contaminated Soils, Selective Excavation and Off-Site Disposal	+	+	Moderate	Moderate to High	Low to Moderate	Low to Moderate	$20,330,000	Moderate
Alternative S4 – Excavation of Contaminated Soils and On-Site Containment	+	+	Moderate to High	Moderate	Low to Moderate	Moderate	$17,700,000	Moderate
Alternative S5 – Excavation of Contaminated Soils and Off-Site Disposal	+	+	Moderate to High	Moderate to High	Low to Moderate	Moderate	$37,730,000	High

Notes:
1. See below for the legend for the qualitative rating system.
2. Present value costs and quantitative ratings are subject to change. Detailed cost spreadsheets (cost summaries, present value analyses, and cost reports) for each alternative are presented in Appendix G.
3. Alternatives S1 and GW1 represent the no action alternatives required by the NCP.

Legend for Qualitative Rating System:

Overall Protection of Human Health and the Environment

– Not Adequate
+ Adequate

Compliance with ARARs

– None
+ Will Comply

Balancing Criteria (Excluding Cost)

None
Low
Low to Moderate
Moderate
Moderate to High
High

Balancing Criteria (Present Value Cost in Dollars)

	Cost Range for Soil Remedial Alternatives	Cost Range for Groundwater Remedial Alternatives
None	$0	$0
Low	Less than $7,500,000	Less than $1,000,000
Low to Moderate	$7,500,001 to $15,000,000	$1,000,001 to $2,000,000
Moderate	$15,000,001 to $22,500,000	$2,000,001 to $3,000,000
Moderate to High	$22,500,001 to $30,000,000	$3,000,001 to $4,000,000
High	More than $30,000,000	More than $4,000,000

Table 14
Detailed Cost Estimate Soil Alternative S4

Year[1]	Capital Costs (Institutional / Access Controls)[2]	Capital Costs (Earthwork)[2]	Annual O&M Costs	Periodic Costs	Total Annual Expenditure[3]	Discount Factor (7.0%)	Present Value[4]
0	$166,000	$17,361,000	$0	$0	$17,527,000	1.0000	$17,527,000
1	$0	$0	$9,000	$0	$9,000	0.9346	$8,411
2	$0	$0	$9,000	$0	$9,000	0.8734	$7,861
3	$0	$0	$9,000	$0	$9,000	0.8163	$7,347
4	$0	$0	$9,000	$0	$9,000	0.7629	$6,866
5	$0	$0	$9,000	$28,000	$37,000	0.7130	$26,381
6	$0	$0	$9,000	$0	$9,000	0.6663	$5,997
7	$0	$0	$9,000	$0	$9,000	0.6227	$5,604
8	$0	$0	$9,000	$0	$9,000	0.5820	$5,238
9	$0	$0	$9,000	$0	$9,000	0.5439	$4,895
10	$0	$0	$9,000	$28,000	$37,000	0.5083	$18,807
11	$0	$0	$9,000	$0	$9,000	0.4751	$4,276
12	$0	$0	$9,000	$0	$9,000	0.4440	$3,996
13	$0	$0	$9,000	$0	$9,000	0.4150	$3,735
14	$0	$0	$9,000	$0	$9,000	0.3878	$3,490
15	$0	$0	$9,000	$28,000	$37,000	0.3624	$13,409
16	$0	$0	$9,000	$0	$9,000	0.3387	$3,048
17	$0	$0	$9,000	$0	$9,000	0.3166	$2,849
18	$0	$0	$9,000	$0	$9,000	0.2959	$2,663
19	$0	$0	$9,000	$0	$9,000	0.2765	$2,489
20	$0	$0	$9,000	$28,000	$37,000	0.2584	$9,561
21	$0	$0	$9,000	$0	$9,000	0.2415	$2,174
22	$0	$0	$9,000	$0	$9,000	0.2257	$2,031
23	$0	$0	$9,000	$0	$9,000	0.2109	$1,898
24	$0	$0	$9,000	$0	$9,000	0.1971	$1,774
25	$0	$0	$9,000	$28,000	$37,000	0.1842	$6,815
26	$0	$0	$9,000	$0	$9,000	0.1722	$1,550
27	$0	$0	$9,000	$0	$9,000	0.1609	$1,448
28	$0	$0	$9,000	$0	$9,000	0.1504	$1,354
29	$0	$0	$9,000	$0	$9,000	0.1406	$1,265
30	$0	$0	$9,000	$28,000	$37,000	0.1314	$4,862
TOTALS:	$166,000	$17,361,000	$270,000	$168,000	$17,965,000		$17,699,094
TOTAL PRESENT VALUE OF ALTERNATIVE S4[5]							**$17,700,000**

Notes:
1. The alternative is expected to require cost expenditures for perpetuity since contaminated soil will be left in place (within on-site repository) that would not allow for unlimited use and unrestricted exposure under the current and potential future land uses. However, period of analysis was assumed to be 30 years beyond the construction in Year 0.
2. Capital costs, for purposes of this analysis are assumed to occur in "year zero" of the project.
3. Total annual expenditure is the total cost per year with no discounting.
4. Present value is the total cost per year including a 7.0% discount factor for that year.
5. Total present value is rounded to the nearest $10,000. Inflation and depreciation are excluded from the present value cost.
   Costs presented for this alternative are expected to have an accuracy between -30% to +50% of actual costs, based on the scope presented.
   They are prepared solely to facilitate relative comparisons between alternatives for evaluation purposes.

Table 15
Detailed Cost Estimate of Interim Groundwater Remedy

Year[1]	Capital Costs (Institutional / Access Controls)[2]	Capital Costs (Earthwork)[2]	Annual O&M Costs	Periodic Costs	Total Annual Expenditure[3]	Discount Factor (7.0%)	Present Value[4]
0	$80,000	$236,000	$0	$0	$316,000	1.0000	$316,000
1	$0	$0	$93,000	$0	$93,000	0.9346	$86,918
2	$0	$0	$93,000	$0	$93,000	0.8734	$81,226
3	$0	$0	$93,000	$0	$93,000	0.8163	$75,916
4	$0	$0	$93,000	$0	$93,000	0.7629	$70,950
5	$0	$0	$93,000	$42,400	$135,400	0.7130	$96,540
6	$0	$0	$93,000	$0	$93,000	0.6663	$61,966
7	$0	$0	$93,000	$0	$93,000	0.6227	$57,911
8	$0	$0	$93,000	$0	$93,000	0.5820	$54,126
9	$0	$0	$93,000	$0	$93,000	0.5439	$50,583
10	$0	$0	$93,000	$42,400	$135,400	0.5083	$68,824
11	$0	$0	$93,000	$0	$93,000	0.4751	$44,184
12	$0	$0	$93,000	$0	$93,000	0.4440	$41,292
13	$0	$0	$93,000	$0	$93,000	0.4150	$38,595
14	$0	$0	$93,000	$0	$93,000	0.3878	$36,065
15	$0	$0	$93,000	$42,400	$135,400	0.3624	$49,069
16	$0	$0	$93,000	$0	$93,000	0.3387	$31,499
17	$0	$0	$93,000	$0	$93,000	0.3166	$29,444
18	$0	$0	$93,000	$0	$93,000	0.2959	$27,519
19	$0	$0	$93,000	$0	$93,000	0.2765	$25,715
20	$0	$0	$93,000	$42,400	$135,400	0.2584	$34,987
21	$0	$0	$93,000	$0	$93,000	0.2415	$22,460
22	$0	$0	$93,000	$0	$93,000	0.2257	$20,990
23	$0	$0	$93,000	$0	$93,000	0.2109	$19,614
24	$0	$0	$93,000	$0	$93,000	0.1971	$18,330
25	$0	$0	$93,000	$42,400	$135,400	0.1842	$24,941
26	$0	$0	$93,000	$0	$93,000	0.1722	$16,015
27	$0	$0	$93,000	$0	$93,000	0.1609	$14,964
28	$0	$0	$93,000	$0	$93,000	0.1504	$13,987
29	$0	$0	$93,000	$0	$93,000	0.1406	$13,076
30	$0	$0	$93,000	$42,400	$135,400	0.1314	$17,792
TOTALS:	$80,000	$236,000	$2,790,000	$254,400	$3,360,400		$1,561,498
							$1,560,000

APPENDIX II
Administrative Record Index

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

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08/14/2023

REGION ID: 02

Site Name: THE BATTERY RECYCLING COMPANY
CERCLIS ID: PRR000004655
OUID: 01
SSID: 02ZS
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
676984	8/14/2023	ADMINISTRATIVE RECORD INDEX FOR THE BATTERY RECYCLING COMPANY SITE	17	Administrative Record Index		(US ENVIRONMENTAL PROTECTION AGENCY)
310519	Undated	SITE ZONING MAP FOR THE BATTERY RECYCLING COMPANY SITE	1	Figure/Map/ Drawing		
310524	Undated	DEED FOR NUMERO DIEZ DE SEGREGACION COMPRAVENTA Y CONSTITUCIONN DE SERVIDUMBRES FOR THE BATTERY RECYCLING COMPANY SITE	12	Other		
310526	Undated	DEED INFORMATION FOR ESCRITURA NUMERO VEINTICINCO - ESCRITURA DE COMPRAVENTA FOR THE BATTERY RECYCLING COMPANY SITE	14	Other		
310527	Undated	REMOVAL ASSESSMENT SITE LOCATION MAP FOR THE BATTERY RECYCLING COMPANY SITE	1	Figure/Map/ Drawing		
310528	Undated	AERIAL SITE LOCATION MAP FOR THE BATTERY RECYCLING COMPANY SITE	1	Figure/Map/ Drawing		
310529	Undated	DEED INFORMATION FOR NUMERO DIEZ SEGREGACIOIN Y COMPRAVENTA FOR THE BATTERY RECYCLING COMPANY SITE	5	Other		

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DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
402285	Undated	POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT FOR THE PUERTO RICO CHEM CO SITE	7	Form		
402286	Undated	WASTE REMOVAL/DISPOSAL FROM THE BETANCOURT DISPOSAL SITE FOR THE PUERTO RICO CHEM COMPANY SITE	17	Other		
402287	Undated	SAFE PRACTICES FOR FIELD WORK FOR THE PUERTO RICO CHEM CO SITE	14	Other		
402299	03/30/1983	RESULTS FROM THE SITE INSPECTION OF 08/25/1982 FOR THE PUERTO RICO CHEMICAL COMPANY SITE	30	Memorandum		CANELLAS,BARTOLOME,J (PR ENVIRONMENTAL QUALITY BOARD)
562054	05/23/1986	CORRESPONDENCE REGARDING ACCESS AND WHETHER OR NOT OCCIDENTAL CHEMICAL COMPANY RETAINS THE LEASE FOR THE PUERTO RICO CHEMICAL COMPANY SITE	2	Letter	MACK,ALAN,J (Occidental Chemical Corporation)	COLON,ANGEL (PR INDUSTRIAL DEVELOPMENT COMPANY)
406887	09/26/1986	US EPA REGION II ADMINISTRATIVE ORDER ON CONSENT - INDEX NO. II-RCRA-3013-60302 FOR THE PUERTO RICO CHEM COMPANY SITE	14	Legal Instrument		
562057	06/23/1987	HYDROGEOLOGIC INVESTIGATION FOR THE PUERTO RICO CHEMICAL COMPANY SITE	79	Report		(OCCIDENTAL CHEMICAL CORP)

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562058	06/23/1987	TRANSMITTAL OF THE HYDROGEOLOGIC INVESTIGATION FOR THE PUERTO RICO CHEMICAL COMPANY SITE	1	Letter		(OCCIDENTAL CHEMICAL CORP)
562059	08/01/1987	REVIEW OF HYDROGEOLOGIC INVESTIGATION FOR THE PUERTO RICO CHEMICAL COMPANY SITE	21	Report		
562061	05/21/1990	CORRESPONDENCE REGARDING OWNERSHIP OF LOT L-280-64 FOR THE PUERTO RICO CHEMICAL COMPANY SITE	1	Letter		(PUERTO RICO INDUSTRIAL DEVELOPMENT COMPANY)
310520	07/26/1995	DEED FOR THE PROPERTY NUMERO OCHENTA Y TRES SEGREGACION COMPRAVENTA Y CONSTITUCION DE SERVIDUMBRES FOR THE BATTERY RECYCLING COMPANY SITE	10	Other		
402292	02/02/1996	TRANSMITTAL OF THE PRELIMINARY ASSESSMENT SCORESHEETS FOR THE PUERTO RICO CHEM CO SITE	2	Letter	DAVILA,JUAN (US ENVIRONMENTAL PROTECTION AGENCY)	SOTO,DENISE,V (PR ENVIRONMENTAL QUALITY BOARD)
402293	02/02/1996	PRELIMINARY ASSESSMENT SCORESHEETS FOR THE PUERTO RICO CHEM CO SITE	26	Chart / Table		QUINONES,JORGE,L (PUERTO RICO ENVIRONMENTAL QUALITY BOARD)
402294	02/08/1996	PRELIMINARY ASSESSMENT SCORESHEETS FOR THE PUERTO RICO CHEM CO SITE	7	Chart / Table		

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402296	03/07/1996	RESPONSE TO LETTER DATED 02/02/1996 FOR THE PUERTO RICO CHEMICAL COMPANY SITE	1	Letter	SOTO,DENISE,V (PR ENVIRONMENTAL QUALITY BOARD)	DAVILA,JUAN (US ENVIRONMENTAL PROTECTION AGENCY)
397235	05/06/1996	ENVIRONMENTAL QUALITY BOARD REGION II MANAGEMENT TASK WORK PLAN FOR THE PUERTO RICO CHEMICAL COMPANY SITE	53	Work Plan		DAVILA,JUAN (US ENVIRONMENTAL PROTECTION AGENCY)
397239	02/09/1999	SAMPLING TRIP REPORT FOR 01/25/1999 AND 01/26/1999 FOR THE PUERTO RICO CHEMICAL COMPANY SITE	12	Report		DORNEMAN,KIERSTEN (ROY F. WESTON, INCORPORATED)
397241	12/06/1999	FINAL SITE INSPECTION VOLUME 1 OF 2 FOR THE PUERTO RICO CHEMICAL COMPANY SITE	687	Report		BUTTERFIELD,W SCOTT (WESTON SOLUTIONS INCORPORATED)|DORNEMAN,KIERSTEN (ROY F. WESTON, INCORPORATED)|SY,WILLIAM (ROY F. WESTON, INCORPORATED)
402071	12/06/1999	FINAL SITE INSPECTION VOLUME 2 OF 2 FOR THE PUERTO RICO CHEMICAL COMPANY SITE	629	Report		(WESTON SOLUTIONS INCORPORATED)|BUTTERFIELD,W SCOTT (WESTON SOLUTIONS INCORPORATED)
502744	12/06/1999	FINAL SITE INSPECTION REPORT JULY 1999 - EPA CONTRACT NO. 68-W5-0019 - TDD NO. 02-98-08-0064C - DCN NO. START-02-F-03355 FOR THE BATTERY RECYCLING COMPANY SITE	65	Report		

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689265	06/01/2000	REGULATION FOR THE USE, CONSERVATION AND MANAGEMENT OF THE WATERS OF PUERTO RICO (SPANISH VERSION) FOR THE BATTERY RECYCLING COMPANY SITE	77	Other		
310522	01/28/2005	CERTIFICACION REGISTRAL - REGISTRO DE LA PROPIEDAD IN THE AMOUNT OF 21,597 FOR THE BATTERY RECYCLING COMPANY SITE	18	Other		
402076	01/31/2005	SITE RE-ASSESSMENT REPORT FOR THE PUERTO RICO CHEMICAL COMPANY SITE	305	Report	(US ENVIRONMENTAL PROTECTION AGENCY)|DAVILA,JUAN (US ENVIRONMENTAL PROTECTION AGENCY)	(NONE)|MORALES,NEREIDA,H (NONE)
683607	06/20/2008	SOIL AND RESIDENTIAL WIPE SAMPLING, APRIL 2008 - FINAL TRIP REPORT FOR THE BATTERY RECYCLING COMPANY SITE	88	Report	(US ENVIRONMENTAL PROTECTION AGENCY)|SINGHVI,RAJESHMAL (US ENVIRONMENTAL PROTECTION AGENCY)	
689421	10/19/2010	ANALYTICAL RESULTS OF THE SOIL INVESTIGATION FOR WORK ASSIGNMENT NO. 0-100 FOR THE BATTERY RECYCLING COMPANY SITE	31	Memorandum	HUMPHREY,ALAN (US ENVIRONMENTAL PROTECTION AGENCY)	LEUSER,RICK (LOCKHEED MARTIN INC)

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683615	03/31/2011	NOTICE OF POTENTIAL LIABILITY, REQUEST TO PERFORM REMOVAL ACTION AND REQUEST FOR INFORMATION PURSUANT TO CERCLA FOR THE BATTERY RECYCLING COMPANY SITE	4	Letter		
146915	05/10/2011	ACTION MEMORANDUM - CONFIRMATION OF VERBAL APPROVAL TO CONDUCT A REMOVAL ACTION FOR THE BATTERY RECYCLING COMPANY SITE	3	Memorandum	MUGDAN,WALTER,E (US ENVIRONMENTAL PROTECTION AGENCY)|ROTOLA,JOSEPH (US ENVIRONMENTAL PROTECTION AGENCY)	GARRISON,GEOFFREY (US ENVIRONMENTAL PROTECTION AGENCY)
296705	06/01/2011	POLLUTION REPORT NO. 1 INITIAL FOR THE BATTERY RECYCLING COMPANY SITE	7	Report	MUGDAN,WALTER (US ENVIRONMENTAL PROTECTION AGENCY)|ROTOLA,JOSEPH (US ENVIRONMENTAL PROTECTION AGENCY)|SODERBERG,CARL (US ENVIRONMENTAL PROTECTION AGENCY)	GARRISON,GEOFFREY (US ENVIRONMENTAL PROTECTION AGENCY)
110919	06/07/2011	Administrative Settlement Agreement and Order on Consent for a Removal Action, Index Number CERCLA-02-2011-2010, In the Matter of Puerto Rico Battery Recycling, a/k/a Arecibo Battery CERCLA Site, The Battery Recycling Company, Inc., Respondent.	42	Legal Instrument		(US ENVIRONMENTAL PROTECTION AGENCY)
502742	01/26/2012	SAMPLING AND ANALYSIS REPORT - ERTEC PROJECT NO. E114714 FOR THE BATTERY RECYCLING COMPANY SITE	58	Report		

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502743	01/26/2012	TRANSMITTAL OF THE SAMPLING AND ANALYSIS REPORT - ERTEC PROJECT NO. E114714 FOR THE BATTERY RECYCLING COMPANY SITE	1	Letter		
448284	05/07/2012	CORRESPONDENCE REGARDING THE CONFIDENTIAL HEALTH HAZARD EVALUATION FOR THE BATTERY RECYCLING COMPANY SITE	9	Letter		
683799	06/26/2014	US EPA NOTICE OF POTENTIAL LIABILITY AND FILING OF NOTICE OF FEDERAL LIEN UNDER THE CERCLA SENT TO LUIS FIGUEROA NIEVES, AWILDA CARRASQUILLO ENCARNACION FOR THE BATTERY RECYCLING COMPANY SITE	11	Letter		(US ENVIRONMENTAL PROTECTION AGENCY)|DIFORTE,NICOLETTA (US ENVIRONMENTAL PROTECTION AGENCY)
502757	09/05/2014	CORRESPONDENCE REGARDING THE LEAD MONITORING STATIONS FOR THE BATTERY RECYCLING COMPANY SITE	3	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|FONT,JOSE (US ENVIRONMENTAL PROTECTION AGENCY)	
502758	10/30/2015	CORRESPONDENCE REGARDING THE SURFACE SOIL SAMPLING RESULTS FOR THE BATTERY RECYCLING COMPANY SITE	3	Email		(US ENVIRONMENTAL PROTECTION AGENCY)|ROSOFF,DAVID (US ENVIRONMENTAL PROTECTION AGENCY)

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DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
430298	12/14/2015	US EPA FIELD NOTICE OF FEDERAL INTEREST SENT TO THE BATTERY RECYCLING COMPANY (TBRC) FOR THE BATTERY RECYCLING COMPANY SITE	1	Form		
502751	12/29/2015	PHASE I REMOVAL ASSESSMENT SOIL SAMPLING HEALTH AND SAFETY PLAN - EPA CONTRACT NO. EP-S2-14-01 - TDD NO. TO-0006-0122 - DCN NO. RST3-02-D-0166 FOR THE BATTERY RECYCLING COMPANY SITE	164	Work Plan		
502752	12/29/2015	TRANSMITTAL OF THE PHASE I REMOVAL ASSESSMENT SOIL SAMPLING HEALTH AND SAFETY PLAN FOR THE BATTERY RECYCLING COMPANY SITE	2	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|ROSOFF,DAVID (US ENVIRONMENTAL PROTECTION AGENCY)	(WESTON SOLUTIONS)|HUERTAS,CARLOS (U.S. ENVIRONMENTAL PROTECTION AGENCY)
363678	02/19/2016	STATE/TRIBAL CORRESPONDENCE FOR THE BATTERY RECYCLING COMPANY SITE	2	Letter		
438224	05/13/2016	ADMINISTRATIVE ORDER INDEX NO. CERCLA-02-2016-2022 FOR THE BATTERY RECYCLING COMPANY SITE	11	Legal Instrument		MUGDAN,WALTER (US ENVIRONMENTAL PROTECTION AGENCY)

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434534	05/19/2016	POLLUTION REPORT NO. 1 INITIAL FOR THE BATTERY RECYCLING COMPANY SITE	2	Report		GARRISON,GEOFFREY (US ENVIRONMENTAL PROTECTION AGENCY)
393239	07/27/2016	ACTION MEMORANDUM - CONFIRMATION OF A SECOND VERBAL AUTHORIZATION FOR AN ONGOING EMERGENCY REMOVAL ACTION (RV2) AT THE BATTERY RECYCLING COMPANY SITE	2	Memorandum	MUGDAN,WALTER,E (US ENVIRONMENTAL PROTECTION AGENCY)	GARRISON,GEOFFREY (US ENVIRONMENTAL PROTECTION AGENCY)|ROTOLA,JOSEPH (US ENVIRONMENTAL PROTECTION AGENCY)
419412	08/26/2016	REMEDIAL SITE ASSESSMENT DECISION - SITE INSPECTION #001 FOR THE BATTERY RECYCLING COMPANY SITE	2	Form		ACOSTA,ILDEFONSO (US ENVIRONMENTAL PROTECTION AGENCY)
419414	09/01/2016	HAZARD RANKING SYSTEM (HRS) PACKAGE REFERENCE 1 - 21 FOR THE BATTERY RECYCLING COMPANY SITE	1336	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(WESTON SOLUTIONS, INC.)
419415	09/01/2016	HAZARD RANKING SYSTEM (HRS) PACKAGE REFERENCE 22 - 23 FOR THE BATTERY RECYCLING COMPANY SITE	1371	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(WESTON SOLUTIONS, INC.)

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419416	09/01/2016	HAZARD RANKING SYSTEM (HRS) PACKAGE REFERENCE 24 - 48 FOR THE BATTERY RECYCLING COMPANY SITE	708	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(WESTON SOLUTIONS, INC.)
363680	09/08/2016	PROPOSED NPL SITE LISTING NARRATIVE FOR THE BATTERY RECYCLING COMPANY SITE	1	Publication		
438235	09/22/2016	ACTION MEMORANDUM RV2 CONFIRMATION OF TWO VERBAL AUTHORIZATIONS, REQUEST FOR CEILING INCREASE, AND $2 MILLION AND 12-MONTH EXEMPTIONS FOR PUERTO RICO BATTERY RECYCLING A/K/A THE BATTERY RECYCLING COMPANY SITE	16	Memorandum	STANISLAUS,MATHY (US ENVIRONMENTAL PROTECTION AGENCY)	MUGDAN,WALTER (US ENVIRONMENTAL PROTECTION AGENCY)
510613	06/29/2017	TRANSMITTAL OF THE FINAL REMOVAL ASSESSMENT REPORT FOR THE BATTERY RECYCLING COMPANY SITE	1	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)	(WESTON SOLUTIONS INCORPORATED)
510614	06/29/2017	FINAL REMOVAL ASSESSMENT REPORT FOR THE BATTERY RECYCLING COMPANY SITE	1308	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(WESTON SOLUTIONS INCORPORATED)

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503987	07/31/2017	CORRESPONDENCE REGARDING PRESS RELEASE: EPA ADDS BATTERY SMELTER FACILITY IN ARECIBO, PUERTO RICO TO THE FEDERAL SUPERFUND LIST FOR THE BATTERY RECYCLING COMPANY SITE	2	Email		JOHNSON,VALENCIA (US ENVIRONMENTAL PROTECTION AGENCY)
519697	08/03/2017	FEDERAL REGISTER NATIONAL PRIORITIES LISTING FOR THE BATTERY RECYCLING COMPANY AND SAINT-GOBAIN PERFORMANCE PLASTICS SITES	6	Publication		(FEDERAL REGISTER)
689260	10/13/2017	POLLUTION REPORT NO. 3 RV1 FINAL FOR THE BATTERY RECYCLING COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)|MUGDAN,WALTER (US ENVIRONMENTAL PROTECTION AGENCY)|ROTOLA,JOSEPH (US ENVIRONMENTAL PROTECTION AGENCY)|WILSON,ERIC,J (US ENVIRONMENTAL PROTECTION AGENCY)	(US ENVIRONMENTAL PROTECTION AGENCY)|GARRISON,GEOFFREY (US ENVIRONMENTAL PROTECTION AGENCY)

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501474	10/13/2017	POLLUTION REPORT NO. 3 RV1 FINAL FOR THE BATTERY RECYCLING COMPANY SITE	4	Report	(US ENVIRONMENTAL PROTECTION AGENCY)|MUGDAN,WALTER (US ENVIRONMENTAL PROTECTION AGENCY)|ROTOLA,JOSEPH (US ENVIRONMENTAL PROTECTION AGENCY)|WILSON,ERIC,J (US ENVIRONMENTAL PROTECTION AGENCY)	(US ENVIRONMENTAL PROTECTION AGENCY)|GARRISON,GEOFFREY (US ENVIRONMENTAL PROTECTION AGENCY)
624384	05/15/2018	HEALTH AND SAFETY PLAN FOR THE BATTERY RECYCLING COMPANY SITE	195	Work Plan		
624385	05/15/2018	TRANSMITTAL OF HEALTH AND SAFETY PLAN FOR THE BATTERY RECYCLING COMPANY SITE	1	Letter		
624388	07/11/2018	FINAL QUALITY ASSURANCE PROJECT PLAN FOR THE BATTERY RECYCLING COMPANY SITE	748	Work Plan		
624389	07/11/2018	TRANSMITTAL OF FINAL QUALITY ASSURANCE PROJECT PLAN FOR THE BATTERY RECYCLING COMPANY SITE	1	Letter		

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689262	03/23/2019	POLLUTION REPORT NO. 6 RV2 FOR THE BATTERY RECYCLING COMPANY SITE	7	Report	(US ENVIRONMENTAL PROTECTION AGENCY)|CARPENTER,ANGELA (US ENVIRONMENTAL PROTECTION AGENCY)|FONT,JOSE (US ENVIRONMENTAL PROTECTION AGENCY)|MUGDAN,WALTER (US ENVIRONMENTAL PROTECTION AGENCY)	(US ENVIRONMENTAL PROTECTION AGENCY)|GARRISON,GEOFFREY (US ENVIRONMENTAL PROTECTION AGENCY)
624397	04/17/2019	FINAL WORK PLAN VOLUME 1 FOR THE BATTERY RECYCLING COMPANY SITE	143	Work Plan		(CDM SMITH)
624403	05/23/2019	FINAL QUALITY ASSURANCE PROJECT PLAN ADDENDUM NO. 1 FOR THE BATTERY RECYCLING COMPANY SITE	830	Work Plan		
624404	05/23/2019	TRANSMITTAL OF FINAL QUALITY ASSURANCE PROJECT PLAN ADDENDUM NO. 1 FOR THE BATTERY RECYCLING COMPANY SITE	1	Letter		
577924	07/01/2019	ACTION MEMORANDUM RV3 - REQUEST FOR FUNDING APPROVAL FOR A REMOVAL ACTION AT THE BATTERY RECYCLING COMPANY SITE	20	Memorandum	EVANGELISTA,PAT (US ENVIRONMENTAL PROTECTION AGENCY)	GARRISON,GEOFFREY (US ENVIRONMENTAL PROTECTION AGENCY)|ROTOLA,JOSEPH (US ENVIRONMENTAL PROTECTION AGENCY)

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689263	09/20/2019	POLLUTION REPORT NO. 7 RV2 FINAL FOR THE BATTERY RECYCLING COMPANY SITE	11	Report	(US ENVIRONMENTAL PROTECTION AGENCY)|CARPENTER,ANGELA (US ENVIRONMENTAL PROTECTION AGENCY)|FONT,JOSE (US ENVIRONMENTAL PROTECTION AGENCY)|MUGDAN,WALTER (US ENVIRONMENTAL PROTECTION AGENCY)	(US ENVIRONMENTAL PROTECTION AGENCY)|GARRISON,GEOFFREY (US ENVIRONMENTAL PROTECTION AGENCY)
689261	01/31/2020	POLLUTION REPORT NO. 5 RV3 FOR THE BATTERY RECYCLING COMPANY SITE	12	Report	(US ENVIRONMENTAL PROTECTION AGENCY)|EVANGELISTA,PAT (US ENVIRONMENTAL PROTECTION AGENCY)|FONT,JOSE (US ENVIRONMENTAL PROTECTION AGENCY)|ROTOLA,JOSEPH (US ENVIRONMENTAL PROTECTION AGENCY)	(US ENVIRONMENTAL PROTECTION AGENCY)|GARRISON,GEOFFREY (US ENVIRONMENTAL PROTECTION AGENCY)
689264	03/10/2020	POLLUTION REPORT NO. 10 RV3 FOR THE BATTERY RECYCLING COMPANY SITE	12	Report	(US ENVIRONMENTAL PROTECTION AGENCY)|EVANGELISTA,PAT (US ENVIRONMENTAL PROTECTION AGENCY)|FONT,JOSE (US ENVIRONMENTAL PROTECTION AGENCY)|ROTOLA,JOSEPH (US ENVIRONMENTAL PROTECTION AGENCY)	(US ENVIRONMENTAL PROTECTION AGENCY)|GARRISON,GEOFFREY (US ENVIRONMENTAL PROTECTION AGENCY)

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590432	03/31/2020	US EPA REGION II FACT SHEET COVID COMMUNITY UPDATE MARCH 2020 FOR THE BATTERY RECYCLING COMPANY SITE	1	Publication		(US ENVIRONMENTAL PROTECTION AGENCY)
590439	03/31/2020	US EPA REGION II FACT SHEET COVID COMMUNITY UPDATE MARCH 2020 FOR THE BATTERY RECYCLING COMPANY SITE (SPANISH VERSION)	1	Publication		(US ENVIRONMENTAL PROTECTION AGENCY)
624426	05/01/2020	REVISED HEALTH AND SAFETY PLAN ADDENDUM NO. 1 FOR THE BATTERY RECYCLING COMPANY SITE	132	Work Plan		
624427	05/01/2020	TRANSMITTAL OF REVISED HEALTH AND SAFETY PLAN ADDENDUM NO. 1 FOR THE BATTERY RECYCLING COMPANY SITE	1	Letter		
624430	06/15/2020	REMEDIAL INVESTIGATION SCREENING CRITERIA FOR THE BATTERY RECYCLING COMPANY SITE	26	Letter		
624431	06/16/2020	FINAL QUALITY ASSURANCE PROJECT PLAN ADDENDUM NO. 2 FOR THE BATTERY RECYCLING COMPANY SITE	40	Work Plan		
624432	06/16/2020	TRANSMITTAL OF FINAL QUALITY ASSURANCE PROJECT PLAN ADDENDUM NO. 2 FOR THE BATTERY RECYCLING COMPANY SITE	1	Letter		

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689489	10/06/2022	POLLUTION REPORT NO. 18 RV3 FINAL FOR THE BATTERY RECYCLING COMPANY SITE	5	Report	EVANGELISTA,PAT (US ENVIRONMENTAL PROTECTION AGENCY)|FONT,JOSE (US ENVIRONMENTAL PROTECTION AGENCY)|GUERRERO-PEREZ,CARMEN (US ENVIRONMENTAL PROTECTION AGENCY)	HUERTAS,CARLOS (US ENVIRONMENTAL PROTECTION AGENCY)
654947	11/09/2022	FINAL SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT FOR THE BATTERY RECYCLING COMPANY SITE	170	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CDM SMITH)
689238	06/09/2023	REVISED FINAL REMEDIAL INVESTIGATION REPORT FOR THE BATTERY RECYCLING COMPANY SITE	334	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CDM SMITH)
689239	06/09/2023	REVISED FINAL REMEDIAL INVESTIGATION REPORT - APPENDICES FOR THE BATTERY RECYCLING COMPANY SITE	2860	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CDM SMITH)
688972	07/17/2023	US EPA GENERAL NOTICE LETTER SENT TO OCCIDENTAL CHEMICAL CORPORATION FOR THE BATTERY RECYCLING COMPANY SITE	3	Letter		WILSON,ERIC,J (US ENVIRONMENTAL PROTECTION AGENCY)

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688973	07/17/2023	US EPA GENERAL NOTICE LETTER SENT TO PUERTO RICO INDUSTRIAL DEVELOPMENT COMPANY FOR THE BATTERY RECYCLING COMPANY SITE	3	Letter		WILSON,ERIC,J (US ENVIRONMENTAL PROTECTION AGENCY)
689074	07/17/2023	DNER'S CONCURRENCE ON THE PROPOSED PLAN FOR THE BATTERY RECYCLING COMPANY SITE	1	Letter	Rodriguez,Teresita (US ENVIRONMENTAL PROTECTION AGENCY)	(PUERTO RICO DEPARTMENT OF NATURAL AND ENVIRONMENTAL RESOURCES (DNER))
689626	08/11/2023	FINAL FEASIBILITY STUDY REPORT FOR THE BATTERY RECYCLING COMPANY SITE	444	Report		(CDM SMITH)
689624	08/11/2023	PROPOSED PLAN FOR THE BATTERY RECYCLING COMPANY SITE (ENGLISH VERSION)	28	Publication		(US ENVIRONMENTAL PROTECTION AGENCY)
689625	08/14/2023	PROPOSED PLAN FOR THE BATTERY RECYCLING COMPANY SITE (SPANISH VERSION)	31	Publication		(US ENVIRONMENTAL PROTECTION AGENCY)
704724	10/12/2022	REVISED FINAL HUMAN HEALTH RISK ASSESSMENT FOR THE BATTERY RECYCLING COMPANY SITE	563	Report		(US ENVIRONMENTAL PROTECTION AGENCY)

APPENDIX III

Puerto Rico Department of Natural Resources Support Letter

GOVERNMENT OF PUERTO RICO
DEPARTMENT OF NATURAL AND ENVIRONMENTAL RESOURCES

January 17, 2024

BY EMAIL: luna.zolymar@epa.gov

Mrs. Zolymar Luna
Remedial Project Manager (RPM)
US Environmental Protection Agency (USEPA)
Caribbean Environmental Protection Division (CEPD)
City View Plaza II – Suite 7000
#48 Road 165 km 1.2
Guaynabo, PR 00968-8069

Dear Mrs. Luna:

RE: BATTERY RECYCLING COMPANY, SUPERFUND SITE AT ARECIBO, PUERTO RICO RECORD OF DECISION (ROD) CONCURRENCE LETTER

The Puerto Rico Department of Natural and Environmental Resources (PRDNER) has completed its review of the aforementioned document. This Draft ROD includes the preferred remedial alternative to address the contamination of soil and groundwater in the Battery Recycling Company (BRC) Superfund Site. The selected remedy for soil contaminants is Soil Alternative S4, Excavation of Contaminated Soil, Ex Situ Stabilization and On-Site containment; and for groundwater a monitoring program and institutional controls (ICs) as an interim remedy. Alternative S4 includes demolition of existing buildings, excavation of soils with concentration exceeding 440 mg/kg of lead within residential area and 134 mg/kg in the eastern drainage ditch, excavation of soils with concentrations above 800 mg/kg of lead and 5.85 of arsenic in the BRC property, ex-situ treatment through stabilization with phosphate-blended amendment, containment of treated soil in an on- Site repository covered with a geomembrane, post excavation confirmatory sampling, backfilling excavated areas with clean fill, ICs in non-residential areas. The interim groundwater contamination remedy includes annual groundwater monitoring to further evaluate natural attenuation and ICs in the form of governmental controls that restrict the usage of contaminated groundwater. The selected remedies for both soil and groundwater contamination are protective of human health and the environment, complies with ARARs and are cost effective.

All DNER's comments and concerns were addressed throughout conference calls with USEPA representatives. Therefore, DNER concurs with the Draft ROD issued by USEPA for the Battery Recycling Company Superfund Site soil and groundwater contamination. Although DNER has reviewed the complete document, this letter is intended solely to grant its concurrence to the USEPA preferred remedy for soil and groundwater contamination included in the ROD,

If you have any question, please feel free to contact Ms. Mariangely Alemán Gaetán, Environmental Specialist assigned to this case, at (787) 999-2200 extension 5914 or by email to: mariangelyaleman@drna.pr.gov.

Cordially,

Edwin O. Malavet Santiago, Manager
Environmental Emergencies Response Area
And Superfund Program

c. Teresita Rodriguez, USEPA-CEPD Response and Remediation Branch Chief

APPENDIX IV

Responsiveness Summary

APPENDIX IV
RESPONSIVENESS SUMMARY
THE BATTERY RECYCLING COMPANY SUPERFUND SITE

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Appendix IV	Attachment A	Proposed Plan
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Appendix IV	Attachment C	The Transcript of the August 29, 2023, Public Meeting
Appendix IV	Attachment D	Written Comments Submitted During the Public Comment Period

INTRODUCTION

A responsiveness summary is required by the regulations promulgated under the Superfund statute. It provides a summary of comments received during the public comment period, as well as the responses of the U.S. Environmental Protection Agency (EPA) to those comments. All comments received were considered by EPA in its Record of Decision (ROD) regarding The Battery Recycling Company Superfund Site (Site).

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

On August 15, 2023, EPA released a Proposed Plan, attached hereto as Attachment A, and supporting documentation for the Site. EPA made these documents available to the public at the Municipality of Arecibo City Hall, Jose de Diego Ave. Arecibo, Puerto Rico 00612 and EPA's website for the Site (http://www.epa.gov/superfund/battery-recycling-company) and in repositories maintained at the EPA Region 2 Caribbean Environmental Protection Division office in Guaynabo, Puerto Rico; Record Center in 290 Broadway, 18th Floor New York, New York 10007-1866 and the Puerto Rico Department of Natural and Environmental Resources, San Juan, Puerto Rico. EPA published a notice of availability of these documents in the Primera Hora newspaper on August 15, 2023, attached hereto as Attachment B. EPA provided an initial 30-day public comment period, which was extended an additional 30 days to October 16, 2023.

On August 29, 2023, EPA held a public meeting at Casa Ulanga, Arecibo, to inform local officials and residents about the Superfund process, discuss the findings of the Remedial Investigation (RI) for the Site, present the remedial alternatives for Site including EPA's preferred alternative, and solicit oral comments. A copy of the public meeting transcript is attached hereto as Attachment C.

This Responsiveness Summary provides a summary of the public's comments and concerns regarding the Proposed Plan, and the Environmental Protection Agency's (EPA) responses to those comments. All comments summarized in this document have been considered in EPA's final decision for selecting a remedy for soil and sediment, and an interim remedy for groundwater.

This Responsiveness Summary includes attachments as follows:

Attachment A: The Proposed Plan,

Attachment B: The August 15, 2023, public notice,

Attachment C: The transcript of the August 29, 2023, public meeting; and

Attachment D: Written comments received by EPA during the public comment period.

SUMMARY OF COMMENTS AND EPA RESPONSES

Verbal Comments

This section summarizes comments received from the public during the August 29, 2023, public meeting along with EPA's responses.

Comment #1: A participant expressed concerns about the construction permits that were issued in the past and asked if the preferred remedy considers that the Site is in a flood zone/floodplain. In addition, the participant asked if the Site is in the maritime terrestrial zone and expressed concerns related to the current zoning classification for the area. According to the participant, the zoning classification should be an ecological conservation area due to its proximity to the Caño of Tiburones Reserve.

Response to Comment #1: The Site includes areas that are susceptible to flooding (i.e., that present a 1% annual chance of flooding and a 26% chance over a 30-year period). The Site also includes the property that was operated by The Battery Recycling Company, Inc. (BRC) located at Puerto Rico State Road No. 2 (PR-2), kilometer 72.2 Cambalache Ward, Puerto Rico (BRC Property). In the past, the elevation of the BRC Property was raised approximately 2 to 10 feet. The BRC Property is zoned for commercial use. Areas outside the BRC Property, are zoned for commercial use. According to the Federal Emergency Management Administration Advisory Base Flood Elevations and the PR Planning Board, the Site is not located in a Coastal A zone or an Area of Moderate Wave Action.[1] As part of the Feasibility Study (FS), EPA evaluated this information along with the current and potential future zoning designation of the Site. Based upon the information currently available, EPA believes the preferred alternative for soil (Alternative S4) meets the threshold criteria (protection of human health and the environment and compliance with ARARs) and provides the best balance of tradeoffs compared to the other alternatives with respect to the balancing criteria. The interim remedy for groundwater and proposed remedy for soil will integrate climate adaption factors during the design and construction phases to address climate-related vulnerabilities that may compromise the effectiveness of the remedies.

Comment #2: A participant asked about potential exposure risks of the business's owners, employees and customers of the local business that are located near the BRC Property and site reuse.

Response to Comment #2: As part of the Remedial Investigation (RI), soil samples were taken from the nursery and hardware store and no concerns associated with the Site were identified. In addition, the Department of Natural and Environmental Resources (DNER) manages the collection and analysis of lead samples at two air monitoring stations within one-quarter mile of the BRC Property; both stations are predominantly downwind from the BRC Property. The lead sampling

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[1] https://gis-r2-fema.hub.arcgis.com/apps/31dfa15671944086b54b55bfc03344d7/explore, https://gis.jp.pr.gov/AdvisoryMaps/PANEL_72000C0230J.pdf and https://www.fema.gov/sites/default/files/documents/fema_coastal-glossary.pdf.

stations are operated on a year-round basis, and the measurements are sent quarterly to EPA's Air Quality System. Air monitoring data shows that the lead concentration has significantly decreased since the closure of BRC.

EPA encourages the beneficial and safe reuse of Superfund sites. The first step towards redevelopment is remediation and ensuring that the selected remedy is protective to the human health and the environment.

Comment #3: A participant asked if groundwater conductivity data was collected.

EPA Response to Comment #3: Conductivity data was collected during groundwater sampling. Appendix D of the Remedial Investigation Report includes the conductivity measurements taken during the sampling. Conductivity (as a water quality parameter) was generally about 2 millisiemens per centimeter or mS/cm throughout the plume.

Comment #4: A participant recommended EPA to consider phytoremediation to remediate the soil in the Eastern Ditch Channel.

EPA Response to Comment #4: In accordance with the NCP, the FS evaluated the remedial technology types and process options that are capable of remediating each of the contaminated media at the Site. The primary source of information used to identify remedial technologies and process options is the Federal Remediation Technologies Roundtable (FRTR) "Technology Screening Matrix" (EPA 2020). As part of this step, phytoremediation was evaluated, and it was not retained because there have been limited full-scale applications of this technology for contaminants present at the site. For additional details on EPA's technology evaluation process, refer to Table 4-2a, *Screening of Potentially Applicable Remedial Technologies/Process Options Based on Effectiveness, Implementability, and Relative Cost Contaminated Soils*, of the FS.

Comment #5: A participant expressed concerns related to lead exposure via air and the health effects it may cause to residents and employees of the local businesses located near the Site.

EPA Response to Comment #5: The soil remedy intends to address the source of lead contamination found at the Site to prevent exposure. Nevertheless, EPA has taken removal actions at the Site to address and prevent further releases of lead that posed an immediate threat to human health and the environment, including, but not limited to, cleaning vehicles and the homes of BRC's employees and excavating contaminated soils immediately adjacent to the Site. In addition, lead slag piles were treated and disposed of and equipment at the BRC Property underwent cleaning to remove lead dust and prevent exposure via air. Also, the Site has been fenced and security services are provided to prevent trespassing and potential exposure to contaminated soil/materials. As part of the remedy, EPA will implement best management practices to minimize dust generation and exposure risk (i.e., dust suppression). In addition, EPA will develop a health and safety plan that will consider the need for fenceline monitoring devices. To learn how air measurements technologies can address citizens' concerns during the remedial action phase, visit the following page: Engineering Bulletin: Design Considerations for Ambient Air.

Comment # 6: A participant asked about the extent of the groundwater and soil contamination.

EPA Response to Comment #6: Chlorinated Volatile Organic Compounds (CVOCs) contamination is present in groundwater below and downgradient of the BRC Property between 16.5 and 73 feet below ground surface (bgs). The deepest observed depth of CVOC-contamination above screening criteria was approximately 73 feet bgs. Lead was found at concentrations greater than 800 mg/kg throughout most of the BRC Property in surface soil (0–1 feet bgs), including soil underneath on-site structures. Lead concentrations below the top foot of soil were generally found at concentrations less than 800 mg/kg. However, in source areas where acid was likely discharged, elevated lead concentrations were detected to a maximum of 8 to 12 feet bgs. Lead and other primary Site-related contaminants were not detected at concentrations greater than RI screening criteria in the sediments of the Río Grande de Arecibo or within the other ditches to the northeast of the BRC Property with the exception of lead and chromium contamination in the Eastern Ditch area.

Comment #7: A participant asked about the historical uses, former operators, and previous investigations conducted at the BRC Property.

Response to Comment #7: The Puerto Rico Industrial Development Company (PRIDCO) owned the BRC Property from 1964 through 1982. The Puerto Rico Chemical Company, Inc. operated a chemical manufacturing plant at the BRC Property from approximately 1966 until 1979. BRC operated a battery lead smelting operation at the BRC Property beginning in 1994 until 2014. Since 2003, the BRC Property has been owned by Luis Figueroa Nieves (President of BRC) and Awilda Carrasquillo Encarnacion.

Comment# 8: A participant made several comments not related to the BRC Proposed Plan, and asked a question related to the effectiveness of the cover to be used as part of the proposed remedial action for soil (Alternative S4).

EPA Response to Comment #8: In accordance with the NCP, the FS evaluated the remedial technology types and process options that are capable of remediating each of the contaminated media at the Site. The primary source of information used to identify remedial technologies and process options is the Federal Remediation Technologies Roundtable (FRTR) "Technology Screening Matrix." As part of this step, it was determined that capped on-Site containment could be effective at preventing exposure and migration of contaminated soils. Therefore, it was a retained as a viable remedial alternative for the Site. Excavated contaminated soil would be consolidated in an engineered repository on the BRC Property specifically constructed to isolate contaminated/treated soil using covers. The appropriate type of cover for the repository would be determined during the Remedial Design (RD) phase. While different types of covers may meet repository infiltration reduction requirements, as well as repository performance standards/criteria, for cost-estimating purposes, it was assumed a vegetated geosynthetic multilayer cover would be used as a cover system for the repository because it would likely meet infiltration reduction requirements. The geosynthetic multilayer cover would include either a linear low-density polyethylene or a high-density polyethylene geomembrane with a layer of 18 inches of common fill (subsoil) and 6 inches of growth media to support vegetation. The type of geomembrane and thickness of cover would be determined during the RD phase.

EPA has developed several technical documents that highlights the effectiveness and implementability of on-site containment units using geomembranes. To learn more, please visit the following online resource: Technology Screening Matrix - Landfill and Soil Capping.

Comment # 9: A participant asked about EPA's role monitoring the former BRC employees and families' members that were enrolled in the lead-blood surveillance program.

EPA Response to Comment #9: As part of the Removal Action response that was conducted in 2011, EPA collaborated with the Puerto Rico Department of Health (DOH) - funded by the Centers for Disease Control and Prevention (CDC)- to effectively address the public health emergency that occurred as a result of the BRC's operations at the time. Presently, we have no current information on the patients that were initially enrolled in the blood surveillance program that was led by DOH, but EPA encourages community members and any BRC's former employees to contact the PR DOH Lead Surveillance Program for further assistance via email vigilanciadeplomo@salud.pr.gov and/or phone at 787-765-2929 ext 3232, 3219. For more information about DOH's Lead Surveillance Program visit https://www.salud.pr.gov/CMS/495.

Comment #10: A participant asked about the estimated remediation times for the preferred remedies for groundwater and soil.

EPA Response to Comment #10: Based on the estimates that were developed as part of the FS, it is estimated that it would take approximately 1.5 years to meet Remedial Action Objectives (RAOs) for the soil and about 1 year to implement ICs to meet the groundwater RAOs.

Written Comments

EPA received written comments on the Proposed Plan from a concerned citizen, a member of a non-governmental organization known as AmandOceano, and from one potentially responsible party for the Site, Occidental Chemical Corporation (Occidental). Below, is a summary of the written comments and EPA's responses to those comments.

Comment #11: The Site's proximity to the protected nesting areas may constitute a location-specific ARAR that should have been considered in the RI/FS and Proposed Plan.

EPA Response to Comment #11: The Federal Endangered Species Act and implementing regulations as well as the Puerto Rico Regulation to Govern Vulnerable and Endangered Species, were identified as Location-Specific ARARs in the FS. On-site remedial action must attain (or waive) ARARs upon completion of the remedial action. On-site is defined as the areal extent of contamination and all suitable areas in very close proximity to the contamination that are necessary for implementation of the response action. Federal agencies are required to "request of the Secretary of Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action." Therefore, as part of the RI/FS, an ecological reconnaissance/ecological characterization survey was conducted at the Site and surrounding areas. In addition, information regarding threatened and endangered species and ecologically sensitive environments that may exist at or in the vicinity of the site was requested to the U.S. Fish and Wildlife Service and DNER to identify the species that may be present at or near the Site. The ecological survey focused on areas that exhibited habitat suitable for supporting populations or ecological communities that may potentially be exposed to site-related contaminants. These areas consisted of terrestrial, riparian, and aquatic habitats throughout the site. Although, this ecological characterization did not include the coastal zone or marine habitat, lead and other primary SRCs were not detected at concentrations greater than RI screening criteria in the sediments of the Río Grande de Arecibo or within the other ditches to the northeast of the BRC Property. Consequently, "nesting areas" or sensitive habitats located downstream of the river mouth are not considered impacted areas or areas of concern that warrant further evaluation and/or remediation. Furthermore, if threatened or endangered species are identified on-site within the remedial areas, activities will be designed to conserve the species and their habitat. For additional information on the ecological characterization that was performed at the Site, please refer to Section 3.3 of the Remedial Investigation Report.

Comment #12: On-site containment would challenge future land use of the site, especially for agricultural and farming purposes.

EPA Response to Comment #12: EPA works with communities to safely return Superfund Sites to their beneficial use. To ensure a safe and beneficial reuse, remedial alternatives must be designed to be protective of human health and the environment. Therefore, Site's RAOs were driven by the current and reasonably anticipated future land uses for the Site. According to the current zoning map (Soil Classification Map, Land Management Plan Municipality of Arecibo, December 2020) the BRC Property is categorized as industrial (I). Permitted uses under the current zoning designation, include gasoline stations, laundromats, bakeries, biomedical waste processing facilities, renewable energy projects, and motor vehicle car repair shops, among other uses. This zoning designation also allows for commercial uses such as storage facilities, car dealerships, pharmacies, financial and bank institutions, and offices, among other commercial uses. Therefore, EPA believes the proposed remedy for soil is protective and compatible with the potential site reuses mentioned above. To learn more about successful redevelopment projects at Superfund Sites with on-site containment or capped units, please visit to: Reuse Opportunities at Capped Superfund Sites (PDF).

Comment #13: Monitored natural attenuation (MNA) was chosen as the interim remedy for groundwater contamination primarily because of cost considerations and the evidence of biodegradation of CVOC. MNA would decrease contaminant concentrations to safe levels after 2 to 3 centuries. This is an unacceptable time period for a remedy.

EPA Response to Comment #13: EPA acknowledges that MNA is occuring at the site, but MNA was not selected as the remedy for groundwater. The proposed interim remedy for groundwater includes exposure control, in the form of institutional controls, with further evaluation of attenuation, migration, and the effects of the soil remedy so that a final remedy can selected by EPA at a later date.

Comment #14: According to the RI, "the presence of CVOCs in BRC property soil is a data gap." Until this data gap is filled and proper cleanup of the CVOC source is achieved, other treatment options should be considered.

EPA Response to Comment #14: Extensive soil sampling did not identify a soil source of CVOCs. However, a Pre-Design Investigation (PDI) of soils and groundwater will be conducted to address data gaps before any remedy or treatment is implemented.

Comment #15: The presence of ethene and ethane along the plume led to the conclusion that complete dechlorination occurs at the Site. However, to our knowledge, no data on the background concentration of ethene and ethane were reported in the public documents. The Cambalache Power Plant might be an alternate source of ethene and ethane in the area due to the Plant's handling and combustion of fuels (natural gas or diesel).

EPA Response to Comment #15: Ethene/ethane is one line of evidence for the evaluation of MNA. The commenter is directed to Table 5-4 in the RI to see the data used for the MNA evaluation. The Cambalache Power Plant is hydrologically downgradient from the site, and therefore dissolved ethane/ethene from CVOC reduction is a much more plausible explanation for the presence of ethene/ethane than the power plant. Other degradation products and geochemical parameters, such as dissolved oxygen and nitrate/nitrite, also indicated reductive dechlorination conditions.

Comment #16: The highest concentration of organic carbon was 11.3 mg/L, which is below EPA guidance for natural attenuation that suggests that organic carbon concentrations exceeding 20 mg/L are sufficient to drive continuing biodegradation. We suggest that biostimulation and bioaugmentation could be viable options to enhance biodegradation in this system.

EPA Response to Comment #16: It is important to note that the preferred remedy for groundwater is an interim remedy that includes human exposure control in the form of institutional controls, with further evaluation of attenuation, migration, and the effects of the soil remedy on the groundwater so that a final groundwater remedy can be selected by EPA at a later date. Please, note that bioremediation was evaluated in the Feasibility Study in Alternative 3.

Comment #17: For the degradation modeling, the fraction organic carbon (foc) was assumed to be 0.001 and 0.002 for the sand and clay, respectively. However, a site-specific value for foc was not measured during the RI/FS. To refine the evaluation, site-specific data should have been implemented before relying on this modeling assessment to choose the appropriate remediation strategy.

EPA Response to Comment #17: In the absence of site-specific data, it is necessary to assume default or standard values in accordance with model guidance. According to the REMChlor-MD User's Manual and ASTM standards, a default value of 0.001 is often used if foc is unknown (p. 26 of REMChlor-MD Toolkit User's Manual, published June 2018). Using this low value is a conservative assumption, because the low fraction organic carbon results in low retardation in the model, resulting in faster contaminant travel velocities. The results of this model, which was used to estimate treatment time frames, is not sensitive to this input variable. The results are more dependent on the source term and degradation rates. Future data collection can include fraction organic carbon (or, partition coefficient) along with other data that can improve the accuracy of modeling at the site.

Comment #18: Exploration of other alternative to address each contamination zone of the plume distinctly might be a feasible option considering the time, cost, and effectiveness of the treatment train, compared to employing a 300+ year monitoring campaign.

EPA Response to Comment #18: The-groundwater action is an interim remedy rather than a final Site-wide remedy in order to prevent exposure while groundwater exceeds drinking water standards and will allow EPA to further evaluate attenuation, migration, and the effects of the soil remedy. A final remedy will be selected by EPA at a later date. Thermal treatment, air sparging, ISCR, ISCO technologies were evaluated in the Feasibility Study. The time to achieve the remediation goals would still be many years even with treatment in the source area, as noted in the Feasibility Study Appendix D.

Comment #19: The proposed soil and interim groundwater remedies support division of the soil and groundwater remedial actions into separate operable units ("OUs").

EPA Response to Comment #19: An operable unit can be a certain geographic portion of a site or can address an environmental medium at the site (e.g., groundwater or soil). Operable units may also be comprehensive, but temporary remedies (e.g., temporary caps across a site), that provide interim protection of human health and the environment before final remediation. The cleanup of a site can be divided into a number of operable units, depending on the complexity of the problems associated with the site. Although the Record of Decision states the selected remedy is one operable unit, the cleanup of the contamination will be addressed by medium: soil and groundwater. EPA felt this was the most expeditious way to address soil contamination while also ensuring that exposure protection (in the form of monitoring and institutional controls) were in place for groundwater.

Comment #20: EPA should consider acknowledging that the BRC Property owners have and will support implementation of ICs. ICs are an important element of the proposed soil remedy and groundwater interim remedy. Engagement by EPA and the cooperation of the BRC Property owners is necessary to ensure ICs are implemented and maintained to protect human health and the environment.

EPA Response to Comment #20: EPA is not aware that the BRC Property owners have expressed support for institutional controls (ICs). EPA will alert the BRC Property owners regarding the groundwater ICs and will work with the property owners to implement soil ICs. The groundwater action is an interim remedy, upon which ICs would be relied upon to prevent exposure. The Record of Decision includes governmental controls such as existing Puerto Rico laws and regulations that serve to restrict the usage of contaminated groundwater by restricting well installation and informational ICs such as advisories and notices. The soil remedy includes community notifications and deed restrictions and/or notices to restrict the disturbance and/or usage of areas where hazardous substances, including lead and/or arsenic remain above levels that allow for unlimited use and unrestricted exposure or that would potentially compromise the implemented remedial action.

Comment #21: Background concentrations of the constituents of concern should be considered as part of the design of the Pre-Design Investigation (PDI). The purpose of the PDI is to determine if additional monitoring wells should be installed at the Site to monitor the groundwater and to verify the absence of VOC source material in the vadose zone. Background concentrations were assessed for various parameters in soil, sediment, and surface water during the Remedial Investigation, but it does not appear that potential contributions to groundwater quality from background concentrations were evaluated for groundwater.

EPA Response to Comment #21: A PDI for groundwater will be performed to determine if additional monitoring wells should be installed at the Site. This could include installing an upgradient well to measure off-Site contributions if there are believed to be additional industrial sources in the area.

Comment #22: EPA should consider establishing interim remedy preliminary remedial goals ("PRGs") for groundwater. EPA's Proposed Plan indicates use of screening criteria, i.e., Federal Maximum Contaminant Levels or Puerto Rico Water Quality Standards, to evaluate groundwater data collected in the future. These criteria are applicable to a final remedy. Development of PRGs more aligned with the objective(s) of an interim remedy and an adaptive management approach (see Interim Remedy Approach comment below) would facilitate evaluation of interim remedy progress and selection of a final remedy in the long-term.

EPA Response to Comment #22: Chemical-specific applicable or relevant and appropriate requirements or ARARs (such as Puerto Rico Water Quality Standards) for groundwater were used to aid in defining the extent of groundwater contamination and are appropriate for the evaluation of groundwater data for either an interim or final groundwater remedy.

Comment #23: EPA should consider formally adopting the adaptive management ("AM") approach for the interim groundwater remedy, which would also help to keep stakeholders informed about progress. One approach to remediating the groundwater that includes collection of data over time to determine what long-term action(s) may be needed. In the short-term, ICs will protect human health and the environment. This approach will provide flexibility during implementation of the interim groundwater remedy, will allow for necessary optimizations or modifications in response to data collected, and is consistent with EPA's AM approach to remediation of Superfund sites.

EPA Response to Comment #23: EPA agrees that the interim remedy for the groundwater is consistent with adaptive management principles.

Comment #24 EPA should consider consolidating the soils excavated from the residential area with the other soils/sediments that will be contained at the BRC Property, as described in Alternative S2A, instead of transporting and disposing of the soils at a landfill. The Proposed Plan includes the containment of on-property and off-property soils from the eastern drainage ditch but provides that the soils from the residential area will be disposed of off-Site. The volume of soils from the residential area is a small percentage (<0.5%) of the total volume of soils/sediments and could easily be incorporated into the on-site containment design instead of being disposed of off-Site. There is little or no incremental benefit for the proposed remedy to dispose of these soils at an off-Site facility. As stated in the Proposed Plan, difficulties may be encountered for off-Site disposal "because of the limited number of disposal facilities within Puerto Rico" and the potential regulatory requirement to meet Land Disposal Restrictions ("LDRs") if the material is managed. On the other hand, diverting the soils from a landfill would be beneficial. Some additional benefits of consolidating these soils at the Site include reduced greenhouse gas emissions ("GHG") from transportation, reduced potential for transportation accidents, and control of the impacted soils/sediments at one location. The consolidation of these soils on the BRC Property would not affect overall protectiveness of human health and the environment or the long-term effectiveness and permanence of the proposed remedy. On the contrary, this on-Site containment approach is more easily implementable and more cost effective than off-Site disposal.

EPA Response to Comment #24: For the preferred alternative (S4), the Proposed Plan did not indicate the disposal location of the residential property soil. As indicated in the FS, this small quantity of soil (380 BCY) is expected to be disposed of in the engineered repository at the BRC Property.

Comment #25: EPA should consider consolidating the above ground building materials that cannot be readily decontaminated and recycled (e.g., metal) with the soils/sediments that will be contained at the BRC Property instead of transporting and disposing of these materials at an off-Site landfill. There are risks associated with decontamination of building demolition debris that EPA should consider. These risks include not being able to decontaminate the material effectively and additional exposure to workers and the surrounding community when handling of the demolition debris during the decontamination process. Alternatively, consolidating these materials at the BRC Property would reduce GHG from transportation, reduce potential for accidents, preserve solid waste landfill capacity, and control materials at one location. Additionally, the local community would benefit if some of these materials were contained at the BRC Property instead of added to landfills in the area, as there are a limited number of off-Site disposal facilities within Puerto Rico. This also mitigates the difficulties and costs regarding identifying a suitable off-Site disposal facility and the potential requirement to meet LDRs.

EPA Response to Comment #25: To the greatest possible extent, EPA Region 2's Clean and GreenPolicy(https://www.epa.gov/sites/default/files/2016-01/documents/r2_clean_and_green_update.pdf) will be followed during implementation of the soil remedy. Greener cleanup practices may include recycling or repurposing decontaminated scrap metal and concrete. Metal can be readily recycled after decontamination, putting it back into productive use. Health and safety measures will mitigate any risks from handling such material.

The goal of the Policy is to enhance the environmental benefits of federal cleanup programs by promoting technologies and practices that are sustainable, while complying with all applicable laws and regulations. The objectives of green remediation are to: protect human health and the environment by achieving remedial action goals; support human and ecological use and reuse of remediated land; minimize impacts to water quality and water resources; reduce air emissions and greenhouse gas production; minimize material use and waste production; and conserve natural resources and energy.

The principles outlined in the policy are not intended to allow cleanups that do not satisfy threshold requirements for protectiveness, or do not meet other site specific cleanup objectives, to be considered greener cleanup. The principles are not intended to trade cleanup program objectives for other environmental objectives.

Comment #26: EPA should consider leaving the foundations and impermeable surfaces in place on the BRC Property, as described in Alternative S2A, but adding cover soil to eliminate potential contact with impacted materials/soils instead of resurfacing the areas with concrete or asphalt. This action would be done in lieu of decontaminating, transporting, and disposing the debris at a landfill. Leaving the impermeable surfaces in place would add another layer of protection and help to minimize potential infiltration of rainwater in those areas. There are risks associated with demolition, removal, and decontamination of building demolition debris that EPA should consider. These risks include: short-term exposure to on-property workers and nearby populations (human and ecological) from the debris and exposed underlying soils; potential flooding (flooding has been documented in the past) during removal that could exacerbate the problems on the BRC Property and potentially affect off-property lands; being unable to decontaminate the material effectively; and additional potential exposure to workers and the surrounding community when handling of the debris during the decontamination process. Alternatively, leaving the existing impermeable surfaces in place on the BRC Property would reduce risks during construction. The short-term risks are also reduced by limiting worker exposure, limiting potential exposure to nearby populations (human and ecological), and limiting transportation of the materials. There would be minimal negative impact to the reduction of toxicity, mobility, and volume of the contaminants because the material would be contained. This approach would be easily implementable and cost effective.

EPA Response to Comment #26: As part of the FS, each remedial alternative for soil was evaluated against the nine threshold and balancing evaluation criteria, noting how it compares to the other options under consideration. Based on this evaluation, it was determined that Alternative S4 is readily implementable, would provide greater permanence as compared to the other capping alternatives and is expected to achieve substantial and long-term risk reduction through treatment of hazardous substances including arsenic and lead in soil. Furthermore, the preferred alternative's focus on consolidating the waste in an on-site engineered repository will result in greater cleanup of the BRC Property and will be specifically constructed to isolate contaminated soil using covers. Alternatives S2A and S2B evaluated containment-focused alternatives where foundations were left in place. Long-term effectiveness for those alternatives is reduced because larger extents of areas remain with contaminated soil left in place. Health and safety measures will mitigate any risks from handling such material. The detailed comparative analysis of the alternatives is contained in the FS Report.

Comment #27: EPA should consider a low-profile cover over the entire BRC Property with proper grading to promote surface water drainage off the BRC Property would be more resilient to the effects of climate change and flooding and could pose less short-term risks when compared to consolidating material in a smaller and sloped containment area that is 12 feet high. The Proposed Plan states the following with respect to the footprint of covers placed over contaminated soil under Alternatives S2A and S2B: "Alternatives S2A and S2B could be more susceptible to the effects of climate (i.e., increasing frequency of severe storms and flooding) as compared to the smaller footprint of cover installed at the on-site disposal repository under Alternative S4, if not properly installed, monitored, and maintained over the long term." A low-profile cover would be less susceptible to the potential erosion effects of high winds and heavy rain that could result in erosion or a slope failure of the 12-foot high containment area. A low-profile cover would also promote slower and more dispersed surface water drainage to minimize potential erosion following a flooding event. A low-profile cover over a larger area that promotes surface water runoff would also be beneficial in limiting infiltration through the soils on the property. EPA should also consider that there are more risks associated with excavation and consolidating material in a smaller sloped containment area that could be mitigated by leaving material in place covered with a low-profile soil cover. The short-term risks of excavation and consolidation include: higher potential exposure to workers during soil excavation, movement, and re-compaction of materials; potential migration of contaminants with wind and surface water runoff during construction that could affect nearby populations (human and ecological); the potential need to collect and manage potentially impacted water during construction; potential flooding during excavation and construction of the containment area that could exacerbate the already existing flooding problems on the BRC Property and potentially affect off-property lands; the potential that post-excavation sampling could be added excavation volume to meet PRGs at the base of the excavations that would increase the size of the containment area (vertically and horizontally); and added truck traffic required to transport fill to the BRC Property to place in the excavations. A long-term risk is the potential for the mass of the smaller sloped containment area to alter the natural groundwater flow regime, which could affect contaminant migration. Alternatively, a low-profile cover would be designed to match surrounding lands and be less visually obtrusive to the local community compared to a smaller sloped containment area that is 12-feet high.

EPA Response to Comment #27: A cover that would encompass the entire BRC Property was evaluated as part of Alternatives 2A and 2B. However, these alternatives (i.e., 2A and 2B) would have larger footprints of covered areas that would require more maintenance, would be susceptible to being breached and may cause greater limits on reuse. While the profile of the repository would be greater than the profile of the covers in Alternatives 2A and 2B, the footprint and height of the repository will be further refined during the remedial design. Climate resiliency measures would be considered during remedial design in accordance with EPA's Climate Resilience Technical Fact Sheet for Contaminated Waste Containment Systems to minimize future climate change impacts. Examples of climate resiliency measures include using resilient cover materials such as rock armoring or flood-resistant plant species. Additionally, contours and swales can be used to promote proper drainage and reduce flooding.

Comment #28: Regarding the Proposed Plan's position that the lead in soil/sediment is a principal threat waste, EPA should consider that lead in soil/sediment can be reliably contained and will not present a significant risk to human health, or the environment once consolidated and covered on the property. The Proposed Plan considers lead in soil/sediment to be a principal threat waste. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. The proposed soil remedy includes excavation of soils and sediment and stabilization treatment of an assumed portion of the soils/sediments impacted with lead followed by consolidation of lead impacted soils/sediments with concentrations above the PRG in a containment area that includes a cover. Lead in soil is not highly mobile and therefore containment of the soils is a reliable means to prevent future exposures. Maintaining the cover and applying restrictions on the property (such as through ICs) to prevent potential disturbance of the containment area will reliably eliminate the direct contact exposure pathway. Maintaining the cover will also significantly reduce potential contact of rainwater with the consolidated soils, further reducing the already low potential mobility of the lead.

EPA Response to Comment #28: The National Oil and Hazardous Substances Contingency Plan (NCP) establishes an expectation that EPA will use treatment to address principal threats posed by a site wherever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, surface water or air, or acts as a source for direct exposure. As stated in the comment above, principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health, or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of the alternatives using the nine remedy selection criteria. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element. Based on the results of the analysis that was performed for the Site, it was determined that soil that is highly contaminated with lead, if left untreated, would serve as a continued threat of human exposure and source of contamination to other media through wind entrainment, stormwater runoff, and infiltration from precipitation. Additionally, approximately 50 percent of the soil contaminated with lead is considered hazardous based on its toxicity and leachability and would require treatment for off-Site disposal under RCRA. Therefore, lead contamination in soil fits the definition of principal threat waste and would require treatment to reduce toxicity prior to on-site containment.

Comment #29: EPA should re-consider the need for ex-situ stabilization treatment of some of the soil/sediment prior to containment. Stabilizing treatment will not change the reliability of the containment aspect of the remedy or reduce the volume of soil requiring containment. The Proposed Plan states: "Alternatives S4 and S5 include ex-situ treatment (stabilization) of a portion of excavated contaminated soil, which involves using reagents that would result in reducing the bioavailability (and thus toxicity) and mobility of contaminants within the excavated soil."

Containment of the contaminated soil will effectively achieve the same outcome by eliminating the exposure pathway and isolating the material from the environment. Maintaining the cover will also significantly reduce potential contact of rainwater with the consolidated soils, further reducing the already low potential mobility of the lead. The Proposed Plan also states that "[t]his process of physically and chemically isolating [the excavated contaminated soil] may increase the volume." EPA should also consider the risks associated with stabilization treatment. The short-term risks include: higher potential exposure to dust from the soil or stabilizing agent to workers and nearby population (human and ecological) while managing the stabilization chemicals and during the chemical/soil mixing process; potential migration of contaminants with wind and surface water runoff during the chemical/soil mixing process; potential difficultly in identifying a suitable contractor to implement this part of the proposed remedy; the potential need to collect and manage water impacted with contaminants and the chemical reagent; and potential flooding during mixing that could exacerbate the problems at the BRC Property and at off-Site residential areas.

EPA Response to Comment #29: Ex-situ treatment of contaminated soil that is considered hazardous prior to containment in an on-site repository would reduce the mobility and toxicity of the contaminants in the soil and would further reduce the magnitude of residual risk from contaminated soil left on-site in an on-site repository. While there are potential risks to workers when implementing ex-situ treatment with stabilizing treatment media, adherence to established safety measures would reduce these potential risks. A treatability study will be performed to determine the most appropriate amendment for the soils.

Responsiveness Summary
Attachments A
Proposed Plan

Superfund Program
Proposed Plan

U.S. Environmental Protection Agency
Region 2

The Battery Recycling Company Superfund Site
Arecibo, Puerto Rico

August 2023

MARK YOUR CALENDARS!

Public Comment Period

August 15, 2023 to September 14, 2023
EPA will accept written comments on the Proposed Plan during the public comment period.

Public Meeting

Tuesday, August 29, 2023

EPA will hold a public meeting to explain the Proposed Plan and the alternatives presented in the Feasibility Study. Oral and written comments will also be accepted at the meeting. The meeting will be held at Casa Ulanga, located at #7 Gonzalo Marín St, Arecibo.

The Administrative Record for the proposed action is available for public review at the following information repositories:

U.S. EPA Region 2 Caribbean Environmental Protection Division
City View Plaza II – Suite 7000
Road PR-165, KM 1.2
Guaynabo, Puerto Rico
Hours: Monday-Friday – 9 A.M. to 5 P.M.

City Hall Municipality of Arecibo
Jose de Diego Ave.
Arecibo, Puerto Rico 00612
Phone: 787-882-2770
Hours: Monday - Friday 8:00 A.M. to 4:00 P.M.

Puerto Rico Department of Natural & Environmental Resources Environmental
San José Industrial Park
1375 Ponce de León Ave.
San Juan, PR 00926-2604
(787)999-2200 ext. 5900, 5901, 5915
Hours: Monday – Friday 9:00 am to 3:00 pm

U.S. EPA Records Center, Region 2
290 Broadway, 18th Floor
New York, New York 10007-1866 (212)637-4308
Hours: Monday-Friday – 9:00 am to 5:00 pm

EPA website for the Battery Recycling Company
www.epa.gov/superfund/battery-recycling-company

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan describes the proposed remedial alternative for soil and the interim remedial alternative for groundwater, and other remedial alternatives that the United States Environmental Protection Agency (EPA) considered for The Battery Recycling Company Superfund Site (Site) and identifies EPA's preferred alternatives along with the rationale for this preference.

This Proposed Plan document is issued by EPA, the lead agency for Site, in consultation with the Puerto Rico Department of Natural and Environmental Resources (DNER). EPA will select a final remedy for soil and an interim remedy for groundwater at the Site after reviewing and considering all information submitted during a 30-day public comment period. EPA may modify the preferred alternatives or select other action presented in this Proposed Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all alternatives presented in this document.

EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA or Superfund), 42 U.S.C. § 9617(a), and Sections 300.430(f) 300.435(c) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

This Proposed Plan summarizes information that can be found in greater detail in the Remedial Investigation (RI) Report and the Feasibility Study (FS) Report, as well as in other documents contained in the Administrative Record for this Site. The location of the Administrative Record is provided in the "Mark Your Calendars" text box in this Proposed Plan.

COMMUNITY ROLE IN SELECTION PROCESS

EPA and DNER rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the Feasibility Study and this Proposed Plan have been made available to the public for a public comment period which begins on August 15, 2023 and concludes on September 14, 2023.

A public meeting will be held during the public comment period at Casa Ulanga on August 29, 2023, at 5:00 p.m.to present the alternatives of the Feasibility Study, to elaborate further on the reasons for recommending the preferred alternative, and to receive public comment.

Comments received during the public meeting, as well as written comments will be documented in the Responsiveness Summary of the Record of Decision (ROD), the document which formalizes the selection of the remedy.

Written comments should be addressed to:

Zolymar Luna
Remedial Project Manager
City View Plaza II Building, Suite 7000
Km 1.2, Road PR-165
Guaynabo, PR 00969
Luna.zolymar@epa.gov

SCOPE AND ROLE OF ACTION

This Proposed Plan addresses the interim remedy for groundwater and the proposed final remedy for soil. EPA uses interim actions to address areas or contaminated media that ultimately may be included in the final record of decision for a site. Interim actions include measures to treat contamination in an operable unit and/or prevent migration of contaminants or further environmental degradation until such time as a final remedial decision is issued.

The Site is being addressed as one operable unit. EPA completed RI/FS activities for both groundwater and soil, and the results are presented and discussed in further detail in this Proposed Plan. The Site includes a groundwater plume of chlorinated volatile organic compounds (VOCs) and three areas with soil contamination, primarily impacted with lead. The proposed remedy for the source area soil includes excavation, ex-situ stabilization and on-Site containment which is expected to be the final remedy for soil. The proposed interim remedy for the groundwater includes monitoring and institutional controls ("ICs") that would limit groundwater use until a final remedy for groundwater is selected by EPA. As part of the interim remedy, further evaluation of attenuation, migration, and the effects of the soil remedy on the groundwater would be conducted. A final action for the groundwater plume will be determined in the future.

SITE DESCRIPTION

The Site includes property that was operated by The Battery Recycling Company, Inc. (BRC) located at Puerto Rico State Road No. 2 (PR-2), kilometer 72.2 Cambalache Ward, Puerto Rico (BRC Property) (**Figure 1**). The BRC Property occupies approximately 16 acres.

The BRC Property is bounded on three sides (north, east, and south) by agricultural or undeveloped land, and on the west side by PR-2. A former cattle pasture (Cattle Pasture Area), a land crab habitat in the drainage pathways and canals that run toward the Caño Tiburones, and a residential neighborhood are located north of the BRC Property.

A hardware store and concrete block business are located on the opposite side of PR-2 to the west. There are 10 structures located on the BRC Property, referred to as Structures 1 through 9 and 1A, consisting of the following: Structure 1 (Administration), Structure 1A (Administration), Structure 2 (Process Building), Structure 3 (Waste Storage), Structure 4 (Wastewater Treatment Plant), Structure 5 (Storage), Structure 6 (Tank Farm), Structure 7 (Air Emission Stack, also referred to as the Bag House frame), Structure 8 (Waste Storage), and Structure 9 (Abandoned Tank). One large surface drainage feature at the BRC Property is a drainage ditch that runs west to east and bisects the BRC Property (hereinafter referred to as, BRC Property Drainage Ditch), which discharges into a deep drainage ditch (hereinafter referred to as, Eastern Drainage Ditch) to the east of the BRC Property that flows north toward the Caño Tiburones and ultimately to Arecibo Bay.

Properties Adjacent to Battery Recycling Company Property

Agricultural and residential properties immediately adjacent to the BRC Property are summarized below (**Figure 2**).

Cattle Pasture Area – To the north of the BRC Property is a cleared agricultural area formerly used as pastureland for cattle. This area has always been vacant land. Cattle operations ceased in 2011. The area is bounded to the west by PR-2, the BRC Property to the south, residential houses and a land crab habitat in the drainage pathways and canals that run toward the Caño Tiburones to the north, and agricultural/cattle pastures to the north and east.

Eastern Forested Area – To the east of the BRC Property is a large area consisting of dense forested land. The Eastern Drainage Ditch runs along the western portion of this property, separating it from the BRC Property.

Southern Nursery Area – To the south of the BRC Property is an agricultural area used for a nursery. There is a fence line separating the property from the BRC Property.

Western Area – To the west of the BRC Property is a grassy and paved area that lies directly across from the PR-2. On the opposite side of PR-2 are concrete block manufacturing and hardware store businesses, a church, an electric substation, an industrial property containing multiple buildings, an open field north of the industrial warehouse, and the Río Grande de Arecibo.

Residential Area – To the northwest of the BRC Property is a residential area in a cul-de-sac on the eastern side of PR-2. There are five residential structures within this area.

SITE HISTORY

BRC was founded and began operations at the BRC Property in 1994 for the collection and recycling of lead-acid batteries. Until 2004, BRC performed small-scale battery breaking and lead smelting. Between 2004 and 2005, the facility expanded operations and became a large-scale secondary smelter. Operations at the facility ceased in 2014 and included breaking and sorting lead-acid batteries and refining the lead to be resold. The operations generated large quantities of battery acid and lead-contaminated waste. BRC's improper handling of hazardous materials and hazardous wastes led to high levels of lead contamination at and near the BRC Property.

Prior to BRC operations, the BRC Property was owned by the Puerto Rico Industrial Development Company (PRIDCO) from 1964 through 1982. PRIDCO leased the BRC Property to the Puerto Rico Chemical Company, Inc. (PRCC) for the manufacture of organic chemicals using o-xylene to produce fumaric acid and phthalic acid from 1966 until closure of the facility due to an explosion in 1979. PRCC was a wholly owned subsidiary of Hooker Chemical Corporation, which changed its name to Occidental Chemical Corporation (Occidental) on April 1, 1982. After the explosion in 1979, PRCC relinquished the Site back to PRIDCO. The Site was sold by PRIDCO to Luis Figueroa and his spouse Awilda Carrasquillo for the operations of BRC at the BRC Property. Luis Figueroa was the President of BRC while it was in operation.

On September 30, 1986, EPA entered into an Administrative Order on Consent, Index Number-II RCRA-3013-60302, with Occidental, which documented the release of trichloroethylene (TCE), dichloroethane (DCE) and vinyl chloride during the PRCC operations at the Site. During and after PRCC operations, several spills of o-xylene were reported outside the BRC Property. Subsequent assessments by the Puerto Rico Environmental Quality Board (PREQB) (known today as the Department of Natural and Environmental Resources or DNER) noted stressed vegetation east of the o-xylene tank, and east of the facility boundary. In the years following the 1979 explosion and plant shutdown, PREQB performed an inspection and found approximately 30,000 55-gallon containers of phthalic anhydride on the BRC Property in deteriorated condition. In addition, a large quantity of hazardous waste was observed inadequately stored, with liquid waste staining the ground surface. Groundwater sampling at the BRC Property detected elevated concentrations of 1,1- DCE, trans-1,2-DCE, toluene, trichloroethene, and vinyl chloride. Groundwater contamination was also found near the BRC Property.

After BRC began operating at the former PRCC facility, PREQB completed a preliminary assessment (January 1996) and EPA conducted a sampling investigation (January 1999) to evaluate the BRC Property. The 1999 investigation found arsenic at a maximum concentration of 10.6 milligrams per kilogram (mg/kg) in the soil of a ditch to the south of the BRC Property and lead at a maximum concentration of 117 mg/kg in the sediment of the wetland on the western portion of the BRC Property.

During the 1996 to 2004 timeframe, PREQB found BRC to be out of compliance with Puerto Rico and federal laws and/or regulations, including operating without the required permits, improper storage of hazardous wastes, irregularities in waste management, spills, and violations of air emissions regulations. During the same timeframe, PREQB also received complaints of accumulations of batteries and solid wastes, discharges of battery acid to the soil and surface water of the adjacent river, bad odors including acid-like odors, and illegal dumping.

In April 2008, EPA collected surficial soil samples in an east-west aligned ditch along the northern fence line of the BRC Property that contained lead concentrations as high as 57,500 mg/kg. A 2010 sampling event in this area found lead concentrations up to 4,700 mg/kg, with an average lead concentration of 843 mg/kg. EPA Resource Conservation and Recovery Act (RCRA) compliance evaluation inspections in 2010 found improper storage and handling of hazardous materials and hazardous waste, significant spillage of particulate matter in several areas, and overflow of the stormwater/wastewater collection system into the Eastern Drainage Ditch and to other areas. The inspections showed that BRC was in violation of RCRA on several counts, including failure to make hazardous waste determinations on its solid waste, illegal disposal of hazardous waste, and failure to minimize risks (releases).

In November 2010, and April and May 2011, the Centers for Disease Control and Prevention tested some family members of BRC employees for blood lead levels. From each clinic that performed testing, 20–40% of samples collected from the susceptible population (children below 7 years of age and pregnant and lactating women) had lead levels above 10 micrograms per deciliter, EPA's blood lead level of concern at the time. Sampling of cars and homes of BRC employees indicated lead levels above 40 micrograms per square foot ($\mu g/ft^2$), with some vehicles measuring above 100,000 $\mu g/ft^2$. The contamination pathway transport was believed to be the transfer of lead-contaminated dust in the employees' boots and uniforms from the BRC Property to the employees' cars and homes. On June 7, 2011, EPA entered into a CERCLA Settlement Agreement and Order on Consent, Index Number-02-2011-2010, for BRC to conduct removal activities at the Site including, but not limited to, removing lead contamination from the adjacent cattle pasture area, from the vehicles and homes of BRC employees, and instituting decontamination measures at the BRC Property to mitigate the migration of contamination from the facility on employee clothing.

In 2011 and 2012, EPA conducted removal assessments of residential properties and vehicles belonging to current and former BRC employees. The first phase of the removal assessments in June 2011 resulted in removal actions at residential properties and vehicles containing lead contamination. The second phase included the reassessment of properties and vehicles that were previously cleaned up and further removal response for those with remaining elevated lead levels.

From August through October 2011, PREQB collected soil, sediment, and aqueous samples from the BRC Property and other properties within a 1-mile radius. Elevated lead levels above the soil screening level (400 mg/kg) were detected in several areas at the BRC Property and on surrounding properties.

In 2014, BRC shut down operations at the Site. EPA took over removal activities at the Site. In 2015, EPA further investigated the cattle field to the north of the BRC facility using a portable X-ray fluorescence (XRF) elemental analyzer to delineate lead contamination and identify areas for excavation and removal, which was thereafter performed by EPA. Following the 2015 removal activities, post-excavation sampling confirmed that all lead contamination was removed from the excavated area. In September 2015, EPA conducted additional XRF screening of samples collected from the northeastern corner of the BRC Property and the BRC Property Drainage Ditch, which indicated the presence of lead in both areas, with concentrations generally greater than 800 mg/kg and as high as 88,800 mg/kg.

In November 2015, aqueous samples of runoff flowing through the BRC Property Drainage Ditch and off the BRC Property showed the presence of lead at levels as high as 1.9 milligrams per liter (mg/L). In addition, EPA collected samples from two slag storage areas at the BRC Property where piles of furnace slag and other solid waste from operations were kept in open-air structures. The waste piles in these structures were not covered or kept within bermed areas and were subject to erosion by wind and water. Waste material had spilled out onto the open ground, and staining was visible throughout the ground surface near both piles. The analytical results showed that both waste piles contained elevated levels of arsenic, cadmium, and lead.

A removal assessment of the BRC Property was conducted by Weston, on behalf of EPA Region 2's Removal Action Branch, in two phases from January through March 2016. As part of the Phase I soil investigation, EPA advanced soil borings and collected soil samples for lead screening throughout the property but not within the on-property building footprints. XRF screening, with laboratory confirmation samples, showed that lead was present above the Removal Management Level (RML) of 800 mg/kg throughout the BRC Property. All areas of the BRC Property were affected, including bare soil areas, vegetated areas, asphalt, and gravel covered areas, and the BRC Property Drainage Ditch. In some areas, contamination was shown to extend to depths of 3 feet or more below ground surface (bgs). In March 2016, the Phase II multimedia sampling event was completed at the Site, which included the collection of aqueous, solid waste, wipe, and microvac (vacuumed) samples from within BRC Property structures. Based on the analytical results collected from sumps and Structure Nos. 1, 1A, 2, 4, and 7, extensive lead contamination was documented throughout these areas of the BRC Property.

DNER manages the collection and analysis of lead samples at two air monitoring stations within one-quarter mile of the BRC Property; both stations are predominantly downwind from the BRC Property. The lead sampling stations are operated on a year-round basis, and the measurements are sent quarterly to EPA's Air Quality System (AQS). From 2011 to 2015, the stations downwind of the BRC Property repeatedly showed lead concentrations that exceed the National Ambient Air Quality Standard of 0.15 micrograms per cubic meter (μg/m^3), including the highest lead reading in the entire AQS database for calendar year 2013 (8.216 μg/m^3). Air quality modeling by PREQB showed that the BRC Property was the primary source causing the high lead concentrations at the downwind monitoring stations and that the contribution by other lead emission sources in the area was insignificant.

There are 147 residents and workers within one-quarter mile of the BRC Property that were considered subject to air releases above regulatory guidelines. Within four miles of the BRC Property there are more than 50,000 people; commercial agricultural enterprises, including a cattle pasture to the north and a palm tree farm and garden center to the south; 2,900 acres of wetlands; and several other sensitive environments.

On May 13, 2016, EPA issued CERCLA Administrative Order, Index Number 02-2016-2022, to BRC and the BRC Property owners, Luis Figueroa and Awilda Carrasquillo Encarnacion, requiring that they refrain from: removing equipment or assets from the Site that are or may be contaminated; excavating, moving or constructing upon the soil; dismantling or decontaminating equipment or assets without prior approval and oversight from EPA; causing any waste oil or other liquids that may contain hazardous substances to be released at the Site; and taking any other actions, including disposal activities that may result in the release of hazardous substances.

In 2016, EPA prepared a Hazard Ranking System Report to document the results of EPA's investigations and its determination to include the Site on its National Priorities List (NPL). EPA added the Site to the NPL on August 3, 2017.

SITE CHARACTERISTICS

Physical Setting of the Site

The Site is located on the coastal and alluvial deposits of the Río Grande de Arecibo floodplain, approximately 0.5 miles east of the Río Grande de Arecibo, and approximately 2.75 miles north of where the north-flowing river emerges from the mountains to the south. The floodplain and river continue for approximately 1.5 miles north of the Site before discharging to the Arecibo Bay of the Atlantic Ocean on Puerto Rico's north coast. The BRC Property is at an elevation of about 4.5 to 6 meters (15 to 20 feet) above mean sea level (amsl) with the eastern half of the property sloping to the east and the western boundary of the property being State Road PR-2, which sits topographically higher than the land on either side. However, during extreme weather events some areas of the Site may flood. Consequently, the proposed interim remedy for groundwater and proposed remedy for soil, will integrate climate adaption factors during the design and construction phases to address climate-related vulnerabilities that may compromise the effectiveness of the remedies.

According to EPA's Environmental Justice Screening and Mapping Tool, the Site is in a census tract (72013300302), which has legacy pollution concerns and limited workforce development/employment opportunities. The proposed interim remedy for groundwater and proposed remedy for soil should not result in adverse impacts to environmental resources that would affect low-income, minority populations living within the vicinity of, or using, the Site because of its location that is relatively secluded with mostly industrial and agricultural zoning.

Land Use

The primary land uses near the Site are agricultural, residential, and commercial. There are a few private wells located within a 4-mile radius of the Site, but none are located to the north or downgradient from the Site according to regional groundwater flow. The nearest private well is located within a 0.5- to 1-mile radius of the Site. There are no residences, schools, or day care centers within 200 feet of the BRC Property. The nearest residential area, consisting of five residences, is located approximately 1,000 feet northwest of the BRC Property. Approximately 55,721 residents, 22,580 wetland acres, and state- and federal-listed endangered species are located within a 4-mile radius of the Site.

As discussed above the proposed remedy for soil and proposed interim remedy for groundwater should not result in adverse impacts to environmental resources that would affect low-income, minority populations living within the vicinity of, or using, the Site because of its location that is relatively secluded with mostly industrial and agricultural zoning.

Geology

The site is located in the north-central coast of Puerto Rico and is within the North Coast Limestone Province. The geologic setting includes alluvial deposits of the Río Grande de Arecibo floodplain deposited above the limestone formations that form the bedrock.

Hydrogeology

The bedrock aquifer at the Site is in the Aymamon Limestone, which is part of the North Coast Limestone aquifer system. The limestone was not encountered during the site investigation.

The unconfined alluvial aquifer at the Site extends from the water table, approximately 8 to 20 feet bgs, to the bedrock surface at approximately 130 feet bgs. The alluvial aquifer consists of discontinuous sands, silts, and clay layers of varying thickness and the majority of the unit is silt and clay. Caliche, a carbonate-cemented alluvium, is found in the shallow fill material at the Site, mostly above the alluvial aquifer. The silt and clay units in the aquifer have low transmissivity and the groundwater gradient is low. Overall, regional groundwater flow is northward toward the coast, with localized flow toward the Río Grande de Arecibo and Caño Tiburones.

Surface Hydrology

The BRC Property is located on relatively flat terrain with a slope that drains toward the northern/northeastern part of the Site. In the central-eastern part of the BRC Property, there is an open channel stormwater drainage swale, the BRC drainage ditch, which is approximately 1 to 2 feet deep, and which runs from west to east and divides the eastern part of the BRC Property. Based on the topography of the BRC Property, most stormwater on the eastern half of the property collects in this swale. The BRC drainage ditch flows into a former irrigation ditch (Eastern Drainage Ditch), which runs south to north along the eastern boundary of the BRC Property.

Historically, water within the Eastern Drainage Ditch likely flowed north through a series of irrigation channels discharging into the Caño Tiburones south canal, eventually reaching Arecibo Bay. Currently, this ditch extends approximately 3,000 feet adjacent to and north of the BRC Property. Water was not observed flowing in the Eastern Drainage Ditch, and it appears to currently act as a collection point for runoff to infiltrate, rather than directing flow to the north. Another drainage ditch is present at the southern edge of the eastern part of the BRC Property, discharging into the Eastern Drainage Ditch.

NATURE AND EXTENT OF CONTAMINATION

Primary site-related contaminants (SRCs) are inorganics (lead, antimony, arsenic, chromium, and copper) and chlorinated volatile organic compounds (VOCs) (TCE, cis-1,2-DCE, and vinyl chloride). These contaminants are present in the following media:

Building Materials – Samples collected during the 2016 and 2019 investigations found lead dust contamination throughout most of the buildings present at the BRC Property at concentrations greater than the EPA Site-Specific Action Level for lead. Solid waste and aqueous samples collected from on-site sumps and lagoons contained lead, antimony, arsenic, cadmium, cobalt, and thallium at concentrations greater than the EPA RMLs.

BRC Property Soil Contamination – Lead was found at concentrations greater than 800 mg/kg throughout most of the BRC Property in surface soil (0–1 feet bgs), including soil underneath on-site structures. Lead concentrations below the top foot of soil were generally found at concentrations less than 800 mg/kg. However, in source areas where acid was likely discharged to, elevated lead concentrations were detected to a maximum of 8 to 12 feet bgs. The highest concentrations (greater than 5,000 mg/kg) were found near the former production (Structure 2) and slag/battery storage (Structure 3) areas. In the BRC drainage ditch, lead concentrations were greater than 800 mg/kg, down to 4 feet bgs.

Concentrations of the other primary SRCs (antimony, arsenic, chromium, and copper) were also frequently greater than the RI screening criteria, site-specific background values (SSBVs), and EPA Regional Screening Levels (RSLs) in surface soil on the BRC Property, specifically in the production and storage areas and in the Eastern Drainage Ditch. Near source areas, primary SRC concentrations greater than the criteria were found in deeper soil. Generally, the distribution of primary SRCs followed a similar distribution to that of lead.

Off-Property Soil and Sediment – Lead contamination in soil outside of the BRC Property is limited to the Eastern Drainage Ditch, soil adjacent to the ditch within the eastern forested area, and soil immediately north of the facility in the cattle pasture area. Lead concentrations in soil and sediments greater than 800 mg/kg are present in the Eastern Drainage Ditch and associated low-lying areas adjacent to the BRC Property at an overall length of approximately 2,000 feet. The highest concentrations of lead were present in the Eastern Drainage Ditch at the confluence with the BRC drainage ditch.

Soil and sediments at the bottom of the ditch contained the highest lead concentrations; lead concentrations decreased in soil and sediments moving up the bank of the ditch, significantly decreasing within the first 5 to 10 feet laterally away from the ditch. Lead contamination is generally limited to the top foot of soil and sediment.

A minimal amount of contamination is present in the eastern forested area, in low-lying areas associated with the Eastern Drainage Ditch, and in some areas at the top of the bank immediately adjacent to the Eastern Drainage Ditch. This contamination may be attributed to clearing, dumping, or tracking during construction activities.

Generally, concentrations of other primary SRCs (antimony, arsenic, chromium, and copper) in the off-BRC Property areas were found at concentrations greater than SSBVs within the Eastern Drainage Ditch and adjacent areas. Elevated primary SRC concentrations are co-located with elevated lead concentrations, with the highest concentrations in the soil and sediments in the area where the BRC drainage ditch would discharge into the Eastern Drainage Ditch.

Lead contamination was previously present in the southernmost part of the cattle pasture area. However, following excavation conducted under a removal action, sampling showed that the remaining contamination is limited to soil immediately adjacent to the BRC Property exit road. Additionally, lead concentrations in the soil and sediments within the southern nursery area, the western area, and the residential area are low, with lead concentrations greater than 200 mg/kg adjacent to PR-2.

Río Grande de Arecibo and Irrigation Channel Sediment Contamination **-** Lead and other primary SRCs were not detected at concentrations greater than RI screening criteria or SSBVs in the sediments of the Río Grande de Arecibo or within the other ditches to the northeast of the BRC Property.

Contaminants in Surface Water – Lead was not found in surface water at concentrations greater than the RI surface water screening criteria. The only primary SRC found above the RI surface water screening criteria was copper, found at concentrations greater than the criteria in one sample.

Contaminants in Groundwater – EPA took three rounds of groundwater samples. Total lead concentrations exceeded the RI groundwater screening criterion of 15 micrograms per liter (µg/L) in one well during Round 1 and three wells during Round 3. Dissolved lead did not exceed the RI groundwater screening criterion in any of the samples during all three rounds of sampling. For all three rounds of sampling combined, dissolved lead was detected in 19 of 53 samples, at concentrations ranging from 0.17 to 11 µg/L, all below the RI screening criterion. In Round 3, except for one well, nearly all the samples with elevated total lead concentrations had low or no detections of dissolved lead, suggesting the total concentrations observed in those samples were related to particulates (turbidity) in the samples.

Total arsenic concentrations exceeded the screening criterion (10 µg/L) in five wells, ranging from 10.2 to 19.1 µg/L during Rounds 1, 2, and 3, with a maximum concentration of 19.1 µg/L during Round 3. Dissolved arsenic concentrations exceeding the screening criteria were similar during all rounds, ranging from 10.3 to 19.6 µg/L, with the maximum concentration in Rounds 1 and 3, and a maximum of 14.9 µg/L during Round 2

Chlorinated VOCs found at concentrations greater than the RI screening criteria in monitoring well and groundwater screening samples include TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride. Of these chlorinated VOCs, cis-1,2-DCE and vinyl chloride were found most frequently and were widely distributed. The chlorinated VOC contamination is present in groundwater below and downgradient of the BRC Property between 16.5 and 73 feet bgs. The deepest observed depth of chlorinated VOC-contamination above screening criteria was approximately 73 feet bgs.

Data indicates that the source of groundwater contamination is on the BRC Property with contamination migrating downgradient in alignment with the measured potentiometric surface. This distribution pattern suggests the contamination is migrating via advection from a source, and remnant contaminant mass is sorbed to low permeability silt and clay. The maximum concentrations of cis-1,2-DCE (3,500 µg/L in Round 1) and vinyl chloride (350 µg/L in Round 3) were detected in MW-8, which is located along the northern BRC Property line, downgradient of Structure 3 (the former slag pile storage building). An additional line of evidence is that chlorinated VOC contamination was not detected in a groundwater screening sample collected upgradient of the apparent source area. The cis-1,2-DCE plume is approximately 3,500 feet in length and the vinyl chloride plume is approximately 6,000 feet in length (**Figure 4**).

TCE is believed to have been the parent source of the chlorinated VOC contamination at the Site. The presence of degradation byproducts (i.e., cis-1,2-DCE and vinyl chloride) of the parent source would indicate that biodegradation is occurring or had occurred at some point in the past. TCE dechlorination to trans-1,2-DCE was also observed within the plume. Ethene/ethane have been detected along the plume, indicating that complete dechlorination has occurred.

The dechlorination products and redox conditions at the Site show there is adequate evidence for anaerobic biodegradation of chlorinated organics within the plume. TCE, cis-1,2-DCE, and vinyl chloride can be progressively dechlorinated by microbes via reductive dechlorination in the dissolved phase via the following pathway: TCE → cis-1,2-DCE → vinyl chloride → ethene and carbon dioxide. When TCE is degraded to DCE, the cis isomer (cis-1,2-DCE) is predominant over the trans isomer (trans-1,2-DCE). The majority of the reductive dechlorination pathway requires an anaerobic environment. However, while degradation of vinyl chloride can occur slowly in an anaerobic groundwater, it occurs more quickly in an aerobic environment.

PRINCIPAL THREAT WASTE

EPA has established expectations to use treatment to address any principal threats posed by a site. Principal threat wastes are those source materials considered to be highly toxic or mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. Throughout the Site, and particularly in the Eastern Drainage Ditch and BRC Property, elevated concentrations of Site-related lead were detected that exceeds a preliminary remediation goal (PRG) of 800 mg/kg, with the maximum being 97,900 mg/kg. As discussed further below, modeling predicts all receptors on the BRC Property would significantly exceed EPA's goal of limiting to 5% or less the probability of a child's or developing fetus' blood lead level (PbB) from exceeding 5 micrograms per deciliter (µg/dL). If left unaddressed, soil that is highly contaminated with lead would serve as a continued source of contamination to other media through wind entrainment, stormwater runoff, and infiltration from precipitation. Therefore, lead contamination in soil fits the definition of principal threat waste and would require treatment.

SUMMARY OF SITE RISKS

As part of the RI/FS, EPA conducted a baseline human health risk assessment (HHRA) and a screening level ecological risk assessment (SLERA) to estimate the current and future effects of contaminants on human health and the environment. The baseline risk assessment estimated the human health and ecological risk which could result from the contamination at the Site if no remedial actions were taken.

Human Health Risk Information

A four-step human health risk assessment process was used for assessing site-related cancer risks and noncancer health hazards. The four-step process is comprised of: Hazard Identification, Exposure Assessment, Toxicity Assessment, and Risk Characterization (see box "What is Risk and How is it Calculated", page 9).

The HHRA began with selecting contaminants of potential concern (COPCs) in various media (i.e., surface soil, sediment, surface water, and groundwater) that could potentially cause adverse effects in exposed populations.

WHAT IS A "PRINCIPAL THREAT"?

The National Oil and Hazardous Substances Contingency Plan (NCP) establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, surface water or air, or acts as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of the alternatives using the nine remedy selection criteria. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

Potential Exposure Pathways

The current and future land use scenarios evaluated in the HHRA included the following exposure pathways and populations:

- Resident (Adult and Child [birth to < 6 years of age]) in the Residential Area (comprised of five parcels known as Properties 1 through 5) to the north of the BRC Property: incidental ingestion of and dermal contact with surface soil and inhalation of particulates and volatiles released from surface soil.
- Trespasser (Adolescent [12 to < 18 years of age]) in the Cattle Pasture/Eastern Forested Area: incidental ingestion of and dermal contact with surface soil and particulates and volatiles released from surface soil.
- Recreational User (Crabber) (Adolescent [12 to < 18 years of age]) in the Land Crab Habitat: incidental ingestion of and dermal contact with surface soil and ingestion and dermal contact while wading in sediment.
- Recreational Users (Older Child [6 to <18 years of age]) in Cattle Pasture/Eastern Forested Area ditches: incidental ingestion of and dermal contact with ditch surface soil inhalation of particulates and volatiles released from surface soil as well as dermal contact while wading in surface water.
- Recreational User (Crabber) (Adolescent [12 to <18 years of age]) at the Río Grande de Arecibo: dermal contact while wading in surface water and ingestion and dermal contact while wading in sediment.

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the chemicals of potential concern (COPCs) at the site in various media (*i.e.*, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

Exposure Assessment: In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil and ingestion of and dermal contact with contaminated groundwater. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

Toxicity Assessment: In this step, the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure and severity of adverse effects are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other noncancer health hazards, such as changes in the normal functions of organs within the body (*e.g.,* changes in the effectiveness of the immune system). Some chemicals are capable of causing both cancer and noncancer health hazards.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks for all COPCs. Exposures are evaluated based on the potential risk of developing cancer and the potential for noncancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one in ten thousand excess cancer risk;" or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of 10^{-4} to 10^{-6}, corresponding to a one in ten thousand to a one in a million excess cancer risk. For noncancer health effects, a "hazard index" (HI) is calculated. The key concept for a noncancer HI is that a "threshold" (measured as an HI of less than or equal to 1) exists below which noncancer health hazards are not expected to occur. The goal of protection is 10^{-6} for cancer risk and an HI of 1 for a noncancer health hazard. Chemicals that exceed a 10^{-4} cancer risk or an HI of 1 are typically those that will require remedial action at the site.

– Commercial Worker (Adult) in the Western Area/Southern Nursery Area: incidental ingestion of and dermal contact with surface soil and inhalation of particulates and volatiles released from surface soil.

The future land use only scenarios evaluated in the HHRA included the following exposure pathways and populations:

– Resident (Adult and Child [birth to < 6 years of age]) in the BRC Property, Cattle Pasture/ Eastern Forested Area, or Western Area/Southern Nursery Area: incidental ingestion of and dermal contact with surface soil and inhalation of particulates and volatiles released from surface soil.
– Commercial Worker (Adult) at the BRC Property: incidental ingestion of and dermal contact with surface soil and inhalation of particulates and volatiles released from surface soil.
– Agricultural Worker (Adult) at the BRC Property, Cattle Pasture/Eastern Forested Area, or Western Area/Southern Nursery Area: incidental ingestion of and dermal contact with surface soil and inhalation of particulates and volatiles released from surface soil.
– Recreational User (Crabber) (Adolescent [12 to < 18 years of age]) in the Land Crab Habitat: incidental ingestion of and dermal contact with surface soil and inhalation of particulates and volatiles released from surface soil as well as dermal contact while wading in surface water.
– Construction Worker (Adult) at the BRC Property: incidental ingestion of and dermal contact with surface/subsurface soil and inhalation of particulates and volatiles released from surface/subsurface soil.
– Residential Water User (Adult and Child [birth to < 6 years of age]): ingestion of and dermal contact with groundwater or inhalation of volatile chemicals in groundwater while bathing or showering.
– Worker Water User (Adult): ingestion and dermal contact while using tap water at work.

In this assessment, exposure point concentrations (EPCs) were estimated using either the maximum concentration detected of a contaminant or the 95% upper confidence limit (UCL) of the average concentration. Chronic daily intakes were calculated based on the reasonable maximum exposure (RME), which is the highest exposure reasonably anticipated to occur at the Site. No detections in sediment screened in as COPCs so EPCs were not developed for exposures to sediment at Rio Grande de Arecibo.

Risk Characterization

In the risk assessment, two types of toxic health effects were evaluated for COPCs other than lead: cancer risk and noncancer hazard. Calculated cancer risk estimates for each receptor were compared to EPA's target risk range of 1×10^{-6} (one-in-one million) to 1×10^{-4} (one-in-ten thousand). The calculated noncancer hazard index (HI) estimates were compared to EPA's target threshold value of 1. This section provides an overview of the human health risks resulting from exposures to contaminants exceeding the target cancer risk and noncancer hazard thresholds. Lead risks and vapor intrusion evaluation are discussed separately.

Surface Soil - Based on the results shown in **Table A**, cancer risks exceeded the EPA acceptable range of 1×10^{-6} to 1×10^{-4} for future residents (1×10^{-3}) and agricultural workers (3×10^{-4}) at the BRC Property. The cancer risks were equal to the upper end of the EPA acceptable range (i.e., 1×10^{-4}) for current/future residents at Properties 3 and 5 and for future residents in the Cattle Pasture/Eastern Forested Area. Elevated potential cancer risks for soil exposures were primarily due to arsenic and chromium in surface soil. The cancer risk for chromium may be overestimated because it was assumed that all the chromium is in the more toxic hexavalent form and there is no evidence that hexavalent chromium was involved with historic Site operations as opposed to the less toxic trivalent form.

The total noncancer hazard index for child residents at residential properties 1-5 and the Western Area/Southern Nursery Area as well as for construction workers at the BRC Property exceeded the EPA's acceptable threshold of 1 but did not when broken down by individual target organ/effect.

Table A. Summary of Risks Associated with Surface Soil

Receptor	Hazard Index[1]	Cancer Risk[2]
Residential Area (Current/Future Use)		
Child/Adult Resident– Property 1	**2**[+*]	8×10^{-5}
Child/Adult Resident – Property 2	**2**[+]	9×10^{-5}
Child/Adult Resident– Property 3	**2**[+]	1×10^{-4}
Child/Adult Resident– Property 4	**2**[+]	9×10^{-5}
Child/Adult Resident – Property 5	**2**[+]	1×10^{-4}
Cattle Pasture/Eastern Forested Area (Future Use)		
Child/Adult Resident	**5**	1×10^{-4}
Western Area/Southern Nursery Area (Future Use)		
Child/Adult Resident	**2**[+]	9×10^{-5}
BRC Property (Future Use)		
Child/Adult Resident	**7**	**1×10^{-3}**
Agricultural Worker	0.9	**3×10^{-4}**
Construction Worker	**5**[+]	8×10^{-6}

*__Bold__ indicates value above the acceptable risk range or value.
[+]The noncancer hazard does not exceed 1 based upon a breakdown by individual target organ/effect.
[1]For residents, the noncancer hazard index shown is for a child, as there were elevated hazard indices only for child resident. The hazard index for the adult and child resident was evaluated separately.
[2]For residents, cancer risk is based on an age-adjusted scenario combining child and adult exposures. Carcinogenic risks for child and adult are combined to represent cumulative lifetime cancer risks.

Groundwater – As shown in **Table B**, the cancer risks exceeded the EPA acceptable range of 1×10^{-6} to 1×10^{-4} for hypothetical future residential (2×10^{-2}) and worker (7×10^{-4}) groundwater users, and the elevated cancer risks were primarily driven by vinyl chloride. The noncancer hazard index was above EPA's threshold of 1 for future child (40) and adult (24) residential groundwater users, primarily driven by cis-1,2-DCE, trans-1,2-DCE, vinyl chloride, arsenic, and lead, and for future worker groundwater users (15) which was primarily driven by cis-1,2-DCE.

Surface Water and Sediment **-** The cancer risks and noncancer hazards for recreational users potentially exposed to contaminants in surface water in the Land Crab Habitat did not exceed the respective EPA thresholds. The cancer risks and noncancer hazards for recreational users wading in the surface water or sediment of the Río Grande de Arecibo were also well below the respective EPA thresholds.

Table B. Summary of Risks Associated with Groundwater (Future Use)

Receptor	Hazard Index	Cancer Risk[1]
Child Resident	**40**	**2×10^{-2}**
Adult Resident	**24**	
Worker	**15**	**7×10^{-4}**

*Bold indicates value above the acceptable risk range or value.
[1]See note 2 under Table A

Lead Evaluation **-** Lead was selected as a COPC in soil, sediment (evaluated as ditch surface soil), and groundwater based on the maximum detected concentrations exceeding screening levels. Since there are no published quantitative toxicity values for lead, it is not possible to evaluate cancer and noncancer risk estimates from lead using the same methodology as the other COPCs.

Consistent with EPA guidance, exposure to lead was evaluated separately from the other contaminants using blood lead modeling. The risk reduction goal for lead in soil at the Site is to limit to 5% or less the probability of a child's or developing fetus' PbB from exceeding 5 µg/dL. The Integrated Exposure Uptake Biokinetic (IEUBK) model was used to assess residential exposures to lead in surface soil and groundwater and older child recreational user exposures to lead in ditch surface soil. The Adult Lead Model (ALM) model was used to assess trespasser and worker exposures to lead in surface soil, ditch surface soil, and surface/subsurface soil. The IEUBK model indicated that the percentage of a hypothetical population exceeding the blood lead level reference value of 5 µg/dL was elevated for the following exposure scenarios: current/future residential exposures to surface soil at the Residential Area Property 4 (7.5%), future residential exposures to surface soil at the BRC Property (98.4%), future recreational user exposures to surface soil in the ditches at the Cattle Pasture/Eastern Forested Area (18.7%), and future residential exposures to groundwater used as tap water (18.1%). Similarly, the ALM model predicted that 36% of commercial workers, 76% of agricultural workers and 85% of construction workers would exceed the risk reduction goal at the BRC Property.

Vapor Intrusion Evaluation **-** If properties over the VOC groundwater plume (i.e., BRC Property and Cattle Pasture/Eastern Forested Area) are reoccupied or developed for residential or commercial use, future residents or workers may be exposed to volatile COPCs via vapor intrusion from groundwater to indoor air. To assess the potential for this pathway to be complete, groundwater monitoring well data from all shallow monitoring wells were compared to the appropriate exposure scenario (either residential or commercial) of EPA vapor intrusion screening levels (VISLs) based on a target cancer risk of $1x10^{-6}$ and a target noncancer hazard quotient of 1. Groundwater concentrations of three chemicals (i.e., vinyl chloride, TCE, and trans-1,2-DCE) exceeded the residential VISLs. Vinyl chloride was the only chemical that also exceeded the commercial VISL. Therefore, these chemicals (i.e., vinyl chloride, TCE, and trans-1,2-DCE) are present at concentrations in groundwater that have the potential to migrate into buildings should the buildings at BRC be reoccupied or if areas within the confines of the plume are developed for residential or commercial use in the future.

Ecological Risk Information

A screening-level ecological risk assessment (SLERA) was conducted to evaluate the potential for ecological risks to sensitive receptors from the presence contaminants in surface soil, sediment and surface water. Surface soil, surface water, and sediment concentrations were compared to ecological screening levels (ESLs) as

WHAT IS ECOLOGICAL RISK AND HOW IS IT CALCULATED?

A Superfund baseline ecological risk assessment is an analysis of the potential adverse health effects to biota caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current and future land and resource uses. The process used for assessing site-related ecological risks includes:

Problem Formulation: In this step, the contaminants of potential ecological concern (COPECs) at the site are identified. Assessment endpoints are defined to determine what ecological entities are important to protect. Then, the specific attributes of the entities that are potentially at risk and important to protect are determined. This provides a basis for measurement in the risk assessment. Once assessment endpoints are chosen, a conceptual model is developed to provide a visual representation of hypothesized relationships between ecological entities (receptors) and the stressors to which they may be exposed.

Exposure Assessment: In this step, a quantitative evaluation is made of what plants and animals are exposed to and to what degree they are exposed. This estimation of exposure point concentrations includes various parameters to determine the levels of exposure to a chemical contaminant by a selected plant or animal (receptor), such as area use (how much of the site an animal typically uses during normal activities); food ingestion rate (how much food is consumed by an animal over a period of time); bioaccumulation rates (the process by which chemicals are taken up by a plant or animal either directly from exposure to contaminated soil, sediment or water, or by eating contaminated food); bioavailability (how easily a plant or animal can take up a contaminant from the environment); and life stage (*e.g.*, juvenile, adult).

Ecological Effects Assessment: In this step, literature reviews, field studies or toxicity tests are conducted to describe the relationship between chemical contaminant concentrations and their effects on ecological receptors, on a media-, receptor- and chemical-specific basis. To provide upper and lower bound estimates of risk, toxicological benchmarks are identified to describe the level of contamination below which adverse effects are unlikely to occur and the level of contamination at which adverse effects are more likely to occur.

Risk Characterization: In this step, the results of the previous steps are used to estimate the risk posed to ecological receptors. Individual risk estimates for a given receptor for each chemical are calculated as a hazard quotient (HQ), which is the ratio of contaminant concentration to a given toxicological benchmark. In general, an HQ above 1 indicates the potential for unacceptable risk. The risk is described, including the overall degree of confidence in the risk estimates, summarizing uncertainties, citing evidence supporting the risk estimates and interpreting the adversity of ecological effects.

an indicator of the potential for adverse effects to ecological receptors. Furthermore, potential for risk to seven surrogate receptors representative of avian and mammalian communities (herbivorous birds, invertivorous birds, carnivorous birds, herbivorous mammals, herbivorous flying mammals, invertivorous mammals, and invertivorous flying mammals) that are assumed to use the Site were addressed through food chain exposure models. A complete summary of all exposure scenarios can be found in the SLERA.

Surface Soil - Through the screening, various inorganics and pesticides were determined to potentially pose risk to ecological receptors. Based on the results of the food chain modeling performed and an evaluation of the frequency and magnitude of ESL and background exceedances, the majority of risk was attributed to lead, antimony, cadmium and chromium in the Eastern Drainage Ditch, select locations in the eastern forested area adjacent to the ditch and the eastern side of the BRC Property.

Furthermore, despite the exceedances noted within the BRC Property, western area, southern nursery area, and residential area, only the ditches on the eastern side of the property, which are connected to where the source material was used in the facility, contain valuable ecological habitat (refer to **Figure 2**). There is some limited habitat in the northern cow pasture, which includes the land crab habitat, however, this area was determined to not be influenced by the BRC Property due to drainage pathways and distance from the facility.

Surface Water - Through screening surface water results from the Rio Grande de Arecibo and the drainage ditches leading to the Caño Tiburones wetland, several inorganics were determined to potentially pose risk to ecological receptors. However, upon further reviewing the frequency and magnitude of these detections, as well as their locations relative to the BRC Property, it was determined that none of these compounds were considered COPECs related to previous operations at the BRC facility. Sporadic ESL exceedances of these metals do not pose significant risk.

Sediment – Potentially site-related sediment was collected from the downstream section of Río Grande de Arecibo, and arsenic, chromium, copper, lead, vanadium, and zinc were analyzed using XRF. The maximum and average potentially site-related concentrations of copper and chromium exceeded the ESLs, but the concentrations did not exceed background, indicating that these metals are not site-related. There is no ESL for vanadium, but the maximum background concentration exceeded the maximum site concentration, indicating that vanadium is not site-related. Although the maximum concentrations for arsenic, lead and zinc exceeded both the ESL and background, the average XRF results for potentially site-related (downstream) sediment did not exceed them. The results do not indicate any significant site-related contamination from release at the BRC Property.

A post-SLERA addendum was prepared for the Eastern Drainage Ditch area focusing on the most sensitive receptor (herbivorous birds, the Common Ground Dove [*Columbina passerina*]) and lead (a primary risk driver). Although chromium, cadmium, lead, and antimony were identified as contributing to elevated risk, it was determined that chromium, cadmium, and antimony were collocated with lead; therefore, the addendum focused on lead. This post-SLERA addendum derived a preliminary remediation goal (PRG) for lead by refining the food chain exposure models to determine the soil concentration of lead that would be protective of populations of herbivorous birds (See “Remediation Goals” below).

Risk Assessment Summary

In conclusion, elevated potential cancer risks and/or noncancer hazards were identified for future residential and nonresidential uses of the BRC Property, as well as for future use of groundwater as tap water. Lead was evaluated separately from other COPCs, using models that predict blood lead levels, and elevated risks were identified for current/future residential exposures at the Residential Area – Property 4, future residential and nonresidential uses of the BRC Property, future recreational use of the Cattle Pasture/Eastern Forested Area ditches, and future use of groundwater as tap water. In addition, based on vapor intrusion screening evaluation, three chemicals (i.e., vinyl chloride, TCE, and trans-1,2-DCE) are present at concentrations in groundwater that have the potential to migrate into buildings at levels that could cause inhalation risks if the BRC Property or other areas impacted by the groundwater plume are redeveloped for residential or commercial use. Additionally, inorganic contaminants pose risk to ecological receptors; the distribution of the metals exceedances in soil suggests potential risks are primarily driven by metal concentrations in the Eastern Drainage Ditch and the eastern side of the BRC Property.

Based on the results of the human health and ecological risk assessments, it is EPA’s current judgment that the Preferred Alternative identified in this Proposed Plan is necessary to protect human health or the environment from actual or threatened releases of hazardous substances into the environment.

REMEDIAL ACTION OBJECTIVES

The Remedial Action Objectives (RAOs) for the Site are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered (TBC) guidance, and Site-specific risk-based levels. According to the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and RI/FS guidance, RAOs should include chemicals of concern (COCs), exposure routes, and receptors. RAOs were developed for soil and groundwater.

Section 121(d) of CERCLA, as amended, requires that any remedial action must, at a minimum, achieve overall protection of human health and the environment and comply with ARARs. The proposed groundwater action will be an interim remedy rather than a final Site-wide remedy in order to prevent exposure while groundwater exceeds drinking water standards and will allow EPA to further evaluate attenuation, migration and the effects of the soil remedy.

The RAOs are as follows:

Soil:

- RAO 1: - Prevent human exposure to contaminated soil via ingestion and inhalation that poses an unacceptable risk.
- RAO 2: Prevent exposure to contaminated soil by ecological receptors (via direct contact, ingestion, and uptake into the food chain) that poses an unacceptable risk.
- RAO 3: Prevent the migration of contaminated soil to surface water, sediment, and groundwater.

Groundwater:

- RAO 4: Prevent human exposure via direct contact, ingestion, or inhalation of vapors to contaminated groundwater at concentrations that pose an unacceptable risk.

Groundwater modeling estimates that natural attenuation, even with the addition of active treatment, as evaluated in the FS, might take several centuries to restore the groundwater. As such, an RAO specific to restoration of groundwater was not developed for this proposed interim.

Preliminary Remediation Goals

The development of remediation goals and PRGs is a requirement of the NCP (40 CFR 300.430(e)(2)(i)). Identification and selection of the PRGs are typically based on RAOs, the current and anticipated future land uses, and the tentatively identified ARARs. The PRGs are typically presented as chemical- and media-specific values that directly address the RAOs.

EPA has established PRGs which it will use to clean up contaminated soil at the Site. The PRGs for the Site are shown in **Table C**, below.

Table C. Identification of PRGs

Area of Concern/Media	Contaminant[1]	PRG
BRC Property – Soil	Lead	800 mg/kg[5]
	Arsenic	5.8 mg/kg
Eastern Drainage Ditch – Soil	Lead	355 mg/kg[2]
		134 mg/kg[3]
Residential Area – Soil	Lead	400/200 mg/kg[4]

1 – Chromium, antimony and cadmium are also ecological contaminants of concern in site soil, but no PRGs for these metals were developed because they are co-located with lead.
2 – Human health risk-based PRG based on future recreational use of soil within the Eastern Drainage Ditch.
3 – Ecologically derived PRG, based on exposure to lead by the Common Ground Dove, used as a secondary goal to ensure the average concentration of 134 mg/kg is achieved within the Eastern Drainage Ditch soil.
4- To achieve a lead risk reduction goal consistent with recent toxicological findings, the average lead concentration across the surface of the remediated area must be at or below 200 mg/kg, with no single point above 400 mg/kg, which corresponds to a typical (or hypothetical) child or group of similarly exposed children having an estimated risk of no more than 5% of the population exceeding a 5 µg/dL PbB.
5- Human health risk-based PRG based on future commercial use of soil on the BRC Property, which is based on default Adult Lead Methodology (ALM) parameters at a target PbB of 5 µg/dL and a soil/dust ingestion rate of 67 mg/day for an outdoor worker.

Though PRGs were not developed for groundwater, RI screening criteria based on the lower of the chemical-specific applicable or relevant and appropriate requirements or ARARs (e.g., Puerto Rico Water Quality Standards and federal maximum contaminant levels (MCLs), as well as regional screening levels (RSLs)), were used to aid in defining the extent of contaminated media and will be used to evaluate groundwater data collected in the future. The RI Screening Criteria for groundwater are listed in **Table D** below.

Table D. Screening Criteria for Groundwater

Area of Concern/Media	Contaminant	Screening Level
Groundwater	cis-1,2-DCE	70 µg/L
	trans-1,2-DCE	100 µg/L
	TCE	5 µg/L
	Vinyl chloride	0.22 µg/L
	Arsenic	10 µg/L
	Lead	15 µg/L

In addition, the vapor intrusion screening levels for TCE and vinyl chloride of 1.18 µg/L and 0.15 µg/L respectively will be used to determine if vapor intrusion poses a concern.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA Section 121(b)(1), 42 U.S.C. Section 9621(b)(1) requires that each selected Site remedy be protective of human health and the environment, be cost-effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

In accordance with the NCP (40 CFR §300.430), and EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA*, each alternative was assessed using *nine evaluation criteria*, namely overall protection of human health and the environment, compliance with ARARs, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, and state and community acceptance.

In this section of the Proposed plan, the interim remedial alternative for groundwater and the remedial alternatives for soil are summarized. Detailed descriptions of the soil remedial alternatives can be found in the FS Report.

Interim Remedial Alternative for Contaminated Groundwater - Monitoring Program and Institutional Controls

Groundwater modeling estimates that natural attenuation, even with the addition of active treatment, as evaluated in the FS, might take several centuries to restore the groundwater. The presence of silt and clay at the Site and the length of the vinyl chloride plume may result in a longer VOC degradation period. Therefore, a groundwater monitoring program and ICs would be employed as an interim remedy, to assess the decline of hazardous substances including arsenic, lead, and VOCs, and to ensure that receptors are protected.

Annual sampling would be performed for a minimum of eight years, to collect data and perform a statistical analysis of contaminant concentrations in individual wells. In addition, collected data would be used to assess natural attenuation, migration, and the effects of the soil remedy. Depending on the results, the monitoring program may be extended after the initial eight years. For cost estimating purposes, the monitoring program is assumed for 30 years. Wells would be sampled annually for VOCs, arsenic, lead, geochemical parameters (i.e., nitrate/nitrite, sulfate, sulfide, ammonia, alkalinity, chloride, ferrous iron, methane ethane ethene [MEE], and total organic carbon), and field parameters. A Pre-Design Investigation (PDI) will be performed to determine if additional monitoring wells should be installed at the Site and verify the absence of VOC source material in the vadose zone.

The preferred soil remedy is anticipated to decrease arsenic and lead in groundwater. Although, there are no drinking water wells in the area of contamination (groundwater plume), ICs would be relied upon to prevent exposure. ICs would include governmental controls such as existing Puerto Rico laws or regulations that would serve to restrict the usage of contaminated groundwater by restricting well installation until the aquifer is restored to drinking water quality standards. ICs in the form of informational devices would also be implemented, such as advisories or notices published in newspapers and periodic letters sent to local government authorities on the need to limit water withdrawal or new construction unless appropriate vapor intrusion investigations are conducted and/or mitigation measures are undertaken.

The total estimated present-worth cost for this interim groundwater action is $1.56 million.

Remedial Alternatives for Contaminated Soil

The construction time for each alternative reflects only the actual time required to construct or implement the action and does not include the time required to design the remedy, negotiate the performance of the remedy with any potentially responsible parties, or procure contracts for design and construction.

Common Elements

Common elements are assumed to be included as part of each soil remedial alternative. The following common elements do not apply to the no action alternative.

Institutional Controls – ICs (*e.g.*, community notifications and deed restrictions and/or notices) would restrict the disturbance and/or usage of areas where hazardous substances, including lead and/or arsenic remain above levels that would allow for unlimited use and unrestricted exposure (UU/UE) or that would potentially compromise the implemented remedial action. ICs would not be employed in residential areas because they would not be necessary. ICs are only assumed under Alternatives S2, S3, and S4.

Residential Soil – Contaminated soil within the residential areas would be removed for disposal under all soil alternatives. The extent of removal would target lead concentrations greater than the PRG of 400 mg/kg to achieve an average below 200 mg/kg, resulting in unrestricted use for the residential areas. Contaminated soil generated within the residential area would be classified as nonhazardous solid waste.

Building/Structure Demolition – The BRC Property is currently inactive and unoccupied with several standing buildings/structures (**Figure 3**). During the RI, sample results indicated elevated levels of contamination in the soil beneath several of the buildings/structures. Buildings/structures would be demolished to facilitate access to contaminated soil beneath them for remediation. Additionally, the existing structures, equipment and building materials are unusable due to high levels of lead on them. If left unattended, the structures and remaining equipment will deteriorate increasing the likelihood of further release to the environment. Debris from demolished buildings/structures would be decontaminated and would be disposed of as nonhazardous waste at an off-Site permitted disposal facility within Puerto Rico. Building/structure demolition is assumed under Alternatives S3, S4, and S5. Structures and asphalted areas cover approximately 50% of the 16-acre BRC Property.

Monitoring – For all alternatives except for S5, long-term monitoring and maintenance would be undertaken, particularly of any containment system. Remedial alternatives presented for contaminated soil are expected to prevent further migration of contaminated soil to groundwater. Following the soil remedy, the groundwater monitoring program under the interim groundwater remedy would also assist in ensuring the soil remedy is effective.

Five-Year Site Reviews – For each alternative that may result in hazardous substances, pollutants, or contaminants remaining at the Site above levels that allow for unrestricted use and unlimited exposure, the statutory requirement for five-year reviews is triggered by the implementation of this action to ensure that the remedy remains, protective of human health and the environment. Alternatives 2 through 5 will be subject to five-year reviews, which are required by Section 121(c) of the Superfund law.

Alternative 1 – No Action
Total Capital Cost: $ 0
Operation and Maintenance: $0
Total Present-Worth: $0
Construction Timeframe: 0
The NCP requires that a "No Action" alternative be developed as a baseline for comparing other remedial alternatives. This alternative would leave contaminated soil at the Site within the potential areas of concern in its current state, and no remedial action would be initiated to address contaminated soil or otherwise mitigate the associated unacceptable risks to human health or the environment. Contaminated soil would not be addressed and would be left in the current condition and could potentially continue to migrate off-site to surrounding areas.

Alternative S2A – Capping In-Place of Contaminated Soil, Selective Excavation and Off-Site Disposal
Total Capital Cost: $ 8.4 million
Operation and Maintenance: $ 23,000 per year
Total Present Worth: $8.7 million
Construction Timeframe: 1 year

Residential Soil - Contaminated soil within the residential area would be excavated and disposed of as nonhazardous waste at an off-site permitted commercial disposal facility.

BRC Property - Contaminated soil exceeding the PRGs outside the footprint of buildings/structures and asphalt pavements would be contained by capping in-place through construction of an exposure barrier. For the purposes of the FS, an exposure barrier would be constructed predominantly using soil. The thickness of the representative exposure barrier is assumed to be 24 inches (18 inches of common clean fill [subsoil] and 6 inches of growth media overlying geotextile as a demarcation layer). Soil material for the cover construction would be procured from a nearby commercial source identified during the remedial design (RD) phase of the remedy. Imported soil (clean fill) material would be sampled before placement to confirm the material is free of contaminants (i.e., below PRGs). The six inches of growth media may be amended, if necessary, to support the seed for revegetation. Grading of certain parts of the area may be required if current grading does not ensure drainage eastward toward the Eastern Drainage Ditch, maintaining existing drainage patterns. The assumed materials and thicknesses would be refined, if necessary, during the RD process. For the purposes of the cost estimate, regular monitoring including inspections and vegetation maintenance would be performed after the remedy is implemented.
Under this alternative, the concrete slabs of buildings/structures and asphalt pavement would be resurfaced to provide adequate in-place containment of underlying contaminated soil exceeding the PRGs. A minimum of six inches of asphalt and four inches of concrete would be installed over existing asphalt pavement areas and the concrete slabs of buildings/structures, respectively.

Eastern Drainage Ditch - Capping in-place of soil exceeding PRGs within the Eastern Drainage Ditch would be achieved through placement of an armored cover. An armored cover would be constructed predominantly using rock material (riprap or gravel). The thickness of the representative armored cover would be about 18 inches. Before placement of the armored cover, the Eastern Drainage Ditch would be cleared of existing vegetation and graded to ensure drainage toward the northerly direction. A geotextile material would be installed to stabilize the drainage ditch slopes and to serve as the bedding layer for the rock material. The assumed materials and thicknesses would be refined, if necessary, during the RD process. Clean rock material (gravel or riprap) required for the construction of cover would be procured from a nearby commercial source.

Alternative S2B – Capping In-Place of Contaminated BRC Soil, Excavation and Off-site Disposal of Eastern Drainage Ditch Material, On-Site Containment of Residential Soil
Total Capital Cost: $ 9.7 million
Operation and Maintenance: $15,000 per year
Total Present Worth: $10 million
Estimated Construction Timeframe: 1 year

BRC Property - Under this alternative, capping in-place of contaminated soil would be performed within the BRC Property as described in Alternative S2A. Excavated contaminated soil from the residential areas would be spread within the BRC Property for on-site containment and capped with an exposure barrier, similar to S2A, consisting of clean fill, geotextile and growth media. The capped contaminated soil would be graded to ensure water runoff drains eastward toward the Eastern Drainage Ditch, maintaining existing drainage patterns.

Eastern Drainage Ditch Area - Contaminated soil within the Eastern Drainage Ditch would be excavated for off-Site disposal. Approximately 25% of the excavated contaminated soil is assumed to be characterized as potentially hazardous waste for the purpose of treatment and disposal. The volume of contaminated soil characterized as hazardous waste generated would be treated/stabilized using phosphate-blended amendment and would be disposed of as nonhazardous waste at an off-site permitted commercial disposal facility within Puerto Rico. The rest of the excavated contaminated soil volume would be disposed of as nonhazardous waste at an off-site permitted commercial disposal facility within Puerto Rico. Confirmation soil samples would be collected from the sidewalls and bottom of the excavation. After the excavation and collection of confirmed soil samples, the excavated area would be graded to provide positive drainage. A 6-inch surface layer of growth media would be placed for revegetation. The growth media may be amended, if required, to support the seed for revegetation. Before establishment of vegetation, an erosion control blanket would be placed to limit erosion and prevent erosional damage. Imported fill would be sampled before placement to confirm the material is free of contaminants (i.e., below PRGs).

Alternative S3 – In-Situ Treatment of Contaminated Soil, Excavation and Off-site Disposal of Eastern Drainage Ditch Material and Residential Soil
Total Capital Cost: $ 20.1 million
Operation and Maintenance: $7,000 per year
Total Present Worth: $20.3 million
Estimated Construction Timeframe: 1 year

Alternative S3 focuses on in-situ stabilization/solidification treatment of contaminated soil within the BRC Property. Contaminated soil within the Eastern Drainage Ditch and residential areas would be excavated and disposed of at an off-Site permitted disposal facility within Puerto Rico.
Buildings/structures and asphalt pavement located within the BRC Property would be demolished to facilitate access to the contaminated soil beneath them.

BRC Property - Under this alternative, contaminated soil located within BRC Property would receive in-situ treatment. The in-situ treatment is assumed to be stabilization/solidification and/or biologically mediated stabilization using bacteria that produce calcium carbonate ($CaCO3$). In-situ treatment would reduce the bioavailability (and thus toxicity) and mobility of the contaminants within the contaminated soil. During the RD phase, a Site-specific treatability study would be conducted to determine the effectiveness of the treatment technology in the environment of the Site.

It is anticipated that phosphate-blended amendment would be roto-tilled into the contaminated soil to a depth of 1 feet bgs. For contaminated soil between depths of 1 to 4 feet interval and 4 to 8 feet interval, other mechanical methods such as hydraulic excavators and/or auger mixing would be used for in situ phosphate-blended amendment mixing.

Eastern Drainage Ditch Area - Contaminated soil would be excavated for off-Site disposal similar to Alternative S2B.

Alternative S4 – Excavation of Contaminated Soil, Ex Situ Stabilization and On-site Containment
Total Capital Cost: $ 17.5 million

Operation and Maintenance: $9,000 per year
Total Present Worth: $17.7 million
Estimated Construction Timeframe: 1.5 years

BRC Property **-** Contaminated soil within the BRC Property would be excavated for on-site containment in an engineered repository that would be constructed within the BRC Property boundaries. It is assumed that 50 percent of the total excavated contaminated soil generated would be characterized as hazardous waste. The contaminated soil characterized as hazardous waste would be treated/stabilized using phosphate-blended amendment for containment in an on-site engineered repository that would be constructed within the BRC Property. The rest of the excavated contaminated soil volume is assumed to be characterized as nonhazardous waste and would not require treatment/stabilization before containment. Contaminated soil within the footprint of the engineered repository would not be excavated since the construction of the engineered repository would cover the contaminated soil in-place.

Eastern Drainage Ditch **–** Contaminated soil would be excavated similar to Alternative S2B for on-Site containment in an engineered repository that would be constructed within the BRC Property.

On-Site Repository
During the RD phase, the location of the repository on the BRC Property would be refined. In addition, multiple smaller repositories could also be developed.

Based on the volume of contaminated soil requiring consolidation, the estimated footprint and location of an on-site repository is illustrated on **Figure 5.** The repository is assumed to be located in the northeastern corner of the BRC Property with an approximate footprint of 3 acres and an approximate height of 12 feet. It is assumed that the repository would be designed and constructed to ensure stormwater drains eastward toward the Eastern Drainage Ditch, maintaining the existing drainage patterns of the BRC Property.

Alternative S5 – Excavation of Contaminated Soil and Off-Site Disposal
Total Capital Cost: $ 37.7 million
Operation and Maintenance: $0
Total Present Worth: $37.7 million
Estimated Construction Timeframe: 1.5 year

Alternative S5 would involve excavation of contaminated soil at the BRC Property, the Eastern Drainage Ditch, and the residential properties followed by off-Site disposal. Contaminated soil would be transported and disposed of at an off-Site permitted commercial disposal facility within Puerto Rico. All buildings/structures and asphalt pavement located within the BRC Property would be demolished to facilitate access to the contaminated soil beneath them.

Soil at the BRC Property with lead concentrations greater than or equal to the PRG of 800 mg/kg (i.e., based on non-residential industrial use/worker direct contact) would be addressed. ICs to limit the BRC Property to commercial use would be implemented for this alternative because soil with lead concentrations equal to 800 mg/kg would remain there.

Part of the excavated contaminated soil at the BRC Property and the Eastern Drainage Ditch is assumed to be characterized as hazardous waste for the purpose of treatment and disposal. Excavated contaminated soil characterized as hazardous waste, which would be stabilized as described in Alternative S4, and contaminated soil characterized as potentially nonhazardous waste, would be loaded and transported for disposal at an off-Site permitted disposal facility(ies) within Puerto Rico.

EVALUATION OF REMEDIAL ALTERNATIVES
EPA uses nine criteria to assess remedial alternatives individually and compare them in order to select a remedy. The criteria are described in the following box.

For groundwater, because the proposed action is an interim remedy, an assessment of the relevant evaluation criteria was performed and is provided here. Based on information currently available, EPA believes that the proposed interim action for groundwater meets the threshold criterion of being protective of human health and the environment until a final remedy is implemented for the Site. Although chemical-specific ARARs will not be met through this proposed action, the interim action provides protection in the short term by limiting use or access to groundwater. EPA believes ICs will limit use of groundwater and are achievable, while the soil remedy is implemented. While the interim remedy for groundwater will not reduce toxicity, mobility or volume, these factors will be considered as part of the final groundwater remedy. The Puerto Rico Department of Natural and Environmental Resources concurs with EPA's preferred interim remedy for groundwater.

EVALUATION CRITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES

Overall Protectiveness of Human Health and the Environment evaluates whether and how an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

Compliance with ARARs evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that are legally applicable, or relevant and appropriate to the site, or whether a waiver is justified.

Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.

Reduction of Toxicity, Mobility, or Volume of evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, the community, and the environment during implementation.

Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

Cost includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

State/Support Agency Acceptance considers whether the State agrees with the EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.

Community Acceptance considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

For soil, this section of the Proposed Plan summarizes the relative performance of each alternative against the nine threshold and balancing evaluation criteria, noting how it compares to the other options under consideration. The full comparative analysis of the alternatives is contained in the FS Report.

Overall Protection of Human Health and the Environment

Of the six remedial alternatives, only the no action alternative (i.e., Alternative S1) would fail to provide protection of human health and the environment.

Alternatives S2A, S2B, S3, S4, and S5 would be protective of human health and the environment and would achieve the RAOs.

For all alternatives (except Alternative S1), the potential for human and ecological exposure (from ingestion or inhalation of lead and other co-located metals) would be reduced through remedial actions (contaminant, removal and/or isolation), implementation of and adherence to ICs to achieve RAOs 1 and 2.

For all alternatives (except Alternative S1), mobility and migration of soil contaminated with COCs would be reduced through contaminant removal and/or isolation to achieve RAO 3.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Alternative S1 fails to be compliant with ARARs because no action would be taken to address contaminated soil. Remedial action implemented under the remaining alternatives (Alternatives S2A, S2B, S3, S4, and S5) would comply with or meet the chemical-, location-, and action-specific ARARs identified for the soil portion of the Site remedy.

Chemical-specific ARARs for air would be pertinent to Alternatives S2A, S2B, S3, S4, and S5. Compliance with air quality ARARs would be attained through implementation of best management practices (BMPs), including erosion and dust suppression measures. Air monitoring would be used during intrusive work to monitor dust that could impact the surrounding community.

Location-specific ARARs for Alternatives S2A, S2B, S3, S4, and S5 relate to work potentially affecting threatened or endangered species and work performed within or adjacent to floodplains and or wetlands. Actions would be carried out in a manner to avoid adversely affecting these species and water resources.

Action-specific ARARs would be pertinent for Alternatives S2A, S2B, S3, S4, and S5. Excavation and off-Site disposal of residential soil are common elements for all alternatives. Therefore, compliance with Land Disposal Restrictions (LDRs) would be required. Compliance would be attained through the characterization of waste generated during the excavation of contaminated soil. If characteristic hazardous waste is in fact generated, LDRs would be met prior to disposal. Actions under each alternative will be carried out in a manner that will comply with all substantive requirements of the various statutes and implementing regulations.

Long-Term Effectiveness and Permanence
Alternative S1 fails to provide long-term effectiveness and permanence since no remedial action would be taken. Under Alternatives S2A, S2B, S3, and S4, contaminated soil would remain on-Site but long-term effectiveness and permanence would be achieved through off-Site disposal at an appropriate facility and/or isolation (containment and/or stabilization) of contaminants within the contaminated soil. Under Alternatives S2A, S2B, S3, and S4, contaminated soil would be left in place to differing degrees, and these alternatives would require monitoring and maintenance to ensure effectiveness over the long term. The magnitude of residual risks from the Eastern Drainage Ditch would be eliminated through removal of contaminated soil from the Eastern Drainage Ditch under Alternatives S2B, S3, S4, and S5. Under all Alternatives, the magnitude of residual risks from residential soil would be eliminated through removal of contaminated soil.

For Alternative S2A, the magnitude of residual risks from the BRC Property would be reduced because all contaminated soil within the BRC Property and the Eastern Drainage Ditch would be contained at the BRC Property, under a cap, as long as the cap is maintained. Nevertheless, the exposure pathways to humans and ecological receptors would be limited by the physical isolation of contaminated soil by a properly engineered in-place containment system.

For Alternative S2B, the magnitude of residual risks from the BRC Property would be similar to Alternative S2A, but residual risks for the Eastern Drainage Ditch would be eliminated through removal of contaminated soil.

For Alternative S3, the magnitude of residual risks would be reduced through chemical isolation through solidification within the BRC Property. The entire volume of contaminated soil would be treated to reduce the bioavailability (and thus toxicity) or mobility of the contaminants while leaving the contaminated soil in place, reducing the exposure to humans and ecological receptors. But long-term effectiveness and permanence of the in-situ stabilized soil depends on long-term, maintenance, monitoring and inspection to measure the effectiveness of reduced bioavailability of the contamination.

For Alternative S4, contaminated soil at the BRC Property would be excavated and then placed in a disposal repository at the BRC Property. Although the excavated contaminated soil would be disposed of in the repository under a cover, it could pose an exposure or migration risk if the engineered cover was compromised or not maintained. Long-term maintenance, monitoring and ICs would need to be implemented to protect the implemented remedy. Outside the footprint of the disposal repository, Alternative S4 would provide long-term effectiveness and permanence by a complete excavation. Therefore, long-term effectiveness is greater than Alternatives S2A, S2B, or S3.

Alternative S5 would provide long-term effectiveness and permanence through complete excavation and off-Site disposal of all contaminated soil. Therefore, the long-term effectiveness and permanence of S5 is greater than Alternatives S2A, S2B, S3, or S4.

In addition, the covers placed over contaminated soil under Alternatives S2A and S2B could be more susceptible to the effects of climate (i.e., increasing frequency of severe storms and flooding) as compared to the smaller footprint of cover installed at the on-site disposal repository under Alternative S4, if not properly installed, monitored, and maintained over the long term.

Overall, for Alternatives S2A, S2B, S3, and S4, long-term effectiveness and permanence would be achieved through implementation of BMPs, periodic inspections, long-term post-construction monitoring, maintenance, and repair as necessary to maintain the integrity of the engineering controls. ICs would also require monitoring and maintenance in perpetuity (except Alternative S5) to help ensure the long-term integrity of the remedy.

Reduction in Toxicity, Mobility, or Volume (T/M/V) through Treatment
Alternatives S1 and S2A fail to provide a reduction of toxicity, mobility, or volume through treatment since treatment is not a component of these alternatives.

Alternative S3 would meet the statutory preference for treatment as a principal element because it would include in-situ treatment of soil within the BRC Property, which would reduce the bioavailability (and thus toxicity) or mobility while leaving the contaminated soil in place. In addition, Alternatives S2B and S3 include ex-situ stabilization of excavated contaminated soil from the Eastern Drainage Ditch using reagents that would result in reducing the bioavailability (and thus toxicity) and mobility of contaminants within the excavated soil.

Alternatives S4 and S5 include ex-situ treatment (stabilization) of a portion of excavated contaminated soil, which involves using reagents that would result in reducing the bioavailability (and thus toxicity) and mobility of contaminants within the excavated soil. This process of physically and chemically isolating them may increase the volume.

The statutory preference would be partially met under Alternatives S2B and S4.

Short-Term Effectiveness

Alternative S1 would not pose short-term risks to the community or workers, and there would be no adverse environmental impacts since no remedial action would be taken.

Alternatives S2A, S2B, S3, S4, and S5 involve the import of clean fill material (soil and rock/riprap) for remedy construction purposes (cover construction and excavation backfill). Therefore, truck traffic would have a short-term risk to the community and the workers. For Alternatives S3, S4, and S5, there would be short-term risks due to a significant increase in truck traffic because of the transport and handling of the excavated contaminated soil for off-Site disposal in addition to the import of clean fill material for excavation backfill. Alternative S4 would have additional short-term impacts to workers, because of potential safety hazards during the construction of an on-Site repository.

Alternatives S3, S4, and S5 involve extensive demolition and off-Site disposal of buildings/structures within the BRC Property as compared to the Alternatives S2A and S2B, posing a short-term risk to workers because of the operation of heavy equipment and dust generated from construction debris. Short-term risks to workers would be mitigated through safety measures such as personal protective equipment (PPE) (e.g., steel toe boots), dust control measures, work zones, and other safety practices.

Fire-prevention protocols and techniques (e.g., planning, specified work time frames, fire watches) would be implemented to protect workers and the community and to prevent adverse environmental impacts. Impacts from noise would be mitigated by implementing appropriate construction work hours. Air emissions from construction and hauling activities could lead to short-term environmental impacts to unimpacted areas. Dust control and erosion control measures/BMPs would be implemented as appropriate to minimize impact. Using low-emissions equipment and selecting resources and treatment materials carefully would minimize short-term environmental impacts.

The estimated durations for construction of Alternatives S2A, S2B, and S3 are approximately 1 year and the durations for Alternatives S4 and S5 are approximately 1.5 years. Thus, the short-term impact on the community, workers, and the environment would be somewhat greater for Alternatives S4 and S5 as compared to Alternatives S2A, S2B, and S3.

Implementability

Alternative S1 would be the easiest to implement, both technically and administratively, because it involves no action.

Alternatives S3, S4, and S5 involve modification to the BRC Property including demolition of existing buildings/structures and earth moving. These activities, along with other remedial components would have greater technical implementability challenges compared to Alternatives S2A and S2B, which involve capping in-place of BRC Property contaminated soil, limited demolition of existing buildings/structures, and asphalt pavement as part of the in-place containment system.

For Alternative S4, in general, the demolition of existing buildings/structures (limited demolition under Alternatives S2A and S2B and more extensive demolition under Alternatives S3, S4, and S5), on-Site disposal repository construction (Alternative S4), ICs, and long-term O&M would require coordination between EPA and various Puerto Rico regulatory entities. Puerto Rico and EPA offices regulating land disposal would consult regarding the implementation of Alternatives S4 and S5.

Technical feasibility also differs between Alternatives S2A, S2B, S3, S4, and S5 in terms of implementation because of the volumes of material to be disposed. Under Alternatives S2A, S2B, S3, S4, and S5, approximately 380 bank cubic yards (BCY), 4,140 BCY, 4,520 BCY, 0 BCY, and 56,940 BCY, respectively, of contaminated soil would require off-Site disposal. Under Alternatives S2A and S2B, approximately 18,200 tons of buildings/structures demolition material as compared to Alternatives S3, S4, and S5, where approximately 65,720 tons of buildings/structures demolition material would require off-site disposal. Difficulties may be encountered, because of the limited number of disposal facilities within Puerto Rico.

For Alternative S3, in-situ treatment technologies (stabilization/solidification) would require bench tests and treatability studies to optimize the performance of the treatment method. In-situ treatment technologies are commercially available. Those that involve proprietary technology may not be readily available within Puerto Rico, thus requiring longer-term planning and greater coordination.

Materials, services, and equipment (earthmoving equipment) necessary for construction are readily commercially available. Under Alternatives S2A, S2B, and S4, implementation of long-term monitoring for containment failure would be relatively straightforward as compared to the monitoring of the in-situ treatment under Alternative S3. Specialized equipment and construction staff would be required for Alternative S3.

Costs

A 7% discount rate was used to estimate the costs for each alternative. **Table E**, below, summarizes the present worth costs for all remedial alternatives. For cost estimating and planning purposes the costs were evaluated over a 30-year period except for Alternative S5, which does not require monitoring.

Table E. Summary of Costs

Alternative	Capital Costs	O&M Costs (Annual)	Present-Worth*
S1	$0	$0	$0
S2A	$8,358,000	$23,000	$8,700,000
S2B	$9,697,000	$15,000	$9,940,000
S3	$20,131,000	$7,000	$20,330,000
S4	$17,527,000	$9,000	$17,700,000
S5	$37,731,000	$0	$37,730,000

* A 7% discount rate was used to develop the present-worth costs.

State/Support Agency Acceptance

The Puerto Rico Department of Natural and Environmental Resources concurs with EPA's preferred alternative as presented in this Proposed Plan.

Community Acceptance

Community acceptance of the Preferred Alternative will be evaluated after the public comment period ends and will be described in the Responsiveness Summary section of the Record of Decision, the document in which EPA will formally select a remedy for the Site.

PREFERRED REMEDY AND BASIS FOR PREFERENCE

Based upon an evaluation of groundwater data and the soil remedial alternatives, EPA proposes the interim remedy for groundwater consisting of monitoring and ICs and Alternative S4 (Excavation of Contaminated Soil, Ex-situ Stabilization and On-Site Containment) as the preferred remedial alternative to address the soil contamination at the Site.

The proposed interim action for groundwater includes the following key components:

- A PDI to determine if additional monitoring wells should be installed at the Site and to verify the absence of source material in the vadose zone;
- Annual groundwater monitoring to further evaluate attenuation, migration, and the effects of the soil remedy; and
- ICs in the form of governmental controls such as existing Puerto Rico laws or regulations that serve to restrict the usage of contaminated groundwater by restricting well installation until the aquifer is restored to drinking water quality standards. ICs in the form of informational devices would also be implemented, such as advisories or notices published in newspapers and periodic letters sent to local government authorities on the need to limit water withdrawal or new construction unless appropriate vapor intrusion investigations are conducted and/or mitigation measures are undertaken.

Alternative S4 would provide protection of human health and the environment through excavation, ex-situ treatment (i.e., stabilization), and on-Site containment in conjunction with ICs and monitoring.

Alternative S4 has the following key components:

- Excavation of soil within all areas of concern outside the footprint of the engineered repository.
- Treatment through stabilization of excavated soil using a phosphate-blended amendment;
- Containment of treated soil in an on-Site engineered repository covered with a geomembrane, the material and thickness of which would be determined during the RD phase;
- Post-excavation confirmatory sampling and analysis;
- Backfill with clean fill in excavated areas;
- Demolition of the BRC Property buildings and remaining structures, including sump and foundations;
- ICs in non-residential areas in the form of community notifications and deed restrictions and/or notices to restrict the disturbance and/or usage of areas where hazardous substances, including lead and/or arsenic remain above levels that allow for unlimited use and unrestricted exposure or that would potentially compromise the implemented remedial action; and
- Long-term monitoring.

The estimated present-worth cost for the interim groundwater action is $1.56 million and for the soil action (Alternative S4) is $17.7 million, for a total present-worth cost of $19,260,000. This is an engineering cost estimate that is expected to be within the range of plus 50 percent to minus 30 percent of the actual project cost. Further details of the cost are presented in Appendix G of the FS Report.

Because it is anticipated the preferred remedy will result in hazardous substances, pollutants, or contaminants remaining at the Site above levels that would allow for unlimited use and unrestricted exposure, pursuant to Section 121(c) of CERCLA, statutory reviews will be conducted no less often than once every five years to ensure that the remedy remains protective of human health and environment.

Basis for the Remedy Preference for Groundwater

The proposed interim remedy includes a groundwater monitoring program and ICs to prevent exposure in the near-term. This interim remedy allows EPA to further evaluate attenuation, migration, and the effects of the soil remedy until a final remedy for groundwater is selected.

Based on information currently available, EPA believes that this interim action is protective of human health and the environment until a final remedy is implemented for the groundwater at the Site. Although this interim action is not intended to address fully the statutory mandates, it will limit use or access to groundwater, thereby reducing human risks associated with exposure and achieving the interim groundwater RAO.

Basis for the Remedy Preference for Soil (Alternative S4)

Alternative S4, Excavation of Contaminated Soil, Ex Situ Stabilization and On-site Containment, was selected as the preferred alternative for soil because it is readily implementable, would provide greater permanence as compared to the other capping alternatives and is expected to achieve substantial and long-term risk reduction through treatment of hazardous substances including arsenic and lead in soil.

The preferred alternative, Alternative S4, includes excavation, treatment/stabilization, and containment of source material associated with the principal threat waste. The exposure pathways to human and ecological receptors would be addressed by excavating soil exceeding PRGs from selective areas outside the footprint of the engineered repository, treatment/stabilization, and placement in an engineered repository to be constructed at the BRC Property. Therefore, long-term effectiveness is greater than Alternatives S2A, S2B, or S3. ICs and post-construction monitoring would be implemented to ensure the integrity of the remedy.

Alternatives S3, S4 and S5 would result in reducing toxicity and mobility of contaminants within the soil. However, when compared to S5, Alternative S4 has fewer short-term impacts from truck traffic (e.g., emissions), while still allowing most of the Site to be available for reuse, at a lower cost - $17.7 million compared to $37.7 million for Alternative S5. Additionally, Alternative S4 is more implementable than Alternative S3.

Based upon the information currently available, EPA believes the preferred alternative for soil (Alternative S4) meets the threshold criteria (protection of human health and the environment and compliance with ARARs) and provides the best balance of tradeoffs compared to the other alternatives with respect to the balancing criteria.

The preferred alternative satisfies the following statutory requirements of Section 121 of CERCLA: 1) the proposed remedy is protective of human health and the environment; 2) it complies with ARARs; 3) it is cost effective; 4) it utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and 5) it satisfies the preference for treatment as a principal element. Long-term monitoring would be performed to assure the protectiveness of the interim groundwater and final soil remedy.

Consistent with EPA Region 2's Clean and Green policy, EPA will evaluate the use of sustainable technologies and practices with respect to implementation of the selected remedy.

For additional information on EPA's Preferred Alternative for the Battery Recycling Company Superfund site, please contact:

Zolymar Luna Díaz,
Remedial Project Manager
(787) 977-5844
Luna.zolymar@epa.gov

Lilliana Alemán,
Community Involvement Coordinator
787-977-5816
alemanroman.lilliana@epa.gov

Brenda Reyes,
Community Involvement Coordinator
(787) 977-5869
reyes.brenda@epa.gov

Postal and Physical Address:
U.S. EPA Region 2 Caribbean Environmental Protection Division
City View Plaza II Building, Suite 7000
Km 1.2, Road PR-165
Guaynabo, PR 00969

On the Web at: www.epa.gov/superfund/battery-recycling-company or using the QR Code below.

For general information or questions about EPA's Superfund program, please contact the EPA Regional Public Liaison: George Zachos, zachos.george@epa.gov or (732) 321-6621 or toll free at (888) 283-7626.

SCAN ME

Battery Recycling Company Property

N

0 1,000 2,000 4,000 Feet

1 inch = 2,000 feet

Figure 1
Site Location Map
Battery Recycling Company Superfund Site
Arecibo, Puerto Rico

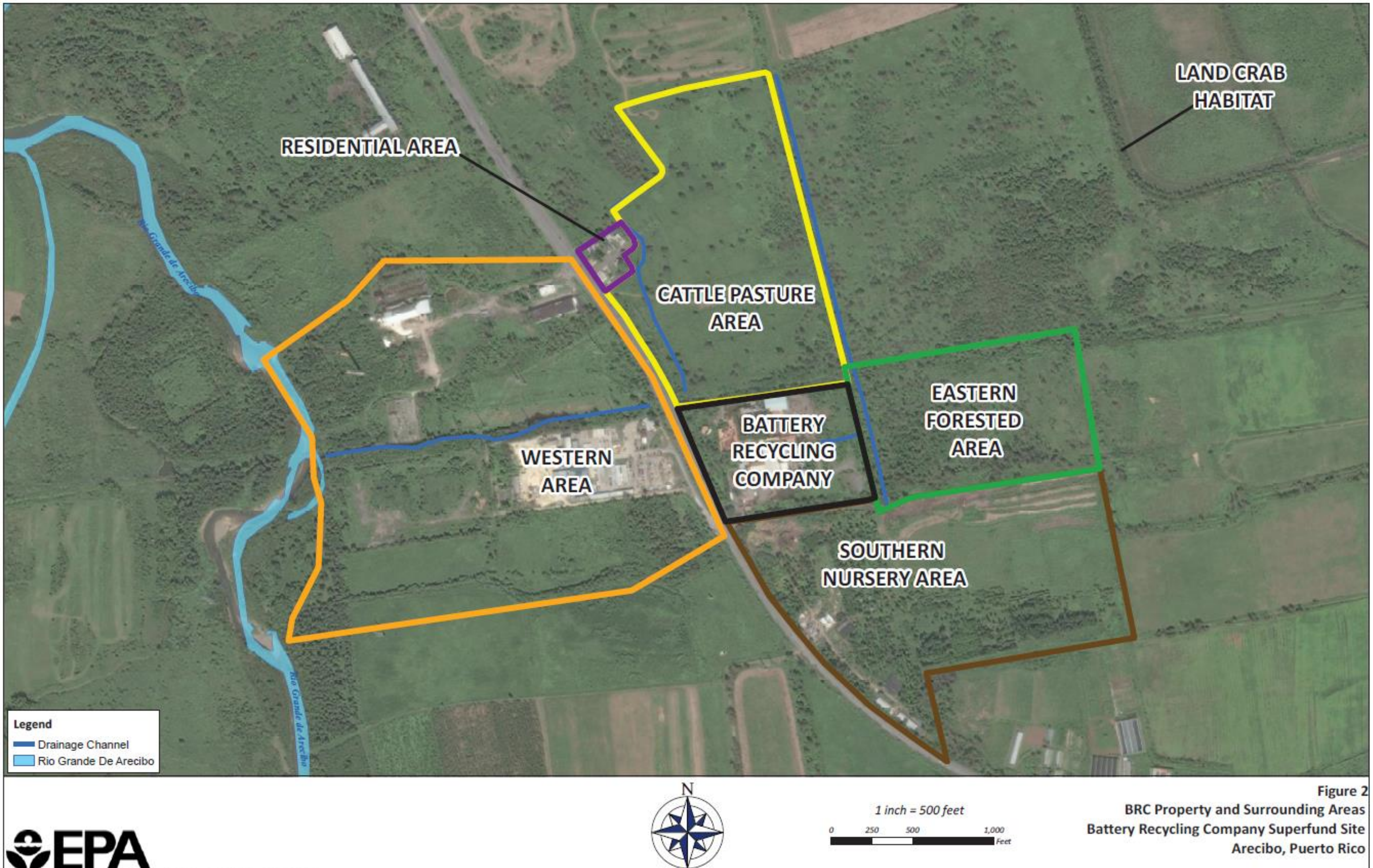


Figure 2
BRC Property and Surrounding Areas
Battery Recycling Company Superfund Site
Arecibo, Puerto Rico

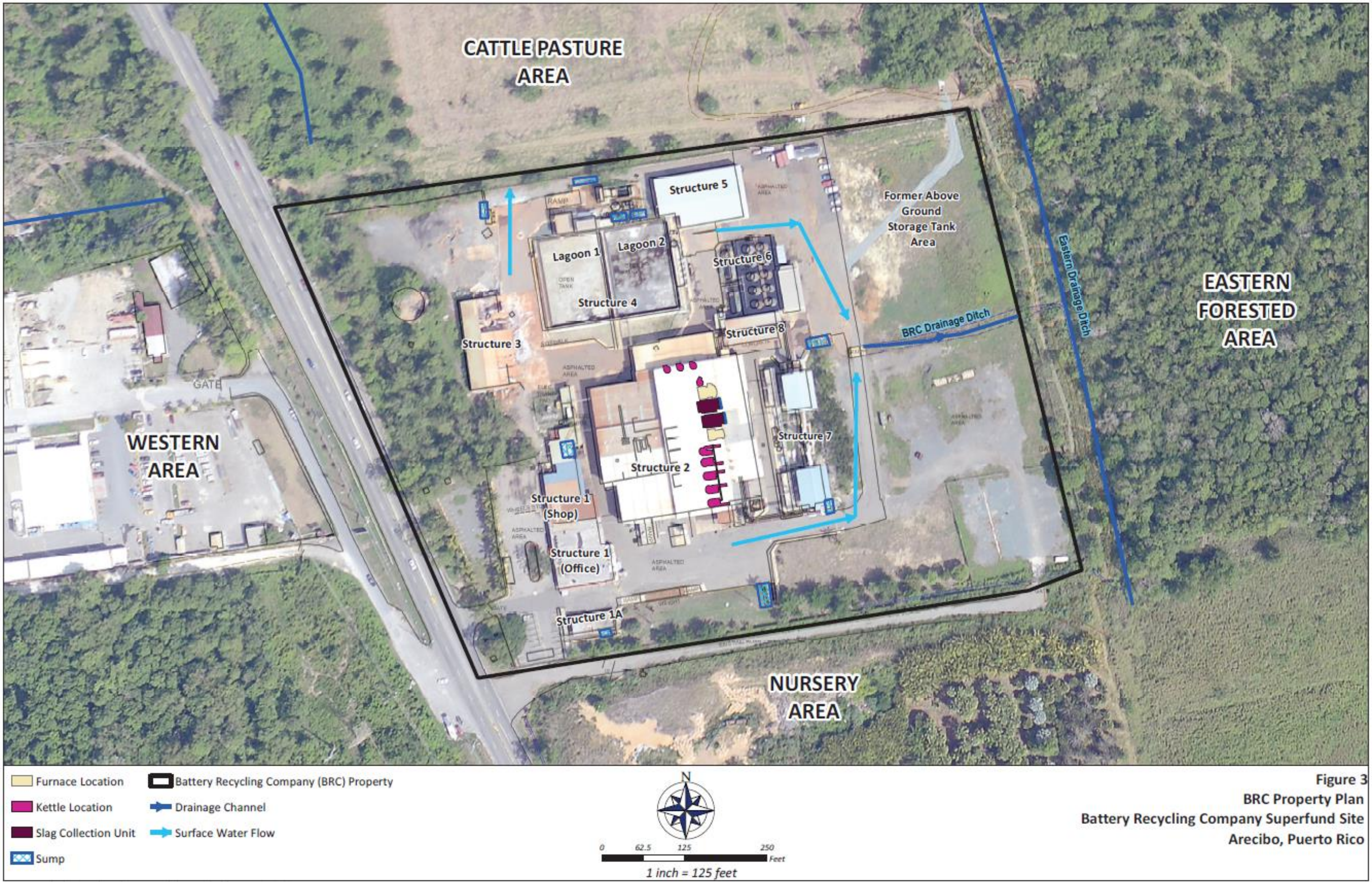
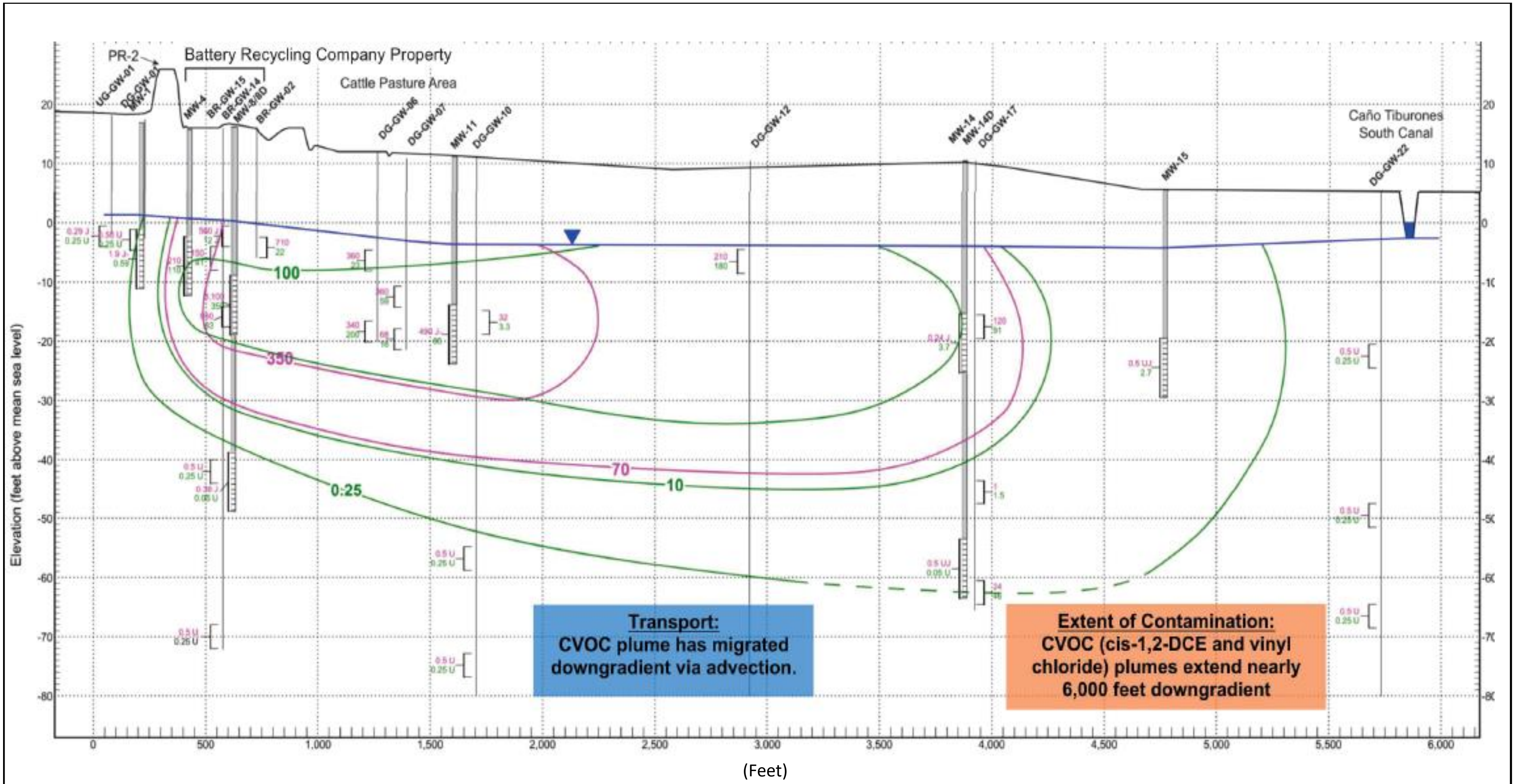


Figure 3
BRC Property Plan
Battery Recycling Company Superfund Site
Arecibo, Puerto Rico

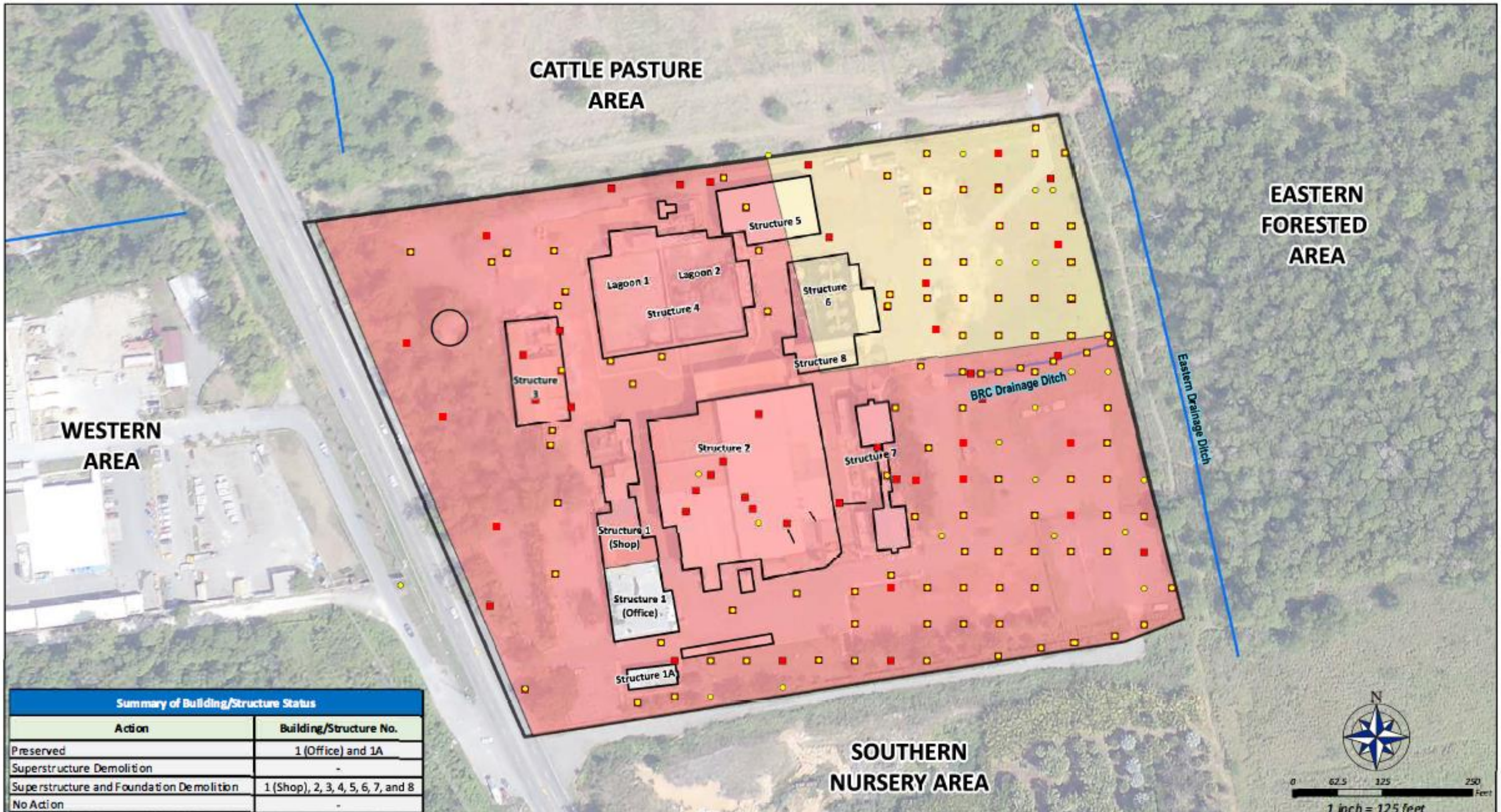


Cis-1,2-DCE Isoconcentration Contour (Dashed Where Inferred) µg/L

Vinyl Chloride Isoconcentration Contour (Dashed Where Inferred) µg/L

EPA

Figure 4
Extent of Groundwater Contamination
Battery Recycling Company Superfund Site
Arecibo, Puerto Rico



Summary of Building/Structure Status

Action	Building/Structure No.
Preserved	1 (Office) and 1A
Superstructure Demolition	-
Superstructure and Foundation Demolition	1 (Shop), 2, 3, 4, 5, 6, 7, and 8
No Action	-

Battery Recycling Company Property
Drainage Channel
Building

Locations Exceeding Lead and Arsenic PRGs:

BRC Property Soil (0 to 1 ft bgs) Arsenic: ≥ 5.8 mg/kg
BRC Property Soil (0 to 1 ft bgs) Lead: ≥ 800 mg/kg
Extent of Excavation of Contaminated Soil within BRC Property (0 to 1 ft bgs)
Extent of On-Site Disposal Repository

Figure 5
Remedial Alternative S4 - BRC Property
Extent of Excavation - 0 to 1 FT BGS
Battery Recycling Company Superfund Site
Arecibo, Puerto Rico

Lugar de Superfondo The Battery Recycling Company
Arecibo, Puerto Rico

Agosto 2023

LA EPA ANUNCIA EL PLAN PROPUESTO

El Plan Propuesto describe dos alternativas; una para remediar el suelo y otra interina para el agua subterránea. La Agencia de Protección Ambiental (EPA, por sus siglas en inglés) consideró e identificó las alternativas preferidas, junto con la justificación de dicha preferencia para el Lugar de Superfondo The Battery Recycling Company (el Lugar).

Este documento fue desarrollado por la EPA, agencia a cargo, en consulta con el Departamento de Recursos Naturales y Ambientales de Puerto Rico (DRNA). Después de revisar y considerar toda la información presentada durante un período de comentario público de 30 días, la EPA seleccionará el remedio final para el suelo y uno interino para el agua subterránea en el Lugar. En base a nueva información o comentario público, la EPA puede modificar la alternativa preferida o seleccionar otra acción según se presenta en este Plan Propuesto. Por lo tanto, se exhorta al público a revisar y comentar sobre todas las alternativas presentadas en este documento.

La EPA emite este Plan Propuesto como parte de sus responsabilidades de participación pública bajo la Sección 117(a) de la Ley de Respuesta Ambiental Comprensiva, Compensación y Responsabilidad de 1980, según enmendada (CERCLA o Superfondo) 42 U.S.C. § 9617(a), y las Secciones 300.430(f) 300.435(c) del Plan de Contingencia Nacional por la Contaminación de Petróleo y Sustancias Peligrosas (NCP, por sus siglas en inglés).

Este Plan Propuesto resume y describe información que se encuentra detalladamente en los informes de Investigación Correctiva (RI, por sus siglas en inglés) y del Estudio de Viabilidad (FS, por sus siglas en inglés), así como en otros documentos contenidos en el Expediente Administrativo del Lugar. La ubicación del Expediente Administrativo se proporciona en el texto bajo "Añada a su calendario".

¡AÑADA A SU CALENDARIO!

PERÍODO DE COMENTARIO PÚBLICO

15 de agosto de 2023 al 14 de septiembre de 2023

EPA aceptará comentarios por escrito sobre el Plan Propuesto durante el período de comentario público.

REUNIÓN PÚBLICA

Martes, 29 de agosto de 2023

La EPA celebrará una reunión pública para proveer información sobre el Plan Propuesto y las alternativas presentadas en el Estudio de Viabilidad. También se aceptarán comentarios verbales y por escrito en la reunión pública. La misma se llevará a cabo en Casa Ulanga, ubicada en la Calle Gonzalo Marín #7, Arecibo.

El Expediente Administrativo para la acción propuesta se encuentra disponible para revisión pública en los siguientes repositorios de información:

U.S. EPA Región 2 División de Protección Ambiental del Caribe
City View Plaza II- Suite 7000
Carretera PR-165 KM. 1.2
Guaynabo, Puerto Rico
Horario: lunes – viernes - 9 am. a 5 pm

Alcaldía Municipio de Arecibo
Ave. José de Diego
Arecibo, Puerto Rico 00612
Teléfono: 787-882-2770
Horario: lunes - viernes 8:00 am a 4:00 pm

Departamento de Recursos Naturales y Ambientales de Puerto Rico
Programa de Respuesta de Emergencia y Superfondo
Edificio de Agencias Ambientales Cruz A. Matos
Carretera 8838, km. 6.3, Sector El Cinco, Río Piedras
Teléfonos: 787-999-2200
Horario: lunes – viernes, 9:00 am a 3:00 pm

U.S. EPA Centro de Registros, Región 2
290 Broadway, Piso 18
New York, New York 10007-1866
Teléfono: 212-637-4308
Horario: lunes - viernes 9:00 am a 5:00 pm

Sitio web de la EPA para The Battery Recycling Company:
www.epa.gov/superfund/battery-recycling-company

ROL DE LA COMUNIDAD EN EL PROCESO DE SELECCIÓN

La EPA y el Departamento de Recursos Naturales y Ambientales de Puerto Rico (DRNA) dependen del insumo del público para garantizar que se consideren las preocupaciones de la comunidad al seleccionar un remedio efectivo para cada lugar de Superfondo. Con este fin, el Estudio de Viabilidad y este Plan Propuesto se han puesto a disposición del público para un período de comentario público que comienza el 15 de agosto de 2023 y concluye el 14 de septiembre de 2023.

Se llevará a cabo una reunión pública durante el período de comentario público en Casa Ulanga, el 29 de agosto de 2023, a las 5:00 p.m., para presentar las alternativas del Estudio de Viabilidad, profundizar en las razones para recomendar la alternativa preferida y recibir comentarios del público.

Los comentarios recibidos durante la reunión pública, así como los comentarios por escrito, se documentarán en la sección "Resumen de Respuestas" del Récord de Decisión (ROD, por sus siglas en inglés), el documento que formaliza la selección del remedio.

Comentarios escritos deben ser dirigidos a:

Zolymar Luna
Gerente de Proyectos
City View Plaza II, Suite 7000
Carretera PR-165, Km 1.2,
Guaynabo, PR 00969
Luna.zolymar@epa.gov

ALCANCE Y ROL DE LA ACCIÓN A TOMAR

Este Plan Propuesto aborda el remedio interino para el agua subterránea y el remedio final propuesto para el suelo. La EPA utiliza acciones interinas para abordar áreas o medios contaminados que en última instancia pueden ser incluidos en el ROD final para un lugar. Las acciones interinas incluyen medidas para tratar la contaminación en una unidad operacional y/o prevenir la migración de contaminantes o un impactor ambiental mayor, hasta que se emita una decisión de remedio final.

El Lugar está considerado una unidad operacional. La EPA completó las actividades de RI/FS tanto para las aguas subterráneas como para el suelo, y los resultados son presentados y discutidos con mayor detalle en este Plan Propuesto. El Lugar consta de un penacho de agua subterránea de compuestos orgánicos volátiles (COVs) y suelo contaminado primordialmente por plomo en tres áreas. El remedio propuesto para los suelos incluye excavación de los suelos contaminados, tratamiento por medio de estabilización del suelo *ex situ*, y contención en una unidad a ser construida, y se espera que sea el remedio final para el suelo.

El remedio interino propuesto para el agua subterránea conlleva un programa de monitoreo e implantación de controles institucionales (CIs) que restringen su uso hasta que un remedio final sea seleccionado por la EPA. Como parte del remedio interino, se llevará a cabo una evaluación adicional de atenuación, migración y los efectos del tratamiento del suelo en el agua subterránea. Una acción final para el agua subterránea se determinará en el futuro.

DESCRIPCIÓN DEL LUGAR

El Lugar incluye una propiedad que fue operada por The Battery Recycling Company, Inc. (BRC) que ubica en la Carretera Estatal Numero 2 (PR-2), kilómetro 72.2 Barrio Cambalache, Arecibo, Puerto Rico (Propiedad BRC) **(Figura 1)**. La Propiedad BRC ocupa aproximadamente 16 acres.

La Propiedad BRC está delimitada en tres lados (norte, este, y sur) por tierras agrícolas o no desarrolladas, y al lado oeste por la PR-2. Al norte de la Propiedad BRC se ubica un área que se utilizó para el pastoreo de ganado (área de pastos de ganado), un hábitat de cangrejos terrestre en las vías de drenaje y canales que drenan hacia el Caño Tiburones, y un área residencial

Al oeste y en el lado opuesto de la PR-2 se encuentran ubicados una ferretería y un negocio de bloques de concreto. Dentro de la Propiedad BRC hay 10 estructuras, denominadas como Estructuras 1 a la 9 y 1A, que consisten en lo siguiente: Estructura 1 (Administración), Estructura 1A (Administración), Estructura 2 (Edificio de Procesamiento), Estructura 3 (Almacenamiento de Desperdicios), Estructura 4 (Planta de Tratamiento de Aguas Residuales), Estructura 5 (Almacenamiento), Estructura 6 (Finca de Tanques), Estructura 7 (Chimenea de Emisiones Atmosféricas, también conocida como la Estructura de la Casa de Bolsas), la Estructura 8 (Almacenamiento de Desperdicios) y la Estructura 9 (Tanque Abandonado). Hay un extenso drenaje superficial en la Propiedad BRC, la cual es una zanja que drena dentro de la Propiedad BRC. Éste corre de oeste a este, y divide la Propiedad BRC (de ahora en adelante, drenaje de la Propiedad BRC) y desemboca en una profunda zanja de drenaje (de ahora en adelante, Drenaje del Este) al este de la Propiedad BRC que fluye hacia el norte en dirección al Caño Tiburones, y desemboca finalmente en la Bahía de Arecibo.

Propiedades adyacentes a la propiedad de The Battery Recycling Company
Propiedades agrícolas y residenciales, inmediatamente adyacentes a las partes actuales e históricas de la Propiedad BRC, se resumen a continuación (**Figura 2**).

Área de Pastoreo de Ganado – Al norte de la Propiedad BRC hay un área agrícola limpia que anteriormente se utilizaba como área de pastoreo para ganado. Esta área siempre ha sido un terreno vacante. Las operaciones de pastoreo para el ganado cesaron en 2011. El área es delimitada al oeste por la carretera estatal PR-2, por la Propiedad BRC al sur, por un área residencial y un hábitat de cangrejos terrestres en las vías de drenaje y canales hacia el Caño Tiburones al norte, y por un área de pastoreo/ agrícolas al norte y al este.

Área Boscosa del Este – Al este de la Propiedad BRC hay un área extensa que consta de tierra boscosa densa. El Drenaje del Este, corre a lo largo de la parte oeste de esta propiedad, separándola de la Propiedad BRC.

Vivero del Sur – Al sur de la Propiedad BRC hay un área agrícola utilizada para un vivero. Hay una verja que separa la propiedad de la Propiedad BRC.

Área Oeste **–** Al oeste de la Propiedad BRC hay un área pavimentada y con césped que se encuentra directamente frente a la carretera PR-2. En el lado opuesto de la carretera PR-2 se encuentran un negocio de fabricación de bloques de concreto y una ferretería, una iglesia, una subestación eléctrica, una propiedad industrial que contiene múltiples edificios, un campo abierto al norte de un almacén industrial y el Río Grande de Arecibo.

Área Residencial **–** Al noroeste de la Propiedad BRC hay un área residencial en un calle sin salida en el lado este de la PR-2. Hay cinco estructuras residenciales dentro de esta área.

HISTORIA DEL LUGAR
BRC fue fundada e inició operaciones en 1994 en la Propiedad BRC para almacenar y reciclaje de baterías de plomo-ácido. Hasta 2004, BRC desmantelaba baterías y operaba una fundición de plomo a pequeña escala. Entre 2004 y 2005, la instalación incrementó sus operaciones y se convirtió en una fundición secundaria a gran escala. Las operaciones en la instalación cesaron en 2014 e incluía romper y clasificar baterías de plomo-ácido y recuperaba el plomo para revenderlo. Las operaciones en BRC generaron grandes cantidades de ácido de batería y residuos contaminados con plomo. El manejo inadecuado de materiales y desperdicios peligrosos por parte de la empresa condujo a altos niveles de contaminación por plomo en la Propiedad BRC y sus alrededores.

Previo a las operaciones de BRC, la Compañía de Fomento Industrial de Puerto Rico (PRIDCO, por sus siglas en inglés) era el dueño de la Propiedad BRC. Desde 1964 hasta 1982, PRIDCO arrendó la Propiedad BRC a Puerto Rico Chemical Company, Inc., (PRCC) para la fabricación de químicos orgánicos utilizando o-xileno para producir ácido fumárico y ácido ftálico desde 1966 hasta el cierre de la instalación debido a una explosión en 1979. PRCC era una subsidiaria de Hooker Chemical Corporation, que cambió su nombre a Occidental Chemical Corporation (Occidental) el 1 de abril de 1982. Después de la explosión en 1979, PRCC cedió el Lugar a PRIDCO. La Propiedad BRC fue vendido por PRIDCO a Luis Figueroa y a su esposa Awilda Carrasquillo para las operaciones de BRC. Luis Figueroa fue el presidente de la BRC mientras estuvo en operación.

El 30 de septiembre de 1986, la EPA acordó una Orden Administrativa de Consentimiento con Occidental, Número de Índice-II RCRA-3013-60302, el cual documentó descargas de tricloroetileno (TCE) dicloro etano (DCE) y cloruro de vinilo durante las operaciones de PRCC en el Lugar. Durante y después de las operaciones de PRCC, se informaron varios derrames de o-xileno fuera de la Propiedad BRC. Evaluaciones posteriores realizadas por la Junta de Calidad Ambiental de Puerto Rico (JCA), conocido hoy como el Departamento de Recursos Naturales y Ambientales o DRNA) notó vegetación estresada al este del tanque de o-xileno y al este del límite de la instalación. En los años posteriores a la explosión y cierre de la planta de 1979, la JCA realizó una inspección y encontró aproximadamente 30,000 bidones de 55 galones de anhídrido ftálico en la propiedad en condiciones deterioradas. Además, se observó una gran cantidad de desperdicios peligrosos almacenados inadecuadamente, con desperdicios líquidos, manchando la superficie del suelo. Muestreo de agua subterránea en el Lugar detectó concentraciones elevadas de 1,1-DCE, trans-1,2-DCE, tolueno, TCE y cloruro de vinilo. También se encontró contaminación de aguas subterráneas cerca de la Propiedad BRC.

Después de que BRC comenzó a operar en la antigua instalación de PRCC, la Junta de Calidad Ambiental de Puerto Rico (JCA, conocida ahora como el DRNA) completó una evaluación preliminar (enero 1996) y la EPA realizó una investigación de muestreo (enero 1999) para evaluar la Propiedad BRC. La investigación de 1999 encontró arsénico en una concentración máxima de 10.6 miligramos por kilogramo (mg/kg) en el suelo de una zanja al sur de la Propiedad BRC y plomo en una concentración máxima de 117 mg/kg en el sedimento del humedal en la parte oeste de la Propiedad BRC.

Durante el período de 1996 a 2004, la JCA encontró que BRC no cumplía con las regulaciones federales y de Puerto Rico, incluyendo operando sin los permisos requeridos, almacenamiento inadecuado de desperdicios peligrosos, irregularidades en el manejo de residuos, derrames y violaciones de las regulaciones de emisiones al aire. Durante el mismo período, la JCA también recibió quejas sobre acumulaciones de baterías y desperdicios sólidos, descargas de ácido de baterías al suelo y aguas superficiales a aguas superficiales adyacente, malos olores, incluyendo olores similares a ácidos, y derrames.

En abril de 2008, la EPA colectó y se analizaron muestras superficiales de este a oeste a lo largo de la verja norte de la Propiedad BRC, que contenían concentraciones de plomo de hasta 57,500 mg/kg. Un evento de muestreo en el 2010 en esta área encontró concentraciones de plomo de hasta 4,700 mg/kg, con una concentración promedio de plomo de 843 mg/kg. Inspecciones de evaluación de cumplimiento realizadas por la EPA bajo la Ley de Conservación y Recuperación de Recursos (RCRA, por sus siglas en inglés) en 2010 encontraron almacenamiento y manejo inadecuado de materiales y desperdicios peligrosos, derrames significativos de material particulado en varias áreas y desbordamiento del sistema de recolección de aguas pluviales/aguas residuales hacia el Drenaje del Este y otras áreas. Las inspecciones mostraron que la BRC estaba en violación de RCRA en varios aspectos, incluyendo la falta de determinación de desperdicios peligrosos en sus desperdicios sólidos, disponer ilegalmente de desperdicios peligrosos e incumplimiento para minimizar riesgos (emisiones).

En noviembre de 2010, y en abril y mayo de 2011, los Centros para el Control y la Prevención de Enfermedades realizaron pruebas a algunos familiares de empleados de BRC para medir los niveles de plomo en la sangre. De cada clínica que realizó las pruebas, entre el 20% y el 40% de las muestras recogidas de la población susceptible (niños menores de 7 años y mujeres embarazadas y lactantes) presentaron niveles de plomo por encima de 10 microgramos por decilitro, el nivel de preocupación establecido por la EPA en ese momento. El muestreo de automóviles y hogares de los empleados de BRC indicó niveles de plomo por encima de 40 microgramos por pie cuadrado ($\mu g/ft^2$), y algunos vehículos alcanzaron mediciones superiores a 100,000 $\mu g/ft^2$. Se creía que el transporte de la vía de contaminación estaba relacionado con la transferencia de polvo contaminado con plomo en las botas y uniformes de los empleados desde la Propiedad BRC hasta sus automóviles y hogares. El 7 de junio de 2011, la EPA firmó un Acuerdo de Conciliación y Orden de Consentimiento CERCLA, Número de Índice-02-2011-2010, con BRC para llevar a cabo actividades de remoción en el Lugar, que incluían, pero no se limitaba, eliminar la contaminación por plomo del área de pastoreo de ganado adyacente, de los vehículos y hogares de los empleados de BRC, e implementar medidas de descontaminación en la Propiedad BRC para mitigar la migración de la contaminación de las instalaciones a través de la ropa de los empleados.

En 2011 y 2012, la EPA realizó evaluaciones de remoción de propiedades residenciales y vehículos que pertenecían a empleados actuales y anteriores de BRC. La primera fase de las evaluaciones de remoción realizada en junio de 2011 resultó en acciones de remoción en propiedades residenciales y vehículos que contenían contaminación por plomo. La segunda fase incluyó la reevaluación de propiedades y vehículos que fueron previamente remediados y acciones de remoción para aquellos que aun tenían niveles elevados de plomo.

Desde agosto hasta octubre de 2011, la JCA colectó muestras de suelo, sedimentos y agua de la Propiedad BRC y otras propiedades dentro de un radio de 1 milla. Niveles elevados de plomo sobre el nivel de cernimiento de suelo (400 mg/kg) se detectaron en varias áreas de la instalación y en las propiedades circundantes.

En 2014, la BRC cesó operaciones. La EPA se hizo cargo de las actividades de remoción en el Lugar. En 2015, la EPA investigó el área de pastoreo de ganado al norte de las instalaciones de BRC usando un analizador portátil de fluorescencia de rayos X (XRF, por sus siglas en inglés) para delimitar las áreas contaminadas por plomo en el área de pastoreo del ganado e identificar áreas para excavación y remoción, las cuales fueron luego realizadas por la EPA. Luego de la remoción de 2015, el muestreo posterior a la excavación confirmó que se eliminó toda la contaminación por plomo del área excavada. En septiembre de 2015, la EPA llevó a cabo un cernimiento adicional mediante XRF con muestras colectadas en la esquina noreste de la Propiedad BRC y el Drenaje de la Propiedad BRC, lo que indicó la presencia de plomo en ambas áreas, con concentraciones generalmente superiores a 800 mg/kg y tan altas como 88,800 mg/kg.

En noviembre de 2015, muestras acuosas de escorrentía que fluían a través del Drenaje de la Propiedad BRC y fuera de la Propiedad BRC mostraron la presencia de plomo en niveles de hasta 1,9 miligramos por litro (mg/L). Además, la EPA colectó muestras de dos áreas de almacenamiento de residuos en la instalación donde se guardaban pilas derivads de horno y otros desperdicios sólidos de las operaciones de la instalación en estructuras al aire libre. Las pilas de desperdicios en estas estructuras no estaban cubiertas ni se mantuvieron dentro de áreas con diques y estuvieron sujetas a la erosión por el viento y el agua. El material de desecho se derramó sobre el terreno abierto, y las manchas eran visibles en toda la superficie del suelo cerca de ambas pilas. Los resultados analíticos mostraron que ambas pilas de desechos contenían niveles elevados de arsénico, cadmio y plomo.

Una evaluación de remoción en la Propiedad BRC fue llevada a cabo por Weston, en nombre de la Rama de Acción de Remoción de la Región II de la EPA, en dos fases desde enero hasta marzo de 2016. Como parte de la investigación del suelo de la Fase I, la EPA avanzó barrenos y colectaron muestras de suelo para el cernimiento de plomo en toda la propiedad, pero no dentro de las huellas del edificio en la Propiedad BRC. La prueba de XRF, con muestras de confirmación de laboratorio, mostraron que el plomo estaba presente por encima del nivel de manejo para remoción (RML, por sus siglas en inglés) de 800 mg/kg en toda la propiedad. Todas las áreas de la propiedad se vieron afectadas, incluidas las áreas de suelo sin cubierta, áreas con vegetación, áreas cubiertas de asfalto y grava, y el Drenaje de la Propiedad BRC. En algunas áreas, se demostró que la contaminación se extendía a profundidades de 3 pies o más bajo la superficie del suelo. En febrero y marzo de 2016, se completó un evento de muestreo de múltiples medios Fase II en el Lugar, que incluyó la colección de muestras acuosas, de desperdicios sólidos, de toallitas y de microvac (succionadas) desde dentro de las estructuras en la Propiedad BRC. En base a los resultados analíticos de las muestras acuosas, de desperdicios sólidos, de toallitas y de microvac colectadas de los sumideros ubicados en la instalación y las Estructuras Número 1, 1A, 2, 4 y 7, se documentó una gran contaminación por plomo a través de la Propiedad BRC.

La DRNA administra la recolección y el análisis de muestras de plomo en dos estaciones de monitoreo de aire dentro de un de cuarta milla de Propiedad BRC; ambas estaciones están predominantemente a sotavento de la Propiedad BRC. Las estaciones de muestreo de plomo funcionan todo el año y las mediciones se envían trimestralmente al Sistema de Calidad del Aire (AQS, por sus siglas en inglés) de la EPA. De 2011 a 2015, las estaciones a sotavento de la Propiedad BRC mostraron repetidamente concentraciones de plomo que superan el Estándar Nacional de Calidad del Aire Ambiental de 0.15 microgramos por metro cúbico (μg/m^3), incluyendo la lectura de plomo más alta en toda la base de datos del AQS para el año calendario 2013 (8,216 μg/m^3). La JCA realizó modelaje de la calidad del aire y mostró que la Propiedad BRC fue la fuente principal que causó las altas concentraciones de plomo en las estaciones de monitoreo a favor del viento y que la contribución de otras fuentes de emisión de plomo en el área es insignificante.

Se consideró que 147 residentes y trabajadores dentro de un cuarto milla que estaban sujetos a emisiones al aire por encima de las guías reglamentarias. Dentro de las 4 millas de la Propiedad BRC y las fuentes asociadas, hay más de 50,000 personas; empresas agrícolas comerciales que incluyen un rancho ganadero al norte y una granja de palmeras y un centro de jardinería al sur; 2,900 acres de humedales; y varios otros entornos sensibles.

El 13 de mayo de 2016, la EPA emitió la Orden Administrativa CERCLA, Número de Índice 02-2016-2022, a la BRC y a los propietarios de la BRC, Luis Figueroa y Awilda Carrasquillo Encarnación, disponiéndose que se abstengan de: retirar equipos o activos de la Propiedad BRC que estén o puedan estar contaminados; excavar, mover o construir sobre los suelos; desmantelar o descontaminar equipos o activos sin aprobación previa y bajo la supervisión de la EPA; hacer que cualquier aceite de desperdicio u otros líquidos que puedan contener sustancias peligrosas se liberen y tomar cualquier otra medida, incluyendo las actividades de disposición que puedan dar lugar a la liberación de sustancias peligrosas.

En 2016, la EPA preparó un Informe del Sistema de Clasificación de Peligros para documentar los resultados de las investigaciones de la EPA hasta la fecha y su determinación de incluir el Lugar en su Lista de Prioridades Nacionales (NPL, por sus siglas en inglés). La EPA agregó el Lugar a la NPL el 3 de agosto de 2017.

CARACTERÍSTICAS DEL LUGAR

Entorno físico del Lugar

El Lugar está ubicado en los depósitos costeros y aluviales de la planicie de inundación del Río Grande de Arecibo, aproximadamente 0.5 millas al este del Río Grande de Arecibo, y aproximadamente 2.75 millas al norte de donde el río que fluye hacia el norte emerge de las montañas hacia el sur. La planicie de inundación y el río continúan por aproximadamente 1.5 millas al norte del Lugar antes de desembocar en la Bahía de Arecibo del Océano Atlántico en la costa norte de Puerto Rico. La Propiedad BRC se encuentra a una altura de aproximadamente 4.5 a 6 metros (15 a 20 pies) sobre el nivel medio del mar (msl, por sus siglas en inglés) con la mitad este de la propiedad inclinada hacia el este y el límite oeste de la propiedad siendo la carretera estatal PR-2, que se encuentra topográficamente más alta que el terreno a ambos lados. Sin embargo, durante eventos climáticos extremos, algunas áreas del Lugar pueden inundarse. A consecuencia, el remedio provisional propuesto para las aguas subterráneas y el remedio propuesto para el suelo integrarán los factores de adaptación climática durante las fases de diseño y construcción para abordar las vulnerabilidades relacionadas con el clima que pueden comprometer la efectividad de los remedios.

De acuerdo con la Herramienta de Detección y Mapeo de Justicia Ambiental de la EPA, el Lugar se encuentra en un tracto censal (72013300302) con problemas de contaminación y oportunidades limitadas de desarrollo/empleo de la fuerza laboral. El remedio interino propuesto para las aguas subterráneas y el remedio propuesto para el suelo no deberían tener impactos adversos en los recursos ambientales que afectarían a las poblaciones minoritarias de bajos ingresos que viven en las inmediaciones del Lugar, o que lo utilizan, debido a su ubicación relativamente aislada con zonificación principalmente industrial y agrícola.

Uso del terreno

Los principales usos del suelo cerca del Lugar son agrícolas, residenciales y comerciales. Hay algunos pozos privados ubicados dentro de un radio de 4 millas del Lugar, pero ninguno está ubicado al norte o gradiente abajo del Lugar de acuerdo con el flujo de agua subterránea regional. El pozo privado más cercano está ubicado dentro de un radio de 0.5 a 1 milla del Lugar. No hay residencias, escuelas o guarderías a menos de 200 pies de la Propiedad BRC. El área residencial más cercana, que consta de cinco residencias, está ubicada aproximadamente a 1,000 pies al noroeste de la Propiedad BRC.

Aproximadamente 55,721 residentes, 22,580 acres de humedales y especies en peligro de extinción incluidas en la lista estatal y federal se encuentran dentro de un radio de 4 millas del Lugar.

Como se discutió anteriormente, el remedio propuesto para el suelo y el remedio interino propuesto para las aguas subterráneas no deberían tener como resultado impactos adversos en los recursos ambientales que afectarían a las poblaciones minoritarias de bajos ingresos que viven en las cercanías del Lugar o lo utilizan debido a su ubicación que es relativamente aislada con una zonificación principalmente industrial y agrícola.

Geología

El Lugar está localizado en la costa centro-norte de Puerto Rico y se encuentra dentro de la Provincia de Piedra Caliza de la Costa Norte. El entorno geológico incluye depósitos aluviales de la llanura aluvial del Río Grande de Arecibo depositados sobre las formaciones de piedra caliza que forman el lecho rocoso.

Hidrogeología

El acuífero de roca madre en el Lugar se encuentra en la formación Caliza Aymamón, que forma parte del sistema acuífero del Carso del Norte. La roca caliza no se encontró durante la investigación del Lugar.

El acuífero aluvial no confinado en el Lugar se extiende desde el nivel freático, aproximadamente de 8 a 20 pies de profundidad, hasta la superficie del lecho rocoso de aproximadamente 130 pies de profundidad. El acuífero aluvial consiste en capas discontinuas de arena, limo y arcilla de espesor variable y la mayor parte de la unidad es limo y arcilla. El caliche, un aluvión cementado con carbonato, se encuentra en el material de relleno poco profundo del Lugar, principalmente sobre el acuífero aluvial. Las unidades de limo y arcilla en el acuífero tienen baja transmisividad y el gradiente de agua subterránea es bajo. En general, el flujo de agua subterránea regional se dirige hacia el norte hacia la costa, con un flujo localizado hacia el Río Grande de Arecibo y Caño Tiburones.

Hidrología superficial

La Propiedad BRC está ubicada en un terreno relativamente plano con una pendiente que drena hacia la parte norte/noreste del Lugar. En la parte central-este de del Lugar, hay un canal de drenaje abierto de aguas pluviales, el Drenaje de la Propiedad BRC, que tiene aproximadamente 1 a 2 pies de profundidad, y que corre de oeste a este y divide la parte este de la Propiedad BRC. Según la topografía de Propiedad BRC, la mayor parte de las aguas pluviales de la mitad este de la propiedad se acumulan en esta zanja de desagüe. El Drenaje de la Propiedad BRC drena hacia una antigua zanja de riego (Drenaje del Este), que corre de sur a norte a lo largo del límite este de la Propiedad BRC.

Históricamente, el agua dentro del Drenaje del Este probablemente fluía hacia el norte a través de una serie de canales de riego que descargaban en el canal sur de Caño Tiburones, llegando eventualmente a la Bahía de Arecibo. Actualmente, este drenaje se extiende aproximadamente 3,000 pies adyacentes a y al norte de la Propiedad BRC. No se observó agua fluyendo en Drenaje del Este, y actualmente parece actuar como un punto de recolección para que la escorrentía se infiltre, en lugar de dirigir el flujo hacia el norte. Hay otra zanja de drenaje en el borde sur de la parte este de la Propiedad BRC, que descarga en Drenaje del Este.

NATURALEZA Y ALCANCE DE LA CONTAMINACIÓN

Los contaminantes primarios relacionados con el Lugar (SRC, por sus siglas en inglés) son inorgánicos (plomo, antimonio, arsénico, cromo y cobre) y compuestos orgánicos volátiles (COVs) clorados; TCE, cis-1,2-DCE y cloruro de vinilo. Estos contaminantes están presentes en los siguientes medios:

Materiales de edificios – las muestras colectadas durante las investigaciones de 2016 y 2019 encontraron contaminación por polvo de plomo en la mayoría de los edificios presentes en la Propiedad BRC, en concentraciones superiores al nivel de Acción Específico del Lugar de la EPA para plomo. Las muestras acuosas y de desperdicios sólidos colectadas de los sumideros y lagunas en el Lugar contenían plomo, antimonio, arsénico, cadmio, cobalto y talio en concentraciones superiores a los RML de la EPA.

Contaminación del suelo en la Propiedad BRC – Se encontró plomo en concentraciones superiores a 800 mg/kg en la mayor parte de la Propiedad BRC en suelos superficiales (0 – 1 pie por debajo de la superficie del suelo), incluyendo los suelos debajo de las estructuras *in situ*. Las concentraciones de plomo del primer pie del suelo generalmente se encontraron en concentraciones inferiores a 800 mg/kg. Sin embargo, en áreas de origen donde probablemente se descargó ácido al subsuelo, se detectaron concentraciones elevadas de plomo a un máximo de 8 a 12 pies por debajo de la superficie del suelo. Las concentraciones más altas (superiores a 5,000 mg/kg) se encontraron cerca de las áreas de la antigua planta de producción (Estructura 2), y del almacén de escoria/batería (Estructura 3). En el Drenaje de la Propiedad de BRC, las concentraciones de plomo fueron superiores a 800 mg/kg, hasta 4 pies por debajo de la superficie del suelo.

Las concentraciones de los otros SRC primarios (antimonio, arsénico, cromo y cobre) también fueron con frecuencia mayores que los criterios de cernimiento del RI, los valores de fondo específicos del Lugar (SSBV, por sus siglas en inglés) y los niveles regionales de cernimiento (RSL, por sus siglas en inglés) de la EPA en suelos superficiales en la Propiedad BRC, específicamente en las áreas de producción y almacenamiento y en el Drenaje del Este. Cerca de las áreas de origen, se encontraron concentraciones primarias de SRC superiores a los criterios en suelos más profundos. Generalmente, la distribución de los SRC primarios siguió una distribución similar a la del plomo.

Suelo y sedimento fuera de la Propiedad – La contaminación con plomo en los suelos fuera de la Propiedad BRC se limita al Drenaje del Este, los suelos adyacentes a la zanja dentro del área boscosa del este y los suelos inmediatamente al norte de la instalación en el área de pastoreo para ganado. Las concentraciones de plomo en suelos y sedimentos superiores a 800 mg/kg están presentes en el Drenaje del Este y las áreas bajas asociadas adyacentes a la Propiedad BRC en una longitud total de aproximadamente 2,000 pies. Las concentraciones más altas de plomo estaban presentes en el Drenaje del Este en la confluencia con el Drenaje de la Propiedad BRC.

Los suelos y sedimentos en el fondo de la zanja contenían las concentraciones más altas de plomo; las concentraciones de plomo disminuyeron en los suelos y sedimentos que subían por el banco de la zanja, disminuyendo significativamente dentro de los primeros 5 a 10 pies lateralmente moviéndose fuera de la zanja. La contaminación por plomo generalmente se limita al pie superior del suelo y los sedimentos.

Una cantidad mínima de contaminación está presente en el Área Boscosa del Este en las áreas bajas asociadas con el Drenaje del Este, y en algunas áreas en la parte superior del banco inmediatamente adyacente al Drenaje del Este. Esta contaminación puede atribuirse a actividades de limpieza, el vertido o el seguimiento durante las actividades de construcción.

Generalmente, las concentraciones de otros SRC primarios (antimonio, arsénico, cromo y cobre) en las áreas fuera de la Propiedad BRC se encontraron en concentraciones mayores que los SSBV dentro del Drenaje del Este y áreas adyacentes. Las concentraciones primarias elevadas de los SRCs se colocaron con concentraciones elevadas de plomo, con las concentraciones más altas en el suelo y los sedimentos en el área donde el Drenaje de la Propiedad BRC descargaría hacia el Drenaje del Este.

Anteriormente, la contaminación por plomo estaba presente en la parte más al sur del Área de Pastoreo de Ganado. Sin embargo, luego de la excavación realizada bajo una acción de remoción, el muestreo reveló que la contaminación restante se limita a los suelos inmediatamente adyacentes al camino de salida de la Propiedad BRC. Además, las concentraciones de plomo en los suelos y sedimentos dentro del Área del Vivero del

Sur, el área oeste y el área residencial son bajas, con concentraciones de plomo superiores a 200 mg/kg adyacentes a PR-2.

Contaminación de sedimento en el Río Grande de Arecibo y canal de irrigación – El plomo y otros SRCs primarios no se detectaron en concentraciones superiores a los criterios de cernimiento del RI o SSBV en los sedimentos del Río Grande de Arecibo o dentro de las zanjas de drenaje del noreste.

Contaminantes en el agua superficial – No se encontró plomo en el agua superficial en concentraciones superiores a los criterios de cernimiento del agua superficial del RI. El único SRC principal que se encontró por encima de los criterios de cernimiento de agua superficial de RI fue el cobre, que se encontró en concentraciones mayores que los criterios en una muestra.

Contaminantes en el agua subterránea – La EPA tomó tres rondas de muestras de agua subterránea. Las concentraciones totales de plomo excedieron el criterio de cernimiento de agua subterránea del RI de 15 microgramos por litro (µg/L) en un pozo durante la Ronda 1 y tres pozos durante la Ronda 3. El plomo disuelto no superó el criterio de detección de agua subterránea del RI en ninguna de las muestras durante las tres rondas de muestreo. Para las tres rondas de muestreo combinadas, se detectó plomo disuelto en 19 de 53 muestras, en concentraciones que oscilaron entre 0.17 y 11 µg/L, todas por debajo del criterio de detección del RI. En la Ronda 3, excepto por un pozo, casi todas las muestras con concentraciones elevadas de plomo total tuvieron detecciones bajas o nulas de plomo disuelto, lo que sugiere que las concentraciones totales observadas en esas muestras estaban relacionadas con partículas (turbidez) en las muestras.

Las concentraciones de arsénico total excedieron el criterio de selección (10 µg/L) en cinco pozos, con un rango de 10.2 a 19.1 µg/L durante las Rondas 1, 2 y 3, con una concentración máxima de 19.1 µg/L durante el evento de la Ronda 3. Sin embargo, durante la Ronda 2, la concentración de MW-9 fue de solo 0.91 J µg/L. Las concentraciones de arsénico disuelto que excedieron los criterios de selección fueron similares durante todas las rondas, con un rango de 10.3 a 19.6 µg/L, en las Rondas 1 y 3, y un máximo de 14.9 µg/L durante la Ronda 2.

Los COVs clorados que se encuentran en concentraciones mayores que los criterios de cernimiento del RI en muestras pozos de monitoreo y muestreo para cernimiento de agua subterránea incluyen TCE, cis-1,2-DCE, trans-1,2-DCE y cloruro de vinilo. De estos COVs clorados, el cis-1,2-DCE y el cloruro de vinilo se encontraron con mayor frecuencia y con mayor distribución. La contaminación de COVs clorados está presente en el agua subterránea debajo y gradiente abajo de la Propiedad BRC entre 16.5 y 73 pies por debajo de la superficie del suelo. La mayor profundidad observada de contaminación por COVs clorados por encima de los criterios de evaluación fue de aproximadamente 73 pies por debajo de la superficie del suelo.

Los datos indican que la fuente de contaminación del agua subterránea se encuentra en la Propiedad BRC y la contaminación migra gradiente abajo en alineación con la superficie potenciométrica medida. Este patrón de distribución sugiere que la contaminación está migrando por advección desde una fuente, y la masa contaminante remanente se absorbe en limo y arcilla de baja permeabilidad. Las concentraciones máximas de cis-1,2-DCE (3500 µg/L en la Ronda 1) y cloruro de vinilo (350 µg/L en la Ronda 3) se detectaron en MW-8, que se encuentra a lo largo del límite norte de la Propiedad BRC, gradiente abajo de la Estructura 3 (el antiguo edificio de almacenamiento de pilas de escoria). Una línea adicional de evidencia es que la contaminación por COVs clorados no se detectó en una muestra de cernimiento de agua subterránea colectada aguas arriba del área aparente de la fuente. El penacho de cis-1,2-DCE tiene una longitud aproximada de 3,500 pies y el penacho de cloruro de vinilo tiene una longitud aproximada de 6,000 pies.

Se cree que el TCE fue la fuente principal de la contaminación por COVs clorados en el Lugar. La presencia de subproductos de degradación (es decir, cis-1,2-DCE y cloruro de vinilo) de la fuente original indicaría que se está produciendo o se ha producido biodegradación en algún momento en el pasado. Degradación de TCE para trans-1,2-DCE también se observó dentro del penacho. Se ha detectado eteno/etano a lo largo del penacho, lo que indica que se ha producido una degradación completa.

Los productos de degradación y las condiciones de reducción en el Lugar muestran que existe evidencia adecuada de biodegradación anaeróbica de compuestos orgánicos clorados dentro del penacho. Los microbios pueden degradar progresivamente el TCE, el cis-1,2-DCE y el cloruro de vinilo a través de la degradación reductora en la fase disuelta a través de la siguiente ruta: TCE → cis-1,2-DCE → cloruro de vinilo → eteno y dióxido de carbono. Cuando el TCE se degrada a DCE, el isómero cis (cis-1,2-DCE) predomina sobre el isómero trans (trans-1,2-DCE). La mayor parte de la vía de degradación reductora requiere un entorno anaeróbico. Sin embargo, mientras que la degradación del cloruro de vinilo puede ocurrir lentamente en un agua subterránea anaeróbica, ocurre más rápidamente en un ambiente aeróbico.

DESPERDICIOS DE AMENAZA PRINCIPAL

La EPA ha establecido expectativas para utilizar el tratamiento para abordar cualquier amenaza principal que presente un lugar. Los desperdicios de amenaza principal son aquellos materiales de origen que se consideran altamente tóxicos o móviles y que, por lo general, no pueden contenerse de manera confiable o presentarían un riesgo significativo para la salud humana o el medio ambiente en caso de exposición.

En todo el Lugar, y particularmente en el Drenaje del Este y la Propiedad BRC, se detectaron concentraciones elevadas de plomo relacionado con el Lugar que exceden una meta preliminar para remediar el mismo (PRG, por sus siglas en inglés) de 800 mg/kg, siendo el máximo de 97,900 mg/kg. Como discutido más adelante, el modelo predice que todos los receptores en la Propiedad BRC superarían significativamente la meta de la EPA de limitar al 5 % o menos la probabilidad de que el nivel de plomo en la sangre (PbB) de un niño o feto en desarrollo supere los 5 microgramos por decilitro (µg/dL). Si el suelo altamente contaminado con plomo no se atiende, sirve como una fuente continua de contaminación a otros medios a través del arrastre del viento, la escorrentía de aguas pluviales y la infiltración de la precipitación. Por lo tanto, la contaminación por plomo en los suelos se ajusta a la definición de desperdicios de amenaza principal y requeriría tratamiento.

¿QUÉ ES UNA "AMENAZA PRINCIPAL"?

El Plan Nacional de Contingencia de Sustancias Peligrosas y Petróleo (NCP) establece una expectativa de que la EPA utilizará el tratamiento para abordar las principales amenazas que plantean para un lugar siempre que sea posible (Sección 300.430(a)(1)(iii)(A) del NCP). El concepto de "amenaza principal" se aplica a la caracterización de "materiales de origen" en un lugar Superfundo. Un material de origen es un material que incluye o contiene sustancias peligrosas, contaminantes o contaminantes que actúan como depósito para la migración de la contaminación a las aguas subterráneas, aguas superficiales o al aire, o que actúan como fuente de exposición directa. Los desechos de principal amenaza son aquellos materiales de origen considerados altamente tóxicos o altamente móviles que generalmente, no pueden contenerse de manera confiable, o presentarían un riesgo significativo para la salud humana o el medio ambiente, si se está expuesto. La decisión de tratar estos desechos se toma en base a un lugar específico a través de un análisis detallado de las alternativas usando los nueve criterios de selección de remedios. Este análisis proporciona una base para llegar a una conclusión legal de que el remedio emplea el tratamiento como elemento principal.

RESUMEN DE LOS RIESGOS EN EL LUGAR

Como parte del RI/FS, la EPA realizó una evaluación de riesgo de referencia para la salud humana (HHRA, por sus siglas en inglés) y una evaluación a nivel de cernimiento del riesgo ecológico (SLERA, por sus siglas en inglés) para estimar los efectos actuales y futuros de los contaminantes en la salud humana y el medio ambiente. La evaluación base de riesgo estimó el riesgo a la salud humana y ecológico que pudiera resultar por la contaminación en el Lugar de no tomar acciones para remediar el mismo.

Información del riesgo para la salud humana

Se utilizó un proceso de evaluación de riesgos para la salud humana de cuatro pasos para evaluar los riesgos de cáncer y los peligros para la salud no relacionados con el cáncer relacionados con el Lugar. El proceso de cuatro pasos se compone de la identificación del peligro, la evaluación de la exposición, la evaluación de la toxicidad y la caracterización del riesgo (véase el cuadro adjunto "Qué es el riesgo y cómo se calcula", página 9).

El HHRA comenzó con la selección de contaminantes de posible preocupación (COPCs, por sus siglas en inglés) en varios medios (es decir, suelo superficial, sedimento, agua superficial y agua subterránea) que podrían causar efectos adversos en las poblaciones expuestas.

Vías de exposición potenciales

Los escenarios de uso del terreno actuales y futuros evaluados en el HHRA incluyeron las siguientes vías de exposición y poblaciones:

—Residentes (adulto y niño [desde el nacimiento hasta <6 años de edad]) en el Área Residencial (Propiedades 1 a 5) al norte de la Propiedad BRC: ingestión incidental y contacto dérmico con el suelo superficial e inhalación de partículas y volátiles liberados del suelo superficial.

— Intruso (adolescente [de 12 a < 18 años de edad]) en Área de Pastoreo de Ganado/Área Boscosa del Este: ingestión incidental y contacto dérmico con el suelo superficial y el suelo superficial de la zanja, e inhalación de volátiles y partículas del suelo superficial.

— Trabajador comercial (adulto) en el Área Oeste/ Área del Vivero Sur: ingestión incidental y contacto dérmico con el suelo superficial e inhalación de partículas y volátiles liberados del suelo superficial.

— Usuario recreativo (cangrejero) (adolescente [12 a < 18 años de edad]) en el Hábitat del Cangrejo Terrestre: ingestión incidental y contacto dérmico con la superficie del suelo e ingestión y contacto dérmico al caminar en sedimento.

— Usuarios recreativos (niños mayores [de 6 a <18 años de edad]) en Área de Pastoreo Ganado/ Área Boscosas del Este: ingestión incidental y contacto dérmico con el suelo de la superficie de la zanja, inhalación de partículas y volátiles liberados del suelo superficial, así como contacto dérmico al caminar en aguas superficiales.

— Usuario recreativo (cangrejero) (adolescente [12 a <18 años de edad]) en el Río Grande de Arecibo: contacto dérmico al caminar por agua superficial e ingestión y contacto dérmico al caminar en sedimento.

Los escenarios del futuro uso de suelos evaluados en el HHRA incluyeron las siguientes vías de exposición y poblaciones:

— Residente (adulto y niño [desde el nacimiento hasta < 6 años de edad]) en la Propiedad BRC, Área de Pastoreo de Ganado/ Área Boscosa del Este o Área Oeste/ Área de Vivero del Sur: ingestión incidental y contacto dérmico con el suelo superficial e inhalación de partículas y volátiles liberados del suelo superficial.

— Trabajador comercial (adulto) en la Propiedad BCR: ingestión incidental y contacto dérmico con el suelo superficial e inhalación de partículas y volátiles liberados del suelo superficial.

¿QUÉ ES UN RIESGO Y CÓMO SE CALCULA?

Una evaluación de referencia de los riesgos para la salud humana del Superfondo es un análisis de los posibles efectos adversos para la salud causados por las emisiones de sustancias peligrosas de un Lugar en ausencia de cualquier acción para controlar o mitigar estos bajo los usos actuales y futuros del terreno. Se utiliza un proceso de cuatro pasos para evaluar los riesgos para la salud humana relacionados con el Lugar para escenarios de exposición máxima razonable.

Identificación de peligros: En este paso, se identifican las sustancias químicas potencialmente preocupantes (COPCs) en el Lugar en varios medios (es decir, suelo, aguas subterráneas, aguas superficiales y aire) basándose en factores como la toxicidad, la frecuencia de aparición y el destino y transporte de los contaminantes en el medio ambiente, las concentraciones de los contaminantes en medios específicos, la movilidad, la persistencia y la bioacumulación.

Evaluación de la exposición: En este paso se evalúan las diferentes vías de exposición a través de las cuales las personas podrían estar expuestas a los contaminantes en el aire, el agua, el suelo, etc. identificados en el paso anterior. Ejemplos de vías de exposición son la ingestión incidental y el contacto dérmico con el suelo contaminado y la ingestión y el contacto dérmico con las aguas subterráneas contaminadas. Los factores relacionados con la evaluación de la exposición incluyen, entre otros, las concentraciones en medios específicos a las que las personas podrían estar expuestas y la frecuencia y duración de esa exposición. Utilizando estos factores, se calcula un escenario de "exposición máxima razonable", que representa el nivel más alto de exposición humana que podría esperarse razonablemente.

Evaluación de la toxicidad: En este paso se determinan los tipos de efectos adversos para la salud asociados a las exposiciones químicas y la relación entre la magnitud de la exposición y la gravedad de los efectos adversos. Los posibles efectos sobre la salud son específicos de cada sustancia química y pueden incluir el riesgo de desarrollar cáncer a lo largo de la vida u otros peligros para la salud no relacionados con el cáncer, como cambios en las funciones normales de los órganos del cuerpo (por ejemplo, cambios en la eficacia del sistema inmunológico). Algunas sustancias químicas son capaces de causar tanto cáncer como otros peligros para la salud no relacionados con el cáncer.

Caracterización del riesgo: Este paso resume y combina los resultados de las evaluaciones de exposición y toxicidad para proporcionar una evaluación cuantitativa de los riesgos del Lugar para todos los COPC. Las exposiciones se evalúan en función del riesgo potencial de desarrollar cáncer y el potencial de peligros para la salud no relacionados con el cáncer. La probabilidad de que un individuo desarrolle cáncer se expresa como una probabilidad. Por ejemplo, un riesgo de cáncer de 10^{-4} significa un “riesgo de cáncer en exceso de uno en diez mil”; o se puede observar un cáncer adicional en una población de 10,000 personas como resultado de la exposición a contaminantes del Lugar bajo las condiciones identificadas en la Evaluación de Exposición. Las normativas actuales del Superfondo para las exposiciones identifican el rango para determinar si es necesaria una acción correctiva como un exceso de riesgo individual de cáncer de por vida de 10^{-4} a 10^{-6}, que corresponde a un exceso de riesgo de cáncer de uno en diez mil a uno en un millón. Para los efectos sobre la salud no relacionados con el cáncer, se calcula un "índice de riesgo" (HI, por sus siglas en inglés).

El concepto clave de un HI no cancerígeno es que existe un límite (medido como un HI menor o igual a 1) por debajo del cual no se espera que se produzcan riesgos para la salud no cancerígenos. El objetivo de protección es de 10^{-6} para el riesgo de cáncer y un HI de 1 para un peligro para la salud no relacionado con el cáncer. Las sustancias químicas que superan un riesgo de cáncer de 10^{-4} o un HI de 1 suelen ser las que requerirán medidas correctoras en el Lugar y se denominan sustancias químicas preocupantes o COC (por sus siglas en inglés) en la decisión del remedio final o Récord de Decisión.

— Trabajador agrícola (adulto) en la Propiedad BRC, Área de Pastoreo de Ganado/ Área Boscosa del Este o Área Oeste/ Área de Vivero del Sur: ingestión incidental y contacto dérmico con el suelo superficial e inhalación de partículas y volátiles liberados del suelo superficial.

— Usuario recreativo (cangrejero) (adolescente [12 a < 18 años de edad]) en el Hábitat del Cangrejo Terrestre: ingestión incidental y contacto dérmico con el suelo superficial e inhalación de partículas y volátiles liberados del suelo superficial, así como contacto dérmico al caminar en aguas superficiales.

— Trabajador de la construcción (adulto) en la Propiedad BRC: ingestión incidental y contacto dérmico con el suelo superficial/subsuperficial e inhalación de partículas y volátiles liberados del suelo superficial/subsuperficial.

— Usuario de agua residencial (adultos y niños [desde el nacimiento hasta < 6 años de edad]): ingestión y contacto dérmico con agua subterránea o inhalación de sustancias químicas volátiles en el agua subterránea mientras se baña o se ducha.

— Usuarios de agua en el trabajo (adulto): ingestión y contacto dérmico mientras usa agua del grifo en el trabajo.

En esta evaluación, las concentraciones de punto de exposición (EPC, por sus siglas en inglés) se estimaron utilizando la concentración máxima detectada de un contaminante o el límite de confianza superior (UCL, por sus siglas en inglés) del 95 % de la concentración promedio. Las ingestas crónicas diarias se calcularon con base en la exposición máxima razonable (RME, por sus siglas en inglés), que es la exposición más alta que se prevé razonablemente en el Lugar. No se detectaron COPCs a niveles de cernimiento en los sedimentos analizados, por lo que no se desarrollaron EPCs para las exposiciones a sedimentos en el Río Grande de Arecibo.

Caracterización del riesgo

En la evaluación de riesgos, se evaluaron dos tipos de efectos tóxicos para la salud de los COPCs distintos al plomo: riesgo de cáncer y peligro no cancerígeno. Las estimaciones de riesgo de cáncer calculadas para cada receptor se compararon con el rango de riesgo objetivo de la EPA de $1x10^{-6}$ (uno en un millón) a $1x10^{-4}$ (uno en diez mil). Las estimaciones calculadas del índice de riesgo no cancerígeno (HI, por sus siglas en inglés) se compararon con el valor umbral objetivo de 1 de la EPA. Esta sección brinda una descripción general de los riesgos para la salud humana que resultan de la exposición a contaminantes que superan los umbrales objetivos de riesgo de cáncer y peligro no cancerígeno. Los riesgos de plomo y la evaluación de la intrusión de vapor se analizan por separado.

Suelo superficial - Según los resultados que se muestran en la **Tabla A**, los riesgos de cáncer excedieron el rango aceptable de la EPA de $1×10^{-6}$ a $1×10^{-4}$ para futuros residentes ($1×10^{-3}$) y trabajadores agrícolas ($3×10^{-4}$) en la Propiedad BCR. Los riesgos de cáncer fueron iguales al extremo superior del rango aceptable de la EPA (es decir, $1 × 10^{-4}$) para los residentes actuales/futuros en las Propiedades 3 y 5 y para futuros residentes en el Área Boscosa del Este/Área de Pastero de Ganado. Los potenciales riesgos elevados de cáncer por exposición al suelo se deben principalmente al arsénico y al cromo presentes en el suelo superficial. El riesgo de cáncer por el cromo puede estar sobreestimado porque se asumió que todo el cromo está en su forma más toxica como cromo hexavalente y no hay evidencia de que el cromo hexavalente haya estado involucrado en las operaciones históricas del Lugar a diferencia de la forma trivalente la cual es menos tóxica.

El índice total de riesgo no cancerígeno para los niños residentes en las propiedades residenciales 1 – 5 y el Área Oeste/Área de Viveros del Sur, así como para los trabajadores de la construcción en la Propiedad BRC, superó el umbral aceptable de unidad 1 de la EPA, pero no lo hizo cuando se desglosó por efecto/órgano objetivo individual.

Tabla A. Resumen de riesgos asociados con el suelo superficial

Receptor	**Índice de Riesgo**[1]	**Riesgo de Cáncer**[2]
Área Residencial (Uso Actual/Futuro)		
Niño/Adulto Residente– Propiedad 1	**2**$^{+*}$	$8 x 10^{-5}$
Niño/Adulto Residente– Propiedad 2	**2**$^{+}$	$9 x 10^{-5}$
Niño/Adulto Residente– Propiedad 3	**2**$^{+}$	$1 x 10^{-4}$
Niño/Adulto Residente– Propiedad 4	**2**$^{+}$	$9 x 10^{-5}$
Niño/Adulto Residente– Propiedad 5	**2**$^{+}$	$1 x 10^{-4}$
Área de Pastoreo de Ganado/Área Boscosa del Este (Uso Futuro)		
Niño/Adulto Residente	**5**	$1 x 10^{-4}$
Área Oeste/ Área del Vivero Sur (Uso Futuro)		

Receptor	Índice de Riesgo[1]	Riesgo de Cáncer[2]
Niño/Adulto Residente	**2**[+]	9 x 10^{-5}
Propiedad BRC (Uso Futuro)		
Niño/Adulto Residente	**7**	**1 x 10^{-3}**
Trabajador Agrícola	0.9	**3 x 10^{-4}**
Trabajador Comercial	**5**[+]	8 x 10^{-6}

***Texto en negrilla** indica un valor por encima del rango o valor de riesgo aceptable.

[+]El peligro no relacionado con el cáncer no supera 1 en función de un desglose por efecto/órgano objetivo individual.

[1]Para los residentes, el índice de riesgo no relacionado con el cáncer que se muestra es para un niño, ya que hubo índices de riesgo elevados solo para los niños residentes. El índice de riesgo para el adulto y el niño residente se evaluó por separado.

[2]Para los residentes, el riesgo de cáncer se basa en un escenario ajustado por edad que combina exposiciones de niños y adultos. Los riesgos carcinogénicos para el niño y el adulto se combinan para representar los riesgos carcinogénicos acumulativos de por vida.

Agua subterránea: como se muestra en la **Tabla B**, los riesgos de cáncer excedieron el rango aceptable de la EPA de 1×10^{-6} a 1×10^{-4} para el usuario residencial hipotético en el futuro (2×10^{-2}) y trabajadores (7×10^{-4}) usando agua subterránea, y los riesgos elevados de cáncer fueron impulsados principalmente por el cloruro de vinilo. El índice de riesgo no cancerígeno estuvo por encima del umbral de unidad 1 de la EPA para futuros niños (40) y adultos (24) usuarios de agua subterránea residencial, impulsado principalmente por cis-1,2-DCE, trans-1,2-DCE, cloruro de vinilo, arsénico y plomo, y para futuros trabajadores usuarios de agua subterránea (15), que fue impulsado principalmente por cis-1,2-DCE.

Agua superficial y sedimentos: los riesgos de cáncer y los peligros no cancerígenos para los usuarios recreativos potencialmente expuestos a contaminantes en el agua superficial en el Hábitat del Cangrejo Terrestre no excedieron los umbrales respectivos de la EPA. Los riesgos de cáncer y los peligros no cancerígenos para los usuarios recreativos que caminan por las aguas superficiales o los sedimentos del Río Grande de Arecibo también estuvieron muy por debajo de los umbrales respectivos de la EPA.

Tabla B. Resumen de riesgos asociados con agua subterránea (uso futuro)

Receptor	Índice de Riesgo	Riesgo de Cáncer[1]
Residente Niño	**40**	**2 x 10^{-2}**
Residente Adulto	**24**	
Trabajador	**15**	**7 x 10^{-4}**

***Texto en negrilla** indica un valor por encima del rango o valor de riesgo aceptable.

[1]Ver nota 2 bajo la Tabla B

Evaluación de plomo - El plomo se seleccionó como COPC en el suelo, sedimento (evaluado como suelo superficial de zanja) y agua subterránea en función de las concentraciones máximas detectadas que superan los niveles de cernimiento. Dado que no hay valores de toxicidad cuantitativos publicados para el plomo, no es posible evaluar las estimaciones de riesgo de cáncer y no cancerígenos del plomo utilizando la misma metodología que los otros COPCs.

De acuerdo con las guías de la EPA, la exposición al plomo se evaluó por separado de los demás contaminantes utilizando modelos de plomo en sangre. El objetivo de reducción del riesgo de plomo en los suelos del Lugar es limitar al 5% o menos la probabilidad de que el PbB de un niño o feto en desarrollo supere los 5 µg/dL. El modelo biocinético de captación de exposición integrada (IEUBK, por sus siglas en inglés) se utilizó para evaluar las exposiciones residenciales al plomo en el suelo superficial y las aguas subterráneas y las exposiciones de usuarios recreativos de niños mayores al plomo en el suelo superficial de la zanja. El modelo de plomo adulto (ALM, por sus siglas en inglés) se utilizó para evaluar la exposición de intrusos y trabajadores al plomo en el suelo superficial, suelo de las zanjas y suelo superficial/subsuperficial. El modelo IEUBK indicó que el porcentaje de una población hipotética que excedía el valor de referencia del nivel de plomo en la sangre de 5 µg/dL se elevó para los siguientes escenarios de exposición: exposiciones residenciales actuales/futuras al suelo superficial en la Propiedad 4 del Área Residencial (7.5 %), exposiciones residenciales futuras al suelo superficial en la Propiedad BRC (98.4 %), exposiciones futuras de usuarios recreativos a la tierra superficial en las zanjas en el Área Boscosa del Este/Área de Pastoreo de Ganado (18.7 %) y exposiciones residenciales futuras al agua subterránea utilizada como agua de grifo (18.1%). De manera similar, el modelo ALM predijo que el 36 % de los trabajadores comerciales, el 76 % de los trabajadores agrícolas y el 85 % de los trabajadores de la construcción superarían la meta de reducción de riesgos en la Propiedad BRC.

Evaluación de intrusión de vapor - Si las propiedades sobre el penacho de agua subterránea de COV (es decir, Propiedad BRC Área de Pastoreo de Ganado/ Área Boscosa del Este) se vuelven a ocupar o se desarrollan para uso residencial o comercial, los futuros residentes o trabajadores pueden estar expuestos a COPCs volátiles a través de la intrusión de vapor del agua subterránea al aire interior. Para evaluar que se complete el potencial de esta vía se compararon los datos de los pozos de monitoreo de aguas subterráneas de todos los pozos de monitoreo menos profundos con el escenario de exposición apropiado (residencial o comercial) de los niveles de detección de intrusión de vapor (VISL, por sus siglas en inglés) de la EPA en función de un riesgo de cáncer objetivo de $1x10^{-6}$ y un cociente de riesgo objetivo no cancerígeno de 1. Las concentraciones de agua subterránea de tres sustancias químicas (es decir, cloruro de vinilo, TCE y trans-1,2-DCE) excedieron los VISL residenciales. El cloruro de vinilo fue el único químico que también excedió el VISL comercial. Por lo tanto, estos productos químicos (es decir, cloruro de vinilo, TCE y trans-1,2-DCE) están presentes en concentraciones en el agua subterránea que tienen el potencial de migrar a los edificios en caso de que se vuelvan a ocupar los edificios en BRC o si las áreas dentro de los límites del penacho se desarrollan para uso residencial o comercial en el futuro.

Evaluación de riesgo ecológico

Se llevó a cabo una evaluación de riesgos ecológicos a nivel de cernimiento (SLERA, por sus siglas en inglés) para evaluar el potencial de riesgos ecológicos a receptores sensitivos de la presencia de contaminantes en la superficie del suelo, los sedimentos y las aguas superficiales. Las concentraciones de suelos superficiales, aguas superficiales y sedimentos se compararon con los niveles de cernimiento ecológico (ESL, por sus siglas en inglés) como un indicador del potencial de efectos adversos para los receptores ecológicos. Además, el riesgo potencial para siete receptores sustitutos representativos de las comunidades de aves y mamíferos (aves herbívoras, aves invertívoras, aves carnívoras, mamíferos herbívoros, mamíferos voladores herbívoros, mamíferos invertívoros y mamíferos voladores invertívoros) que se supone que utilizan el Lugar se evaluaron a través de modelos de exposición de la cadena alimenticia. Puede encontrar un resumen completo de todos los escenarios de exposición en el SLERA.

***Suelo superficial* –** A través del cernimiento se determinó que varios inorgánicos y pesticidas potencialmente presentan un riesgo para los receptores ecológicos. En base a los resultados del modelo de la cadena alimenticia que se realizó, y una evaluación de la frecuencia y magnitud de los ESL y niveles de trasfondo, la mayor parte del riesgo se atribuyó al plomo, antimonio, cadmio y cromo en el Drenaje del Este, localizaciones selectas en el Área Boscosa del Este adyacente a la zanja y el lado este de la Propiedad BRC.

Además, a pesar de las excedencias observadas dentro de la Propiedad BRC, el Área Oeste, el Área de Viveros del Sur y el Área Residencial, solo las zanjas en el lado este de la propiedad, que están conectadas a donde se utilizó el material de origen en la instalación, contienen un hábitat ecológico valioso (**Figura 2**). Existe un hábitat

¿QUÉ ES EL RIESGO ECOLÓGICO Y CÓMO SE CALCULA?

Una evaluación de riesgo ecológico de referencia de Superfondo es un análisis de los posibles efectos adversos para la salud de la biota causados por la liberación de sustancias peligrosas de un lugar en ausencia de cualquier acción para controlar o mitigar estos bajo los usos actuales y futuros de la tierra y los recursos. El proceso utilizado para evaluar los riesgos ecológicos relacionados con el Lugar incluye:

Formulación del problema: En este paso, se identifican los contaminantes de preocupación ecológica potencial (COPEC) en el Lugar. Los puntos finales de evaluación se definen para determinar qué entidades ecológicas son importantes para proteger. Luego, se determinan los atributos específicos de las entidades que están potencialmente en riesgo y que es importante proteger. Esto proporciona una base para la medición en la evaluación de riesgos. Una vez que se eligen los puntos finales de la evaluación, se desarrolla un modelo conceptual para proporcionar una representación visual de las relaciones hipotéticas entre las entidades ecológicas (receptores) y los factores de estrés a los que pueden estar expuestos.

Evaluación de la exposición: En este paso, se realiza una evaluación cuantitativa de qué plantas y animales están expuestos y en qué grado están expuestos. Esta estimación de las concentraciones de puntos de exposición incluye varios parámetros para determinar los niveles de exposición a un contaminante químico por parte de una planta o animal seleccionado (receptor), como el uso del área (cuánto del Lugar utiliza típicamente un animal durante sus actividades normales); tasa de ingestión de alimentos (cuánta comida consume un animal durante un período de tiempo); tasas de bioacumulación (el proceso mediante el cual una planta o un animal absorben sustancias químicas, ya sea directamente por exposición a suelo, sedimentos o agua contaminados, o al ingerir alimentos contaminados); biodisponibilidad (con qué facilidad una planta o un animal puede absorber un contaminante del medio ambiente); y etapa de vida (por ejemplo, juvenil, adulto).

Evaluación de efectos ecológicos: En este paso, se realizan revisiones de la literatura, estudios de campo o pruebas de toxicidad para describir la relación entre las concentraciones de contaminantes químicos y sus efectos en los receptores ecológicos, sobre una base específica de medios, receptores y sustancias químicas. Para proporcionar estimaciones de riesgo de límite superior e inferior, se identifican puntos de referencia toxicológicos para describir el nivel de contaminación por debajo del cual es poco probable que ocurran efectos adversos y el nivel de contaminación en el que es más probable que ocurran efectos adversos.

Caracterización del riesgo: En este paso, los resultados de los pasos anteriores se utilizan para estimar el riesgo que representa para los receptores ecológicos. Las estimaciones de riesgo individuales para un receptor dado para cada sustancia química se calculan como un cociente de peligro (HQ), que es la relación entre la concentración de contaminantes y un punto de referencia toxicológico determinado. En general, un HQ superior a 1 indica la posibilidad de un riesgo inaceptable. Se describe el riesgo, incluido el grado general de confianza en las estimaciones de riesgo, resumiendo las incertidumbres, citando pruebas que respaldan las estimaciones de riesgo e interpretando la adversidad de los efectos ecológicos.

limitado en el área de pastoreo de ganado del norte, que incluye el Hábitat del Cangrejo Terrestre, no obstante, esta área no se determinó que estuviera influenciada por la Propiedad BRC dado a las vías de drenaje.

Aguas superficiales - Mediante el cernimiento de los resultados de las aguas superficiales del Río Grande de Arecibo y las zanjas de drenaje que conducen al humedal de Caño Tiburones, se determinó que varios inorgánicos presentan un riesgo potencial para los receptores ecológicos. Sin embargo, luego de revisar más a fondo la frecuencia y la magnitud de estas detecciones, así como sus ubicaciones en relación con la Propiedad BRC, se determinó que ninguno de estos compuestos fue considerados COPECs relacionados con las operaciones previas en la instalación BRC. Las excedencias esporádicas de ESL de estos metales no representan un riesgo significativo.

Sedimento **–** Muestras de sedimentos potencialmente relacionados con el Lugar se colectaron aguas abajo del Río Grande de Arecibo, y se analizaron para arsénico, cromo, cobre, plomo, vanadio y zinc utilizando XRF. Las concentraciones máximas y promedio de cobre y cromo potencialmente relacionadas con el Lugar excedieron los ESL, pero las concentraciones no excedieron el trasfondo, lo que indica que estos metales no están relacionados con el Lugar. No hay ESL para el vanadio, pero la concentración de trasfondo máxima superó la concentración máxima en el Lugar, lo que indica que el vanadio no está relacionado con el Lugar. Aunque las concentraciones máximas de arsénico, plomo y zinc excedieron tanto el ESL como el trasfondo, los resultados promedio de XRF para sedimentos potencialmente relacionados con el Lugar (aguas abajo) no los excedieron. Los resultados no indican ninguna contaminación significativa relacionada con el Lugar por la liberación en la Propiedad BRC.

Se preparó un anejo posterior al SLERA para el área del Drenaje del Este que se enfoca en el receptor más sensible (aves herbívoras, la paloma terrestre común [Columbina passerina]) y el plomo (principal factor de riesgo). Aunque el cromo, el cadmio, el plomo y el antimonio se identificaron como contribuyendo a elevar el riesgo, se determinó que el cromo, el cadmio y el antimonio estaban colocados con plomo, por lo que el documento se centró en el plomo. Este anejo posterior al SLERA derivó un objetivo de remedio preliminar (PRG, por sus siglas en inglés) para el plomo al refinar los modelos de exposición de la cadena alimenticia para determinar la concentración de plomo en el suelo que protegería a las poblaciones de aves herbívoras (Ver "Metas de Remedio: a continuación).

Resumen de la evaluación de riesgos

En conclusión, se identificaron riesgos potenciales elevados de cáncer y/o peligros no cancerígenos para usos residenciales y no residenciales futuros de la Propiedad BRC, así como para el uso futuro de aguas subterráneas como agua de grifo. El plomo se evaluó por separado de otros COPCs, utilizando modelos que predicen los niveles de plomo en la sangre, y se identificaron riesgos elevados para exposiciones residenciales actuales/futuras en el Área Residencial - Propiedad 4, usos residenciales y no residenciales futuros de la Propiedad BRC, uso recreativo futuro de las zanjas del Área Forestal del Este/Área de Pastoreo de Ganado y uso futuro de agua subterránea como agua de grifo. Además, según la evaluación de detección de intrusión de vapor, tres sustancias químicas (es decir, cloruro de vinilo, TCE y trans-1,2-DCE) están presentes en concentraciones en el agua subterránea que tienen el potencial de migrar a los edificios a niveles que podrían causar riesgos de inhalación si la Propiedad BRC u otras áreas afectadas por penacho de agua subterránea se redesarrollan para uso residencial o comercial. Además, los contaminantes inorgánicos representaban un riesgo para los receptores ecológicos; la distribución de los excesos de metales en el suelo sugiere que los riesgos potenciales se deben principalmente a las concentraciones de metales en el Drenaje del Este y el lado este de la Propiedad BRC.

En base a los resultados de la salud humana y evaluaciones de riesgo ecológico, el juicio actual de la EPA es que la Alternativa Preferida identificada en este Plan Propuesto es necesaria para limitar los riesgos potenciales para proteger la salud humana o el medio ambiente de las liberaciones reales o amenazas de sustancias peligrosas al medio ambiente.

OBJETIVOS DE LA ACCIÓN DE REMEDIO

Los Objetivos de la Acción de Remedio (RAOs, por sus siglas en inglés) para el Lugar son objetivos específicos para proteger la salud humana y el medio ambiente. Estos objetivos se basan en la información y los estándares disponibles, como los requisitos aplicables o relevantes y apropiados (ARARs, por sus siglas en inglés), la orientación a considerarse (TBC, por sus siglas en inglés) y los niveles basados en el riesgo específicos del Lugar. De acuerdo con el Plan de Contingencia Nacional de Contaminación de Petróleo y Sustancias Peligrosas (NCP, por sus siglas en inglés) y la guía de RI/FS, los RAO deben incluir sustancias químicas de interés (COC), rutas de exposición y receptores. Se desarrollaron RAOs para suelos y aguas subterráneas.

La sección 121(d) de CERCLA, enmendada, requiere que cualquier acción de remedio debe, como mínimo, lograr la protección general de la salud humana y el medio ambiente y cumplir con los ARAR. La acción de aguas subterráneas propuesta será un remedio interino a fin de evitar exposición mientras el agua subterránea exceda los estándares de agua potable y permitirá que la EPA evalúe más a fondo la atenuación, migración y los efectos del remedio del suelo.

Los RAOs son los siguientes:

Suelos:

- RAO 1: Prevenir la exposición humana al suelo contaminado a través de la ingestión y la inhalación que excedan riesgos inaceptables.
- RAO 2: Prevenir la exposición al suelo contaminado por receptores ecológicos (a través del contacto directo, la ingestión y la absorción en la cadena alimenticia) que excedan riesgos inaceptables
- RAO 3: Prevenir la migración de suelos contaminados a aguas superficiales, sedimentos, y aguas subterráneas.

Agua subterránea:

- RAO 4: Prevenir la exposición a través del contacto directo, ingestión o inhalación de vapores a aguas subterráneas contaminadas en concentraciones que excedan riesgos inaceptables.

El modelaje del agua subterránea estima que la atenuación natural, inclusive con tratamiento activo, como se evaluó en el FS, podría tomar varios siglos para restaurar el agua subterránea. Por lo tanto, no se desarrolló un RAO específico para el remedio interino.

Metas preliminares de remedio

El desarrollo de metas de remedio y PRGs es un requisito del NCP (40 CFR 300.430(e)(2)(i)). La identificación y selección de los PRG generalmente se basa en los RAO, los usos actuales y futuros previstos del suelo y los ARAR que han sido identificados tentativamente. Los PRG generalmente se presentan como valores específicos de sustancias químicas y medios que abordan directamente los RAO.

La EPA ha establecido PRGs que utilizará para limpiar el suelo contaminado del Lugar. Los PRG para el Lugar se muestran en la **Tabla C**, a continuación.

Tabla C. Identificación de PRGs

Área de interés/medio	Contaminante[1]	PRG
Propiedad BRC – Suelo	Plomo	800 mg/kg[5]
	Arsénico	5.8 mg/kg
Zanja de Drenaje del Este – Suelo	Plomo	355 mg/kg[2]
		134 mg/kg[3]
Área Residencial – Suelo	Plomo	400/200 mg/kg[4]

1 – El cromo, el antimonio y el cadmio también son contaminantes ecológicos de preocupación en los suelos del Lugar, pero no se desarrollaron PRGs para estos metales porque están colocados con plomo.

2 – PRG basado en el riesgo para la salud humana basado en el uso recreativo futuro de los suelos dentro del Drenaje del Este.

3 – PRG derivado para el riesgo ecológico, basado en la exposición al plomo de la paloma terrestre común, utilizado como objetivo secundario para garantizar que se alcance la concentración promedio de 134 mg/kg dentro del suelo del Drenaje del Este.

4 – Para lograr una meta de reducción del riesgo de plomo consistente con hallazgos toxicológicos recientes, la concentración promedio de plomo en la superficie del área remediada debe ser igual o inferior a 200 mg/kg, sin un solo punto por encima de 400 mg/kg, lo que corresponde a un nivel de plomo en sangre infantil de 5 µg/dL.

5 – PRG basado en el riesgo para la salud humana basado en el uso comercial futuro del suelo en la Propiedad BRC, que se basa en los parámetros predeterminados de la Metodología de Plomo para Adultos (ALM) en un BLL objetivo de 5 µg/dL y una tasa de ingestión de suelo/polvo de 67 mg/día para un trabajador al aire libre.

Aunque no se desarrollaron PRGs para las aguas subterráneas, los criterios de cernimiento del RI basado en el menor de los requisitos químicos específicos aplicables o relevantes y apropiados o ARARs (p. ej., los estándares de calidad del agua de Puerto Rico y los niveles máximos de contaminantes MCL federales, así como los niveles de cernimiento regionales [RSLs, por sus siglas en inglés]), se utilizaron para ayudar a definir la extensión de los medios contaminados y se utilizarán para evaluar los datos de aguas subterráneas recopilados en el futuro. Los criterios de cernimiento del RI para las aguas subterráneas se enumeran en la **Tabla D**, a continuación.

Tabla D. Criterios de cernimiento para las aguas subterráneas

Área de interés/medio	Contaminante[1]	PRG
Agua subterránea	cis-1,2-DCE	70 µg/L
	trans-1,2-DCE	100 µg/L
	TCE	5 µg/L
	Cloruro de vinilo	0.22 µg/L
	Arsénico	10 µg/L
	Plomo	15 µg/L

Además, los niveles de cernimiento de intrusión de vapor para TCE y cloruro de vinilo de 1.18 µg/L y 0.15 µg/L, respectivamente se utilizarán para determinar si la intrusión de vapor representa una preocupación.

RESUMEN DE ALTERNATIVAS DE REMEDIO

El artículo 121(b)(1) de CERCLA, 42 U.S.C. 9621(b)(1) requiere que cada remedio seleccionado para el Lugar proteja la salud humana y el medio ambiente, sea costo-efectiva, cumpla con otras leyes estatutarias y utilice soluciones permanentes y tecnologías de tratamiento alternativas y alternativas de recuperación de recursos en la máxima medida posible. Además, el estatuto incluye una preferencia por el uso del tratamiento como elemento principal para la reducción de la toxicidad, movilidad o volumen de las sustancias peligrosas.

De acuerdo con el NCP (40 CFR §300.430) y la *Guía para realizar investigaciones correctivas y estudios de viabilidad* bajo *CERCLA* de la EPA, cada alternativa se evaluó utilizando la evaluación de los nueve criterios, es decir, la protección general de la salud humana y el medio ambiente, cumplimiento con los ARARs, la efectividad y permanencia a largo plazo, la reducción de la toxicidad, la movilidad o el volumen por medio del tratamiento, la efectividad a corto plazo, la posibilidad de implantarse, el costo y la aceptación del gobierno y la comunidad.

En esta sección del Plan Propuesto se resume la alternativa interina para remediar las aguas subterráneas y las alternativas para remediar los suelos. Descripciones detalladas de las alternativas de remedio para el suelo se encuentran en el Informe de FS del Lugar.

Alternativa interina para remediar las aguas subterráneas contaminadas - programa de monitoreo y controles institucionales

Estimados del modelo de aguas subterráneas estima que la atenuación natural, incluso con la adición de un tratamiento activo, como se evaluó en el FS, podría tardar varios siglos en restaurar las aguas subterráneas. La presencia de limo y arcilla en el Lugar y la longitud del penacho de cloruro de vinilo puede resultar en período más extenso para la degradación de COVs. Por lo tanto, como remedio interino se estaría realizando un programa de monitoreo de aguas subterráneas y CIs, para evaluar la reducción de sustancias peligrosas; tales como el arsénico, plomo, y los COVs, y para asegurar que se protejan los receptores, respectivamente.

Se realizarían muestreos anuales durante un mínimo de ocho años, para recopilar datos y realizar análisis estadísticos de las concentraciones de los contaminantes en pozos individuales. Además, los datos recopilados se utilizarían para evaluar la atenuación natural, migración, y los efectos del remedio del suelo. Basado en los resultados, el programa de monitoreo se puede extender más allá de los ocho años iniciales. Para propósitos de estimar los costos, se asume que el programa de monitoreo es de 30 años. Se tomarían muestras de los pozos anualmente para COVs, arsénico, plomo, parámetros geoquímicos (es decir, nitrato/nitrito, sulfato, sulfuro, amoníaco, alcalinidad, cloruro, hierro ferroso, metano etano eteno (MEE y carbono orgánico total) y parámetros de campo. Se realizará un PDI para determinar si se deben instalar pozos de monitoreo adicionales en el Lugar y verificar la ausencia de material fuente de COV en la zona vadosa.

Se prevé que el remedio preferido para el suelo reduzca el arsénico y el plomo en las aguas subterráneas. Si bien, no existen pozos de agua potable en el área de contaminación (penacho de agua subterránea), se utilizarán CIs para prevenir la exposición. Los CIs incluirían controles gubernamentales, como leyes o reglamentos existentes en Puerto Rico, que sirvan para restringir el uso de aguas subterráneas contaminadas al restringir la instalación de pozos hasta que el acuífero se restablezca a los estándares de calidad de agua potable. También se implantarán CIs en forma de dispositivos informativos, como avisos o avisos publicados en periódicos y cartas periódicas enviadas a las autoridades gubernamentales locales sobre la necesidad de limitar la extracción de agua o la construcción de pozos nuevos, a menos que se realicen las investigaciones apropiadas de intrusión de vapor y/o se tomen medidas de mitigación.

El costo actual estimado total para esta acción interina para el agua subterránea es de $1.56 millones.

Alternativas de acción para remediar el suelo contaminado

El tiempo de construcción para cada alternativa refleja solo el tiempo real requerido para construir o implementar la acción y no incluye el tiempo requerido para diseñar el remedio, negociar el desempeño del remedio con cualquier posible parte responsable (PRP) o procurar contratos para el diseño y la construcción.

Elementos comunes

Se asume que los elementos comunes están incluidos en cada alternativa para remediar el suelo. Los siguientes elementos comunes no aplican a la alternativa de no acción.

Controles institucionales (CIs) – Los CIs (p.ej., notificaciones a la comunidad y restricciones de escritura, y/o notificaciones) restringirían el perturbar y/o usar áreas donde sustancias peligrosas, que incluyen plomo y/o arsénico permanecen por encima de los niveles que permitirían un uso ilimitado y una exposición sin restricciones (UU/UE, por sus siglas en inglés) o que potencialmente comprometerían la acción de remedio implantada. Los CIs no se estarían implantando en las áreas residenciales. Los CIs solo se asumen bajo las Alternativas S2A, S2B, S3 y S4.

Suelos residenciales – Los suelos contaminados dentro del área residencial se removerían para su disposición bajo todas las alternativas para remediar los suelos. El alcance de la remoción tendría como meta concentraciones de plomo superiores al PRG de 400 mg/kg con un promedio por debajo de 200 mg/kg, lo que resultaría en un escenario UU/UE para las áreas residenciales. El suelo contaminado generado dentro del área residencial se clasificaría como desperdicio sólido no peligroso.

Demolición de edificios/estructuras – La Propiedad BRC está actualmente inactiva y desocupada con varios edificios/estructuras (Figura 3). Durante el RI, los resultados de las muestras indicaron niveles elevados de contaminación en el suelo debajo de varios de los edificios/estructuras. Para remediar los suelos debajo de los edificios/estructuras, estos serán demolidos para facilitar el acceso al suelo. Además, debido a los altos niveles de plomo en las estructuras existentes, equipos y materiales no se pueden utilizar. Si no se atienden, las estructuras y el equipo restante se deteriorarán, aumentando la probabilidad de una liberación mayor al medio ambiente. Los escombros de edificios/estructuras demolidas se descontaminarían y se dispondrán como desperdicios no peligrosos en una instalación comercial autorizada para disposición fuera del Lugar dentro de Puerto Rico. La demolición de edificios/estructuras solo se asume bajo las Alternativas S3, S4 y S5. Las estructuras y las áreas asfaltadas cubren aproximadamente el 50 % de los 16 acres de la Propiedad BRC.

Monitoreo: Excepto para la Alternativa S5, todas las alternativas requerirán monitoreo y mantenimiento a largo plazo, particularmente las alternativas que incluyen el componente de contención. Se espera que las alternativas presentadas para remediar el suelo contaminado aborden migración adicional del suelo contaminado a las aguas subterráneas. Luego del remedio del suelo, el programa de monitoreo bajo la alternativa interina del agua subterránea ayudara determinar si el remedio de suelo es efectivo.

Revisiones quinquenales del Lugar: Para los remedios donde sustancias peligrosas, o contaminantes que van a permanecer en el Lugar por encima de los niveles que permiten el uso sin restricciones y la exposición ilimitada, el requisito estatutario para revisiones quinquenales es activado por la implantación de esta acción para que el remedio continue protegiendo la salud humana y el medio ambiente. Las Alternativas 2 a la 5 estarán sujetas a estas revisiones quinquenales, las cuales son requeridas por el articulo 121 (c) de la ley del Superfondo.

Alternativa 1 – Ninguna acción

Costo capital total: $ 0
Operación y mantenimiento: $0
Costo total actual: $0
Plazo estimado de construcción: N/A

El NCP requiere que se desarrolle la alternativa de "Ninguna Acción" como una línea base para comparar otras alternativas de remedio. Esta alternativa dejaría el suelo contaminado en el Lugar dentro de las áreas potenciales de preocupación en su estado actual, y no se iniciaría ninguna acción correctiva para abordar el suelo contaminado o mitigar los riesgos inaceptables asociados para la salud humana o el medio ambiente. Los suelos contaminados no se abordarían y se dejarían en la condición actual y potencialmente podrían continuar migrando fuera del Lugar a las áreas circundantes.

Alternativa S2A – Cubierta en el Lugar de suelos contaminados, excavación selectiva y disposición fuera del Lugar

Costo capital total: $ 8.4 millones
Operación y mantenimiento: $23,000 por año
Costo total actual: $8.7 millones
Plazo estimado de construcción: 1 año

Suelos residenciales **–** Suelos contaminados dentro del área residencial serían excavados y eliminados como desperdicio no peligroso fuera del Lugar en una instalación comercial que cumpla con los permisos requeridos.

Propiedad BRC **-** El suelo contaminado que exceda los PRGs fuera de la huella de edificios/estructuras y pavimentos de asfalto se contendrían con una capa *in situ* mediante la construcción de una barrera de exposición. Para los propósitos del FS, una barrera de exposición se construiría predominantemente utilizando tierra. Se asume que el espesor de la barrera de exposición representativa será de 24 pulgadas (18 pulgadfas de relleno común limpio [subsuelo] y 6 pulgadas de medio de crecimiento sobre el geotextil como capa marcadora). El material del suelo para la construcción de la cubierta se adquiriría de una fuente comercial cercana identificada durante la fase del RD. Se tomaría una muestra del material de suelo importado antes de su colocación para confirmar que el material está libre de contaminantes (es decir, por debajo de los PRGs). Las 6 pulgadas del medio de crecimiento pueden modificarse, si es necesario, para sustentar la semilla para la revegetación. Es posible que se requiera la nivelación de ciertas partes del área si la nivelación actual no garantiza un drenaje positivo hacia el este, hacia el Drenaje del Este, manteniendo los patrones de drenaje natural existentes. Los materiales y espesores supuestos se refinarían, si fuera necesario, durante el proceso de RD. Para propósitos de estimación de costos, monitoreo periódico, incluyendo mantenimiento de la vegetación se realizaría después de que se implemente el remedio.

Bajo esta alternativa, las losas de concreto de edificios/estructuras y el pavimento de asfalto se repavimentarían para brindar una contención *in situ* adecuada del suelo contaminado que exceda los PRGs debajo de los edificios/estructuras. Un mínimo de 6 pulgadas de asfalto y 4 pulgadas de concreto se colocarían sobre las áreas de pavimento de asfalto existentes y losas de concreto de edificios/estructuras, respectivamente.

***Drenaje del Este* –** Recubrimiento *in situ* de los suelos que excedan los PRGs dentro del Drenaje del Este se lograría mediante la colocación de una cubierta blindada. Una cubierta blindada se construiría predominantemente con material rocoso (escollo o grava). El espesor de la cubierta blindada representativa sería de aproximadamente 18 pulgadas. Antes de colocar la cubierta blindada, se limpiaría el Drenaje del Este de la vegetación existente y se nivelaría para asegurar un drenaje positivo hacia el norte. Se instalaría un material geotextil para estabilizar los taludes de las zanjas de drenaje y servir como capa de lecho para el material rocoso. El material de roca limpia (grava o escollera) necesario para la construcción de la cubierta se adquiriría de una fuente comercial cercana.

Alternativa S2B – Cubierta *in situ* de los suelos contaminados de BRC, excavación y disposición fuera del Lugar para el material del drenaje del este, y excavación y contención *in situ* de suelos residenciales

Costo capital total: $ 9.7 millones
Operación y mantenimiento: $15,000 por año
Costo total actual: *$10 millones*
Plazo estimado de construcción: *1 año*

***Propiedad BRC* -** Bajo esta alternativa, se realizaría una capa *in situ* sobre el suelo contaminado dentro de la Propiedad BRC como se describe en la Alternativa S2A. Los suelos contaminados excavados del área residencial se esparcirían dentro de la Propiedad BRC para su contención *in situ* y cubiertos por una barrera de exposición, similar a la Alternativa S2A, que consistiría en relleno limpio, geotextil y un medio de crecimiento para la vegetación. El suelo contaminado contenido se nivelaría para garantizar que las escorrentías drenen hacia el Drenaje del Este, manteniendo los patrones de drenaje natural existentes.

***Drenaje del Este* -** El suelo contaminado dentro del Drenaje del Este se excavaría para su disposición fuera del Lugar. Se asume que aproximadamente 25% del suelo contaminado que será excavado se caracterizaría como desperdicio potencialmente peligroso para propósitos de tratamiento y disposición. El volumen de suelo contaminado caracterizado como desperdicio peligroso se trataría/estabilizaría usando una modificación de una mezcla con fosfato y se eliminaría como desperdicio no peligroso en una instalación comercial autorizada para disposición fuera del Lugar en Puerto Rico. El resto del volumen de suelo contaminado excavado se eliminaría como desperdicio no peligroso en una instalación de disposición comercial autorizada fuera del Lugar dentro de Puerto Rico.

Se colectarían muestras de suelo de confirmación en las paredes laterales y el fondo de la excavación. Luego de la excavación y la recolección de muestras de suelo confirmadas, el área excavada se nivelaría para proporcionar un drenaje positivo. Se colocaría una capa superficial de medio de crecimiento de 6 pulgadas para la revegetación. Los medios de crecimiento pueden modificarse, si es necesario, para sustentar la semilla para la revegetación. Antes del establecimiento de la vegetación, se colocaría una capa de control de erosión para limitar la erosión y evitar daños por erosión. El relleno importado se analizaría antes de su colocación para confirmar que el material está libre de contaminantes (es decir, por debajo de los PRGs).

Alternativa S3 – tratamiento *in situ* de suelos contaminados, excavación y disposición fuera del Lugar del material del Drenaje del Este y los suelos residenciales

Costo capital total: $ 20.1 millones
Operación y mantenimiento: $70,000 por año
Valor neto actual total: *$20.3 millones*
Plazo estimado de construcción: *1 año*

La Alternativa S3 se enfoca en el tratamiento in situ de estabilización/solidificación del suelo contaminado de la Propiedad BRC. Los suelos contaminados dentro del Drenaje del Este y las áreas residenciales se excavarían y se dispondrían en una instalación de disposición comercial autorizada fuera del Lugar dentro de Puerto Rico.

Los edificios/estructuras y el pavimento asfáltico ubicados dentro de la Propiedad BRC serían demolidos para facilitar el acceso al suelo contaminado debajo de estos.

Propiedad BRC - Según esta alternativa, el suelo contaminado dentro de la Propiedad BRC recibiría tratamiento in situ. Se asume que el tratamiento in situ es estabilización/solidificación y/o estabilización mediada biológicamente utilizando bacterias que producen carbonato de calcio ($CaCO_3$). El tratamiento in situ reduciría la biodisponibilidad (y por tanto la toxicidad) y la movilidad de los contaminantes dentro del suelo contaminado. Durante la fase de RD, se realizaría un estudio de tratabilidad específico para el Lugar para determinar la efectividad de la tecnología de tratamiento en el entorno del Lugar.

Se anticipa que la modificación de la mezcla con fosfato se trabajará con rotomoldeo en el suelo contaminado hasta una profundidad de 1 pie por debajo de la superficie del suelo. Para suelos contaminados en intervalos entre profundidades de 1 a 4 pies y de 4 a 8 pies, se utilizarían otros métodos mecánicos como excavadoras hidráulicas y/o mezcla con barrena para la mezcla de modificaciones de mezclas con fosfato *in situ*.

Drenaje del Este - El suelo contaminado se excavaría para su disposición fuera del Lugar de manera similar a la Alternativa S2B.

Alternativa S4 – Excavación de suelos contaminados, estabilización *ex situ* y contención
Costo capital total: $ 17.5 millones
Operación y mantenimiento: $9,000 por año
Costo total actual: $17.7 millones
Plazo estimado de construcción: 1.5 años
Propiedad BRC - El suelo contaminado dentro de la Propiedad BRC se excavaría para la contención en un repositorio que se construiría dentro de los límites de la Propiedad BRC. Se asume que el 50 por ciento del total del suelo contaminado que se genere durante la excavación se caracterizaría como desperdicio peligroso. El suelo contaminado caracterizado como desperdicio peligroso se trataría/estabilizaría utilizando una modificación mezclada con fosfato para la contención en un repositorio que se construiría dentro de la Propiedad BRC. Se asume que el resto del volumen de suelo contaminado excavado se caracteriza como desperdicio no peligroso y no requeriría tratamiento/estabilización antes de la contención. El suelo contaminado dentro de la huella del repositorio no se excavaría, ya que la construcción de este servirá de cubierta a el suelo contaminado.

Drenaje del Este - Los suelos contaminados se excavarían de manera similar a la Alternativa S2B para la contención *in situ* en un depósito diseñado que se construiría dentro de la Propiedad BRC.

Repositorio - Durante la fase de RD, se refinará la localización del **repositorio** dentro de la Propiedad BRC. Además, también se podrían desarrollar múltiples repositorios más pequeños.

Basado en el volumen de suelo contaminado que requiere consolidación, la huella estimada y la ubicación de un depósito en el Lugar se ilustra en la **Figura 5**. Se asume que el depósito en el Lugar ubicará en la esquina noreste de la Propiedad BRC con una huella aproximada de 3 acres y una altura aproximada de 12 pies. Se asume que el repositorio se diseñaría y construiría para garantizar un drenaje positivo de las aguas pluviales hacia el este, hacia el Drenaje del Este, manteniendo los patrones de drenaje natural existentes en el Lugar.

Alternativa 5 – Excavación de suelo contaminado y disposición fuera del Lugar
Costo capital total: $ 37.7 millones
Operación y mantenimiento: $0
Costo total actual: $37.7 millones
Plazo estimado de construcción: 1.5 años

La Alternativa S5 implicaría excavación del suelo contaminado en la Propiedad BRC, en el Drenaje del Este, y las áreas residenciales seguido por disposición fuera del Lugar. La excavación del suelo contaminado sería transportada y se dispondrá en una instalación de disposición comercial autorizada fuera del Lugar en Puerto Rico. Todos los edificios/estructuras y el pavimento asfáltico ubicados dentro de la Propiedad BRC serían demolidos para facilitar el acceso al suelo contaminado debajo de estos.

Se tratará el suelo con concentraciones de plomo mayores o iguales al PRG de 800 mg/kg (es decir, basado en uso industrial no residencial/contacto directo con trabajadores). CIs serían implantados para esta alternativa porque el suelo con concentraciones de plomo iguales a 800 mg/kg permanecería en el Lugar.

Parte del suelo contaminado que se excavará dentro de la Propiedad BCR, y en el Drenaje del Este se asume que se caracterizaría como desperdicio peligroso para fines de tratamiento y disposición. El suelo contaminado excavado caracterizado como desperdicio peligroso, que ha sido estabilizado, y el suelo contaminado caracterizado como un desperdicio potencialmente no peligroso se cargaría y transportaría para su disposición fuera del Lugar en una instalación de disposición comercial dentro de Puerto Rico y que cumple con los permisos requeridos.

EVALUACIÓN DE LAS ALTERNATIVAS DE REMEDIO

La EPA utiliza nueve criterios para evaluar individualmente las alternativas de remedio y las compara para seleccionar un remedio. Los criterios se describen en el recuadro de esta página.

Dado que la acción propuesta para el agua subterránea es un remedio interino, se llevó a cabo una evaluación de los criterios relevantes y se proporciona aquí. Basándose en la información disponible en la actualidad, la EPA considera que la acción interina propuesta para las aguas subterráneas cumple con el criterio de umbral de ser protectora de la salud humana y del medio ambiente hasta que se implemente un remedio final para el Lugar. Aunque los ARARs específicos de sustancias químicas no se cumplirán mediante esta acción propuesta, la acción interina proporciona protección a corto plazo al limitar el uso o acceso al agua subterránea. La EPA considera que los CIs limitarán el uso del agua subterránea y se pueden poner en práctica implementables, mientras se implementa la solución del suelo. Aunque el remedio interino para las aguas subterráneas no reducirá la toxicidad, movilidad o volumen, estos factores se considerarán como parte del remedio final para las aguas subterráneas. El Departamento de Recursos Naturales y Ambientales de Puerto Rico concuerda con la solución provisional preferida de la EPA para las aguas subterráneas.

Para el suelo, esta sección del Plan Propuesto resume el rendimiento relativo de cada alternativa con los nueve criterios de evaluación de umbral y de equilibrio, señalando cómo se compara con las otras opciones que están en consideración. El análisis comparativo completo de las alternativas se encuentra en el FS.

CRITERIOS DE EVALUACIÓN PARA ALTERNATIVAS DE REMEDIO DEL SUPERFONDO

La protección general de la salud humana y el medio ambiente determina si una alternativa elimina, reduce o controla las amenazas a la salud pública y al medio ambiente por medio de controles institucionales, controles de ingeniería o tratamiento.

El cumplimiento de los ARAR evalúa si la alternativa cumple con todos los requisitos aplicables o relevantes y apropiados de los estatutos ambientales federales y estatales y otros requisitos que pertenecen al Lugar, o si proporciona motivos para invocar una exención.

La efectividad y la permanencia a largo plazo consideran la capacidad de una alternativa para mantener la protección de la salud humana y el medio ambiente al paso del tiempo.

La reducción de la toxicidad, movilidad o volumen por medio del tratamiento es el desempeño anticipado de las tecnologías de tratamiento que una alternativa puede emplear.

La efectividad a corto plazo considera el período de tiempo necesario para implantar una alternativa y los riesgos que la alternativa puede representar para los trabajadores, los residentes y el medio ambiente durante la implantación.

La posibilidad de implantación es la viabilidad técnica y administrativa de implantar la alternativa, incluida la disponibilidad de materiales y servicios.

El costo incluye los costos estimados de operación y mantenimiento anuales y de capital, así como los costos actuales. El costo del valor presente es el costo total de una alternativa a lo largo del tiempo en términos del valor en dólares de hoy. Se espera que las estimados de costos sean precisos dentro de un rango de +50 a -30 por ciento.

Aceptación del Estado Libre Asociado de Puerto Rico *(o la agencia de apoyo, DNRA)* considera si el Estado está de acuerdo con los análisis y recomendaciones de la EPA, tal como se describen en el RI/FS y el Plan Propuesto.

La aceptación de la comunidad considera si la comunidad local está de acuerdo con los análisis y la alternativa preferida de la EPA. Los comentarios recibidos sobre el Plan Propuesto son un indicador importante de la aceptación por parte de la comunidad.

Protección general de la salud humana y el medio ambiente:

De las seis alternativas de remedio retenidas, solo la alternativa de “No acción” (es decir, la Alternativa S1) no brindaría protección a la salud humana y el medio ambiente. Las alternativas S2A, S2B, S3, S4 y S5 protegerían la salud humana y el medio ambiente y lograrían los RAOs.

Para todas las alternativas (excepto la Alternativa S1), el potencial de exposición humana y ecológica (a partir de la ingestión o inhalación de plomo y otros metales co-localizados) se reduciría a través de acciones de remedio (eliminación y/o aislamiento de contaminantes), implantación de y cumplimiento a los CIs y restricciones de controles de acceso para alcanzar los RAOs 1 y 2.

Para todas las alternativas (excepto la Alternativa S1), la movilidad y la migración del suelo contaminado con los COCs se reducirían por medio de remoción de los contaminantes y/o aislación para alcanzar el RAO 3.

Cumplimiento con los requisitos aplicables o pertinentes y apropiados (ARARs, por sus siglas en inglés)

La Alternativa S1 no cumple con los ARAR específicos de sustancias químicas porque no se tomaría ninguna medida para abordar el suelo contaminado. Por lo tanto, esta alternativa recibió una calificación de "inaceptable". La acción de remedio implantada bajo las alternativas restantes (Alternativas S2A, S2B, S3, S4 y S5) cumpliría con los ARAR específicos de acción, ubicación y producto químico identificados para la acción correctiva para el suelo del Lugar.

Los ARAR específicos de sustancias químicas para el aire serían pertinentes para las Alternativas S2A, S2B, S3, S4 y S5. El cumplimiento de los ARAR de calidad del aire se lograría mediante la implantación de las mejores prácticas de gestión (BMP, por sus siglas en inglés), que incluyen medidas de supresión de polvo y erosión. Se llevaría a cabo monitoreo de aire durante trabajos intrusivos para monitorear el polvo que podría afectar a la comunidad circundante.

Los ARAR específicos de ubicación para las Alternativas S2A, S2B, S3, S4 y S5 se refieren al trabajo que afecta a especies amenazadas o en peligro de extinción y al trabajo realizado dentro o adyacente a zonas inundables o humedales. Las acciones se llevarían a cabo de manera que eviten afectar negativamente a estas especies o los recursos hídricos.

Los ARARs específicos para acciones serían pertinentes para todas las alternativas (S2A, S2B, S3, S4 y S5). La excavación y la disposición fuera del Lugar son elementos comunes en todas las alternativas, por lo tanto, el cumplimiento con los Requisitos de Eliminación Regulada (LDRs) es necesario en todas ellas. El cumplimiento se lograría a través de la caracterización de los residuos generados durante la excavación de suelos contaminados. Si efectivamente se generara algún residuo peligroso con características específicas, los LDRs se cumplirían antes de su disposición.

Las actividades bajo cada alternativa se llevarán a cabo de manera que cumplan con los requisitos sustantivos de varias leyes y regulaciones de implantación identificadas.

Eficacia y permanencia a largo plazo

La Alternativa S1 no proporciona efectividad y permanencia a largo plazo ya que no se tomaría ninguna acción correctiva. Bajo las Alternativas S2A, S2B, S3 y S4, los suelos contaminados permanecerían en el Lugar. La eficacia y la permanencia a largo plazo se lograrían mediante el aislamiento (contención y/o estabilización) de los contaminantes dentro del suelo contaminado. Bajo las Alternativas S2A, S2B, S3 y S4, los suelos contaminados se mantendrían en su lugar en diferentes grados, y los tratamientos requerirían un mantenimiento a largo plazo para garantizar la protección. La magnitud de los riesgos residuales se eliminaría mediante la remoción de los suelos contaminados dentro del canal de drenaje oriental bajo las Alternativas S2B, S3, S4 y S5.

Para la Alternativa S2, la magnitud de los riesgos residuales se reduce ya que todos los suelos contaminados dentro de la Propiedad BRC y el Drenaje del Este serían contenidos en su lugar, sin tratamiento, bajo una cubierta, siempre y cuando se mantenga la cubierta. No obstante, las vías de exposición para los seres humanos y los receptores ecológicos se limitarían mediante el aislamiento físico de los suelos contaminados mediante un sólido sistema de contención diseñado in situ.

Para la Alternativa S2B, la magnitud del riesgo residual sería similar a la Alternativa S2A para la Propiedad BRC, pero los riesgos residuales para el Drenaje del Este se eliminarían mediante la remoción de los suelos contaminados.

Para la Alternativa S3, la magnitud del riesgo residual se reduciría mediante el aislamiento químico dentro de la Propiedad BRC. Se trataría todo el volumen de suelos contaminados para reducir la biodisponibilidad (y, por lo tanto, la toxicidad) o movilidad de los contaminantes, dejando el suelo contaminado en su lugar y reduciendo la exposición a los seres humanos y a los receptores ecológicos. Sin embargo, la efectividad y permanencia a largo plazo del tratamiento de estabilización *in situ* depende de un monitoreo e inspección a largo plazo para medir la eficacia de la reducción de la biodisponibilidad de plomo y arsénico.

Para la Alternativa S4, los suelos contaminados serían excavados y desechados dentro de un repositorio de disposición en el Lugar que se ubicaría dentro de la Propiedad BRC. Aunque los suelos contaminados excavados serían depositados en un depósito bajo cubierta en el Lugar, podrían representar un riesgo de exposición o migración si las cubiertas diseñadas se dañaran o no se mantuvieran adecuadamente. Para proteger el remedio implantado, se debería llevar a cabo y mantener un monitoreo a largo plazo, CIs y restricciones de acceso. Fuera del área del depósito de eliminación en el Lugar, la Alternativa S4 proporcionaría efectividad y permanencia a largo plazo mediante una excavación completa. Por lo tanto, la efectividad a largo plazo es mayor que en las Alternativas S2A, S2B o S3.

La Alternativa S5 proporcionaría efectividad y permanencia a largo plazo mediante una excavación completa y la disposición fuera del Lugar de los suelos contaminados. Por lo tanto, la efectividad y permanencia a largo plazo es mayor que en las Alternativas S2A, S2B, S3 o S4.

Además, las cubiertas colocadas sobre los suelos contaminados en las Alternativas S2A y S2B podrían ser más susceptibles a los efectos del clima (por ejemplo, el aumento de la frecuencia de tormentas severas e inundaciones) en comparación con la huella más pequeña de la cubierta instalada en el repositorio de disposición en el Lugar bajo la Alternativa S4, si no se instalan o mantienen adecuadamente a largo plazo.

Por lo tanto, para las Alternativas S2A, S2B, S3 y S4, la efectividad y permanencia a largo plazo dependen de la integridad de los componentes del remedio y se lograrían mediante la implantación de las BMPs, inspecciones periódicas, monitoreo a largo plazo posterior a la construcción, mantenimiento y reparaciones según sea necesario para mantener la integridad de los controles de ingeniería. Los componentes del remedio, incluyendo los CIs y las restricciones de acceso, también requerirían monitoreo y mantenimiento de manera perpetua (excepto la Alternativa S5) para garantizar la integridad a largo plazo del remedio.

Reducción de la toxicidad, la movilidad o volumen (T/M/V, por sus siglas en inglés) mediante tratamiento

Las Alternativas S1 y S2A no logran reducir la toxicidad, la movilidad o el volumen por medio del tratamiento, ya que el tratamiento no es un componente de estas alternativas.

La Alternativa S3 incluye tratamiento *in situ* del suelo dentro de la Propiedad BRC, lo que reduciría la biodisponibilidad (y por lo tanto la toxicidad) o la movilidad mientras deja el suelo contaminado en su lugar. Además, las Alternativas S2B y S3 incluyen la estabilización *ex situ* de los suelos contaminados excavados del Drenaje del Este mediante el uso de reactivos que resultarían en una reducción de la biodisponibilidad (y, por lo tanto, la toxicidad) y movilidad de los contaminantes en el suelo excavado.

Las Alternativas S4 y S5 incluyen la estabilización *ex situ* de una parte de los suelos contaminados excavados, lo que implica el uso de reactivos que reducirían la biodisponibilidad (y, por lo tanto, la toxicidad) y movilidad de los contaminantes en el suelo excavado. Este proceso de aislarlos física y químicamente puede aumentar el volumen.

Las Alternativas S1 y S2A no cumplen con la preferencia estatutaria de tratamiento como elemento principal de la acción correctiva. La Alternativa S3 cumpliría con la preferencia estatutaria de tratamiento como elemento principal de la acción correctiva. La preferencia estatutaria se cumpliría parcialmente en las Alternativas S2B y S4.

Eficacia a corto plazo

La Alternativa S1 no representaría riesgos a corto plazo para la comunidad o los trabajadores, y no habría impactos ambientales adversos ya que no se tomaría ninguna acción correctiva.

Las Alternativas S2A, S2B, S3, S4 y S5 implican la importación de material limpio (suelo y roca/grava) para fines de construcción del remedio (construcción de cubiertas y rellenos de excavación); por lo tanto, el tráfico de camiones representaría un riesgo a corto plazo para la comunidad y los trabajadores. En el caso de la Alternativa S5, habría un aumento significativo en el tráfico de camiones debido al transporte del suelo contaminado excavado para su eliminación fuera del Lugar, además de la importación de material limpio para relleno de la excavación. Las Alternativas S3, S4 y S5 podrían representar riesgos a corto plazo para los trabajadores debido al aumento significativo en el tráfico de camiones/equipos para el manejo en el Lugar de los suelos contaminados excavados. La Alternativa S4 tendría impactos adicionales a corto plazo para los trabajadores debido a posibles riesgos de seguridad durante la construcción de un depósito en el Lugar.

Las Alternativas S3, S4 y S5 implican una demolición extensa y la disposición fuera del Lugar de edificios/estructuras dentro de la Propiedad BRC en comparación con las Alternativas S2A y S2B, lo que representa un riesgo a corto plazo para los trabajadores debido a la operación de maquinaria pesada y al polvo generado por los escombros de la construcción. Los riesgos a corto plazo para los trabajadores se mitigarían a través de medidas de seguridad como el uso de equipo de protección personal (EPP) (por ejemplo, botas con punta de acero), medidas de control de polvo, zonas de trabajo y otras prácticas de seguridad.

Se implantarían protocolos y técnicas de prevención de incendios (por ejemplo, planificación, marcos de tiempo de trabajo específicos, vigilancia contra incendios) para proteger a los trabajadores y a la comunidad y evitar impactos ambientales adversos. Los impactos del ruido se mitigarían mediante la implantación de horarios de trabajo adecuados para la construcción. Las emisiones de aire generadas por las actividades de construcción y transporte podrían causar impactos ambientales a corto plazo en áreas no afectadas. Se implantarían medidas de control de polvo y control de erosión, así como las BMPs según corresponda, para minimizar el impacto. El uso de equipos de baja emisión y la selección cuidadosa de recursos y materiales de tratamiento reducirían al mínimo los impactos ambientales a corto plazo.

La duración estimada de la construcción para las Alternativas S2A, S2B y S3 es de aproximadamente 1 año; mientras que para las Alternativas S4 y S5 es de aproximadamente 1.5 años. Por lo tanto, el impacto a corto plazo en la comunidad, los trabajadores y el medio ambiente sería un poco mayor para las Alternativas S4 y S5 en comparación con las Alternativas S2A, S2B y S3.

Posibilidad de implantación

La Alternativa S1 no tiene más acciones correctivas tomadas. Esta alternativa sería la más fácil de implantar, tanto técnica como administrativamente, porque no involucra ninguna acción.

Las Alternativas S3, S4 y S5 involucran modificaciones significativas a la Propiedad BRC que incluyen la demolición de edificios/estructuras existentes. Estas actividades, junto con otros componentes del remedio, presentarían mayores desafíos de implantación técnica en comparación con las Alternativas S2A y S2B, que implican la colocación de una cubierta sobre los suelos contaminados en la Propiedad BRC, una demolición limitada de edificios/estructuras existentes y el uso de pavimento asfáltico como parte del sistema de contención.

Para la Alternativa S4, en general, la demolición de edificios/estructuras existentes (demolición limitada en las Alternativas S2A y S2B y una demolición más extensa en las Alternativas S3, S4 y S5), la construcción de un repositorio de disposición en el Lugar (Alternativa S4), los CIs y la operación y mantenimiento a largo plazo requerirían coordinación entre la EPA y varias entidades reguladoras de Puerto Rico. Agencias de Puerto Rico y la EPA, que regulan la disposición de tierras se consultarían con respecto a la implantación de las Alternativas S4 y S5.

La viabilidad técnica también difiere entre las Alternativas S2A, S2B, S3, S4 y S5 en términos de implantación debido a los volúmenes de material para disposición. Bajo las Alternativas S2A, S2B, S3, S4 y S5, se generarían aproximadamente 380 BCY (*bank Cubic Yard*, unidad de volumen), 4,140 BCY, 4,520 BCY, 0 BCY y 56,940 BCY, respectivamente, de suelo contaminado para su disposición fuera del Lugar. Bajo las Alternativas S2A y S2B, se generarían aproximadamente 18,200 toneladas de material de demolición de edificios/estructuras en comparación con las Alternativas S3, S4 y S5, donde se generarían aproximadamente 65,720 toneladas de material de demolición de edificios/estructuras para su disposición fuera del Lugar. Podrían surgir dificultades debido al número limitado de instalaciones de disposición dentro de Puerto Rico.

Para la Alternativa S3, las tecnologías de tratamiento de estabilización in situ requerirían estudios de tratabilidad para optimizar el rendimiento del método de tratamiento. El tratamiento in situ podría ser una tecnología especializada disponible comercialmente o podría ser una tecnología patentada con servicios y materiales no fácilmente disponibles en Puerto Rico, lo que requeriría una planificación a largo plazo y una mayor coordinación. Los materiales, servicios y equipos necesarios para la construcción (equipos de movimiento de tierras) están fácilmente disponibles comercialmente. Bajo las Alternativas S2A, S2B y S4, la implantación del monitoreo a largo plazo para la falla de contención sería sencilla en comparación con el monitoreo de la efectividad a largo plazo del tratamiento in situ bajo la Alternativa S3. Se requeriría equipo especializado y personal de construcción para la Alternativa S3.

Costos

Se utilizó una tasa de descuento del 7% para estimar los costos de cada alternativa. La Tabla E a continuación resume los costos de valor presente para todas las alternativas de remedio evaluadas durante un período de 30 años (Años 0 a 30), excepto para la Alternativa S5, que no requiere monitoreo.

Tabla E. Resumen de costos de valor presente

Alternativa	Costos capitales	Costos de O&M (anual)	Costo presente[1]
S1	$0	$0	$0
S2A	$8,358,000	$23,000	$8,700,000
S2B	$9,697,000	$15,000	$9,940,000
S3	$20,131,000	$7,000	$20,330,000
S4	$17,527,000	$9,000	$17,700,000
S5	$37,731,000	$0	$37,730,000

[1] Se utilizó una tasa de descuento real del 7 por ciento para desarrollar los costos de valor presente para cada alternativa correctiva.

Estado Libre Asociado/ Aceptación de agencia de apoyo

El Departamento de Recursos Naturales y Ambientales de Puerto Rico está de acuerdo con la alternativa preferida de la EPA tal como se presenta en este Plan Propuesto.

Aceptación comunitaria

La aceptación de la comunidad hacia la alternativa preferida se evaluará después de que finalice el período de comentario público y se describirá en el Récord de Decisión, el documento en el cual la EPA selecciona formalmente el remedio para el Lugar.

ALTERNATIVAS PREFERIDAS

Basado en una evaluación de los datos del agua subterránea y las alternativas para remediar el suelo, la EPA propone el monitoreo y los CIs como una acción provisional para el agua subterránea, y la Alternativa S4 (excavación de suelos contaminados, estabilización *ex situ* y contención en el Lugar) como la alternativa preferida para remediar la contaminación del suelo en el Lugar.

La acción provisional propuesta para el agua subterránea incluye los siguientes componentes clave:

— Una investigación prediseño (PDI) para determinar si deberían instalar pozos en el Lugar y verificar la ausencia de material de origen en la zona vadosa.

— Un programa anual de monitoreo del agua subterránea para evaluar la atenuación natural, migración, y los efectos del remedio del suelo, y

— CIs en forma de controles gubernamentales, como las leyes o reglamentos existentes de Puerto Rico que sirven para restringir el uso de agua subterránea contaminada al restringir la instalación de pozos hasta que el acuífero se restablezca a los estándares de calidad de agua potable. También se implantarían CIs en forma de dispositivos informativos, como avisos o avisos publicados en periódicos y cartas periódicas enviadas a las autoridades gubernamentales locales sobre la necesidad de limitar la extracción de agua o nuevas construcciones, a menos que se realicen investigaciones apropiadas de intrusión de vapor y/o se tomen medidas de mitigación.

— La Alternativa S4 proporcionaría protección a la salud humana y al medio ambiente mediante la excavación, el tratamiento de estabilización *ex situ* y la contención en el Lugar, en conjunto con CIs, restricciones de acceso y monitoreo.

La Alternativa S4 tiene los siguientes componentes clave:

— Excavación del suelo dentro de todas las áreas de preocupación fuera del área del repositorio diseñado.

— Tratamiento/estabilización del suelo contaminado excavado mediante el uso de una enmienda mezclada con fosfato.

— Contención de los suelos tratados en un repositorio diseñado *in situ* y cubierto con una geomembrana, cuyo material y grosor se determinarían durante la fase de diseño del remedio (RD, por sus siglas en inglés).

— Muestreo y análisis confirmatorio posterior a la excavación.

— Relleno con material limpio en las áreas excavadas.

— Demolición de los edificios y estructuras restantes en la Propiedad BRC, incluyendo sumideros y cimientos.

— Establecer CIs en áreas no residenciales en forma de notificaciones a la comunidad y restricciones de escritura y/o avisos para limitar la perturbación y/o el uso de áreas donde las sustancias peligrosas, incluyendo plomo y/o arsénico, permanezcan por encima de niveles que permitan un uso ilimitado y una exposición no restringida, o que puedan comprometer potencialmente la acción que se vaya a implantar como remedio.

— Monitoreo a largo plazo.

El costo estimado en términos actuales para la acción interina en el agua subterránea es de $1.56 millones y para la acción en el suelo (Alternativa S4) es de $17.7 millones, para un costo total en términos actuales de $19,260,000. Ésta es una estimación de costo de ingeniería que se espera esté dentro del rango de más 50 por ciento a menos 30 por ciento del costo real del proyecto. Más detalles sobre el costo se presentan en el Apéndice G del Informe del FS.

Dado que se prevé que el remedio preferido resultará en la presencia de sustancias peligrosas, contaminantes o agentes contaminantes en el Lugar por encima de niveles que permitirían un uso ilimitado y una exposición no restringida, de conformidad con la Sección 121(c) de CERCLA, se llevarán a cabo revisiones estatutarias no menos frecuentes de una vez cada cinco años para garantizar que el remedio siga siendo protector de la salud humana y del medio ambiente.

Justificación para la medida provisional para el agua subterránea

El remedio interino propuesto incluye un programa de monitoreo de aguas subterráneas y CIs para prevenir la exposición a corto plazo. Este remedio interino permite a la EPA evaluar más a fondo la atenuación, migración y efectos del remedio del suelo hasta que se seleccione un remedio final para el agua subterránea.

Basada en la información disponible en la actualidad, la EPA considera que esta acción interina es protectora de la salud humana y del medio ambiente hasta que se implemente un remedio final para el agua subterránea en el Lugar. Aunque esta acción interina no tiene la intención de abordar por completo los mandatos legales, limitará el uso o acceso al agua subterránea, reduciendo así los riesgos humanos asociados con la exposición y alcanzando el RAO para el agua subterránea.

Justificación de la preferencia del remedio para la Alternativa 4

La Alternativa S4, excavación de suelos contaminados, estabilización/tratamiento *ex situ* y contención, fue seleccionada como la alternativa preferida para el suelo debido a su facilidad de implantación, ofrecería una mayor permanencia en comparación con las otras alternativas de recubrimiento y se espera lograr una reducción sustancial y a largo plazo de riesgos a través del tratamiento de sustancias peligrosas, incluyendo arsénico y plomo en el suelo.

La alternativa preferida, Alternativa S4, incluye la excavación, tratamiento/estabilización y contención de materiales fuente asociados con los desechos de amenaza principal. Las vías de exposición a receptores humanos y ecológicos se abordarían mediante la excavación de suelo que exceda los PRGs de áreas selectas fuera de la huella del repositorio diseñado, tratamiento/estabilización y colocación en un repositorio diseñado que se construirá en la Propiedad BRC. Por lo tanto, la efectividad a largo plazo es mayor que en las Alternativas S2A, S2B o S3. Se implementarán CIs y monitoreo posterior a la construcción para asegurar la integridad del remedio.

Las Alternativas S3, S4 y S5 resultarían en la reducción de toxicidad y movilidad de contaminantes en el suelo. Sin embargo, en comparación con S5, la Alternativa S4 tiene menos impactos a corto plazo debido al tráfico de camiones (por ejemplo, emisiones), al tiempo que permite que la mayor parte del Lugar esté disponible para su reutilización, a un costo menor - $17.7 millones en comparación con $37.7 millones para la Alternativa S5. Además, la Alternativa S4 es más factible de implantar que la Alternativa S3.

Basándose en la información disponible en la actualidad, la EPA considera que la alternativa preferida para el suelo (Alternativa S4) cumple con los criterios de umbral (protección de la salud humana y el medio ambiente y cumplimiento con ARARs) y proporciona el mejor equilibrio de compensaciones en comparación con las otras alternativas en cuanto a los criterios de balance. La alternativa preferida cumple con los siguientes requisitos legales de la Sección 121 de CERCLA: 1) el remedio propuesto protege la salud humana y el medio ambiente; 2) cumple con los ARARs; 3) es rentable; 4) utiliza soluciones permanentes y tecnologías de tratamiento alternativo o tecnologías de recuperación de recursos en la medida máxima posible; y 5) satisface la preferencia por el tratamiento como un elemento principal. Se realizará monitoreo a largo plazo para asegurar la protección del remedio provisional en el agua subterránea y el remedio final en el suelo.

De acuerdo con la política Limpio y Verde de la Región 2 de la EPA, la EPA evaluará el uso de tecnologías y prácticas sostenibles con respecto a la implantación del remedio seleccionado.

Para obtener información adicional sobre la Alternativa Preferida de la EPA para el Lugar Superfondo de The Battery Recycling Company, comuníquese con:

Zolymar Luna Díaz,
Gerente de Proyectos
(787) 977-5844
Luna.zolymar@epa.gov

Lilliana Alemán,
Enlace Comunitario
787-977-5816
Alemanroman.lilliana@epa.gov

Brenda Reyes,
Enlace Comunitario
(787) 977-5869
Reyes.brenda@epa.gov

Dirección física y postal
U.S. EPA Región 2 División de Protección Ambiental del Caribe
City View Plaza Edificio II, Suite 7000
Km 1.2, Carretera PR-165
Guaynabo, PR 00969

En la web en: www.epa.gov/superfund/battery-recycling-company o utilizando el código QR que se muestra a continuación.

Para obtener información general o hacer preguntas sobre el programa Superfondo de la EPA, comuníquese con el enlace público regional de la EPA: George Zachos, zachos.george@epa.gov o al (732) 321-6621 o de forma gratuita al (888) 283-7626.

SCAN ME

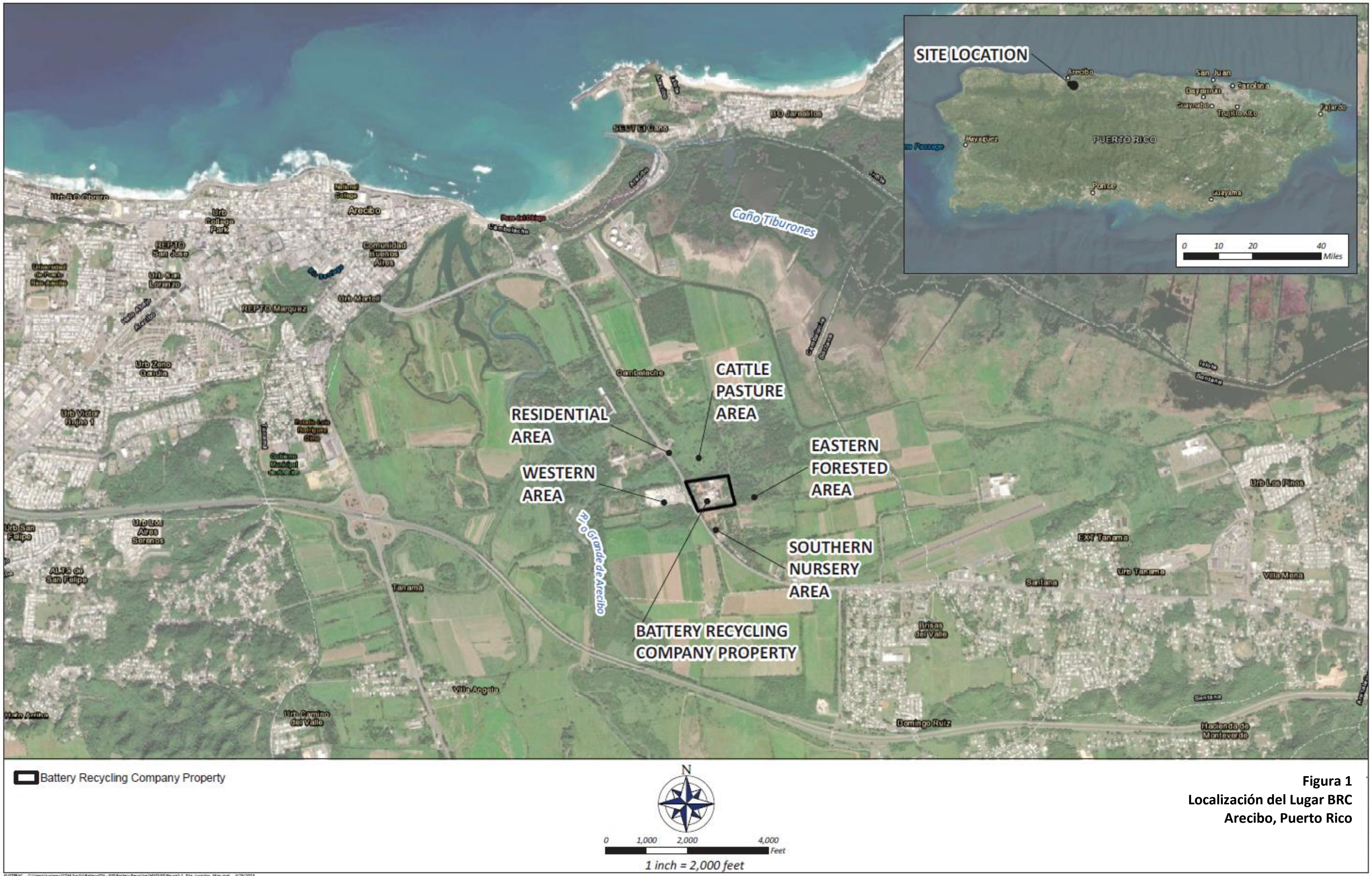
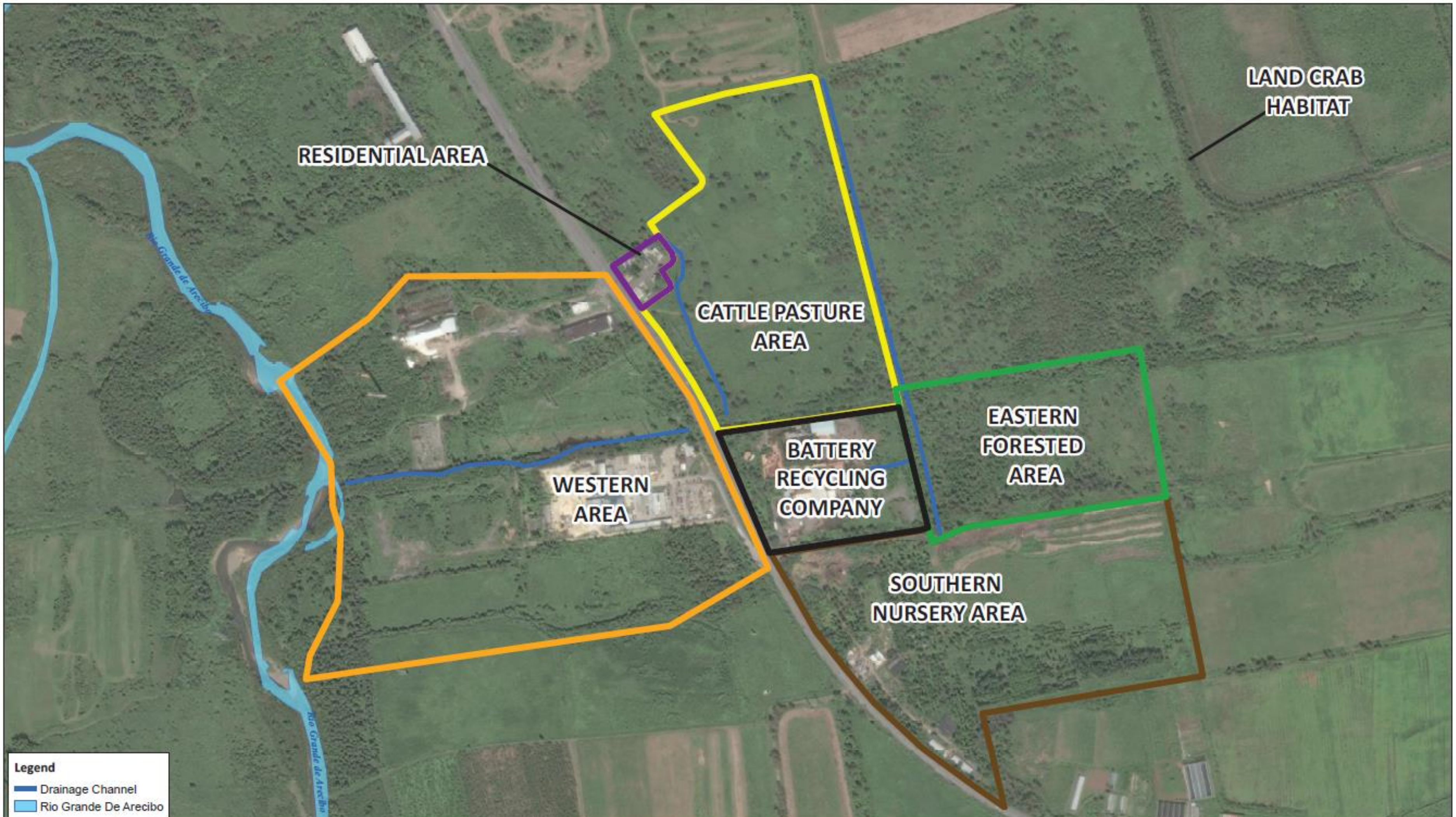


Figura 1
Localización del Lugar BRC
Arecibo, Puerto Rico



N

1 inch = 500 feet

0 250 500 1,000 Feet

Figura 2
Alrededores del Lugar BRC
Arecibo, Puerto Rico

EPA

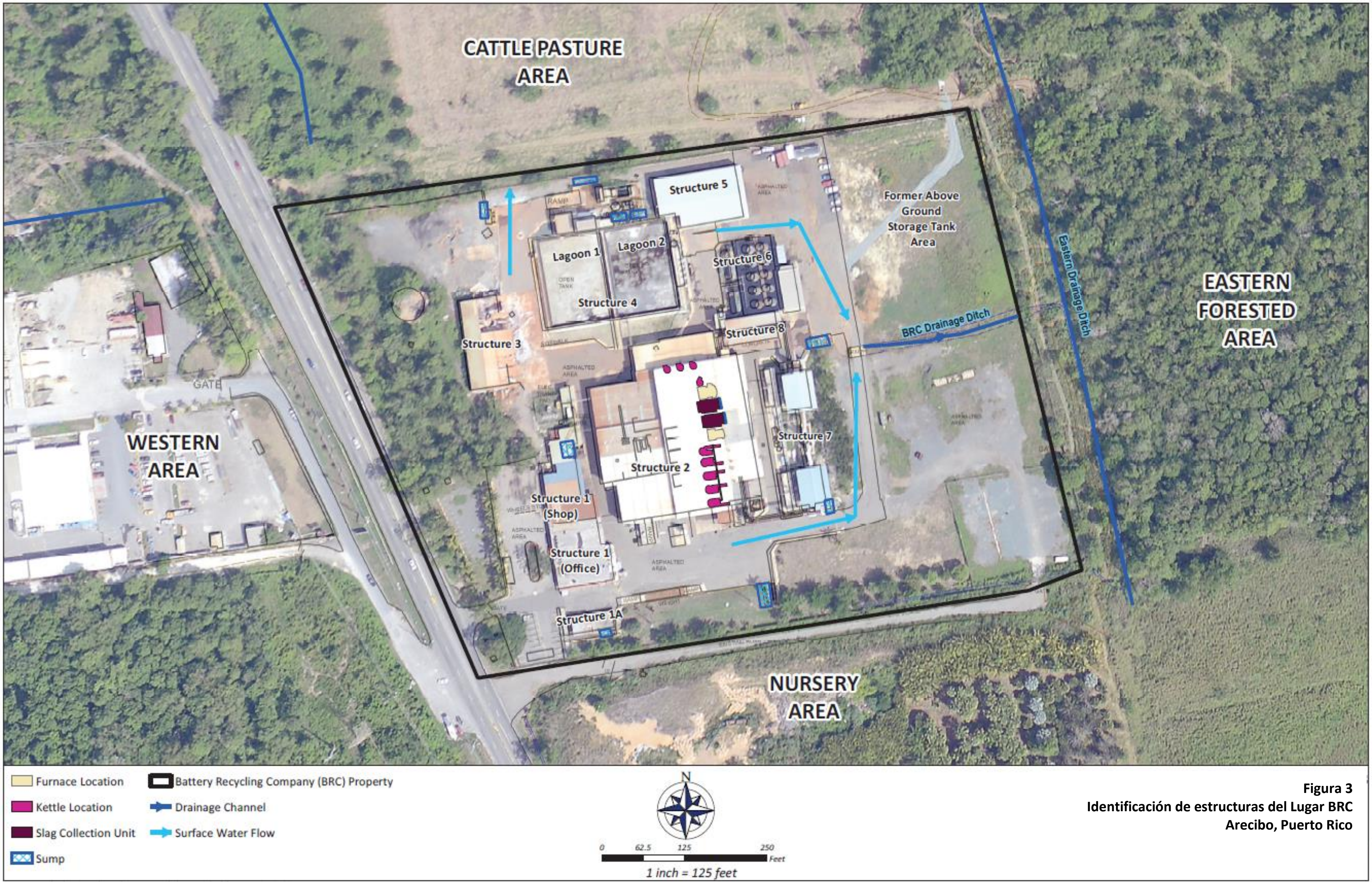


Figura 3
Identificación de estructuras del Lugar BRC
Arecibo, Puerto Rico

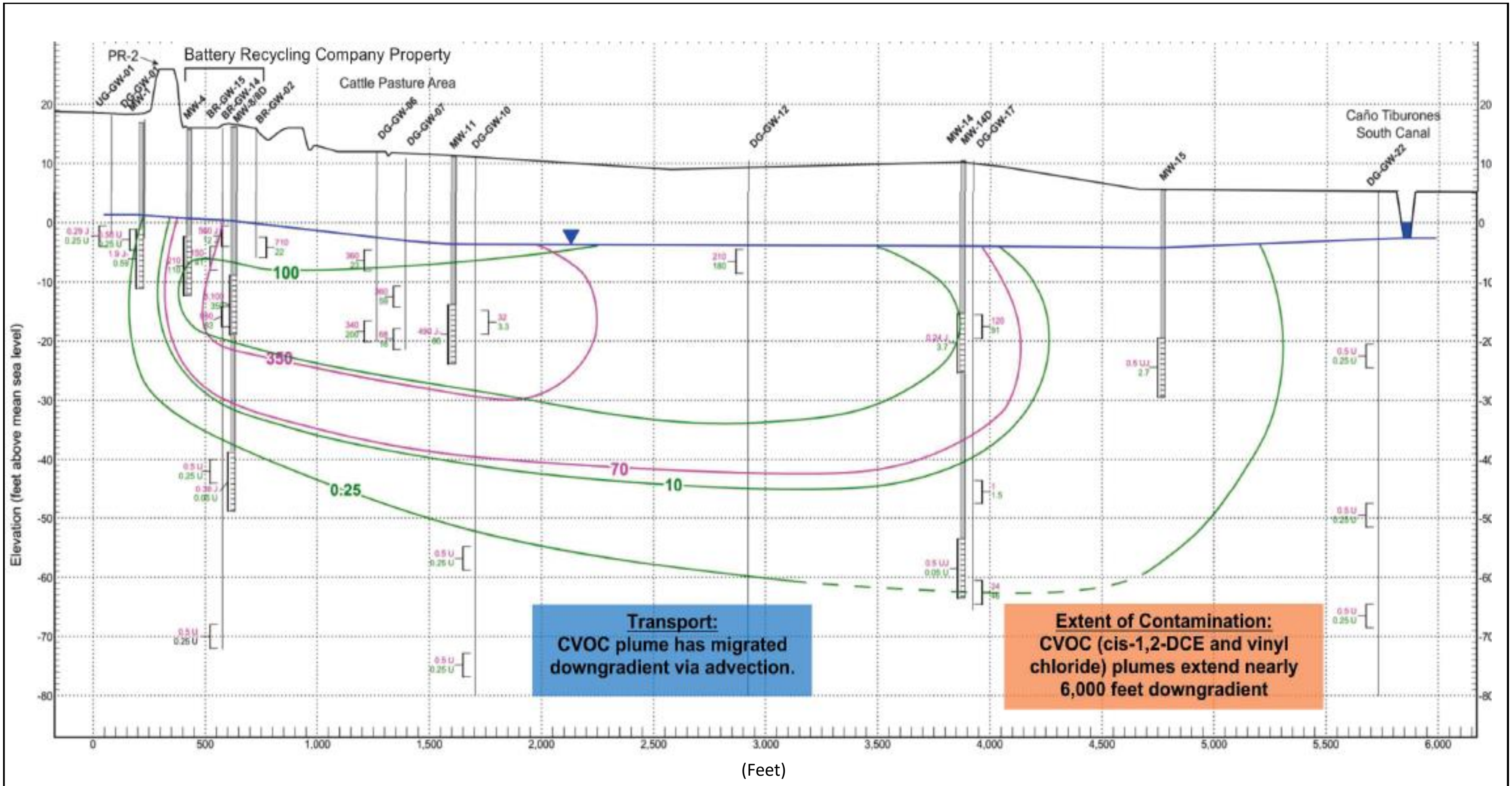
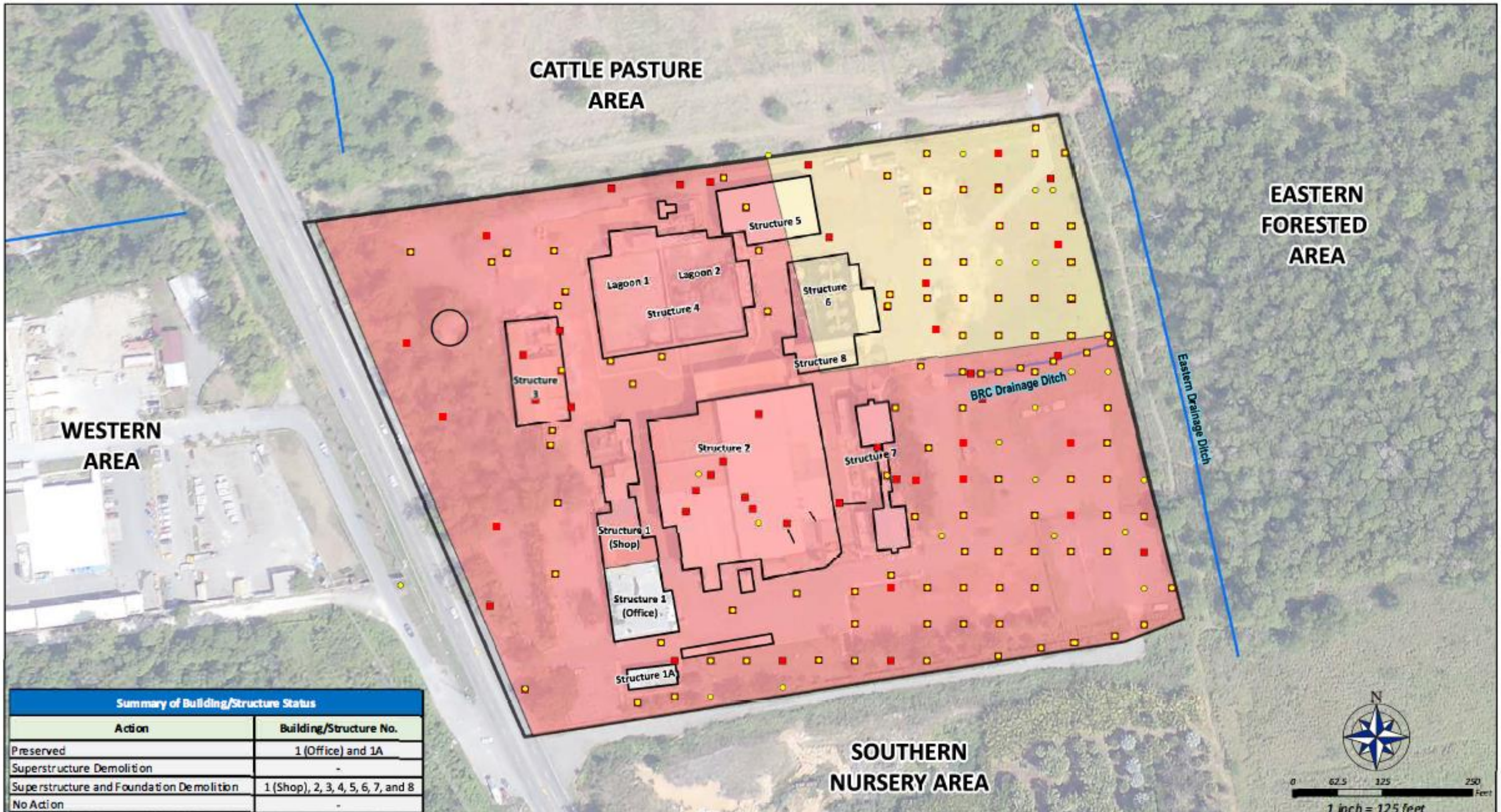


Figura 4
Extensión contaminacion agua subterranea del Lugar BRC
Arecibo, Puerto Rico

EPA



Summary of Building/Structure Status

Action	Building/Structure No.
Preserved	1 (Office) and 1A
Superstructure Demolition	-
Superstructure and Foundation Demolition	1 (Shop), 2, 3, 4, 5, 6, 7, and 8
No Action	-

Battery Recycling Company Property
Drainage Channel
Building

Locations Exceeding Lead and Arsenic PRGs:

BRC Property Soil (0 to 1 ft bgs) Arsenic: ≥ 5.8 mg/kg
BRC Property Soil (0 to 1 ft bgs) Lead: ≥ 800 mg/kg
Extent of Excavation of Contaminated Soil within BRC Property (0 to 1 ft bgs)
Extent of On-Site Disposal Repository

Figura 5
Alternativa S4 – Ubicación propuesta de repositorio
Arecibo, Puerto Rico

Responsiveness Summary
Attachments B
Public Notice

DEPARTAMENTO DE LA FAMILIA
ADMINISTRACIÓN DE FAMILIAS Y NIÑOS

AVISO PÚBLICO

La Administración de Familias y Niños del Departamento de la Familia (ADFAN), a través de la Administración de Cuidado Sustituto y Adopción, ofrece servicios a menores que se encuentren bajo la custodia del Estado. Entre estos servicios se incluye el de ama de llaves, el cual provee servicios de cuidado a menores que se encuentren recibiendo tratamiento médico en instituciones hospitalarias u hogares.

Se solicita identificar un proveedor de servicio de ama de llaves que pueda brindar los cuidados y atenciones que requiera un menor que se encuentre recibiendo tratamiento médico.

Las tareas por realizar son las siguientes:

- Cuidado personal en el hospital u hogar
- Compañía
- Higiene
- Asistencia en Alimentación
- Seguimiento a medicamentos
- Lavandería
- Servicios recreativos

Todo proveedor interesado en ofrecer servicios al Departamento de la Familia podrá someter propuestas durante el periodo del 9 al 18 de agosto de 2023, en el Edificio 185 Roosevelt Plaza, Esquina Trinidad, Hato Rey, San Juan, PR, Segundo Piso o al correo electrónico milliam.roman@familia.pr.gov. Puede comunicarse también al 787-625-4900 ext. 1716.

En San Juan, Puerto Rico a 7 de agosto de 2023.

Glenda Gerena Ríos
Administradora
ADFAN

Leila Pablos Vazquez
Administradora Auxiliar
Cuidado Sustituto y Adopción

Edificio Roosevelt Plaza 185, Ave. Roosevelt Esq. Calle Trinidad, Hato Rey, PR | PO Box 194090, San Juan, PR 00919-4090

787.294.4900 @familia.pr.gov

MÉTODO DE NOTIFICACIÓN ALTERNO

JB Properties LLC., por conducto del Ing. Nelson Reyes, están presentando ante la Oficina de Gerencia de Permisos (OGPe), la Consulta de Ubicación Núm. 2023-481388-CUB-009323.

El Proyecto consiste en recibir materiales reciclables provenientes de la industria de la construcción tales como madera, cemento y acero, en un predio ubicado en la Carretera PR-683, Km. 1.7 en el Barrio Factor del Municipio de Arecibo. Esta notificación con método alterno se realiza al amparo de la Sección 2.1.9.8 del Reglamento Conjunto 2020.

Para las siguientes propiedades, que colindan con el predio objeto de esta solicitud, para las cuales el correo ha devuelto las notificaciones enviadas por el peticionario y/o no se ha obtenido el nombre y la dirección postal del dueño de la propiedad mediante visitas de campo, se publica el método de notificación alterna con el propósito de notificarle la radicación de la consulta.

Nombre de Titular	Número de Catastro	Dirección Postal CRIM
1. Luis A. Rivera Ortiz	032-062-533-05-000	P.O. Box 50, Garrochales, Arecibo, PR, 00652
2. Pablo A. Vélez Rivera	032-062-533-14-000	P.O. Box 172, Arecibo, PR 00652
3. María de los Ángeles López Torres	032-000-006-58-000	HC-52, Box 2512 Arecibo, PR 00652
4. José Francisco Laguna Rivera	032-062-533-12-000	HC-52, Box 2324, Arecibo, PR 00652
5. No tiene dueño CRIM	032-052-533-18-000	Cabida:12,837.13 mts²
6. Gilberto Santiago Ríos	032-051-765-64-000	HC-01 Box 4845, Arecibo, PR 00616
7. No tiene dueño CRIM	032-000-0006-56-000	Cabida: 1,101.02 mts²
8. Julia Aguila Rivera	032-000-006-74-001	HC-1 Box 867-2 Arecibo, PR 00612
9. Heriberto Martínez Laureano	032-000-006-66-001	PO Box 1480, Manati, PR 00674
10. Miraflores del Atlántico Corp.	032-062-533-30-000	P.O. Box 9932, San Juan, PR 00908-9932
11. No Tiene Dueño	032-082-497-07-000	Cabida: 113,691.7 mts²

Los comentarios a esta consulta se podrán enviar a: PO Box 41179, San Juan, PR 00940-1179 o email **notificaciones_ogpe@ddec.pr.gov**.

EPA United States Environmental Protection Agency

Agencia Federal de Protección Ambiental
Anuncio del Plan Propuesto y Período de Comentarios
Lugar de Superfondo The Battery Recycling Company
Arecibo, Puerto Rico

La Agencia Federal de Protección Ambiental (EPA, por sus siglas en inglés), en colaboración con el Departamento de Recursos Naturales y Ambientales (DRNA), anuncia el inicio de un período de treinta (30) días para comentario público sobre el Plan Propuesto para remediar el Lugar de Superfondo The Battery Recycling Company (Lugar), localizado en el Municipio de Arecibo, Puerto Rico.

La alternativa recomendada por la EPA atenderá el suelo en el Lugar y servirá como un remedio interino para el agua subterránea. El remedio interino para el agua subterránea consiste de un programa de monitoreo y controles institucionales. Para el suelo, el remedio recomendado (Alternativa 4) en el Plan Propuesto consiste en la excavación de suelos contaminados, tratamiento por medio de estabilización ex situ, y contención en una unidad a ser construida dentro de los límites de The Battery Recycling Company. Antes de seleccionar un remedio final, la EPA considerará todos los comentarios escritos y verbales recibidos durante este período de comentario. Todos los comentarios (verbales y/o escritos) deberán ser recibidos en o antes del 14 de septiembre de 2023. Los comentarios sobre el Plan Propuesto de la EPA pueden ser enviados por correo postal o correo electrónico a Zolymar Luna, Gerente de Proyecto, City View Plaza II, Suite 7000, Km 1.2, Road PR-165, Guaynabo, PR 00969, luna.zolymar@epa.gov, (787) 977-5865 o 787-977-5844. La EPA proveerá un resumen de todos los comentarios y sus respuestas en el Récord de Decisión, el cual formaliza la selección del remedio.

A tales fines, la EPA llevará a cabo una reunión pública el martes, 29 de agosto de 2023, de 5:00 pm a 7:00 pm, en Casa Ulanga, ubicada en la Calle Gonzalo Marín del Municipio de Arecibo. El propósito de esta reunión es informarle a la comunidad sobre los hallazgos, conclusiones y recomendaciones de la investigación realizada para atender la contaminación del suelo y el agua subterránea en el Lugar. Además, se presentará sobre las alternativas recomendadas y las razones para estas recomendaciones, según descritas en el Plan Propuesto.

Las copias del Plan Propuesto y otros documentos relacionados al Lugar de Superfondo estarán disponibles en los siguientes repositorios de información:

Casa Alcaldía Municipio de Arecibo
Ave. José de Diego
Arecibo, Puerto Rico 00612
Teléfono: 787-882-2770
Horario: lunes – viernes,
8:00 am a 4:00 pm

Departamento de Recursos Naturales y Ambientales
Programa de Respuesta de Emergencia y Superfondo
Edificio de Agencias Ambientales Cruz A. Matos
Carretera 8838, km. 6.3, Sector El Cinco, Río Piedras
Teléfonos:
787-999-2200
Horario: lunes – viernes, 9:00 am a 4:30 pm

Agencia Federal de Protección Ambiental, Región 2
División de Protección Ambiental del Caribe
City View Plaza II- Suite 7000
48 RD, 165 Km. 1.2
Guaynabo, PR 00968-8069
Teléfono: 787-977-5865, 787-977-5844
Horario: lunes – viernes, 9:00 am a 4:30 pm
Por cita previa

Agencia Federal de Protección Ambiental, Región 2
290 Broadway, Piso 18
New York, New York 10007-1866
Centro de Registros
Teléfono: (212) 637-4308
Horario: lunes - viernes, 9:00 am a 3:30 pm
Por cita previa

El Plan Propuesto y otros documentos relacionados se pueden ver y descargar en la Web en: www.epa.gov/superfund/battery-recycling-company o utilizando el código QR que se muestra:

La EPA extiende el período de comentario público sobre el plan de limpieza propuesto para el Lugar Superfondo The Battery Recycling Company en Arecibo, Puerto Rico

Contacto: Brenda Reyes (Reyes.Brenda@epa.gov), (787)-977-5869

NEW YORK (31 de agosto de 2023) – La Agencia de Protección Ambiental de los Estado Unidos (USEPA, por sus siglas en inglés) extendió el período de comentario público sobre su plan de limpieza propuesto para abordar el suelo contaminado con plomo y el agua subterránea en el Lugar Superfondo The Battery Recycling Company (BRC) en Arecibo, Puerto Rico, hasta el 16 de octubre de 2023. La EPA celebró una reunión pública en Casa Ulanga, Calle Gonzalo Marín #7 el 29 de agosto de 2023, para explicar el plan propuesto al público.

La limpieza descrita en el plan propuesto atenderá el suelo contaminado restante y el agua subterránea dentro y fuera de la propiedad del Lugar. Según el plan propuesto, la EPA eliminará el suelo contaminado que se encuentra fuera y dentro del sitio para su tratamiento y contención. El suelo tratado fuera y dentro del Lugar se almacenaría en un área segura y restringida en la antigua instalación. La EPA también monitoreará las aguas subterráneas y limitará el acceso a éstas a través de leyes y regulaciones existentes en Puerto Rico, al igual que con notificaciones a los gobiernos locales y asegurar que el uso futuro de los terrenos no conflija con las metas de limpieza a largo plazo.

La propiedad principal en el Lugar operaba como una instalación de fundición secundaria de plomo y reciclaje de baterías hasta 2014. Antes de la operación de fundición secundaria de plomo, el Lugar se utilizó para fabricar productos químicos orgánicos para producir ácido fumárico y ácido ftálico. Estas actividades dejaron altos niveles de plomo y otros contaminantes en el suelo y las aguas subterráneas que presentaban un riesgo inmediato para la salud humana. En 2011, la EPA formalizó una orden con BRC. para limpiar las áreas de contaminación por plomo en el Lugar. Sin embargo, cuando la compañía no pudo terminar el trabajo, la EPA se hizo cargo de la limpieza y eliminó la contaminación por plomo de los hogares, vehículos y praderas cerca de los empleados. La EPA también descontaminó la instalación para evitar una mayor propagación del plomo. La EPA agregó el Lugar a la Lista Nacional de Prioridades en 2017 y terminó sus primeras actividades de limpieza en 2022.

Los comentarios escritos sobre el plan propuesto pueden enviarse por correo postal a Zolymar Luna Díaz, gerente de proyectos de recuperación, Agencia de Protección Ambiental de Estados Unidos Región 2, División de Protección Ambiental del Caribe #48 Rd, PR-165 Km 1.2 Citi View Plaza II, Suite 7000 Guaynabo, P.R. 00968-8069, correo electrónico: Luna.Zolymar@epa.gov.

Para obtener información adicional y ver el plan de limpieza propuesto, visite la página de perfil del sitio Superfondo de Battery Recycling Company.

Follow EPA Region 2 on Twitter and visit our Facebook page. For more information about EPA Region 2, visit our website.

23-073 - SP

EPA Extends Public Comment Period on Proposed Cleanup Plan for Battery Recycling Company Superfund Site in Arecibo, Puerto Rico

August 31, 2023

Contact Information
Brenda Reyes (Reyes.Brenda@epa.gov)
(787)-977-5869

NEW YORK - The U.S. Environmental Protection Agency (EPA) has extended the public comment period for its proposed cleanup plan to address lead-contaminated soil and groundwater at the Battery Recycling Company Superfund Site in Arecibo, Puerto Rico to **October 16, 2023**. EPA held a public meeting at Casa Ulanga, Calle Gonzalo Marin #7 on August 29, 2023, to explain the proposed plan to the public.

The cleanup outlined in the proposed plan will address remaining contaminated soil and groundwater on and off the property that is the source of the site contamination. Under the proposed plan, EPA would remove contaminated soil for treatment and containment. Treated soil would be stored in a secure and restricted area at the source property, the former operations of The Battery Recycling Company, Inc. (BRC). EPA would also monitor the groundwater and limit the public's access to groundwater through existing Puerto Rico laws and regulations as well as notifications to local governments and ensure future land use does not conflict with long-term cleanup goals.

The main property at the site was operated as a secondary lead smelter and battery recycling operation until 2014. Prior to the secondary lead smelting operation, the site was used for the manufacture of organic chemicals to produce fumaric acid and phthalic acid. These activities left behind high levels of lead and other contaminants in the soil and groundwater. The lead in soil presented an immediate risk to human health. In 2011, EPA entered into an order with then-operator, BRC, to clean areas of lead contamination at the source property under EPA oversight. However, when the company failed to finish the work, EPA took over the cleanup and removed lead contamination from employee's homes, vehicles, and nearby pastures. EPA also decontaminated the source property to limit the further spread of lead. EPA added the site to the Superfund

National Priorities List in 2017 and commenced a cleanup investigation of the site. EPA finished its early cleanup activities in 2022. The cleanup investigation along with an analysis of cleanup alternatives, led to the proposed cleanup plan announced today.

Written comments on the proposed plan may be mailed or emailed to Zolymar Luna Díaz, Remedial Project Manager, U.S. Environmental Protection Agency Region 2, Caribbean Environmental Protection Division #48 Rd, PR-165 Km 1.2 Citi View Plaza II, Suite 7000 Guaynabo, P.R. 00968-8069, Email: Luna.Zolymar@epa.gov.

For additional background and to see the proposed cleanup plan, visit the Battery Recycling Company Superfund site profile page.

Follow EPA Region 2 on Twitter <http://twitter.com/eparegion2> and visit our Facebook <http://facebook.com/eparegion2> page. For more information about EPA Region 2, visit our website <https://epa.gov/aboutepa/epa-region-2>.

23-073

Contact Us <https://epa.gov/newsreleases/forms/contact-us> to ask a question, provide feedback, or report a problem.

LAST UPDATED ON AUGUST 31, 2023

Responsiveness Summary
Attachment C
Public Meeting Transcript

PUBLIC MEETING
The Battery Recycling, Co., Arecibo
Date: August 29, 2023
Time: 5:00pm-7:00pm

Record opens at 5:10pm

Brenda Reyes:

Good evening to all of you. Good afternoon, it's still the afternoon, it is ten past five o'clock. My name is Brenda Reyes Tomassini, Public Affairs Officer of the Federal Environmental Protection Agency, Caribbean Office. During this afternoon, we are holding the first public meeting under the Superfund Program of the facility known as The Battery Recycling Company, which is located here in the city of Arecibo. For our meeting today, our director, Mrs. Carmen Guerrero, is going to be speaking to you and she is going to outline a series of processes that we must follow in order to conduct the public meeting. The most important thing, and I want to briefly summarize it now, is the following. We are going to have a presentation and after that presentation comes the public input, the question-and-answer session. For those who don't want to ask out loud and want to ask anonymously, I have index cards and pen here. You can call me, I'll take them to you, you can hand me the question, I can read it, you don't have to give me your name. And apart from that, you must state your first and last name, if you are going to come here to the microphone during the question-and-answer session. We thank the Municipal Government of Arecibo for providing us with this place, Casa Ulanga. So, we welcome you most cordially to our public meeting, which will be taking place from 5:00 to 7:00 in the evening. And now with you, the director of the Puerto Rico Office Agency, Carmen Guerrero.

Carmen Guerrero:

Thank you very much, Brenda. Good afternoon to all of you. As Brenda said, my name is Carmen Guerrero Perez. I am the director of the Caribbean Division of the Federal Environmental Protection Agency. This afternoon I am going to be facilitating the discussion of this meeting in collaboration with my colleague Jose Font, who is back there, deputy director of the Caribbean Division. First and foremost, we want to thank you for taking the time this afternoon to participate in this meeting on the proposed plan for the cleanup and remediation of the Superfund Battery Recycling Site in Arecibo. We would also like to thank, as Brenda said, the mayor of the municipality of Arecibo, Honorable

Carlos Tito Ramirez and his entire staff for lending us Casa Ulanga to hold this meeting. I had never been here before, it is a wonderful place for this type of event, so thank you very much indeed. And before we start the meeting, we would like to let you know how the program is going to be carried out.

Transcriber's Note:

We turn to slide #2 of the on-screen presentation.

Carmen Guerrero:

I know that Zolymar has here in the presentation a little bit of a summary of what the program is going to be. At the same time, I would like to introduce the key people who are accompanying us in this meeting, who are available to all of you for any questions or comments you may have. After this brief intervention that I am making, we are going to have a presentation from our technical team of the Caribbean Division, which will be led by Zolymar Luna, who is the project manager of this Superfund Site. Our technical team here is also accompanied by colleagues from various EPA Region 2 offices, including the Caribbean Division. I have already introduced Jose Font. We also have Tere Rodriguez, who heads the Response and Remediation Area of the Caribbean Division. Carlos Huerta, who will be arriving soon. Brenda Reyes, Lilliana Alemán. It is very important that you get to know Brenda and Lilliana, who are back here, they work on everything related to the approach to the communities and the integration of the communities in this whole process. We have several colleagues who are here remotely, including Alex Rivera, who works in the Air program. We also have Kathryn Flynn here from the Superfund and Emergency Management division, who is here with us, also available to you. We also have several colleagues from EPA remotely, from the Superfund Division, from the Air Division and the Legal Division of the agency, participating as well. On the other hand, we also want to acknowledge that we have the participation of toxicologists and environmental health scientists from the Agency for the Toxic Substances and Disease Registry, which in English is known as ATSDR, we have Dr. Luis Rivera Gonzalez and I understand that Lee Grazianni is also joining us as part of the meeting. We are also grateful for the participation of representatives of Puerto Rico government agencies, such as the Department of Natural Resources, Omar Santiago, who is over there in the back, as well as Marangely Alemán. So, thank you very much for being here with us. I would like to excuse the representatives of Environmental Health of the Puerto Rico Department of Health, Dr. Mayra Toro and Dr. Wilmarie Muñiz, who wanted to be here with you today, but due to health issues they had to excuse themselves. We are also grateful for the participation of Nayda Rivera, Nayda is here, and remotely Dr. Gredia Huertas Montañez, Public Health specialists and professor, who collaborate with the Department of Health in the Childhood Lead Surveillance project and with various federal agencies such as the CDC, ATSDR and the EPA, and medical and professional entities such as Mount Sinai Hospital and the American Academy of Pediatricians, in what is known as the Pediatric Environmental Health Specialty Unit, which in Spanish would be the "Unidad Especializada en Salud Ambiental Pediátrica", PEHSU for its English initials. I know that we will be receiving the participation of the Aqueduct and Sewer Authority, its Regional Director, José Rivera. I don't know if he has arrived, but I want you to know that we will also have representation from the Authority. And finally, we would like to thank the participation of several representatives of the Municipal Legislature. Here with us we have the Vice President of the Municipal Legislature of the City of Arecibo, Pablo Rodríguez Marrero, and Municipal Legislator José Cintrón Ramos. Thank you both for being here. We also have our colleague, Carmen Cruz. Thank you all for being here this afternoon. We know that there are several representatives of the possible responsible parties of the Superfund Battery Recycling Site. After Zolymar's presentation, we will move on to the public comment and Q&A session. We would appreciate it if you would allow Zolymar to finish her presentation and afterwards we will take your questions and comments. Please know that we can go back through all the sections of Zolymar's presentation that you are interested in. It is very important for you to know that we will be here with you until every question and comment is addressed. If there is a question that we cannot answer today, the agency will answer your question at a later date. We remind you that we can also receive your questions and comments in writing, by e-mail or at our office mailing address, which we will be sharing with you. These are also in the materials that were provided at the entrance and Zolymar will be sharing her email address. Something very important that some people have already asked us about is the deadline for submitting comments. The deadline has been extended by 30 days, so the deadline for submitting comments is now Monday, October 16. Please know that you have more time to submit your written comments after this meeting. The Superfund process requires EPA to develop a summary of each of our responses to the questions you ask today, the questions and comments you submit in writing. This is called the Responsiveness Summary. It is a summary of how we respond to everything you submit today and submit in writing. This document will then be available on our website. Around here, in different places, you will see the QR code, and you can go to that web page and save it. So, before we start, there are some logistical issues that I think it is very important to mention. The translation team. We have here and remotely several colleagues who only speak English, so we have coordinated simultaneous translation for those who need translation. Regarding transcription, we also have that here on my left, so you should know that the audio of this meeting will be recorded and then the public will have a complete transcription of what this meeting is about. The microphones, as Brenda said, we appreciate, very important, that when you come up to speak at the microphone to ask questions or make comments, that you identify yourself with your first and last name, sector where you live or entity you represent, so that we can document it as part of the transcription that Widy is making. Also, some people sometimes ask us if they can record the presentation and the meeting. This is a public meeting, anyone interested in recording it can do so. The restrooms, for those of you who don't know Casa Ulanga, when you go over there, on your left-hand side and then right-hand side, that's where the restrooms are and the emergency exit is right there. So, any emergencies that come up, please, everybody calm, we head towards the door and then to the exit. So, without further ado, we officially open this meeting to update you on our findings and the actions we will be taking to clean up and remediate the contamination identified at the Superfund Battery Recycling Site. Thank you very much and here is Zolymar Luna. Zoly, thank you.

Zolymar Luna:

Thank you, Carmen. OK, now. Before we start, I have a question. On this side, can you see the screen well? This side here? Okay. Or should I move this a little bit? We're good. Checking. Greetings again. Good afternoon. I know it's a bit of a difficult hour. At this hour the gears are already slowing down and listening to perhaps a lot of information can be a little bit complicated. But I assure you that every effort has been made to consolidate and include in this presentation all the information that is relevant to the information and the purpose of the meeting, which is to provide and describe to you the agency's recommended alternative to address the contamination that was found at the Battery Recycling Site.

Transcriber's Note:

We turn to slide #3 of the on-screen presentation.

Zolymar Luna:

This project, as Carmen mentioned, I am the Project Manager, has been several years in the investigation process and in the process of really addressing the needs that were identified there. But this is a team project. I am the project manager, there are other people who collaborate, people who are very committed to the project, to make sure, not only that the remedy makes sense, but also that as the data is collected, that the data is confirmed and is representative. Let me introduce the team. We have Dr. Abigail DeBofsky, she is an ecological risk assessor. We also have Kathryn Flynn. Kathryn is over here; she can introduce herself as well. She is a hydrogeologist. We have Stephanie Kim, who is a human risk assessor. We also have Nick Mazziotta, who is another human risk advisor. For everything, we also need legal advice or counseling. For that we have Attorney Argie Cirillo and as Carmen already introduced, the community coordinators, Brenda Reyes and Lilliana Aleman. It is very important, as Carmen mentioned, that we remember these names, they are really the link between the technical processes and the community. Sometimes, it is the nature of the agency, that these are technical processes or research processes that sometimes take time and those are people who can always be connecting with you, and they are also liaisons for people like me, who many times can't be in the field every day visiting you, but they are those links. That, again, if you have any concerns regarding the related research Site, in this case the Battery Recycling Site, I encourage you to reach out to them as well. And again, this a brief summary of what we will try to include, and I'll try to present today. Again, as I informed you, the information can be a little bit boring, for lack of a better word. But the purpose of this is to make it informative, for you to leave here a bit clearer on the questions that you may have had before you came here. Again, there is a process so that you can continue to check if you have any questions to communicate with us, as Carmen mentioned.

Transcriber's Note:

We turn to slide #4 of the on-screen presentation.

Zolymar Luna:

In the presentation I will be talking a little bit about the Superfund Process. Again, it's important to understand this process to understand why we are at the stage we are at today, and the stage we are going to be heading into. We're going to be talking a little bit about the description of the Superfund Site.

Transcriber’s Note:

The presentation is paused to discuss some details of the hybrid aspect of the meeting. Some instructions are given about the people who are connected in a hybrid way.

Zolymar Luna:

We are back in sync. Sorry for the interruption. Thank you very much. Many interruptions. Okay, we'll talk a little bit about the description of the Site again to understand the results and for those who are not familiar with the area. It's important to understand what's in the surrounding area and the area that was covered as part of the investigation. We will be talking about the history. It's important to understand what happened at the Site over the past 30 years, 40 years, to understand many of the findings that we're going to be presenting today. We will also include a summary of the research results. At the end, as the main purpose of this meeting, we will be talking about the alternatives that were considered and the alternatives that we are recommending to address the need and the environmental concerns at the Site and in the surrounding areas.

Transcriber’s Note:

We turn to slide #5 of the on-screen presentation.

Zolymar Luna:

The Superfund process. Again, this is a summary, but I think it is important to understand that there is a legal framework that ensures that this Superfund process works to ensure that we protect human health as well as the environment. In this process there are several stages. We will be discussing this very briefly. But I want to emphasize that these stages do not necessarily happen the same way in all projects. A very important part of this initial Superfund process - which is designed to address not only the needs of contaminated Sites in Puerto Rico, but throughout the United States in all its jurisdictions - begins with an assessment process. But that assessment process, before it gets to that, something must have happened. It could be a complaint, it could be that there was a spill at a Site, and that in turn starts the assessment stage. It's important that, in order to be able to investigate, I have to first know if there is a concern. And that is the initial part. First is to identify or understand that perhaps there is a problem at a Site and then we proceed to do an assessment of that Site. That assessment involves field studies, samples, soil sampling, groundwater sampling. Not in all cases, but in most cases. An inspection is made, interviews are conducted. From that a document is prepared to then evaluate it and see if it is necessary or if that Site meets the requirements or the score necessary to be added to the National Superfund Priority List. This means that not all Sites where environmental concerns are identified are going to fall on this list. This is important to explain to keep it in perspective. Once it is listed, we then proceed, funds are allocated for the second phase, which is characterization. This is the part that is interesting, because at the beginning what we have is information about possible contamination in an area, but we don't really know how far the contamination goes. We do not necessarily always know what the source is. It is in this process that the necessary resources are invested to understand where the source and the extent of the contamination is. What is the result of all this research process? That we come up with what would be the Proposed Plan, which is what we are going to be presenting today. All the results collected are evaluated to make sure that those needs, or those areas of concern have... We now understand where the contamination is, so we are going to look for viable alternatives for those areas that are impacted. And that is what we call the Proposed Plan. Something important, during all this assessment process, and I don't want us to forget, maybe this part is not as important for other projects, but for this one it was, that during all this process that is being assessed, already characterized, other programs may be taking place. And this happened in the case of Battery Recycling, that while the characterization was being done, the Site was being listed on the National Priorities List, the agency was also carrying out activities to address the source of contamination and the routes of exposure. But going back to the Superfund process, once we are able to accept that plan or that recommended alternative, that alternative is made official in what we call the Record of Decision. This is a great achievement for us. Having been investigating this for some time, we have already decided on a remedy. Then, once we have that remedy and everybody agrees, it goes into what would be the design. We're going to design it; we're going to implement the remedy. And, once we have a good design, you build the remedy. This second part, post-construction, doesn't necessarily apply to all projects, but it does apply to most projects. Once this construction project is done, then it is evaluated whether it is efficient or not, operations and maintenance are carried out, and eventually in some cases it can be deleted from the Superfund List. During each of these stages, from discovery, evaluation, characterization, plan to remediate, the remediation implemented, as well as post-construction, it can be over five years that... In this case... I went back, the camera has me confused, sorry.

Transcribers Note:

The speaker refers back to the previous slide of the presentation.

Zolymar Luna:

It is a process in which the community can always participate in each of these stages. From remedy to post-construction, reviews are conducted. Every five years the alternative is then reviewed to make sure that it is really working as expected.

Transcriber's Note:

We turn to slide #6 of the on-screen presentation.

Zolymar Luna:

This is a short video now, which I'll be.... Can you see it from over there? Yeah, okay. This is a description. For those of you who don't know the area, this is the Caño Tiburones estuarine system, which is actually located on the north side of the Site and what was the old Battery Recycling company. Battery Recycling is in the red box, which is at the bottom. This is the Arecibo Bay, the Rio Grande de Arecibo, the river mouth. To the left we see the town, the urban area of the city of Arecibo. From here we can appreciate, or at least I can, since I am closer, the agricultural areas that are adjacent to the Superfund Site. The bodies of water. How close the road is to Road #2. In this image we are getting closer. To the right are vacant lands. In all the investigation processes, we are calling it the forested area. This is the official entrance or was the official entrance. We still use it. That is a discharge channel that was also used in the early beginnings of the operations that took place at the Site. This is the east drainage channel, which is how we identified it during the process. Below, on the south side, is the nursery of the Landesign company. They plant palms, they also collect to make compost for themselves. This is, as it is known in the area, Comercial Barreto. They have a company; they make concrete blocks, and they also have a hardware store. On the north side you can see a channel marked now in blue, which discharges into the Rio Grande de Arecibo. That structure that you can also see to the north area of the channel is a substation. Here we come back to the company. This actually leads back to road #2. And you see the northern part. That northern part was formerly a cattle grazing area. It's been vacant for several years now, there are no cattle in the area. And we can see here, on the left side, a residential area. In blue we can see what the channels would be. On the right, a channel. And here we can see the proximity of this channel to other channels that go or connect with the Caño Tiburones. And it is important that you memorize this more or less, because we are going to present other images. But of course, all this information is included in the Investigation Report.

Transcriber's Note:

We turn to slide #7 of the on-screen presentation.

Zolymar Luna:

This is a slightly better photo. You can see a little bit closer, with a better resolution, what was the old Battery Recycling company. On the right, let me just use the.... I don't know if you can see that little red dot. See it? Okay. This is the entrance; this is Road #2. This was the entrance. These were the offices. This was the operating area where at that time this company was dismantling the batteries. Here were the air emission control units, the treatment plant. But at this point specifically, this was the area where the runoff was concentrated, and this is a discharge point that goes directly to the east channel. So far, we've seen several images, so it's very easy to see it from the surface. But a lot of things are going on that you can't see with the naked eye.

Transcriber's Note:

We turn to slide #8 of the on-screen presentation.

Zolymar Luna:

In this case we have the groundwater resource. I don't have a way to show what is occurring, but yes, this image is a graphic that explains in a simple way what may be occurring in interactions that occur between the soil and the groundwater. At the Site, in this case, the groundwater starts, or the water table starts 8 to 20 feet below the Battery Recycling Site and flows into Shark Creek.

Transcriber's Note:

We turn to slide #9 of the on-screen presentation.

Zolymar Luna:

As I mentioned, I am also going to give you a historical background. You have to understand, I hope we didn't have to go into details, but we'll be brief. There are several significant events. As I mentioned, we started in 1966. At that time, a company that manufactured or produced organic chemicals operated there. The company was called Puerto Rico Chemicals. At that time the building, the property, was owned by the Puerto Rico Development Company. This company closed in 1979. Before this, there was an explosion. And in 1994, The Battery Recycling Company began to operate for the process of recycling lead-based batteries. Years later, from 1996 to 2000, the Environmental Quality Board, which today is known as the Department of Natural and Environmental Resources, conducts a series of inspections in which they document several deficiencies with various laws, including air regulations and hazardous waste regulations. From 2008 to 2011, EPA also begins other sampling activities at the Battery Recycling Site and lead is detected on the property. In that same period, the Center for Disease Control also tested employees and their family members, and at that time they detected elevated blood lead levels in both employees and their family members. In that same period as well, additional hazardous waste inspections are conducted and additional deficiencies or violations of RCRA or the Hazardous Waste Act are documented by the EPA.

Transcriber's Note:

We turn to slide #10 of the on-screen presentation.

Zolymar Luna:

In 2011, EPA issued an order on consent to address the source, in this case the Battery Recycling company, and to avoid exposure routes as a result of the employees and family members that were affected. And already in 2011 to 2012 the company begins to take several actions to try to mitigate that. However, they could not finish the work, they closed in 2014, and EPA then finished addressing the needs of the families that were impacted, cleaning up vehicles, residences and removing contaminated soils that were identified in the grazing area north of the company.

Transcriber's Note:

We turn to slide #11 of the on-screen presentation.

Zolymar Luna:

In 2016 an order is issued to the company to basically prohibit them from removing equipment from the Site. All of this focused on preventing lead contaminated material or other spills or lead discharges or lead emissions from reaching surrounding areas. And at that same time, EPA then proposes, prepares, what is the package, to recommend this Site to the National Priorities List. That document, when it was drafted and finally submitted, the final score was 56.66. The minimum to be able to submit or recommend a place for the National Priority List is 28.50. This tells you that it was a considerably high score. In 2017 it is officially added to the National Priority List. In 2018, the work of the "Remedial" team, which includes other colleagues, including myself, begins. And here the focus again is to do an investigation to address those concerns that were beyond the Site, off-Site, and develop a feasibility study to include alternatives that are going to address that contamination. Recently, which is the reason we are here, the EPA publishes the plan to remediate the Site and we then begin the public comment period so that interested persons, adjacent communities, and the government of the city of Arecibo can also review it and give their comments, if necessary. As Carmen mentioned, this period was extended to October 16.

Transcriber's Note:

We turn to slide #12 of the on-screen presentation.

Zolymar Luna:

This again is more or less similar to the image I showed at the beginning. The red frame is from Battery Recycling.

Transcriber's Note:

We turn to slide #13 of the on-screen presentation.

Zolymar Luna:

This is basically to give you a summary of the areas that were subject to sampling.

Transcriber's Note:

We turn to slide #14 of the on-screen presentation.

Zolymar Luna:

This image to your left identifies several points where soil samples were taken.

Transcriber's Note:

We turn to slide #15 of the on-screen presentation.

Zolymar Luna:

The one on the right are surface water and sediment points.

Transcriber's Note:

We turn to slide #16 of the on-screen presentation.

Zolymar Luna:

The next image is a little better, isn't it? I think you can see it better. It basically gives you an idea of the area that was covered. Not only were samples taken at the Site, at the old company, but samples were also taken from the surrounding area, in the residential area, and in the vicinity of the channels that go to Caño Tiburones. These are soil samples. Sediment and surface water samples were also taken, identified here, again, a better picture. We can see... we're going to go back a little bit here. Okay. Where are you? Okay. Again, this is very important that we want to verify the extent of the contamination of the east channel, because here, from this point, from the preliminary investigations, we have knowledge that the discharges were reaching this channel. This area was also examined, the channel that ran very close to the residential area and the channel that discharged into the Rio Grande de Arecibo.

Transcriber's Note:

We turn to slide #17 of the on-screen presentation.

Zolymar Luna:

This is another image focused on groundwater sampling. It's a mix, a combination, of well monitoring points that were installed, as well as what we call a screening. A facility was installed, samples were taken at different depths. Then those waters are analyzed for the parameters decided in this project. After this one, going back, here is another picture. We can see again all the areas that were tested, the wells that were installed, that are inside the area, also in the surrounding area, in the residential area. All this was several months' worth of data. This data is compiled, this data is organized, it is evaluated. It is mainly assessed for two very important components, risk. Human risk and risk to ecological receptors.

Transcriber's Note:

We turn to slide #18 of the on-screen presentation.

Zolymar Luna:

The results of that assessment indicated that the contaminants of concern for this Site are arsenic and lead, antimony, cadmium, and chromium in soil. For groundwater, arsenic, lead, vinyl chloride, the two dichloroethane variables and for vapor intrusion we have a concern for trichloroethylene. In the case of antimony and cadmium, if you are curious as to why that bird is there, it is to indicate that these are contaminants of concern for ecological receptors specifically. That's why we're listing them.

Transcriber's Note:

We turn to slide #19 of the on-screen presentation.

Zolymar Luna:

The next image is a summary of the different results that were also obtained in topsoil and subsoil, indicating where the areas of concern are. And in this one we can see... I don't know if you can see it. There is a poster to your right where, perhaps, you can see this image better. On my left. You can see more clearly the different points and areas we identified as the areas that we're going to address under this remediation project. We can see the east channel identified here. Given the results, lead was identified as being present up to 2,000 feet from the channel. The residential area was actually below screening levels. Specifically, we can see here that the area of concern is the soil, specifically, from what was the Battery Recycling company.

Transcriber's Note:

We turn to slide #20 of the on-screen presentation.

Zolymar Luna:

The groundwater results. This is a graphical representation. In reality, given the results that were obtained from the monitoring, a model is made of the extent of the water that is contaminated, in this case with vinyl chloride, which is the more extended point that we see.

Transcriber's Note:

We turn to slide #21 of the on-screen presentation.

Zolymar Luna:

We see here again; this more or less gives you an idea. Again, it's a model, but it gives us an idea of how far the contamination went in case of groundwater. We can also see how the highest concentrations are in the Battery Recycling area.

Transcriber's Note:

We turn to slide #22 of the on-screen presentation.

Zolymar Luna:

This other image, again, a little bit more specific, helps us identify where the areas of concern or the highest concentrations are. Let me go back. Here, again, we can identify that they are within the Battery Recycling facility. From what used to be the company. This is a vertical cross-section. If we stand next to Battery Recycling, looking towards Caño Tiburones, we make a sectional cut from south to north. Are you telling me to move to the other image over there?

Transcriber's Note:

The speaker refers to Brenda Reyes pointing to the poster on the stage. Brenda explains that this is so that people know that the image of the graphic that is on screen is printed on the poster on the stage.

Zolymar Luna:

Ah! Ok. Yes. It is the same graphic and the purpose is so we understand, the idea is that you can see this information and that we can all understand it. This image is here, but if you want to see it after the presentation, there are these posters that you can take pictures of. Also, again, these images are in the reports that were prepared and are available online. But this way you have other resources. There are many other options.

Transcriber's Note:

We turn to slide #23 of the on-screen presentation.

Zolymar Luna:

In this case, several wells were installed on the premises of what used to be the Battery Recycling company and we went up to just short of Caño Tiburones, which is the last screening point that was done, to ensure the extent of the contamination and whether it could be affecting Caño Tiburones.

Transcriber's Note:

A member of the audience asks away from the microphone if he can ask a question now or if he should wait until the end.

Zolymar Luna:

At the end. But we are going to be here. I'm going to explain a few things. There are several wells. In truth, the highest concentrations are still, as I mentioned, at what was the Battery Recycling company. And that, all in all, is good information for us. It's unfortunate that it's happening, but from what could be a complication in a project, understanding that this contamination really isn't affecting residential areas directly, well, it's still a relief. Exposure of this kind, because of the vapor intrusion issue, can complicate a project a lot. We were talking about volatile organic compounds, but we also have inorganic compounds, in this case lead and arsenic. In the case of inorganics, they were detected right on the edge, on the side of what was the Battery Recycling company and very close to the channel. In the channel, as we have already identified, there are several points that have high concentrations of lead. It is completely understandable how in this monitoring well we were able to detect these high concentrations of dissolved lead.

Transcriber's Note:

We turn to slide #24 of the on-screen presentation.

Zolymar Luna:

Of course, as a result of all this information, which I'm summarizing very briefly, it actually took a considerable amount of time to evaluate the data and the possible alternatives that apply, given this data.

Transcriber's Note:

We turn to slide #25 of the on-screen presentation.

Zolymar Luna:

The goals of this project are also identified. There are many words here which can be very lengthy and complicated to read, but basically the main goal is to prevent the exposure of these contaminated soils and contaminated water to people, to human beings. The same goes for ecological receptors. We want to prevent exposure to ecological receptors. They become another goal of the project. The other goal of the project is to prevent these contaminated soils from continuing to contaminate the groundwater body resource.

Transcriber's Note:

We turn to slide #26 of the on-screen presentation.

Zolymar Luna:

The goal for the groundwater alternatives is again to prevent direct contact and the vapors issue, as I mentioned, the vapor intrusion that may be affecting enclosed spaces. To prevent this and the consumption of contaminated water.

Transcriber's Note:

We turn to slide #27 of the on-screen presentation.

Zolymar Luna:

All these goals were analyzed and as part of the national contingency plan, which is basically what governs the Superfund Program, we arrived at this point. We decided on or considered five alternatives that are compatible with the contamination that was detected and defined at the Battery Recycling Site. It is mandatory to include the "no action" option for comparison purposes. It is not arbitrary; we simply have to compare to see the benefit of each of the alternatives we are proposing. Alternative 2A, which was the title given to it. These are numbers to be able to distinguish between the different options. In this case, what is being envisioned is, or what is being presented is, once the buildings are demolished, to deposit a layer and contain those contaminants with a layer of clean soil. What is known as fill. To make sure again that the goals are met, which is exposure. We want to prevent exposure, and this is one way to prevent exposure. In this case, in the drainage channel we would also be installing a cover to prevent exposure. Alternative 2B is very similar. The only difference here is that the soil in the channel would be excavated and taken to a landfill. To a landfill system, in fact, after treatment, so that it can be secured at the final destination. They would be treated first before being taken to a landfill system. Option 3 is the "in situ" treatment option. "In situ" means that it is on-Site. Specifically, there is not going to be an excavation at this Site, what would be the Battery Recycling company grounds. A material is going to be injected that basically solidifies those contaminated soils to prevent exposure, one of the goals, and prevent these contaminants from continuing to migrate into the groundwater. In this case, the option also includes excavating the treated channel soils, treating them, and taking them to a sanitary landfill system for final disposal. In the case of alternative 4, what is proposed is to excavate the contaminated soils from the channel, the contaminated soils within the Site of the old Battery company, the residential soils - which I am going to explain a little bit now - and consolidate them into a unit in what was the old company, which would be protected by a clean soil material and a geotextile material to protect it, prevent exposure and also prevent runoff and rainwater from altering the cover. Alternative 5 is total excavation of the soils in the Battery Recycling area and in the east channel. Importantly, all these alternatives, except the "No Action" alternative, will include demolition of the structures currently located on the former company Site. It also includes the excavation of the residential soil, which is only one residence that will be addressed, to be conservative, and institutional controls will be implemented.

Transcriber's Note:

We turn to slide #28 of the on-screen presentation.

Zolymar Luna:

In the case of groundwater, an interim measure is proposed. This will include an annual monitoring program to collect data in the different systems that are installed, in the wells that are already installed. This will allow us to evaluate the natural attenuation of volatile organic compounds. It will also allow us to evaluate how effective the soil remediation being implemented is, which includes excavations. It will also allow us to evaluate whether the extent of the contamination is migrating to other locations. Basically, how the extent of contamination is behaving, also known as the plume. This action will also include governmental controls that include the process of restricting the installation of wells in this area. All with the objective of preventing and complying with one of our goals, which is to prevent exposure.

Transcriber’s Note:

We turn to slide #29 of the on-screen presentation.

Zolymar Luna:

The alternatives, as part of the contingency plan, have to be evaluated by nine criteria. There is no order of preference. Each criterion is important. All alternatives are evaluated accordingly to basically see what these alternatives offer to meet each of these criteria. The most important, but they are all important, is (1) human safety. How this remedy is actually addressing human health and the environment. (2) The second one is how it complies, whether it's going to comply with local law statutes and federal laws. (3) Whether it's going to be effective in the long term as well, and whether in the long term it could present.... that it will be a remedy that's going to give few problems over many years if it's implemented. (4) How it can also reduce toxicity, mobility and volume through treatment. (5) It's important, if we're doing treatment, it's also important to determine if it's going to allow us to address a need in the short term. We have a problem, so how long is it going to take us to address that need. (6) How is it going to be implemented? Is it easy to implement? Is it going to be a lot of work to implement? That is important to analyze. Because there are many technologies that can work in some projects, but there are some conditions that are not always the same. It is important to see if that project or that remedy applies to this Site and if it can be implemented. (8) Government acceptance. We always consult with the local agencies, in this case the Department of Natural and Environmental Resources, to verify if they agree with this alternative. (9) Community acceptance. Mainly the reason we are here today, to verify that the community agrees with the alternative that the agency is proposing.

Transcriber’s Note:

We turn to slide #30 of the on-screen presentation.

Zolymar Luna:

The alternative being proposed for soils. We are almost, almost in the home stretch. It is the excavation, alternative 4. It's the one that includes an excavation of most of the contaminated soils on the Site to be consolidated with contaminated soils from the eastern drainage and with the residential soils, in a specific area at the Battery Recycling

Site. This is compatible with the current uses of the properties. This is a property that is zoned for commercial and industrial use. This is something that would be totally compatible. Because what would be concerning is doing something similar in residential areas, on a house. If this were a residence, that would not be an option. But the future and current use of this Site is commercial and industrial. For groundwater, the decision we already described it, is an interim measure in which we are proposing a monitoring program. Basically, to verify that this water resource stays as it is, that there is no action that is going to disrupt the monitoring program or whether something changes. Basically, we are looking for an alternative that is viable, but where we can also address community concerns. We understand that with this option we meet both. Cost, which is important. One of the criteria that we mentioned to be able to meet and be able to recommend an alternative is cost. The cost of both is $19.4 million. It is a viable option compared to other projects.

Transcriber's note:

We turn to slide #31 of the on-screen presentation.

Zolymar Luna:

This is a conceptual diagram, basically everything that is red is the area that would be excavated, and the yellow area is the area where the soil would be consolidated. Which, in fact, are going to be stabilized and treated before being consolidated. Because to comply with the new criteria we have to demonstrate that we are reducing mobility, reducing toxicity, in this case, through treatment. And we comply. It is a good point that we are also offering another space within this same property, so that it can be reused in a safe way.

Transcriber's Note:

We turn to slide #32 of the screen presentation.

Zolymar Luna:

This next image is basically a conceptual diagram of what it might look like. But it's not necessarily going to look like that. It's really a mock-up, once the structures are demolished. This is what it might look like. We're going to demolish the buildings, the equipment that was there and, in the corner, if you can see the green at the end, would be the area where we would be consolidating the already treated soils.

Transcriber’s Note:

We turn to slide #33 of the screen presentation.

Zolymar Luna:

In the case of interim groundwater remediation, the monitoring wells that have already been installed would be used. The installation of additional wells can be evaluated or considered, but so far, the proposal includes those already installed. Once the remedy is decided, what is recommended is to do a pre-design study to make sure that this number of wells gives us the information and data necessary to be in compliance.

Transcriber’s Note:

We turn to slide #34 of the screen presentation.

Zolymar Luna:

And we are almost there. Here we are. This is the reminder, as Carmen mentioned. It is very important to receive your questions or if you have them, recommendations or comments about the remedies that we are proposing here today, please send them to us. Here is my e-mail address. The mailing address is also there. The deadline is October 16, the 16th of October. The information is also on the agency's website. On the table outside there was a code that you can take a picture of and download, to download all the documents. Also, there is the contact information where I can receive your comments. Carmen will be here for the questions section. I'll stay with her, but Carmen is going to start it.

Transcriber’s Note:

We turn to slide #35 of the on-screen presentation.

Carmen Guerrero:

A million thanks, Zolymar, for the introduction. They tell me I have to go over there. How does one get up here? This way.

Zolymar Luna:

Over here.

Transcriber's Note:

Carmen Guerrero takes the stage to share the microphone with Zolymar and leaves the microphone below available for questions from the audience.

Carmen Guerrero:

I'd rather be down there, but let's then officially start now what is the public comment session. As we told you at the beginning, we want to make sure that every person who participates in this meeting is heard. As we also told you at the beginning, we have the microphone over here, please state your name, last name, sector or entity you represent. Also, if you prefer to write your questions and you don't want to come to the microphone, you can also do it on notecards that Brenda had over there, and we have them here. Look, Kathryn is showing them to us. You can write your questions on the card and give them to one of us. There's Jose over there. You can give it to any one of us, and we will read the question for you. We would appreciate it, and this is very important, when you came in there was an attendance list and before you leave, we want to make sure that all of you signed the list, because this is the best way that we can keep all of you informed in the future, especially everything related to the Superfund Battery Recycling Site cleanup process. Also very important, if there were people who were unable to attend today's meeting, please let them know that we are willing to coordinate future meetings, if necessary, to update them on the progress of the cleanup and remediation of the Site. So, without further ado, let's start with the questions. I know there was a request just now to go to some of the images in the presentation and we can do that, if you want us to go back to the presentation that can be done. So, everybody is invited, but it is very important that if you ask a question, you do not ask it from your chair. If you can, stand up and stand close to the microphone, because if you don't, we cannot transcribe your questions.

Transcriber’s Note:

Someone from the audience asks a question away from the microphone that is not understood and is asked to repeat it.

Carmen Guerrero:

I’m sorry?

Iván Elías:

Can we make several questions?

Carmen Guerrero:

Of course, you can ask several questions. The important thing is that you approach the microphone if you can, you're all invited. Ivan, you have already broken the ice. So, let's start with the question. Good to see you.

Iván Elías:

Greetings to all of you and to the public. Greetings, Carmen. We are glad to see you. My name is Iván Elias. I have several questions about the historical background. We had been fighting for that company to be shut down, and one of the things we were told is that the company was set up without an environmental impact statement. Is that true?

Zolymar Luna:

Let me go here because this has me stuck to the podium and I can't move. (Transcriber's note: she is referring to the microphone attached to the podium) Look, honestly, we don't have specifics of what happened in this detail. Those processes are processes that are handled through the local agencies. What I can tell you is that the company was closed and that there were several deficiencies.

Iván Elías:

We know it is closed.

Zolymar Luna:

Yes, as you already know. We do have the complaints. The complaints that were received are on record. The Environmental Quality Board at that time made its inspections, as did the Environmental Protection Agency. That aspect or that detail, really, is outside of what we can present today. But if it is a concern to you...

Iván Elías:

Yes, it is a concern. I would like to know the history of the permits that were granted, how they were granted, which permits complied with the applicable regulations and which did not, and who is responsible for the fact that they were granted without complying with all the requirements. That's what I want to know.

Zolymar Luna:

So that it's on...?

Iván Elías:

To know who is responsible. Because if it was the government of Puerto Rico, if it was the Department of Natural Resources, if it was the Environmental Quality Board, hey, if it was the EPA too, we want to know. Because we do not trust government agencies. So, you invite us to talk about remediation and trust is necessary for us to believe that you will comply with the regulations. That's why it is important to know how the permit process took place. We participated in the protests against this project. In the timeline that you presented, there is nothing from 2004. We went to that company to inspect it when Mojica was there. We went to visit the company and we saw the problems that existed. I was representing Citizens in Defense of the Environment and in the timeline that you presented there is nothing from 2004.

Zolymar Luna:

I admit that there are several things that could not be included in detail. Not because they are not important, but because of the time I have. But in the documents, at the end of the Proposed Plan, it's all there.

Iván Elías:

And we filed complaints with the Environmental Quality Board.

Zolymar Luna:

The complaints are there.

Iván Elías:

And we filed complaints with the EPA.

Zolymar Luna:

It was documented.

Iván Elías:

And we filed complaints with the EPA. So, do you understand why we don't trust the agencies?

Zolymar Luna:

Yes...

Iván Elías:

Second question. Is the area where the facility is located a maritime terrestrial zone? Was that condition of maritime terrestrial zone evaluated since it's in Caño Tiburones? In fact, it is in the Caño Tiburones. Caño Tiburones is a maritime terrestrial zone and although the area is dry, it does not mean that it is not part of Caño Tiburones. That is supposed to have been evaluated in an Environmental Impact Statement if an Environmental Impact Statement had been made. But the status of maritime terrestrial zone is not lost. Then you say that it is identified as an industrial zone.

Zolymar Luna:

Its use. Its uses.

Iván Elías:

Yes, yes. It is classified as an industrial zone. I honestly think that this classification is incorrect. It should be a natural resource conservation area. Because that is part of Caño Tiburones. Therefore, if remediation is proposed, based on the premise that it is an industrial zone, remediation for an ecological conservation area is not the same as remediation for an industrial zone. So, that is the second point that I would make.

Zolymar Luna:

Ok. We're taking notes...

Iván Elías:

The third point. I don't know what's going to happen to the contamination if you tell me you're going to pick it up and leave it in the Site. As engineers, we use an expression, "dilution is solution to contamination". You are concentrating them; you are not diluting them. You're taking it out of the ground and you're going to put it on a Site.

Zolymar Luna:

We're going to try...

Iván Elías:

That Site... I don't know about the treatment. That place was flooded during Hugo, during Georges, during Maria, during Irma, during all those hurricanes. And it will continue to flood with all the hurricanes that come and affect the Rio Grande de Arecibo. That is a flood zone. That is a flood zone. Also, it is a storm surge zone, which I didn't hear anything about in your presentation either. I'll leave it at that for the moment.

Zolymar Luna:

Yes, thank you. Noted. The information that we have on the permits.... We definitely don't have it, but the uses are going to be considered.

Wilfredo Vélez:

My name is Wilfredo Vélez Hernández. I am part of Citizens in Defense of the Environment. I am one of the people who filed the complaints at that time, not with the EPA, but with the Environmental Quality Board. It took them seven years to answer the complaint. You may then wonder why people feel that neither the EPA, nor Natural Resources, nor any other government agency does anything for the people. They take so long to answer a complaint that by the time they come to answer it, the people who have been directly affected have already left the place. I had the privilege of interviewing people who were adversely affected by Battery Recycling. And I advised them, "look, let's file complaints in court, because the government agencies are obviously useless". As someone in Natural Resources recently said to me, "you're saying that we are blind and deaf". I said, "and do you have a different opinion of your agency? Because you always drive through places where there is serious contamination. He said, "Oh, people have to file a complaint". I said: "If people don't file a complaint, can't you intervene? He said, "No, we can't". But how can this be? So, a crime is committed and since there is no complaint, it is not investigated. We have had negative experiences with all government agencies, and we have had some differences with the EPA. And, for example, I remember when we were doing the interviews, I interviewed this father who worked there, at Battery Recycling, and he went to his home and contaminated his daughter. And he contaminated the girl so badly with the lead that the father brought in from Battery Recycling that she had a serious lead contamination problem. And there were others. I tried to insinuate "But look, let's take legal action". "No, what's the point? Here in Puerto Rico, there is tremendous impunity for all those people. It's not worth it". And that's the way our community sees the agencies, including the EPA. They understand that they are useless. That they don't answer the people. That they don't answer the needs that really affect human beings. We are glad for what you are proposing in terms of destroying that building. But let me tell you a little bit more.... We went to the hardware store across the street and interviewed the workers. They told me, "We don't dare say anything because we are going to lose our jobs." And I said, "but why?". "Ah, because those people have tremendous power. If we raise any issues, we're going to lose our jobs. We're going to have to keep quiet for fear of losing our jobs." So unfortunately, and it is unfortunate because I think there are good people in these agencies, but there are people who are entirely chosen by these institutions that do not allow them to act. I just came from the court today, from a case that, maybe Mrs. Guerrero knows something about it, of Cueva del Indio, because they arrested a colleague because, allegedly, he did demonstrations that, they understood, were harassment from us towards them. And the court found grounds, because they say that we knocked down a fence that is in an illegal place. I remember that I had the privilege of going with Mrs. Guerrero to investigate and the only way to enter was through the water. She was with a lawyer who took pictures and so on. We were told that action was going to be taken. But look to the contrary. To the contrary. Today, Cueva del Indio is privatized. Completely privatized. To go there you have to pay $10.00 per person. If you go in a car with 5 or 6 people, you have to pay $10.00 per person. I say that because I just came from court with the colleague who is being accused. Because we have been denouncing the barbarities, the environmental crimes that are being committed in our country. There are many children in the communities adjacent to Battery Recycling. We are glad that the EPA has taken, at least, the action of ordering to close that monster that was causing so much damage to the community, to the waters, to Caño Tiburones, but above all to the human beings that live - and some lived, because others left - close to that monster that did so much damage to the community. Thank you.

Fernando Márquez:

Good afternoon. My name is Fernando Márquez. I am a resident. Business owner here in Arecibo. I have been running the PR 2 corridor for approximately 35 years. I sponsor the businesses, both the nursery and the hardware store. One of my questions would be, what risk, as of today, do I have in bringing those products, both from the nursery (Vivero) and the hardware store, into town, and what risk do I bring to my employees? That is one. Two, I would like to know, just as we are all responsible, what charges have been brought against the owners of Battery Recycling? Because the amount that they were billing on a weekly basis, exporting lead, very high quality, which had a huge value, I understand, that they must have been penalized or have to cover the cost, not just what the EPA is.... And we are grateful that, at least, you are informing us that you are making an investment of 19 million dollars, and I don't know how much you have spent to date. I mean, the impact has been huge. It would have been worse if they had brought the garbage incinerator next door. And the last thing I want to ask is, what are they going to do with that land there? Are they going to allow this again? Because this is not the first time. This is the second time. And a third one was proposed; a mega incinerator next door, one mile from downtown Arecibo.

Zolymar Luna:

Thank you. I'm going to start backwards from what I remember because I think that the first one... Yes, the first one was, if I understood it, if you we believe that there is a risk for going to the nursery and the hardware store, right? Did I understand it right?

Fernando Márquez:

Correct, yes.

Zolymar Luna:

Ok. Both areas were investigated, samples were taken from those areas, and there were no concerning results. Currently, there are also some air monitoring stations in the area that help us do just that, verify what the conditions around this company are, because there obviously was an environmental problem. And I can tell you that, in terms of your participation, you can continue promoting that area, because, at least, as far as the Battery contamination is concerned, the contamination of this place, there is no concern. I can tell you that part. And the second question, future use? As we mentioned, it's currently restricted or limited to commercial and industrial use. We have no control over what may occur at the Site. The agency does have control of what happens in terms of remediation. But in terms of what will be installed there in the future, I'll be honest with you, we have no control. State and federal regulations do exist to make sure that whatever is done - and I understand you're worried because of what happened before, because it was still a problem in the past where they didn't comply. But I can tell you that the process is in place to make sure that whatever is installed is compatible and complies with the permits. I know I'm not answering much, but that's really the process. Again, the community always has, during the permit processes, they have a process to allow you to express your concerns.

Fernando Márquez:

And where do we stand regarding the owners? The owners of the Corporation.

Zolymar Luna:

The owners.

Fernando Márquez:

They used to live in Dorado and were in Florida. I mean, they abandoned the issue.

Zolymar Luna:

Yes, the agency has a process. The Superfund program has a compliance component as well. It is called enforcement. It identifies who the potential responsible parties are and has a process to recover the funds that the agency invests. As you rightly mentioned, it is a lot of money. To date, the pre-investigative activities have reached $10 million, and it may be a bit more. There is definitely an investment, and the agency does have its process. I do not have that information on what has happened so far, but there is a process, and we are looking for these responsible parties to comply. If they cannot do it themselves, then the agency should be paid for those expenses. Did I answer you? Was there another question? Yes, that was it.

Fernando Márquez:

Thank you.

Zolymar Luna:

No, thank you.

Lilliana Alemán:

Zolymar, the gentleman, feels that one of his questions hasn't been answered.

Zolymar Luna:

There are some questions that I believe I can't answer. But we're taking notes.

Iván Elías:

Yes, but I imagine you can investigate it.

Zolymar Luna:

Yes, we took note of that.

Iván Elías:

This is a flood zone. That is, it is on the main channel of the Río Grande de Arecibo. It is a flood zone. So, the question is, how are you going to remediate something by leaving the pollutants there, in a flood zone? In the case of a tsunami? It is also a tsunami zone. The tsunami is not a wave that comes. It's a train of waves that clears the land, that washes away buildings and everything. It's going to wash away the levee. The levee of the Rio Grande de Arecibo, a tsunami washes it away and takes with it an important part of the downtown of Arecibo, of the Arecibo town center. And if there's a mound with pollutants there, it will wash them away and spread them out.

Zolymar Luna:

We will take note of that. I wanted to explain a little bit about the remediation process. The soil, before consolidating, would be treated. For that very purpose, to lower the toxicity. That would be part of the remedy. I don't know if I'm answering your question, but that...

Transcriber's Note:

Mr. Iván Elías speaks from his seat, away from the microphone.

Zolymar Luna:

Yes, that is going to be noted and soon, as there's data we can provide, we will share it. Next person.

Carmen Guerrero:

José, do you want to say something?

José Font:

Yes. José Font for the record. In terms of the gentleman's points, very good. We take that and we consider it in the process. Because being a flood zone, if that is a new element that arrives before us, we will consider it; if we are already considering it, then we will let you know. Remember that every question that is presented here today is going to require a formal response in a Responsiveness Summary.

Zolymar Luna:

And it will be available to the public as well in the record. We did evaluate the component that is on the plain of the Río Grande de Arecibo, which is floodable. That is part of the process. I would also like to point out that after Hurricane Maria, it doesn't mean that it won't happen, but an investigation was carried out after Hurricane Maria to take samples in the surrounding areas and the conditions did not really change after Maria, compared to what they were before. The contamination was basically where it was found and it is due also to the nature of the inorganics because they are stubborn about moving out of their place and, in this case, they moved the most in the drainage to the east. But outside of the properties, as the data showed, the sediments did not reach the Río Grande, the Río Grande de Arecibo. Samples were also taken towards the Caño Tiburones channel and no lead or arsenic was detected. So, it is important to note that yes, we understand the concern, but so far, the data we collected confirms that the contamination did not really reach and is not discharging into Caño Tiburones. Those were the priorities of the project. I want to emphasize that.

Idelfonso Ruiz:

Good afternoon, Idelfonso Ruiz. I represent the academic system of Ana G. Mendez University. First of all, installing a well, digging a well is complicated and you have more than one well. So, it is quite a challenge. You did a tremendous job. As well as the sampling, you have more than 50 sediment sampling points. So, the monitoring that you did is significant. It really is a challenge. Having said that, I have a question, specifically with the wells, did you collect conductivity data?

Zolymar Luna:

I have my hydrogeologist there, but I can take notes. Because there's data that I don't know specifically off the top of my head, but she can answer it.

Transcriber’s Note:

Mr. Idelfonso Ruiz turns to Kathryn who is seated near the microphone area.

Idelfonso Ruiz:

I'm concerned about the conductivity of the area.

Zolymar Luna:

Yes, yes, yes, yes, exactly, but maybe she.... But do ask the question.

Idelfonso Ruiz:

Is there conductivity data?

Zolymar Luna:

Yes, there is data. All of this is part of the investigation process that each well underwent.

Idelfonso Ruiz:

How does conductivity behave?

Zolymar Luna:

We are recalling. What's the conductivity like? I don't remember the K right now. What was it? I know it moves one way, it's not fast. I mean, this is part of the positive and the bad, but Kathryn, will you?

Kathryn Flynn:

When we take samples from the wells, we measure conductivity. We have all that in the research, but I don't know the details. But we can look that up.

Zolymar Luna:

It will be noted so that we can give you those precise numbers. Again, it's a lot of data that is collected. But it is all in the reports. Mainly, if I can recommend a study where you can find it, it would be what we call the RFS and then I can tell you where the appendices and all the documents are so that you have that data. Because it is important and they are always carried out, like other water quality studies that are carried out.

Idelfonso Ruiz:

In the analysis of alternatives, I see that, what they are proposing, specifically for the channels, is a very aggressive method, to remove sediments and take them out of there. In that sense, I am a little concerned. I have not been to the Site, so maybe I am saying something that is not correct. But it worries me in the sense that maybe you have within the same channel, you have spaces that maybe don't have any...well, I'm not going to use that word.... But the trophic level is poor. But you may have other works within that channel where you have a whole trophic community there. And removing that sediment would be ecologically altering the system. I am a little bit concerned about the alternatives that were presented. My recommendation is to reconsider in those specific locations using vegetation. And the vegetation then soaks up the contaminant and then the vegetation is taken out and burned. It would be like a recommendation.

Zolymar Luna:

Phytoremediation.

Idelfonso Ruiz:

Phytoremediation, yes.

Zolymar Luna:

Thank you for the comment. It will be taken into consideration. These alternatives are part of the process, and one of them, I don't know if you remember, is how quickly you can implement that remedy so that it gives you results. Because what we want is to limit that exposure quickly, to prevent the exposure. And sometimes in that process, well, we want to see what can be done the fastest, what gives me the fastest results. And that is a process. It does not mean that we are excluding it, but, explaining where proposing this alternative comes from; it goes like that. This alternative allows us to remove that exposure or that source to make sure, and to protect, in fact, the ecological receptors themselves.

Idelfonso Ruiz:

That is why I make the clarification that it does not have to be the entire channel, but in those specific places of the channel where you understand there is a whole trophic complexity. In those specific points.

Zolymar Luna:

Yes, I find it an interesting point. Thank you.

Marta Quiñones:

Marta Quiñones Domínguez of Arecibo and Citizens in Defense of the Environment. I have several questions. I am concerned that at no time were the contaminated people mentioned. There were several children and several adults. Even when Head Start did an evaluation of the Head Start closest to them, they found that all the children were contaminated with lead. Now they are all adults, and no one has done anything for their health. The colleague was mentioning if you can go to the Site. The problem is that I don't know how the cleanups are done and how the wind behaves. And that was not mentioned at any time here. Because if I remove something, as it happens in Vieques, the wind moves the contamination. And so, I think the colleague was quite concerned because if you guys are cleaning up there - "you guys" referring to the EPA, not you two - and the wind is blowing either way, the problem is that it can carry it to the employees in front, to the employees on the side. I don't know if a medical evaluation was done on those employees. Because the problem is that lead is not just anything. That's the first question. The second question is, and you were talking about soil migration from the contamination, but you weren't talking about soil migration through the air. And you say there are some monitors, but the problem is when they are cleaning up. So, you disclosed that there was arsenic and lead among the contaminants and others. But they didn't tell us what these things cause. That exposure to arsenic, that exposure to lead, what kind of effect does it have on human beings and on nature?

Lilliana Alemán:

I wanted to tell you that, in the fact sheet, on the last page, it talks about the pollutants that are of concern and through Internet pages it tells you exactly the damages caused by those pollutants are. You can access the fact sheet. I don't know if we have enough left in print. That answer I think you can find it there.

Marta Quiñones:

We know, because we have fought so hard against the incinerator and we have protested this, we know what it causes. But it's important to inform people. Inform those employees that are there. Inform the people who may be involved in this whole thing. So, it's important. And the recommendation that the colleague made, I think it is clear, that you report that this land cannot be used again in industrial matters. That land must be an ecological protected space. Because otherwise, they come, and they establish themselves there. Things are quickly forgotten here. The colleague also said it. It is not the first time they establish something there. Then someone comes along with a great project and, depending on who is in the administration, they say, well, this is going to be the place. Arecibo is tired of environmental abuses because this is not the only environmental abuse. There are many environmental abuses, including the landfill that is a little further down. So, that's part of the problem. When you mention taking that land to a landfill as one of the alternatives that you evaluated. One might ask to which landfill? Because the problem is that we keep hurting the new people. We don't evaluate. We took 23 years to analyze this. 23 years that people have been exposed. You've been there, 50 years of the Arecibo landfill, people complaining, and it is not assessed. Let's be a little more responsible with the health and safety of the people. So, it is important that this land be taken away from the industrial aspect. Because then economic development comes and says, "we are going to put an industry there". So, it would be better to take that away and turn it into protected, ecological and conservation land. In addition to that, we should talk about what these diseases cause. Not just put it in the document, excuse me. But that it be talked about so that people are clear about what can happen. Because when Head Start found out that their children were contaminated, they explained to the parents what was happening and many of them left Puerto Rico. Because there were no health services here to treat those children and we don't know what can happen. It is important because we are hurting our future. That future is already 23 years old, but other futures continue to arrive and the children of the people who are coming to buy in those businesses, which we support, but you know what exists next door, and that is important. And the other thing, basically, is that they also talk about the wind issue. In other words, how is it going to work and how are we going to control when you are managing this soil there? How are we going to control everything else? Because it says that they are going to clean them in situ, that is, that you are going to work there, you are going to stir the wind at some point, because the machine is going to kick up soil. In other words, that is a lot of risk that is not being presented. Well, maybe it was analyzed, but it is not happening, and it is important that we evaluate it. Thank you. Oh, and we like that it is a Superfund, so we have that kind of money at least to invest, even if they don't hold Battery Recycling responsible, but at least clean up is considered.

Zolymar Luna:

Yes, exactly. There are several questions. I think the most important one, the one you mentioned (about the wind). In fact, the goal is to prevent exposure. Because we know the consequences and the effects that this can have on health. That is the main goal of this remedy. In the construction and excavation process it was considered. There are processes that can be used, or mechanisms that can be used, or mechanisms to control or mitigate what we know as fugitive dust or particulate matter that can move off Site. Those measures are going to be taken and that is part of the consideration that went into making this decision. But yes, primarily what is being considered is to avoid and limit the source. It is necessary to make that excavation and remove it to be able to limit that source. It's like a first step to do what you very well mentioned, to eliminate it and prevent this from happening again another time. Basically, that's it. Because we understand the consequences that there were at that time. And of course, our main goal is to protect human health and the environment. That is always going to be kept in perspective. There was another question that was...

Carmen Guerrero:

The part about informing and orienting the workers.

Zolymar Luna:

I think there was something you mentioned about informing the employees. I'm thinking we're talking about when the remediation activity is going to be done. We are talking about when that happens, that they be notified. That is a note that can be made, that yes, we are going to be notifying. There are monitoring stations right in front of the old company facility, precisely for that, to verify compliance. Regarding the health analysis of the employees. Again, that is something that we have in the pipeline. But this investigation and this Proposed Plan does not include that component. We do work and we are collaborating, in fact, with the Lead Surveillance program so that if any person comes forward with a concern, we can provide guidance. And, in fact, there is a person here, if you want to stand up, focused precisely on addressing that concern.

Transcriber’s Note:

Nayda stands up in the audience.

Carmen Guerrero:

Yes, and to let you know that besides Nayda, Dr. Gredia Huerta also made herself available for that process. So, with both of them we can work that collaboration in terms of orientation. We urge people who are interested in orientation on the health issue to contact them so that we can attend to it. I would also like to recognize Dr. Ingrid Padilla, from the University of Puerto Rico in Mayagüez. Thank you very much, Ingrid, for being here as well.

Transcriber’s Note:

Dr. Ingrid Padilla waves from the audience.

Lilliana Alemán:

The gentleman has one more question.

Iván Elías:

Ivan Elias, again. The question is about the regulations of the different agencies, how are those regulations enforced in this remediation process or even in the process of identifying the history that I referred to just now? I was thinking there is an agreement with the U.S. government and the Department of Natural Resources and the Planning Board. It is the regulation and the coastal zone management plan. Evidently that project is in the coastal zone. So, there are supposed to be things that are not allowed because of the conditions set forth in the coastal zone management plan. The government has not enforced it, but the regulations are there. What I would like to know is if they are going to apply the provisions of these regulations or any other regulations that may have been issued.

Carmen Guerrero:

Yes. To add to the question, Ivan, and that is one of the questions and comments that we brought to make sure that it is answered as part of the process of responding to comments and that it is going to be documented. Something very important is that the different agencies can also have the opportunity to comment in this process. So, the municipality of Arecibo itself, through its land use plan, the Planning Board, Resources, with which we work hand in hand in the process, have reviewed the plan, have issued comments. In other words, within this process, there is a conversation with the local agencies.

Zolymar Luna:

Also, the process for choosing the remedy makes an evaluation for compliance with both local and federal law. For example, one aspect that is taken into consideration is whether there are endangered birds in the area, nesting areas, protected areas. All of that is taken into consideration in the decision process.

José Cintrón:

Good afternoon, José Cintrón of Bajadero. The question is one of depth. In the water, how deep was the sampling? What about in the soil?

Zolymar Luna:

The soil one I owe you. It was detected at depths of 20 to 80 feet below the surface. Soil varies quite a bit, but I can give you that data.

José Cintrón:

So how deep does the excavation have to be to remove the contamination in the soil?

Zolymar Luna:

It is very superficial. Down to one foot, basically. Within a foot of what would be the entire surface of the Site and basically the same thing applies in the drainage channel. Because it was all basically related to the discharges of the runoff water and air emissions that stay in the first layer of the soil.

José Cintrón:

And then, the last question. After Fiona, did you do water sampling again? After Fiona.

Zolymar Luna:

No, after Fiona no sampling was done. I can perhaps emphasize something. The different areas that we were concerned about, related to discharges to the river, we have already confirmed with this investigation that it is not connected to the discharges that occur from the currents in the company to the Rio Grande. Likewise, the channel, the way it is draining, well, the same thing, it stays quite close - in the data we have - it stays quite close to the channel.

José Cintrón:

So, there's none towards the hardware store...?

Zolymar Luna:

That drainage, as far as we have confirmed so far, does not connect to the runoff leaving the site.

José Cintrón:

Thank you.

Zolymar Luna:

You are welcome. Again, I can understand that it is a lot of information and other questions may arise after today. You can share those questions and recommendations via email.

Carmen Guerrero:

Any other questions or comments? I see Biaggi on his way.

Javier Biaggi:

Greetings. A pleasure to greet you all. Good afternoon to all of you. My name is Javier Biaggi. I represent Basura Cero Arecibo and I am president of the PIP Municipal Committee here in Arecibo. I want to remind you of several things about that place. First, there was the company we used to call Arecibo Petrochemical, the Cardinal. How much of that contamination, of that facility, still exists there? Because no remediation was done there, we know that there was a spill of tanks and things like that.

Zolymar Luna:

I understand that you are referring to the Puerto Rico Chemical Company. Yes, the volatile organic compounds that we found are directly related to the operations that this company performed at that date. Because in this case, Battery Recycling does not have those uses and because of the vinyl chloride degradation that is present at the Site, we can make the relationship. It did take several years to detect it, but as part of this investigation, it was confirmed that this company was responsible. It is a responsible party for the contamination that is there.

Javier Biaggi:

The company was responsible, but the owners were not. And the same thing happens here, right? I don't know what responsibility has been attributed to the owners of these facilities for this great contamination. We know who they were, but at the moment, when we searched the records again, they had changed the name of the owner. First it was a Ricardo Roselló and then the name changed. But I don't know what happened there.

Zolymar Luna:

I do not have much detail on the change of ownership. I do understand that, at the beginning, when the Puerto Rico Chemical Company operated, the owner of the property was Puerto Rico Industrial Development, as we call it, PRIDCO. And the company that at the time was.... Right now, the company is called Occidental, they are the subsidiaries. And then the Battery Recycling Company, which operated a few years later, in 1994.

Javier Biaggi:

Exactly.

Zolymar Luna:

In terms of identifying responsible persons or responsible parties, the Battery Recycling company, and in this case its owner, which is Mr. Luis Figueroa, are responsible parties officially on record. The agency started a process again now, when volatile organic compounds were detected in the groundwater, to identify, in this case to notify the other possible responsible parties. That process started.

Javier Biaggi:

I also want to remind you that within that same basin we obviously have the contamination generated by the Caño Tiburones landfill. But also at the Arecibo airport, around 1988, the United States Department of Defense contacted me, because I liked history, because they wanted to know where there were military bases in Arecibo, because of the lead contamination, because they used firing ranges and that kind of thing. And one was the area called Duamel, which was where the barracks were, and the soldiers shot at the target cards that faced the sea. So there had to be plenty of lead there. The other thing was that, in 1944, the U.S. Army started doing some DDT tests before they sprayed DDT in Korea to control malaria and other diseases that were developing there. And by that time, they were also trying, by 2008, they were trying to find out where that air base was, because the DDT that they sprayed in that air base, came out of the Arecibo airport, and the drums and the things that were left over and the things that they cleaned up, were there contaminating that area. The question is if they know that that exists. And the second is, what are they going to do with that? Also, in that same investigation that the Department of Defense was doing, at the Sabana Seca military base, the Navy, they also had another center where they took the airplanes out to fumigate the entire San Juan area. So, what they did there was that they put a cement cap where those things were buried, and they left it down there. In other words, they continue to be sources of contamination, because it did not end there.

Zolymar Luna:

Possibly.

Javier Biaggi:

The water table there is the same as the one here, which is very high, and the water table moves up and down all the time. In other words, not only is the transportation of these materials within the strata there, but there is also a horizontal movement. In Arecibo, we must consider, in addition to the Superfund company that they have there in Santa Ana, we could say, by Sabana Hoyo, of the contamination of pesticide products and that we already know, and you know, I don't think anything has been done there, that remains there. The warehouse that the Land Authority had, that they used for pesticides and herbicides, that was left there.

Zolymar Luna:

Okay, I know. Pesticide Warehouse. It's a Superfund Site.

Javier Biaggi:

Exactly. Yeah, that it's researched and everything. Plus, the toluene. I mean, Arecibo had so many of those things. Centers like that for disposal. And on top of that, we had the contamination that came from the Utuado Paper Mill, which discharged into the river and well, obviously, we are in their basin. That kind of thing also ended up here. We have a series of things that also came to exacerbate that, the approval given by the EPA to the garbage incineration plant that they were going to put in Arecibo. And now comes the big question: Are we cleaning this up and preparing the ground for Energy Answers to apply again for a permit without a non-compliance lead zone? And that's the big question, because I know that those people are still active, that they are looking for a way to establish an incinerator again in Arecibo or in Puerto Rico. And we know that the EPA has not made a firm commitment to full recycling, which is what could prevent that thing. And so, we're nervous because we know that's coming and we want to see if it's part of it.

Zolymar Luna:

In this project, we are looking to reduce emission sources. To address the contamination that is in place. I am aware of some of the Sites you mentioned. The Pesticide Warehouse and Papelera are also Superfund Sites. I can tell you, from this project, like other Superfund projects, the priority of the projects is always to address the source of contamination and avoid exposure. It takes time, sometimes, as you mentioned, it can take 20 years, 10 years. In Battery Recycling, the plan is to address, to decide on a remedy to address the need that exists, the contamination. The future uses, it is important to consider them also in the decision process, what’s going to be done there, what’s the plan. If the plan is conservation, alternatives can be sought that are compatible with conservation. That is also an option that can be included in the process to identify remedies. But, in general terms, in terms of what may happen in an uncertain future, honestly, practically nobody, nor the agency, can tell you that responsibly. We can tell you that we work with permits. That, in the case of this project, in the remediation process, we will be focused on compliance, on avoiding exposure to the neighbors, avoiding exposure to the different industries that are around. Because the purpose of the project is to avoid exposure. That is also part of the remediation. There are monitoring stations and, if necessary, during the preliminary design phase, there are other methods that can be incorporated to communicate to the surrounding community that these remedies are not impacting health. Monitoring can be installed at what would be the property boundary, in addition to what is already in place, if necessary. The commitment is to address the concerns that the community may have and to express and have a design that is compatible with the uses and with what the community understands to be pertinent for that location. But, primarily, to verify that it is a remedy that is viable, that it can be done and in a reasonable time, because I believe that you have waited too long.

Javier Biaggi:

I think so, and the remedy for the Site may be satisfactory, but I remember that the contamination zone was four kilometers around the project.

Zolymar Luna:

No, that's the investigation area. It's not the area of contamination. Because we had to move around to verify where it was, including channels to Caño Tiburones, channels to the Rio Grande. But the area that is really impacted is the property with what was the old company and the discharge channel. Those are the areas that are primarily impacted.

Javier Biaggi:

The thing is that the cows that were in the pasture area had to be eliminated because they had lead in their milk. The milk was heavy. And they had to... And I think they didn't pay the farmer a penny at all, as I understand it. But the thing is that the crops that were around the Central Cambalache, up to Pueblo Extra, on the other side of the river, I remember that we had a project planned with the Land Authority and they called us and told us "look, this happened to us. It is within a four-kilometer zone around this and there is lead contamination and these lands cannot be used." And all the papaya farms there and things that were around that were all removed. So, if we are only going to take care of that, what happens to the rest?

Zolymar Luna:

Yes, I understand. I think that... I don't want to speculate. I have a suspicion as to where the concern might have arisen. I understand it might have been because of the issue with the area, the permit, the permit in an air quality attainment area, but no. We could make a note to really clarify what it was that happened, but the contamination really that's in this report, it's specific to this Site.

Javier Biaggi:

Of course.

Zolymar Luna:

Yes, that detail you mentioned happened. I don't want to say no, because it did. That was taken care of under another program, because during the contamination discovery process, it was identified as an area that needed immediate attention. And then we proceeded to do that excavation, remove those soils, the soils were treated, and I understand that there were cattle that were affected.

Javier Biaggi:

I believe that the investigation should go a little bit beyond the premises.

Zolymar Luna:

We went beyond the premises. So, we confirmed that it is not there. We did the assessment, the necessary studies to confirm where the contamination is. The extension is in that drainage channel, 2,000 feet, approximately, of horizontal extension and then, in the property, specifically, where they were operating. But yes, you were correct. What happens is that remediation was done, and the grazing area was taken care of in previous years.

Javier Biaggi:

So, can we give the good news to the Land Authority that we can continue to use those lands for agricultural use for planting and all that stuff?

Zolymar Luna:

Yes, of course, I believe so. I don't know if there are other, more conditions, right? Because I'm not... But it's not going to be because of the Battery Recycling Site.

Javier Biaggi:

Good, Thank you very much.

Zolymar Luna:

Yes, of course.

Javier Biaggi:

I'm going to add something else.

Zolymar Luna:

Yes, I think it is positive to also talk about land uses. That is important.

Carmen Guerrero:

Adding to what you are mentioning, Javier. Entities such as the Land Authority, Municipality of Arecibo and other entities that have adjacent land, let them know that we are available to meet to clarify the extent of the findings we had.

Javier Biaggi:

Is there someone from the government of Arecibo?

Carmen Guerrero:

We have representation from municipal legislators, including the vice-president of the Legislature.

Javier Biaggi:

That's good. Finally, we cannot forget what is called bioaccumulation. Within the species that are surrounding us there, during all this time, that have been exposed to this, well that has been accumulating from generation to generation, those pollutants. And recreational fishing there, of jaivas and fish, is quite active, and crabs as well. But what should be done is also to carry out a study of these species and see if there is contamination in them and warn people. Because frankly, people do not know if it is contaminated or not and they are having a feast with it.

Zolymar Luna:

It is a valid point. There is a recommendation from ATSDR - I don't remember the definition in Spanish right now. That's why studies were done in sediments. Because, for example, the crab, among others, this is its habitat. It was focused, and that sampling in sediments was precisely to confirm if this was a risk for that type of animals and then for the receptors, the human beings. This process was carried out, and I can positively indicate that these areas were not impacted with lead. Therefore, everything, as I mentioned, was also done from surface water to the surface water that flows to Caño Tiburones. Those were also positive, in the sense that no lead was detected. Which means that there is no lead. This does not represent a risk for those receptors in the area and for the ecological receptors in that area, which is a positive thing. Again, during the remediation activities, the necessary controls will be taken to avoid discharges that reach the channel and, consequently, may affect the Caño. But I can tell you that the findings are positive in this aspect.

Javier Biaggi:

There is a market for typha angustifolia, cattail, which is widely used for making handicrafts, lining furniture, etcetera, etcetera. And there are people who come from other towns, in considerable quantities, to harvest these leaves to do this. What does this mean? We know that typha angustifolia is one of the great filters of pollutants that we have in the environment, and it would be a good idea to do a study on it as well. We could happily be sitting on the lead.

Zolymar Luna:

Yes, no. In fact, what I can tell you about this issue is that if it is not in the sediment, it cannot be in the company, in this case. By extending that study and confirming that it is only in the channel and, in fact, obviously, these are tests that were done in several sections of the extension that are adjacent to the land of what was the company, then we confirm that it must be safe. Also using this material, I have never used it to make chairs or furniture, but I can understand what you mean. In other words, if the sediment is not affected, in this case the flora should not be affected.

Javier Biaggi:

Well, the Villalobos family of Orocovis.

Zolymar Luna:

Yes, they come here, but that would be...

Javier Biaggi:

And finally. I remember when we did the remediation of the fire that occurred in Peñuelas, in a tire company. We warned that it was still burning down there. They had made a pyrolytic oven, strange. The EPA's decision at that time was not to remove the material from there, which was what the regulations prescribed, but to turn it into a clandestine dump. Because at that time they did not ask the government for permission to make a landfill there. They decided to put out the fire and bury the thing there. I was there on that day; at the presentation they made about the remedy. We asked that question, and everybody was dumbfounded, including them. The EPA people who were there knew that it should not have been done that way. Because what is contaminated, what is dangerous, cannot be left there, it must be taken out of here. The remediation of alternative 4 of making a geomembrane, which is like clay or something, to put that in there, how long does that last versus the lead? And I think what I want to say is that what happened in Garrochales, in the pesticide warehouse, what happened in RCA, what happened in the landfill, what happened in Battery Recycling, is to bury the thing again in the same place. In other words, "the bomb is ticking", as the Americans say, the bomb is ringing. At some point, come on, it's going to take its toll on our lives.

Zolymar Luna:

We will take note.

Javier Biaggi:

Thank you and sorry for the inconvenience.

Zolymar Luna:

Yes, no, we will make notes of this.

Carmen Guerrero:

Well, we must close, and we have some questions. If you could be quick, because we have the services that must leave. Those of us from EPA are going to stay here to be able to answer your questions, but if you could ask the questions quickly, we would appreciate it.

Carmen Quintana:

Good afternoon, my name is Carmen Quintana, municipal legislator of Arecibo. I am not a municipal official, but a municipal legislator. It is brief, two little things briefly. What the gentleman argued about the flooding, if they keep everything there. In the FEMA maps, it appears as a floodable area. In other words, it is not something new. In other words, it is currently a floodable area and all the residents of Arecibo know that everything was flooded by Maria. Likewise, it would be good, after Fiona, to try not to do as many samples as you have already done, which have been many, but to do several samples in the area. That would be one of the points. So, one question, I don't know if you are exactly the ones dealing with the issue. The lady's question about the people affected, is EPA the one that does data collection on the people affected or is that information you delegate to other agencies? Because currently we don't know if there was any kind of effort from your agency or from other agencies, either state or federal, to collect the information on the affected humans. Because we know about the cows that were there and everything that they had. But we don't know about the people, whether they have collected that data.

Zolymar Luna:

At one time, that was worked in collaboration with the Department of Health under the Lead Surveillance Program. What I understand is that that program continued, but many people did not continue to participate for various reasons. But currently, we haven’t had contact with the people again. Nor have the people who were affected approached us. But yes, that is why we are collaborating with the Department of Health and in this case with the team of Dr. Gredia Huertas Montañez and Nayda, who was sitting here, in case there are concerns about this issue, to direct people to the agencies that work with and have the knowledge and expertise to address those concerns.

Carmen Quintana:

In other words, it would not be the EPA. You referred it to the Department of Health.

Zolymar Luna:

In fact, all analyses were performed under the CDC and the Puerto Rico Department of Health.

Julio Negrón:

Good evening. My name is Julio Negrón. I represent Clean Harbors in Puerto Rico. I have worked on several projects with the EPA, and I wanted to verify exactly how long the cleanup takes, what type of treatment is going to be given to that land? But specifically with the vinyl chloride that you commented on a few minutes ago, what kind of treatment is going to be given to that specific one? And what kind of time would it take to make sure that the soil that was treated is already completely.... That the level has dropped dramatically so that it is at the level it truly should be?

Zolymar Luna:

Yes, so that it's acceptable for the project. Yes, the vinyl chloride is going to be subject to a monitoring program, because it meets the requirements. We have data that confirms that what we call natural attenuation is occurring, because they are biodegradable. Eventually, with time, they will fade away, in short, because of their form, because of the nature of this type of compound. In the case of lead-contaminated soils, a mixture will be made with phosphate. Phosphates, which is a type of... This is proven, this is not new science, this is done to reduce toxicity and it will be encapsulated. Once these acceptable levels are reduced to prevent exposure and basically to identify the area, it is also important. Basically, I think that is what it is. Well, I can't tell you precisely how long it will take. Yes, it is estimated that it could be up to two years, or it could be less, depending.

Julio Negrón:

Is that after the date of October 16?

Zolymar Luna:

No. First there is a decision process where everybody has to agree. The implementation time can vary, definitely. But once you start the project, that can be one to two years.

Julio Negrón:

OK, thank you very much.

Zolymar Luna:

I think that is all.

Carmen Guerrero:

Well, thank you very much to each of you for your time and for participating in this meeting. The EPA team is still available here, so if you want to come to the maps, ask questions, other information, we are here for you. Please remember to sign the attendance list to ensure that we stay in touch and keep you up to date on how the process of implementing the proposed cleanup plan is going. Thank you very much and may everyone get home safely. Good evening, everyone.

Zolymar Luna:

Good evening.

The meeting ends and the record closes at 7:15pm.

TRANSCRIBER CERTIFICATE

I, Aledawi Figueroa Martinez, transcriber for Smile Again Learning Center, Corp. CERTIFY:

That the foregoing constitutes the translation of the transcript of the recording made during the meeting held at the place and on the date indicated on page one of this transcript. That sentences were slightly rephrased, repeated words and non-applicable conjunctions were eliminated so that the meaning of the speaker was not lost. That, should there be any discrepancy in what is written in this transcript, the audio of the transcript shall prevail.

I further certify that I have no interest in the outcome of this matter and that I am not related in any degree of consanguinity to the parties involved in this matter.

In Isabela, Puerto Rico, October 3rd, 2023.

Aledawi Figueroa Martínez
Smile Again Learning Center, Corp.
787-872-5151 / 787-225-6332
widy.figueroa@smileagainpr.com
www.smileagainpr.com

REUNIÓN PÚBLICA
The Battery Recycling Co., Arecibo
Fecha: 29 de agosto de 2023
Hora: 5:00pm-7:00pm

Se abre récord a las 5:10pm

Brenda Reyes:

Muy buenas noches a todos y a todas. Buenas tardes, todavía es de tarde, son las cinco y diez minutos. Mi nombre es Brenda Reyes Tomassini, Oficial de Asuntos Públicos de la Agencia Federal de Protección Ambiental, Oficina del Caribe. Durante la tarde de hoy, estamos llevando a cabo la primera reunión pública bajo el Programa de Superfondo de la facilidad conocida como The Battery Recycling Company, que ubica aquí en el pueblo de Arecibo. Para nuestra reunión de hoy, nuestra directora, la señora Carmen Guerrero, va a dirigirse a ustedes y les va a indicar una serie de procesos que tenemos que seguir para llevar a cabo la reunión pública. Lo más importante, y quiero resumirlo ahora, es lo siguiente. Nosotros vamos a tener una presentación y luego de esa presentación viene el insumo público, la sesión de preguntas y respuestas. Para quienes no quieran hacer las preguntas y deseen hacerlas de forma anónima, yo tengo aquí tarjetas y bolígrafo. Me llaman, yo se las llevo, me pueden entregar la pregunta, yo la puedo leer, no me tiene que dar su nombre. Y aparte de eso, usted debe decir su nombre y apellido, si va a venir aquí al micrófono durante la sesión de preguntas y respuestas. Agradecemos al Gobierno Municipal de Arecibo por habernos facilitado este lugar, la Casa Ulanga. Así que le damos la más cordial bienvenida a nuestra reunión pública, que estará corriendo de 5:00 a 7:00 de la noche. Con ustedes la directora de la Agencia de la Oficina en Puerto Rico, Carmen Guerrero.

Carmen Guerrero:

Muchísimas gracias, Brenda. Muy buenas tardes a todos y todas. Como dijo Brenda, mi nombre es Carmen Guerrero Pérez. Soy la directora de la División del Caribe, de la Agencia Federal de Protección Ambiental. En la tarde de hoy yo voy a estar facilitando la discusión de esta reunión en colaboración con mi colega José Font, que está allá atrás, subdirector de la División del Caribe. Primero y, ante todo, queremos darles las gracias por sacar de su tiempo en esta tarde para participar en esta reunión sobre lo que es el plan propuesto para la limpieza y la remediación del Lugar Superfondo Battery Recycling en Arecibo. Queremos darle también, como dijo Brenda, las gracias al alcalde del municipio de Arecibo, Honorable Carlos Tito Ramírez y a todo su equipo de trabajo por prestarnos la Casa Ulanga para celebrar esta reunión. Yo nunca había estado aquí, a la verdad que es un espacio maravilloso para este tipo de evento, así que en verdad un millón de gracias. Y antes de dar inicio a la reunión, pues queremos dejarles saber cómo se va a llevar a cabo la agenda.

Nota de la Transcriptora:

Se pasa a la laminilla #2 de la presentación en pantalla.

Carmen Guerrero:

Yo sé que Zolymar ahí tiene en la presentación un poco el resumen de lo que va a ser la agenda. A la misma vez presentarles personas claves que nos están acompañando en esta reunión, que están accesibles para todos ustedes, para cualquier pregunta o comentario que tengan. Luego de esta intervención que yo estoy haciendo, vamos a tener una presentación de parte de nuestro equipo técnico de la División del Caribe, la cual va a ser liderada por Zolymar Luna, quien es la gerente de proyecto de este lugar Superfondo. Nuestro equipo técnico aquí también está acompañado de colegas de diversas oficinas de la Región 2 de la EPA, incluyendo la División del Caribe. Ya presenté a José Font. También tenemos a Tere Rodríguez, que dirige el Área de Respuesta y Remediación de la División del Caribe. Carlos Huerta, que está por llegar. Brenda Reyes, Lilliana Alemán. Es bien importante que conozcan a Brenda y a Lilliana, que están por acá atrás, trabajan todo lo que es el acercamiento con las comunidades y la integración con las comunidades en todo este proceso. De forma virtual tenemos a varios colegas, incluyendo a Alex Rivera, que trabaja en el programa de aire. También aquí tenemos de la división de Superfondo y Manejo de Emergencias a Kathryn Flynn, que está por aquí con nosotros, también disponible. De forma virtual, también contamos con la participación de varios colegas de la EPA, de la División de Superfondo, de la División de Aire y la División Legal de la agencia. Por otra parte, también queremos reconocer que contamos con la participación de toxicólogos y científicos en salud ambiental de la Agencia para el Registro de Sustancias Tóxicas y Enfermedades, que en inglés se conoce como ATSDR, que tenemos al Dr. Luis Rivera González y entiendo que Lee Grazianni también nos está acompañando como parte de la reunión. Agradecemos también la participación de representantes de agencias de gobierno de Puerto Rico, como el Departamento de Recursos Naturales, Omar Santiago, que está por allá atrás, y a la misma vez a Marangely Alemán. Así que gracias mil por estar aquí con nosotros. Quiero excusar a las representantes de Salud Ambiental del Departamento de Salud de Puerto Rico, la Dra. Mayra Toro y la Dra. Wilmarie Muñiz, quienes querían estar aquí hoy con ustedes, pero por unos asuntos de salud tuvieron que excusarse. También agradecemos la participación de Nayda Rivera, Nayda está por aquí, y virtualmente de la Dra. Gredia Huertas Montañez, especialistas en Salud Pública y profesoras, quienes colaboran con el Departamento de Salud en el proyecto de Vigilancia de Plomo en la Población Infantil y con diversas agencias federales como lo son el CDC, ATSDR y la EPA, y entidades médicas y profesionales como el Hospital de Mount Sinaí y la Academia Americana de Pediatras, en lo que se conoce como el Pediatric Environmental Health Specialty Unit, que en español sería la Unidad Especializada en Salud Ambiental Pediátrica, PEHSU, son sus siglas en inglés. Sé que vamos a estar recibiendo la participación de la Autoridad de Acueductos y Alcantarillados, su director regional, José Rivera. No sé si él ha llegado, pero que sepan que también vamos a tener representación de la Autoridad. Y, por último, queremos agradecer la participación de varios representantes de la Legislatura Municipal. Aquí con nosotros tenemos al vicepresidente de la Legislatura Municipal del Municipio de Arecibo, Pablo Rodríguez Marrero, y al legislador municipal José Cintrón Ramos. Gracias a ambos por estar aquí. Tenemos también a la compañera Carmen Cruz. Gracias mil a todos por estar aquí en la tarde de hoy. Sabemos que hay varios representantes de las posibles partes responsables del Lugar Superfondo Battery Recycling. Luego de la presentación de Zolymar, pasaremos a la sesión de lo que es el comentario público y preguntas y respuestas. Agradecemos si permiten a Zolymar que culmine su presentación y luego atenderemos sus preguntas y comentarios. Sepan que podemos ir hacia atrás en todas las secciones de la presentación que va a estar dando Zolymar, que ustedes interesen. Es bien importante que sepan, nosotros vamos a estar aquí con ustedes hasta que cada pregunta y comentario sea atendido. Si hay alguna pregunta que no podemos contestarles hoy, la agencia le estará contestando su pregunta en una fecha posterior. Les recordamos que también podemos recibir sus preguntas y comentarios por escrito, por correo electrónico o a la dirección postal de nuestra oficina, que se la vamos a estar compartiendo. Están también en los materiales que se presentaron en la entrada y horita Zolymar va a compartir su dirección electrónica. Algo bien importante que algunas personas ya nos han preguntado sobre la fecha límite para someter los comentarios. La fecha límite se ha extendido 30 días más, así que la fecha límite es para someter comentarios ahora es el lunes 16 de octubre. Que sepan que tienen más tiempo para poder someter sus comentarios por escrito luego de esta reunión. El proceso de Superfondo requiere que la EPA desarrolle un resumen de cada una de nuestras respuestas a las preguntas que ustedes hagan hoy, a las preguntas y comentarios que envíen por escrito. Esto es lo que en inglés se conoce como el Responsiveness Summary. Es un resumen de cómo nosotros contestamos todo lo que ustedes presenten hoy y presenten por escrito. Este documento luego va a estar disponible en nuestra página de Internet. Por ahí, en distintos lugares, van a ver el código QR y pueden llegar a esa página de Internet y poder grabarla. Entonces, antes de empezar, hay unos asuntos de logística que me es bien importante mencionarles. El equipo de traducción. Tenemos aquí y de forma virtual a varios colegas que sólo hablan inglés, así que hemos coordinado traducción simultánea para aquellos que necesiten traducción. En el tema de transcripción, tenemos también aquí a mi izquierda, que sepan que el audio de esta reunión se estará grabando y luego el público contará con una transcripción completa de lo que es esta reunión. Los micrófonos, como dijo Brenda, agradecemos, bien importante, que cuando se acerquen a hablar al micrófono para hacer preguntas o comentarios, que se identifique con su nombre y apellido, sector donde reside o entidad que representa, para que lo podamos documentar como parte de la transcripción que está haciendo Widy. También algunas personas, a veces nos preguntan si se puede grabar la presentación y la reunión. Esta es una reunión pública, el que interese grabarla puede hacerlo. Los baños, para los que no conozcan la Casa Ulanga, cuando salen aquí, a su mano izquierda y luego derecha, ahí es que se encuentran los baños y la salida de emergencia por aquí mismo. Así que cualquier emergencia que surja, por favor, todos con calma, nos dirigimos hacia la puerta y luego a la salida. Así que, sin más preámbulos, damos inicio oficial a esta reunión para actualizarles sobre nuestros hallazgos y las acciones que se estarán tomando para limpiar y remediar la contaminación identificada en el Lugar Superfondo Battery Recycling. Muchísimas gracias y aquí les dejo con Zolymar Luna. Zoly, gracias.

Zolymar Luna:

Gracias, Carmen. Ahora sí. Antes de comenzar, tengo una pregunta. ¿Este lado pueden ver bien la pantalla? ¿De este lado aquí? Ok. ¿O muevo esto un poquito? Estamos bien. Verificando. Saludos nuevamente. Buenas tardes. Sé que es una hora un poquito difícil. Ya a esta hora las revoluciones van bajando y, escuchar quizás mucha información, puede ser un poquito complicado. Pero les aseguro que se ha hecho lo posible para consolidar e incluir en esta presentación toda la información que es relevante a la información y al propósito de la reunión, que es ofrecerles y describirles la alternativa recomendada por la agencia para atender la contaminación que se encontró en el Lugar de Battery Recycling.

Nota de la Transcriptora:

Se pasa a la laminilla #3 de la presentación en pantalla.

Zolymar Luna:

Este proyecto, como Carmen mencionó, soy la Gerente de Proyecto, pero lleva varios años en procesos de investigación y en proceso realmente de atender las necesidades que allí se identificaron. Pero esto es un proyecto que se trabaja en equipo. Yo soy la gerente del proyecto, hay otras personas que colaboran, personas que están bien comprometidas con el proyecto, para asegurarse, no tan solo que el remedio tenga sentido, también que según los datos se vayan recopilando, esos datos se vayan confirmando y sean representativos. Les voy a presentar al equipo. Contamos con la Dra. Abigail DeBofsky, ella es asesora de riesgo ecológico. También tenemos a Kathryn Flynn. Kathryn está por aquí, que puede presentarse también. Ella es hidrogeóloga. Contamos con Stephanie Kim, que es asesora de riesgo humano. También con Nick Mazziotta, que es otro asesor de riesgo humano. Para todo, necesitamos también asesoría o consejería legal. Tenemos para eso la Lcda. Argie Cirillo y como Carmen ya presentó, a las coordinadoras comunitarias, Brenda Reyes y Lilliana Alemán. Muy importante, como Carmen mencionó, que recordemos esos nombres, ellos realmente son el enlace de los procesos técnicos y la comunidad. A veces, es la naturaleza de la agencia, que estos son procesos técnicos o procesos de investigación que a veces toman tiempo y esas son personas que siempre pueden estar conectándose con ustedes y también son enlaces para personas como yo, que muchas veces no pueden estar todos los días en el campo visitándolos, pero ellos son esos enlaces. Que nuevamente, si tienen alguna preocupación con relación al Lugar de investigación relacionado, en este caso, al Lugar de Battery Recycling, les recomiendo que también se comuniquen con ellas. Y nuevamente, esto un breve resumen de lo que se tratará de incluir y trataré de presentar en el día de hoy. Nuevamente, como les informé, la información puede ser un poquito aburrida, por no decir otra palabra. Pero el fin de esto es hacerlo informativo, que ustedes se vayan aquí con las preguntas que quizás tenían antes de llegar, un poco aclaradas. Nuevamente, hay un proceso para que ustedes puedan seguir verificando si tienen alguna duda para comunicarse con nosotros, como mencionó Carmen.

Nota de la Transcriptora:

Se pasa a la laminilla #4 de la presentación en pantalla.

Zolymar Luna:

En la presentación estaré hablando un poco del proceso de Superfondo. Nuevamente, es importante entender este proceso para entender por qué estamos en la etapa que estamos hoy, y en la etapa en que nos vamos a dirigir. Vamos a estar hablando un poco de la descripción del Lugar de Superfondo.

Nota de la Transcriptora:

Se pausa la presentación para cuadrar unos detalles del aspecto híbrido de la reunión. Le dan unas instrucciones sobre las personas que se encuentran conectadas de forma híbrida.

Zolymar Luna:

Volvemos otra vez en sintonía. Disculpen por la interrupción. Muchísimas gracias. Muchas interrupciones. Ok, hablaremos un poco de la descripción del Lugar nuevamente para entender los resultados y para aquellos que no están familiarizados con el área. Es importante entender lo que está en la zona aledaña y el área que se cubrió como parte de la investigación. Estaremos hablando del historial. Es importante entender qué ocurrió en el Lugar durante los pasados 30 años, 40 años, para entender muchos de los hallazgos que vamos a estar presentando hoy. También incluiremos un breve resumen de los resultados de la investigación. Al final, como propósito principal de esta reunión, estaremos hablando sobre las alternativas que se consideraron y las que estamos recomendando para atender la necesidad y las preocupaciones ambientales en el Lugar y en las zonas aledañas.

Nota de la Transcriptora:

Se pasa a la laminilla #5 de la presentación en pantalla.

Zolymar Luna:

Proceso de Superfondo. Esto es un resumen nuevamente, pero creo que es importante entender que hay un marco legal que asegura que este proceso de Superfondo funcione para asegurarnos la protección de la salud humana y también del medio ambiente. En este proceso son varias etapas. Estaremos hablando de una forma bien resumida. Pero quiero enfatizar que no necesariamente estas etapas suceden de esa manera en todos los proyectos. Una parte bien importante durante este proceso inicial de Superfondo - que, viene para atender, no solamente necesidades de lugares contaminados en Puerto Rico, sino a través de los Estados Unidos en todas sus jurisdicciones - empieza con un proceso de evaluación. Pero ese proceso de evaluación, antes de llegar ahí, ocurrió algo. Puede ser una querella, puede ser que hubo un derrame en un lugar y ese proceso entonces comienza la etapa de evaluación. Es importante que, para poder investigar, tengo que primero saber si hay una preocupación. Y esa es la parte inicial. Primero es identificar o entender que quizás hay un problema en un lugar y se procede a hacer una evaluación de ese lugar. Esa evaluación conlleva estudios de campos, muestras, tomas de suelo, de agua subterránea. No en todos los casos, pero en la mayoría de los casos. Se hace una inspección, se hacen entrevistas. De eso se prepara un documento para entonces evaluarlo y ver si es necesario o si ese lugar cumple con los requisitos o la puntuación para ser añadido a la Lista Nacional de Prioridades de Superfondo. Esto quiere decir que no todos los lugares donde se identifiquen preocupaciones ambientales van a caer en esta lista. Esto es importante decirlo para que mantengan en perspectiva. Una vez se enlista, se procede entonces, se asignan fondos para la segunda fase, que es la caracterización. Esta es la parte que es interesante, porque al principio lo que tenemos es información sobre una posible contaminación en un área, pero no sabemos realmente hasta dónde llega la contaminación. No necesariamente siempre se sabe cuál es la fuente. En ese proceso, es donde se invierten los recursos necesarios para entender entonces dónde está la fuente y la extensión de esa contaminación. ¿Cuál es el resultado de todo ese proceso de investigación? Que vamos entonces a llegar a lo que sería, y lo que estaremos presentando hoy, que es el Plan Propuesto. Se evalúan todos los resultados recopilados, para asegurarnos entonces que, esas necesidades o esas áreas de preocupación tienen entonces... Ya entendemos dónde está la contaminación, pues vamos a buscar unas alternativas que sean viables para esas áreas que están impactadas. Y eso es lo que le llamamos el Plan Propuesto. Algo importante, durante todo ese proceso de evaluación, y no quiero que se nos olvide, esa parte quizá no es tan importante para otros proyectos, pero para éste lo fue, que durante todo ese proceso que se está evaluando, ya caracterizando, se pueden estar corriendo otros programas. Y esto ocurrió en el caso de Battery Recycling, que mientras se estaba haciendo la caracterización, se estaba enlistando el Lugar en la Lista Nacional de Prioridades, también la agencia estaba llevando a cabo actividades para atender la fuente de contaminación y las rutas de exposición. Pero volviendo al proceso de Superfondo, una vez logramos aceptar ese plan o esa alternativa recomendada, se oficializa esa alternativa en lo que le llamamos el Récord de Decisión. Esto es un gran logro para nosotros. Llevando tiempo investigando, ya decidimos por un remedio. Entonces, una vez tengamos ese remedio y todo el mundo está de acuerdo, se va y se lleva a lo que sería el diseño. Vamos a diseñarlo, vamos a implementar el remedio. Y, una vez tengamos un buen diseño, se construye el remedio. Esta segunda parte no necesariamente aplica a todos los proyectos, pero sí a la mayoría de los proyectos, y es la post construcción. Una vez se lleva a cabo este proyecto de construcción, entonces se evalúa si es eficiente o no, se hacen operaciones y mantenimiento, y eventualmente en algunos casos se puede borrar de la Lista de Superfondo. Durante cada una de estas etapas, desde el descubrimiento, evaluación, caracterización, plan para remediar, el remedio implementado y también post construcción, está de más de los cinco años que se puede... En este caso... Volví para atrás, la cámara me tiene confundida, disculpen.

Nota de la Transcriptora:

La conferenciante se refiere a que volvió a la laminilla anterior de la presentación.

Zolymar Luna:

Es un proceso en el que siempre la comunidad puede participar de cada una de estas etapas. Desde el remedio hasta la post construcción se llevan a cabo revisiones. Cada cinco años se revisa entonces la alternativa para asegurarnos que realmente está funcionando como lo esperado.

Nota de la Transcriptora:

Se pasa a la laminilla #6 de la presentación en pantalla.

Zolymar Luna:

Esto es un breve video ahora, que estaré... ¿Se puede ver desde allá? Sí, ok. Esto es una descripción. Para los que no conocen el área, este es el sistema estuarino del Caño de Tiburones, que se ubica realmente al lado norte de lo que es el Lugar y lo que era la planta antigua de Battery Recycling. Battery Recycling está en el cuadro rojo, que está en la parte inferior. Esta es la bahía de Arecibo, el Río Grande de Arecibo, la desembocadura. A la izquierda estamos viendo lo que es el pueblo, el casco urbano del municipio de Arecibo. Ya desde esta podemos apreciar, o por lo menos yo que estoy más cerca, las zonas agrícolas que están aledañas al Lugar de Superfondo; los cuerpos de agua; la carretera cuán cerca está a la carretera #2. En esta imagen ya nos estamos acercando. A la derecha siempre son los terrenos que han estado baldíos. En todos los procesos de investigación, le estamos llamando el área boscosa. Esta es la entrada oficial o era la entrada oficial. Todavía la utilizamos. Eso es un canal de descarga que se utilizó también en los primeros inicios de las operaciones que se realizaron en el Lugar. Este es el canal de drenaje del este, que así lo identificamos durante el proceso. Abajo, en la parte sur, está el vivero de la compañía “Landesign”. Siembran palmas, también colectan para hacer composta para ellos. Esto es, como lo conocen en el área, Comercial Barreto. Ellos tienen una planta, fabrican bloques de hormigón y también tienen una ferretería. En la parte norte pueden ver un canal marcado ahora en azul, que descarga al Río Grande de Arecibo. Esa estructura también que pueden ver al área norte del canal es una subestación. Aquí volvemos a la planta. Esto es realmente para llevar a la carretera #2. Y ven la parte norte. Esa parte norte anteriormente era una zona de pastoreo de ganado. Lleva ya hace varios años desocupado, no hay ganado en el área. Y podemos ver aquí, al lado izquierdo, una zona residencial. En azul podemos ir viendo lo que serían canales. A la derecha, un canal. Y aquí podemos apreciar la cercanía de este canal hacia otros canales que van o se conectan con el Caño de Tiburones. Y esto es importante que más o menos lo memoricen, porque vamos a presentar otras imágenes. Pero claro, toda esta información está incluida en el Informe de Investigación.

Nota de la Transcriptora:

Se pasa a la laminilla #7 de la presentación en pantalla.

Zolymar Luna:

Esta es una foto un poquito mejor. Se puede apreciar un poquito de cerca lo que era, con una mejor resolución, lo que era la antigua planta de Battery Recycling. A la derecha, déjame usar el... No sé si pueden ver ese puntito rojo. ¿Lo ven? Ok. Esta es la entrada, esta es la Carretera #2. Esta era la entrada. Estas eran las oficinas. Esta era el área de operación, donde en este momento esta planta desmantelaba las baterías. Aquí estaban las unidades de control de emisión de aire, la planta de tratamiento. Pero en este punto específicamente, aquí era el área donde se concentraba la escorrentía y este es un punto de descarga que va directamente al canal del este. Hasta ahora hemos visto varias imágenes, que es bien sencillo verlo desde la superficie. Pero muchas cosas ocurren que no se ven a simple vista.

Nota de la Transcriptora:

Se pasa a la laminilla #8 de la presentación en pantalla.

Zolymar Luna:

En este caso es el recurso de agua subterránea. No tengo una manera de mostrar lo que está ocurriendo, pero sí, esta imagen es un gráfico que de una manera sencilla nos está explicando lo que puede estar ocurriendo en interacciones que ocurren entre el suelo y el agua subterránea. En el Lugar, en este caso, el agua subterránea empieza o el nivel freático está empezando de 8 a 20 pies debajo del Lugar de Battery Recycling y el flujo va hacia el Caño de Tiburones.

Nota de la Transcriptora:

Se pasa a la laminilla #9 de la presentación en pantalla.

Zolymar Luna:

Como les mencioné, también les voy a dar un recorrido histórico. Hay que entender, quisiera no tener que ir en detalle, pero vamos a ser breves. Es que hay varios eventos significativos. Como les mencioné, comenzamos en el 1966. En aquel momento, operó una planta que fabricaba o producía químicos orgánicos. La compañía se llamaba Puerto Rico Chemicals. En aquel momento el edificio, la propiedad, era de la Compañía de

Fomento de Puerto Rico. Esta compañía cierra en el 1979. Antes de, hubo una explosión. Y en el 1994, es que entonces comienza a operar The Battery Recycling Company para el proceso de reciclar baterías a base de plomo. Años después, del 1996 al 2000, la Junta de Calidad Ambiental, que hoy se conoce como el Departamento de Recursos Naturales y Ambientales, lleva a cabo una serie de inspecciones en las cuales se documentan varias deficiencias con varias leyes, incluyendo reglamentos de aire y reglamentos de desperdicios peligrosos. Desde el 2008 al 2011, EPA empieza también otras actividades de muestreo en el Lugar de Battery Recycling y se detecta plomo en la propiedad. En ese mismo período de tiempo, el Centro de Control de Enfermedades también realiza pruebas a empleados y a sus familiares, y en ese momento se detecta que tanto los empleados como sus familiares se detectaron con altos niveles de plomo en sangre. En ese mismo período de tiempo también, EPA continúa y se hacen otras inspecciones de desperdicios peligrosos y se documentan deficiencias adicionales o violaciones de la Ley de RCRA o de Desperdicios Peligrosos.

Nota de la Transcriptora:

Se pasa a la laminilla #10 de la presentación en pantalla.

Zolymar Luna:

En el 2011, EPA emite una orden por consentimiento para atender la fuente, en este caso la planta de Battery Recycling, y también evitar las rutas de exposición como consecuencia de los empleados y los familiares que estaban afectados. Y la compañía ya en el 2011 al 2012 comienza a tomar varias acciones para tratar de mitigar eso. No obstante, no pudieron terminar los trabajos, cierran en el 2014, y EPA termina entonces de atender las necesidades de las familias que estaban impactadas, haciendo la limpieza de vehículos, en las residencias y también removiendo suelos contaminados que se identificaron en el área de pastoreo al norte de la planta.

Nota de la Transcriptora:

Se pasa a la laminilla #11 de la presentación en pantalla.

Zolymar Luna:

En el 2016 se emite una orden a la compañía para, básicamente, prohibir que ellos removieran equipo del Lugar. Todo esto enfocado en evitar que el material con plomo estuviera, básicamente, llegando o existieran otros derrames o descargas de plomo o emisiones de plomo en áreas aledañas. Y en ese mismo tiempo, EPA entonces propone, prepara, lo que es el paquete, para recomendar este Lugar a la Lista Nacional de Prioridades. Ese documento, cuando se redacta y finalmente se presenta, la puntuación final fue de 56.66. El mínimo para poder presentar o recomendar un lugar para la Lista Nacional de Prioridades es de 28.50. Lo que quiere decir que fue una puntuación considerablemente alta. En el 2017 se añade oficialmente a la Lista Nacional de Prioridades. En el 2018, es que entonces empieza el trabajo del equipo de "Remedial", que incluye a otros compañeros, incluyéndome a mí. Y aquí el enfoque nuevamente es hacer una investigación para atender aquellas preocupaciones que estaban más allá, fuera del Lugar, y desarrollar un estudio de viabilidad para incluir las alternativas que van a atender esa contaminación. Recientemente, y la razón por la que estamos aquí, es que la EPA entonces publica el plan para remediar el Lugar y comenzamos entonces el período de comentarios públicos para que las personas interesadas, comunidades adyacentes y el gobierno del Municipio de Arecibo puedan también revisar y dar sus comentarios, si es necesario. Como mencionó Carmen, este período se extendió a octubre 16.

Nota de la Transcriptora:

Se pasa a la laminilla #12 de la presentación en pantalla.

Zolymar Luna:

Esto nuevamente es más o menos similar a la imagen que demostré al principio. El marco rojo es de Battery Recycling.

Nota de la Transcriptora:

Se pasa a la laminilla #13 de la presentación en pantalla.

Zolymar Luna:

Esto es básicamente para darles un resumen de las áreas que estuvieron sujetas a muestreos.

Nota de la Transcriptora:

Se pasa a la laminilla #14 de la presentación en pantalla

Zolymar Luna:

Esta imagen a su izquierda identifica varios puntos donde se tomaron muestras de suelo.

Nota de la Transcriptora:

Se pasa a la laminilla #15 de la presentación en pantalla.

Zolymar Luna:

La de la derecha son puntos de aguas superficiales y sedimentos.

Nota de la Transcriptora:

Se pasa a la laminilla #16 de la presentación en pantalla.

Zolymar Luna:

La próxima imagen está un poquito mejor. ¿Verdad? Creo que se puede ver mejor. Es básicamente una idea del área que se cubrió. No solamente se tomaron muestras en el Lugar, como tal, en la antigua planta, sino que se tomaron muestras también alrededor, en el área residencial y en cercanía a los canales que van al Caño de Tiburones. Estos son muestreos de suelo. También se tomaron, aquí se identifican, otra vez una mejor imagen, de las muestras que se tomaron de sedimento y de agua superficial. Podemos ver, vamos a ir para atrás un poquito aquí. Ok. ¿Dónde estás? Ok. Nuevamente, esto es bien importante, que queremos verificar la extensión de la contaminación del canal del este, porque aquí, por este punto, por las investigaciones preliminares, tenemos conocimiento que las descargas estaban llegando a este canal. Se verificó también entonces en esta zona, en el canal que corría bien cercano al área residencial y el canal que descargaba al Río Grande de Arecibo.

Nota de la Transcriptora:

Se pasa a la laminilla #17 de la presentación en pantalla.

Zolymar Luna:

Esta es otra imagen enfocada en el muestreo de agua subterránea. Es una mezcla, una combinación, de puntos de monitoreo de pozos que se instalaron, como también lo que le llamamos un "screening". Se hizo una instalación, se tomaron muestras a distintas profundidades. Entonces, esas aguas se analizan para los parámetros decididos en este proyecto. Luego de esta, volviendo para atrás, aquí hay otra imagen. Podemos ver nuevamente todas las áreas que se examinaron, los pozos que se instalaron, que están dentro del área, también en el área alrededor, en el área residencial. Todos estos datos fueron varios meses. Se recopila esa data, se organiza esa data, se evalúa. Principalmente se evalúa por dos componentes bien importantes, riesgo. Riesgo humano y riesgo a receptores ecológicos.

Nota de la Transcriptora:

Se pasa a la laminilla #18 de la presentación en pantalla.

Zolymar Luna:

Los resultados de esa evaluación nos indicaron que los contaminantes de preocupación para este Lugar son arsénico y plomo, antimonio, cadmio y cromo en suelo. Para agua subterránea, arsénico, plomo, cloruro de vinilo, las dos variables de dicloro etano y por intrusión de vapores o "vapor intrusion" tenemos una preocupación de tricloroetileno. En el caso de antimonio y cadmio, si tienen curiosidad de por qué está el ave, es para indicar que estos son contaminantes de preocupación para los receptores ecológicos específicamente. Por eso es que los estamos listando.

Nota de la Transcriptora:

Se pasa a la laminilla #19 de la presentación en pantalla.

Zolymar Luna:

La próxima imagen es un resumen de los distintos resultados que se obtuvieron también en suelo superficial y en el subsuelo, indicando dónde están las áreas de preocupación. Y en esta podemos ver... No sé si pueden verlo. Que conste a su derecha, hay un póster que pueden ver mejor, quizás, esta imagen. A mi izquierda. Pueden ver mejor dónde están realmente los distintos puntos y las áreas que nosotros identificamos como las áreas que vamos a atender bajo este proyecto de remediación. Podemos ver el canal del este aquí identificado. Dado a los resultados, se identificó la presencia de plomo hasta 2,000 pies del canal. El área residencial, verdaderamente, fueron por debajo de los niveles de cernimiento. Específicamente, podemos ver aquí que el área de preocupación son los suelos, específicamente, de lo que era la planta de Battery Recycling.

Nota de la Transcriptora:

Se pasa a la laminilla #20 de la presentación en pantalla.

Zolymar Luna:

Los resultados de agua subterránea. Esto es una representación gráfica. Realmente, dado a los resultados que se obtuvieron de los monitoreos, se hace un modelaje de dónde puede estar la extensión del agua que está contaminada, en este caso con cloruro de vinilo, que es el punto que vemos más extenso.

Nota de la Transcriptora:

Se pasa a la laminilla #21 de la presentación en pantalla.

Zolymar Luna:

Vemos aquí nuevamente, esto más o menos es una idea. Nuevamente es un modelaje, pero nos da una idea de hasta dónde llegó la contaminación en caso de agua subterránea. Podemos ver también cómo las concentraciones mayores están en el área de Battery Recycling.

Nota de la Transcriptora:

Se pasa a la laminilla #22 de la presentación en pantalla.

Zolymar Luna:

Esta otra imagen, nuevamente, un poquito más específica, que nos ayuda a identificar dónde están las áreas de preocupación o las concentraciones más altas. Déjame ir para atrás. Aquí, nuevamente, podemos identificar que están dentro de los predios de Battery Recycling. De lo que era la planta. Esto es un corte vertical. Si nos colocamos al lado de Battery Recycling, mirando hacia el Caño de Tiburones, hacemos un corte seccional de sur a norte. ¿Me está indicando que me mueva a la otra imagen de allá?

Nota de la Transcriptora:

La conferenciante se refiere a que Brenda Reyes está apuntando hacia el póster que está en la tarima. Brenda explica que es para que las personas sepan que la imagen de la gráfica que está en pantalla se encuentra impresa en el póster de la tarima.

Zolymar Luna:

¡Ah! Ok. Sí. Es la misma gráfica y el propósito de esto es que entendemos que la idea es que ustedes puedan ver esta información y que lo podamos entender todos y todas. Esta imagen está aquí, pero si después de la presentación quieren ver, están estos pósteres que les pueden tomar fotos. También, nuevamente, estas imágenes están en los informes que se prepararon y están disponibles en línea. Pero para que tenga otros recursos. Hay otras muchas opciones.

Nota de la Transcriptora:

Se pasa a la laminilla #23 de la presentación en pantalla.

Zolymar Luna:

En este caso, se instalaron varios pozos en los predios de lo que era la planta de Battery Recycling y nos extendimos hasta un poquito antes del Caño de Tiburones, que es este último punto de cernimiento que se hizo, para asegurarnos realmente la extensión de la contaminación y si esto puede estar afectando el Caño de Tiburones.

Nota de la Transcriptora:

Una persona del público pregunta fuera del micrófono si puede realizar una pregunta ahora o si debe esperar al final.

Zolymar Luna:

Al final. Pero vamos a estar aquí. Voy a explicar varias cositas. Son varios pozos. Verdaderamente, las concentraciones más altas siguen estando, como mencioné, en lo que era la planta de Battery Recycling. Y eso, dentro de todo, es buena información para nosotros. Es lamentable que esté ocurriendo, pero dentro de lo que puede ser una complicación en un proyecto, entender que esta contaminación realmente no está afectando a áreas residenciales directamente, pues sigue siendo un alivio. Exposición a este tipo, por el asunto de la introducción de vapores, puede complicar mucho un proyecto. Estábamos hablando que había unos compuestos orgánicos volátiles, pero también tenemos inorgánicos, en este caso es plomo y arsénico. En el caso de inorgánicos, se detectaron justo en el borde, del lado que era la planta de Battery Recycling y bien cerca a lo que es el canal. En el canal, como ya identificamos, hay varios puntos que tienen concentraciones altas de plomo. Es totalmente entendible cómo en este pozo de monitoreo pudimos detectar esas concentraciones altas de plomo disuelto.

Nota de la Transcriptora:

Se pasa a la laminilla #24 de la presentación en pantalla.

Zolymar Luna:

Obviamente, a consecuencia de toda esta información, que la estoy resumiendo en bien poco tiempo, pero realmente se tomó un tiempo considerado en evaluar los datos y las posibilidades alternativas que aplican, dado a estos datos.

Nota de la Transcriptora:

Se pasa a la laminilla #25 de la presentación en pantalla.

Zolymar Luna:

Se identifican también los objetivos de este proyecto. Aquí hay muchas palabras que pueden ser muy largo y complicado leerlo, pero básicamente el objetivo principal es prevenir la exposición de estos suelos contaminados y del agua contaminada a las personas, a los seres humanos. Igual ocurre con los receptores ecológicos. Queremos prevenir esa exposición a receptores ecológicos. Se convierten en otro objetivo del proyecto. El otro objetivo del proyecto es prevenir que estos suelos contaminados sigan contaminando el cuerpo del recurso de agua subterránea.

Nota de la Transcriptora:

Se pasa a la laminilla #27 de la presentación en pantalla.

Zolymar Luna:

El objetivo de las alternativas para el agua subterránea es prevenir nuevamente el contacto directo y que el asunto de los vapores, como mencioné, la intrusión de los vapores que pueden estar afectando en espacios que son cerrados. Prevenir esto y también el consumo de agua que pueda estar contaminada.

Nota de la Transcriptora:

Se pasa a la laminilla #27 de la presentación en pantalla.

Zolymar Luna:

Se analizaron todos estos objetivos y como parte del plan de contingencia nacional, que es básicamente lo que rige el Programa de Superfondo, llegamos a este punto. Decidimos o consideramos cinco alternativas que son compatibles con la contaminación que se detectó y se definió en el site de Battery Recycling. La "no acción" es obligatorio incluirlo para poder comparar. No es caprichoso, simplemente tenemos que comparar para ver el beneficio de cada una de las alternativas que estamos proponiendo. La alternativa 2A, que fue el título que se le dio. Son números para poder diferenciar las distintas opciones. En este caso, lo que se está vislumbrando es, o se presenta es, que una vez se demuelen los edificios, tirar una capa y contener esos contaminantes con una capa de suelo limpio. Lo que se conoce como relleno. Para asegurarnos nuevamente que se cumplen con los objetivos, que es exposición. Queremos prevenir exposición y esta es una manera de prevenir exposición. En este caso, en el canal de drenaje también se estaría instalando una cubierta para prevenir exposición. La alternativa 2B es bien similar. La única diferencia aquí es que los suelos del canal se estarían excavando y se estarían llevando a un vertedero. A un sistema de relleno sanitario, de hecho, luego de tratados, para que se pueda asegurar en el destino final. Serían tratados primero antes de ser llevados a un sistema de relleno sanitario. La opción 3 es la opción de tratamiento "in situ". "In situ" significa que es en el sitio. Específicamente no va a haber una excavación en este Lugar en lo que serían los predios de la planta de Battery Recycling. Se va a inyectar un material que, básicamente, solidifica esos suelos contaminados para prevenir, uno de los objetivos, exposición, y también que sigan migrando estos contaminantes al agua subterránea. En este caso, la opción también incluye excavar los suelos del canal tratados, tratarlos y llevarlos para disposición final a un sistema de relleno sanitario. En el caso de la alternativa 4, lo que se propone es excavar los suelos contaminados del canal, los suelos contaminados dentro del predio de la antigua planta de Battery, los suelos residenciales - que voy a explicar algo ahora - y consolidarlos en una unidad en lo que era la antigua planta, que estaría protegida por un material de suelo limpio y un material geotextil para proteger, prevenir la exposición y prevenir también que escorrentía y agua de lluvia pueda alterar la cubierta. La alternativa 5 es excavación total de los suelos en el área de Battery Recycling y también en el canal del este. Algo importante es que todas estas alternativas, excepto la "No Acción", van a incluir que se demuelan las estructuras que ubican actualmente en los predios de la antigua planta. Incluye también la excavación del suelo residencial, que es solamente una residencia que se va a estar atendiendo, para ser conservadores, y se estará implementando controles institucionales.

Nota de la Transcriptora:

Se pasa a la laminilla #28 de la presentación en pantalla.

Zolymar Luna:

En el caso de aguas subterráneas se propone una acción interina. Esta incluirá un programa de monitoreo anual para recopilar datos en los distintos sistemas que están instalados, ya en los pozos que están instalados. Esto nos va a permitir evaluar la atenuación natural de los compuestos orgánicos volátiles. También nos va a permitir evaluar cuán eficaz es el remedio de suelos que se está implementando, que incluye excavaciones. También evaluar si la extensión de la contaminación está migrando a otros puntos. Básicamente, cómo se está comportando esa extensión de contaminación o también como se le conoce como el penacho. Esta acción va a incluir también controles gubernamentales que incluye el proceso de restringir que se puedan instalar pozos en esta área. Todo con el objetivo de prevenir y cumplir con uno de nuestros objetivos, que es prevenir exposición.

Nota de la Transcriptora:

Se pasa a la laminilla #29 de la presentación en pantalla.

Zolymar Luna:

Las alternativas, como parte del plan de contingencia, tienen que ser evaluadas por nueve criterios. No hay un orden de preferencia. Cada criterio es importante. Todas las alternativas se evalúan de acuerdo con esto para ver básicamente qué ofrecen estas alternativas para cumplir con cada uno de estos criterios. La más importante, pero todas son importantes, es (1) la protección humana. Cómo este remedio realmente está atendiendo la salud humana y el medio ambiente. (2) El segundo es cómo cumple, si va a cumplir con los estatutos de leyes locales y leyes federales. (3) Si va a ser eficaz a largo plazo también, y si a largo plazo puede presentar, que va a ser un remedio que va a dar pocos problemas en muchos años si se implementa. (4) Cómo este también puede reducir la toxicidad, movilidad y el volumen a través de tratamiento. (5) Es importante, si estamos usando tratamiento, es importante también si nos va a proveer que en corto plazo vamos a atender una necesidad. Tenemos un problema, cuánto tiempo nos va a tomar en poder atender esa necesidad. (6) ¿Cómo se va a poder implementar? ¿Es fácil de implementar? ¿Va a dar mucho trabajo de implementar? Eso es importante analizarlo. Porque hay muchas tecnologías que pueden funcionar en algunos proyectos, pero hay unas condiciones que no siempre son las mismas. Es importante ver si ese proyecto o ese remedio aplica a este Lugar y si se puede implementar. (8) La aceptación del gobierno. Siempre se consulta con las agencias locales, en este caso el Departamento de Recursos Naturales y Ambientales, para verificar si ellos están de acuerdo con esta alternativa. (9) La aceptación de la comunidad. Principalmente la razón por la que estamos aquí hoy, para verificar que la comunidad está de acuerdo con la alternativa que la agencia está proponiendo.

Nota de la Transcriptora:

Se pasa a la laminilla #30 de la presentación en pantalla.

Zolymar Luna:

La alternativa que se está proponiendo para suelos. Ya estamos casi, casi en la recta final. Es la excavación, la alternativa 4. Es la que incluye una excavación en la mayoría de los suelos contaminados del Lugar para ser consolidados con suelos contaminados del drenaje del este y con los suelos residenciales, en una zona en específica en el Lugar de Battery Recycling. Esto es compatible con los usos actuales de los predios. Este es un predio que está clasificado para uso comercial e industrial. Esto sería totalmente algo compatible. Porque lo que sería preocupante es hacer algo similar en zonas residenciales, en una casa. Si esto fuera una residencia, eso no sería una opción. Pero el uso futuro y actual de este lugar es comercial e industrial. En aguas subterráneas, la decisión, ya la describimos, es una acción interina en la que proponemos un programa de monitoreo. Básicamente, verificar que este recurso de agua se mantenga en donde está, que no haya una acción que vaya a perturbar el programa de monitoreo o si algo cambia. Básicamente, estamos buscando una alternativa que sea viable, pero también podamos atender preocupaciones de la comunidad. Entendemos que con esta opción cumplimos con ambas. El costo, que es importante. Uno de los criterios que mencionábamos para poder cumplir y poder recomendar una alternativa es costo. El costo de ambas es de 19.4 millones de dólares. Es una opción viable comparada con otros proyectos.

Nota de la Transcriptora:

Se pasa a la laminilla #31 de la presentación en pantalla.

Zolymar Luna:

Esto es un conceptual, básicamente todo lo que es rojo es el área que se estaría excavando y el área amarilla es el área donde se estaría consolidando los suelos. Que, de hecho, van a ser estabilizados y tratados antes de ser consolidados. Porque para cumplir con los nuevos criterios tenemos que demostrar que estamos reduciendo movilidad, reduciendo toxicidad, en este caso, a través de tratamiento. Y cumplimos. Es un buen punto en el que se está también ofreciendo otro espacio dentro de esta misma propiedad, para que se pueda reutilizar de una manera segura.

Nota de la Transcriptora:

Se pasa a la laminilla #32 de la presentación en pantalla.

Zolymar Luna:

Esta próxima imagen es básicamente un conceptual de cómo se podría ver. Pero no necesariamente va a ser así. Es realmente un conceptual, una vez se demuelan las estructuras. Así es como se puede ver. Vamos a demoler los edificios, el equipo que estaba allí y la esquina, si pueden ver lo verde al final, sería el área donde se estarían consolidando los suelos ya tratados.

Nota de la Transcriptora:

Se pasa a la laminilla #33 de la presentación en pantalla.

Zolymar Luna:

En el caso de remedio interino de aguas subterráneas, se estarían utilizando los pozos de monitoreo que ya fueron instalados. Se puede evaluar o considerar la instalación de pozos adicionales, pero hasta ahora la propuesta incluye los que fueron ya instalados. Una vez se decida por el remedio, lo que se recomienda es hacer un estudio prediseño para asegurarnos que esta cantidad de pozos nos da la información y los datos necesarios para cumplir.

Nota de la Transcriptora:

Se pasa a la laminilla #34 de la presentación en pantalla.

Zolymar Luna:

Y ya casi aquí. Ya llegamos. Este es el recordatorio, como mencionó Carmen. Es bien importante recibir si ustedes tienen preguntas o tienen recomendaciones o comentarios sobre los remedios que estamos proponiendo aquí hoy, que nos los hagan llegar. Aquí está mi correo electrónico. También está la dirección postal. La fecha límites es octubre 16, o 16 de octubre. La información también está en la página de Internet de la agencia. En la mesa de afuera había un código que le pueden tomar foto y bajar, para bajar todos los documentos. También está la información de contacto donde puedo recibir sus comentarios. Para la sección de preguntas estará Carmen. Yo me quedo con ella, pero Carmen va a empezarla.

Nota de la Transcriptora:

Se pasa a la laminilla #35 de la presentación en pantalla.

Carmen Guerrero:

Un millón de gracias, Zolymar, por la presentación. Me dicen que tengo que ir para allá. ¿Cómo uno sube por acá? Por acá.

Zolymar Luna:

Por aquí.

Nota de la Transcriptora:

Carmen Guerrero sube a la tarima para compartir el micrófono con Zolymar y dejar el micrófono de abajo disponible para las preguntas del público.

Carmen Guerrero:

Me gusta estar más allá abajo, pero vamos entonces a empezar ya oficialmente lo que es la sesión de comentario público. Como les dijimos al principio, queremos asegurar que cada persona que participa en esta reunión sea escuchada. Como le dijimos también al principio, tenemos el micrófono por aquí, digan su nombre, apellido, sector o entidad que representa. También si prefiere escribir sus preguntas y no quiere venir al micrófono, también lo puede hacer en unas tarjetas que Brenda estaba por ahí y las tenemos aquí. Mira, Kathryn nos las está enseñando. Pueden escribir sus preguntas en la tarjeta y nos las entrega a alguno de nosotros. Allá está José. La puede entregar a cualquiera de nosotros, y nosotros leemos la pregunta por usted. Agradecemos, y esto es bien importante, cuando entraron había una lista de asistencia y antes de que salgan queremos asegurar que todos ustedes firmaron la lista, porque esta es la mejor forma que nosotros podemos mantenerlos a todos ustedes informados en el futuro, sobre todo lo relacionado con el proceso de limpieza del Lugar Superfondo The Battery Recycling. También algo bien importante, si hubiese personas que no pudieron participar en la reunión de hoy, favor dejarles saber que estamos dispuestos a coordinar futuras reuniones, de ser necesario, para informarles sobre el progreso de la limpieza y remediación del Lugar. Así que, sin más preámbulos, pues empecemos con las preguntas. Sé que horita hubo una petición para ir a alguna de las imágenes en la presentación y podemos hacer eso, que si quieren que vayamos hacia atrás en la presentación se puede hacer. Así que todos están invitados, pero nos es bien importante que si hacen la pregunta no la hagan desde la silla. Si pueden pararse y pegarse al micrófono, porque si no, no podemos transcribir las preguntas de ustedes.

Nota de la Transcriptora:

Alguien del público pregunta algo fuera del micrófono que no se entiende y se le pide que repita.

Carmen Guerrero:

¿Cómo?

Iván Elías:

¿Podemos hacer varias preguntas?

Carmen Guerrero:

Claro que sí, pueden hacer varias preguntas. Lo importante es si pueden empezar a comenzar a acercarse al micrófono están invitados. Iván, ya tú rompiste el hielo. Así que vamos a empezar con la pregunta. Gusto verte.

Iván Elías:

Saludos a todos ustedes y al público. Saludos, Carmen. Nos alegra verte. Mi nombre es Iván Elías. Yo tengo varias preguntas sobre el historial. Nosotros estuvimos peleando para que se cerrara esa planta, y una de las cosas que nos decían es que esa planta se estableció sin una declaración de impacto ambiental. ¿Eso es cierto?

Zolymar Luna:

Déjame aquí porque esto me tiene confinada al podio y no me puedo mover. (Nota de la transcriptora: se refiere al micrófono que está pegado al podio) Mire, honestamente, no tenemos detalles de lo que ocurrió en ese detalle. Esos procesos son procesos que se manejan a través de las agencias locales. Sí le puedo indicar que la planta cerró, hubo varias deficiencias.

Iván Elías:

Sabemos que cerró.

Zolymar Luna:

Sí, como ustedes ya saben. Sí tenemos las querellas. Están en récord las querellas que se recibieron. La Junta de Calidad Ambiental en aquel momento hizo sus inspecciones, como también lo hizo la Agencia de Protección Ambiental. Ese aspecto o ese detalle, verdaderamente, está fuera de lo que podemos presentar el día de hoy. Pero si es una preocupación para usted...

Iván Elías:

Sí, es una preocupación. Quisiera que se hiciera el historial de los permisos que se otorgaron, cómo se otorgaron, qué permisos cumplieron la reglamentación que aplicaba y cuáles no lo cumplieron, y quién es el responsable de que eso se hubiera otorgado sin cumplir con todos los requisitos. Eso yo lo quiero saber.

Zolymar Luna:

¿Para que quede en el...

Iván Elías:

Para saber quién es el responsable. Porque si fue el gobierno de Puerto Rico, si fue el Departamento de Recursos Naturales, si fue la Junta de Calidad Ambiental, oye, si fue la EPA también, lo queremos saber. Porque nosotros no confiamos en las agencias de gobierno. Entonces, ustedes nos invitan a hablarnos de una remediación y la confianza es necesaria para uno poder decir vamos a confiar en que ustedes van a cumplir con las normas. Por eso es importante saber cómo se dio el proceso de permiso. Nosotros participamos de las protestas contra este proyecto. Inclusive en el historial que usted puso, no hay nada en el 2004. Nosotros fuimos cuando estaba Mojica a esa planta a inspeccionar. Fuimos a una visita presencial en la planta y vimos los problemas que había. Yo estaba representando a Ciudadanos en Defensa del Ambiente y en el listado de las fechas que usted puso no hay nada en el 2004.

Zolymar Luna:

Yo admito que hay varias cosas que en detalle no se pudieron incluir. No porque no son importantes, verdaderamente es por el tiempo que tengo. Pero sí en los documentos, al final del Proposed Plan están.

Iván Elías:

Y pusimos querellas en la Junta de Calidad Ambiental.

Zolymar Luna:

Las querellas están.

Iván Elías:

Y pusimos querellas en la EPA.

Zolymar Luna:

Se documentó.

Iván Elías:

Y pusimos querellas en la EPA. Así que ¿entiende por qué no tenemos confianza en las agencias?

Zolymar Luna:

Sí...

Iván Elías:

Segunda pregunta. Esa área de la planta ¿es zona marítima terrestre? ¿Se evaluó esa condición de zona marítima terrestre por estar en el Caño Tiburones? En realidad, eso está en el Caño Tiburones. El Caño Tiburones es una zona marítimo terrestre y aunque el área esté seca, no quiere decir que no forme parte del Caño Tiburones. Eso se supone que se hubiera evaluado en una Declaración de Impacto Ambiental si se hubiera hecho una Declaración de Impacto Ambiental. Pero la condición de zona marítimo terrestre no se pierde. Entonces, usted dice que está identificada como zona industrial.

Zolymar Luna:

Su uso. Los usos.

Iván Elías:

Sí, sí. Está calificada como zona industrial. Yo, honestamente, pienso que esa calificación es incorrecta. Eso sería un área de conservación de recursos naturales. Porque eso es parte del Caño Tiburones. Por lo tanto, si se propone la remediación, partiendo de la premisa de que es una zona industrial, no es lo mismo una remediación para una zona ecológica de conservación que para una zona industrial. Entonces, ese es el segundo planteamiento que yo haría.

Zolymar Luna:

Ok. Estamos tomando nota...

Iván Elías:

El tercer planteamiento. Yo no sé qué va a pasar con la contaminación si ustedes me dicen que lo van a recoger y lo van a dejar en el sitio. Los ingenieros utilizamos una expresión, "dilution is solution, a la contaminación". Ustedes los están concentrando, no los están diluyendo. Están sacando el terreno y lo van a meter en un sitio.

Zolymar Luna:

Vamos a tratarlo...

Iván Elías:

Ese sitio... Yo no sé lo del tratamiento. Ese sitio con Hugo, con George, con María, con Irma, con todos esos huracanes, se inundó. Y se va a seguir inundando con todos los huracanes que vengan y se lleven el Río Grande de Arecibo. Eso es zona inundable. Eso es zona inundable. Además, es zona de marejada ciclónica, que tampoco oí nada de eso en su presentación. Lo dejo por el momento.

Zolymar Luna:

Sí, gracias. Se tomó nota. La información que tenemos sobre los permisos... Definitivamente no la tenemos, pero se va a considerar los usos.

Wilfredo Vélez:

Mi nombre es Wilfredo Vélez Hernández. Soy parte de Ciudadanos en Defensa del Ambiente. Soy parte de esas personas que radicamos las querellas en aquel momento, no en la EPA como tal, pero sí en la Junta de Calidad Ambiental. Se tardaron siete años en contestar la querella. Ustedes entonces se preguntarán por qué la gente siente que ni la EPA, ni Recursos Naturales, ni ninguna agencia del gobierno, hace nada por el pueblo. Se tardan tanto tiempo en contestar una querella que cuando vienen a contestarla las personas que se habían afectado directamente se han ido ya del Lugar. Tuve el privilegio de estar haciendo entrevistas a personas que fueron perjudicadas por Battery Recycling. Y les aconsejé, "mira, vamos a radicar querellas en el tribunal, porque obviamente las agencias de gobierno no sirven para nada". Como me dijo recientemente alguien en el Recursos Naturales, me dijo "ustedes dicen que nosotros somos ciegos y sordos". Yo le dije: "¿y usted tiene una opinión distinta de lo que es su agencia? Porque ustedes pasan todo el tiempo por el lado de los lugares donde hay una seria contaminación." Me dijo: "Ay! Es que la gente tiene que radicar una querella". Yo le dije: "¿Si la gente no radica la querella ustedes no pueden intervenir?". Me dijo: "No, no podemos". Pero ¿cómo va a ser? De manera que por ahí se comete un crimen y como no hay una querella, pues no se investiga. Nosotros hemos tenido experiencias negativas con todas las agencias del gobierno y hemos tenido algunas diferencias con la EPA. Y, por ejemplo, yo recuerdo que en ese tiempo que hacíamos las entrevistas, entrevisté a este padre que trabajaba allí, en Battery Recycling y fue a su hogar y contaminó a su hija. Y la contaminó tan malamente que la niña, con el plomo que el papá le llevaba de Battery Recycling tuvo un problema serio de contaminación con plomo. Y otras más. Yo traté de insinuarle "Pero mire, vamos a tomar acción legal". "No, pero si ¿para qué? Si aquí en Puerto Rico hay una impunidad tremenda para toda esa gente. No vale la pena. Y esa es la forma en que nuestra comunidad ve a las agencias, incluyendo a la EPA. Ellos entienden que no sirven para nada. Que no responden a la gente. Que no responden a las necesidades que realmente afectan a los seres humanos. Nos alegra lo que están planteando en términos de destruir ese edificio. Pero déjeme decirle alguito más... Nosotros fuimos a la ferretería que está allí al frente y entrevistamos a los trabajadores. Me dijeron: "No nos atrevemos a decir nada porque vamos a perder el empleo." Y yo le dije, "¿pero por qué?". "Ah, porque esa gente tiene un poder tremendo. Si planteamos algo, vamos a perder el empleo. Nos vamos a tener que quedar callados por temor a perder nuestro empleo." O sea que lamentablemente, y es lamentable porque, yo creo que hay gente buena en estas agencias, pero son gente que están completamente cogidas en esas instituciones que no le permiten actuar. Yo acabo de venir horita del tribunal, de un caso que, quizás la Sra. Guerrero sabe algo, de la Cueva del Indio, porque arrestaron a un compañero porque, alegadamente, hizo manifestaciones que, entendían ellos, que era un acoso de parte de nosotros hacia ellos. Y el tribunal encontró causa porque dicen que nosotros tumbamos una verja que está en un lugar ilegal. Me acuerdo que tuve el privilegio de ir con la Sra. Guerrero a investigar y la única forma de entrar era por el agua. Ella andaba con una abogada que tomó fotos y demás. Se nos dijo que se iba a actuar. Pero mire, al contrario. Todo lo contrario. Hoy en día, está privatizada la Cueva del Indio. Completamente privatizada. Para poder ir allí hay que pagar $10.00 por persona. Si usted va en un carro con 5 o 6 personas tiene que pagar $10.00 por persona. Digo eso porque acabo de salir del tribunal con el compañero que está siendo denunciado. Porque hemos estado denunciando las barbaridades, los crímenes ambientales que se cometen en nuestro país. Hay muchos niños en las comunidades adyacentes a Battery Recycling. Nosotros nos alegramos de que la EPA haya tomado, por lo menos, la acción de ordenar que había que cerrar ese monstruo que estaba causando tanto daño a la comunidad, a las aguas, al Caño Tiburones, pero sobre todo a los seres humanos que viven - y vivían, algunos porque otros se fueron - cercanos a ese monstruo que tanto daño le hizo a la comunidad. Gracias.

Fernando Márquez:

Buenas tardes. Mi nombre es Fernando Márquez. Soy residente. Propietario aquí de Arecibo. Llevo aproximadamente 35 años corriendo el corredor de la carretera PR 2. Patrocino los negocios, tanto al vivero como a la ferretería. Una de mis preguntas sería, ¿qué riesgo, al día de hoy, tengo yo al traer esos productos, tanto del vivero como de la ferretería, hacia el pueblo, y el riesgo que le llevo a mis empleados? Ese es uno. Dos, yo quisiera saber que, de la misma manera que todos nosotros somos responsables, ¿qué cargos se les ha puesto a los dueños de Battery Recycling? Porque la cantidad que ellos facturaban semanalmente, exportando el plomo, con una altísima calidad, que tenía un valor enorme, entiendo yo, que tienen que haber sido penalizados o ayudar a sufragar, no solo lo que la EPA está... Y agradecemos que, por lo menos, están indicándonos que están haciendo una inversión de 19 millones de dólares, y no sé cuánto han gastado hasta el día de hoy. O sea, este impacto ha sido enorme. Hubiera sido peor si hubieran traído el incinerador de basura al lado. Y lo último que quiero preguntar es, ¿qué van a hacer con esos terrenos de ahí? ¿Van a permitir otra vez? Porque esta no es la primera vez. Es la segunda vez. Y se proponía una tercera; una mega incineradora al lado, a una milla del pueblo de Arecibo.

Zolymar Luna:

Gracias. Voy a empezar al revés para lo que recuerdo, porque yo creo que ya la primera... Sí, la primera era, si la entendí, si usted entiende que hay un riesgo por ir al vivero y a la ferretería, ¿verdad? ¿Lo entendí bien?

Fernando Márquez:

Correcto, sí.

Zolymar Luna:

Ok. Ambas zonas fueron investigadas, se tomaron muestras de esas zonas, y no arrojaron resultados de preocupación. Actualmente también hay unas estaciones de monitoreo de aire en la zona que nos ayudan a eso mismo, a verificar cuáles son las condiciones alrededor de esta planta, obviamente porque hubo un problema ambiental. Y eso, le puedo decir que, en el término de usted participar, puede seguir promoviendo esa zona, porque, por lo menos, por lo relacionado a la contaminación de Battery, la contaminación de este Lugar, no hay preocupación. Les puedo decir esa parte. Y la segunda pregunta, ¿uso futuro? Como mencionamos, actualmente está restringido o limitado a comercial e industrial. No tenemos control de lo que pueda ocurrir en el Lugar. La agencia sí tiene control de lo que ocurre en términos de remedio. Pero qué se vaya a instalar ahí en un futuro, te soy sincera, no tenemos control. Sí existen los reglamentos estatales y federales para asegurar que lo que se vaya a hacer - y entiendo la parte de lo que ocurrió, porque igual fue un problema en el pasado en el que no se cumplió. Pero, les puedo decir que está el proceso para asegurarse que lo que se vaya a instalar sea compatible y cumpla con los permisos. Yo sé que no estoy contestando mucho, pero realmente ese es realmente el proceso. Nuevamente, la comunidad siempre tiene, durante los procesos de permisología, tienen un proceso para permitir que ustedes expresen sus preocupaciones y eso está ahí.

Fernando Márquez:

¿Y en dónde quedamos con los dueños? Los dueños de la Corporación.

Zolymar Luna:

Los dueños.

Fernando Márquez:

Ellos vivían en Dorado y estaban en la Florida. O sea, el problema lo dejaron.

Zolymar Luna:

Sí, la agencia tiene un proceso. El programa de Superfondo, tiene un componente también de cumplimiento. Lo que se llama "enforcement". Se identifica quiénes son las posibles partes responsables y tiene un proceso para recuperar los fondos que la agencia invierte. Como usted muy bien mencionó, es mucho dinero. A la fecha, las actividades previas a las actividades de investigación alcanzaban los 10 millones de dólares y puede ser un poquito más. Definitivamente hay una inversión y la agencia sí tiene su proceso. No le tengo esa información de qué ha pasado hasta ahora, pero sí hay un proceso y sí se busca que estas partes responsables cumplan. Si no pueden hacerlo ellos, que entonces se pague a la agencia por esos gastos. ¿Contesté? ¿Había otra pregunta? Ya, eso era.

Fernando Márquez:

Gracias.

Zolymar Luna:

No, gracias a usted.

Lilliana Alemán:

Zolymar el caballero siente que no le han contestado una pregunta.

Zolymar Luna:

Hay algunas que yo creo que no te las puedo contestar. Pero hacemos notas.

Iván Elías:

Sí, pero me imagino que las puedes investigar.

Zolymar Luna:

Sí, hicimos notas.

Iván Elías:

Eso es zona inundable. O sea, eso está en el cauce mayor del Río Grande de Arecibo. Es zona inundable. Entonces, la pregunta, ¿cómo es que ustedes van a remediar algo dejando los contaminantes allí, en zona inundable? ¿En el caso de un tsunami? También es zona de tsunami. El tsunami no es una ola que llega. Es un tren de olas que limpia el terreno, que se lleva edificios y todo. Se va a correr el dique. El dique del Río Grande de Arecibo, un tsunami lo limpia y se lleva una parte importante del pueblo de Arecibo, del casco de Arecibo. Y si eso es un montículo con los contaminantes ahí, los va a lavar y los va a regar.

Zolymar Luna:

Se va a hacer nota. Quería explicar un poquito del proceso del remedio. Los suelos, antes de consolidarse, se estarían tratando. Para eso mismo, para bajar la toxicidad. Eso sería parte del remedio. No sé si contesto a su pregunta, pero eso...

Nota de la Transcriptora:

El Sr. Iván Elías habla desde su asiento, fuera del micrófono.

Zolymar Luna:

Sí, eso se va a hacer nota y próximamente, a medida de los datos que podamos ofrecer, se estará compartiendo. Próxima persona.

Carmen Guerrero:

José, ¿quieres decir algo?

José Font:

Sí. José Font para récord. En términos del planteamiento del caballero, muy bueno. Lo tomamos y lo consideramos en el proceso. Porque siendo una zona inundable, si eso es un elemento nuevo que llega ante nosotros, pues lo consideraremos, si ya lo consideramos, pues entonces le dejamos saber. Recuerden que toda pregunta que se presente aquí hoy va a requerir de una respuesta formal en un "Responsiveness Summary".

Zolymar Luna:

Y estará disponibles para el público también en el récord. Sí se evaluó el componente de que está en la planicie del Río Grande de Arecibo, que es inundable. Eso sí es parte del proceso. También quiero indicar que luego del huracán María, no quiere decir que no vaya a ocurrir, pero sí se hizo una investigación luego del huracán María para tomar muestras en las zonas aledañas y verdaderamente las condiciones no cambiaron después de María a las que había antes. La contaminación, básicamente, estuvo, básicamente, donde mismo se encontró y se debe también por la naturaleza de los inorgánicos, porque son tercos para salirse de su lugar y, en este caso, pues lo más que se movieron fueron en el drenaje del este. Pero fuera de los predios, como los datos demostraron, no llegaron al Río Grande, los sedimentos, al Río Grande de Arecibo. Se tomaron muestras también hacia el canal de Tiburones y no se detectaron plomo ni arsénico. O sea, que es importante notar que sí, entendemos la preocupación, pero hasta ahora los datos que recopilamos lo que confirma es que la contaminación no llegó realmente ni está descargando al Caño de Tiburones. Esas fueron las prioridades del proyecto. Quiero enfatizar eso.

Idelfonso Ruiz:

Buenas tardes, Idelfonso Ruiz. Represento el sistema académico de la Universidad Ana G. Méndez. Primero que nada, instalar un pozo, hincar un pozo es complicado y ustedes tienen más de un pozo. Así que es todo un reto. Hicieron un trabajo enorme. Al igual que el muestreo, tienen más de 50 puntos de muestreo de sedimentos. O sea, que es significativo el monitoreo que hicieron. La verdad que es un reto. Habiendo dicho esto, tengo una pregunta, específicamente con los pozos. ¿Colectaron datos sobre conductividad?

Zolymar Luna:

Ahí tengo a mi hidrogeóloga, pero puedo tomar el dato. Porque hay datos que específicamente no me los sé de memoria, pero ella lo puede contestar.

Nota de la Transcriptora:

El señor Idelfonso Ruiz se dirige hacia Kathryn quien está sentada cerca del área del micrófono.

Idelfonso Ruiz:

I'm concerned about the conductivity of the area.

Zolymar Luna:

Sí, sí, sí, sí, exactamente, pero que ella quizás... Pero haga la pregunta.

Idelfonso Ruiz:

¿Hay datos de conductividad?

Zolymar Luna:

Sí, sí hay datos. Todo eso es parte del proceso de investigación que a cada pozo se le hizo.

Idelfonso Ruiz:

¿Cómo se comporta la conductividad?

Zolymar Luna:

Recordamos. ¿Cómo es la conductividad? No recuerdo la K ahora mismo. ¿Cuál era? Yo sé que se mueve de una manera, no es rápido. O sea, esto es parte de lo positivo y malo, pero Kathryn ¿quieres?

Kathryn Flynn:

Cuando sacamos muestras de los pozos medimos la conductividad. Eso todo lo tenemos en la investigación, pero no sé los detalles. Pero eso lo podemos buscar.

Zolymar Luna:

Se estará anotando para poderte dar esos números precisos. Nuevamente, son muchos datos que se recopilan. Pero sí está todo en los informes. Principalmente, si te puedo recomendar un estudio donde está, sería lo que le llamamos el RFS y te puedo después decir hasta dónde están los apéndices y todos los documentos para que tengas esos datos. Porque sí es importante y siempre se hacen, como otros estudios que se hacen de calidad de agua.

Idelfonso Ruiz:

En los análisis de alternativas, veo que lo que están proponiendo, específicamente para los canales es un método bien agresivo, el remover sedimentos y sacarlos de ahí. En ese sentido, sí me preocupa un poco. Yo no he ido al Lugar, así que, a lo mejor estoy diciendo algo que no es correcto. Pero me preocupa en el sentido de que a lo mejor tú tienes dentro del mismo canal, tienes espacios que a lo mejor no tienen ningún...bueno, no voy a utilizar esa palabra... Pero es pobre el nivel trófico. Pero puedes tener otros trabajos dentro de ese canal que tienes toda una comunidad completa trófica en el Lugar. Y remover ese sedimento estaría alterando ecológicamente el sistema. Me preocupa un poquito las alternativas que presentaron. Mi recomendación es que pudieran reconsiderar en esos lugares específicos utilizar vegetación. Y la vegetación entonces, que absorba el contaminante y luego sacar la vegetación y quemarla. Sería como una recomendación.

Zolymar Luna:

Fitorremediación.

Idelfonso Ruiz:

Fitorremediación, sí.

Zolymar Luna:

Gracias por la nota. Se tomará en consideración. Como parte de los procesos son las alternativas, y una de ellas, no sé si recordaba, es cuán rápido se puede implementar ese remedio para que te dé resultados. Porque lo que queremos rápido es, limitar esa exposición, prevenir la exposición. Y a veces en ese proceso, pues queremos ver qué es lo más rápido que se puede hacer, qué me da resultados más rápido. Y, eso es un proceso. No quiere decir que lo estamos excluyendo, pero, explicando de dónde viene la parte de proponer esta alternativa; va por eso. Esta alternativa nos permite entonces, remover esa exposición o esa fuente para asegurarnos, y proteger, de hecho, a los mismos receptores ecológicos.

Idelfonso Ruiz:

Por eso es que hago la aclaración que no tiene que ser todo el canal, pero en aquellos lugares específicos del canal que ustedes entiendan que hay toda una complejidad trófica. En esos puntos específicos.

Zolymar Luna:

Sí. Me parece una nota interesante. Gracias.

Marta Quiñones:

Marta Quiñones Domínguez de Arecibo y de Ciudadanos en Defensa del Ambiente. Tengo varias preguntas. A mí me preocupa que en ningún momento se mencionaron a las personas contaminadas. Fueron varios niños y varios adultos. Inclusive cuando Head Start hizo una evaluación del Head Start que está más cercano de ellos, encontró que todos los niños estaban contaminados con plomo. Ahora ya todos ellos son adultos y nadie ha hecho algo por la salud de ellos. El compañero estaba hablando, si puede ir al Lugar. El problema es que yo no sé cómo se hacen las limpiezas y cómo funciona el viento. Y eso no fue mencionado en ningún momento aquí. Porque si yo remuevo algo, como sucede en Vieques, el viento mueve la contaminación. Y entonces, yo creo que el compañero estaba bien preocupado porque si ustedes están limpiando allí - "ustedes" refiriéndome a la EPA, no a ustedes dos - y el viento está soplando para cualquier lado, el problema es que puede llevarlo a los empleados del frente, a los empleados del lado. No sé si se hizo una evaluación médica de esos empleados. Porque el problema es que el plomo no es cualquier cosa. Esa es la primera pregunta. La segunda pregunta es, y ustedes hablaban de migración de suelos de la contaminación, pero no hablaban de migración de suelos por el aire. Y dice que hay unos monitores, pero el problema es cuando estén limpiando. Entonces, reveló que había arsénico y plomo entre los contaminantes y otros más. Pero no nos dijeron qué causa estas cosas. Esa exposición al arsénico, esa exposición al plomo, ¿qué tipo de efecto tiene al ser humano y a la naturaleza?

Lilliana Alemán:

Quería decirle que, en la hoja informativa, en la última página, habla sobre los contaminantes que son preocupantes y a través de las páginas de Internet le dice exactamente cuáles son los daños que causan esos contaminantes. Pueden acceder la hoja informativa. No sé si nos quedan suficientes impresas. Esa contestación creo que la puede encontrar ahí.

Marta Quiñones:

Nosotros lo sabemos, porque hemos luchado tanto en contra del incinerador y hemos protestado esto, sabemos lo que causa. Pero es importante informarle a la gente. Informarles a esos empleados que están allí. Informarle a la gente que puede estar involucrada en todo este asunto. Así que es importante. Y la recomendación que hizo el compañero, creo que es clara, que ustedes informen que ese terreno no puede ser nuevamente utilizado en cuestiones industriales. Ese terreno debe de ser de espacio protegido ecológicos. Porque de lo contrario, vienen y establecen. Aquí se olvidan las cosas rápidamente. Lo dijo también el compañero. O sea, no es la primera vez que establecen algo allí. Después viene alguien con un gran proyecto y, dependiendo de quién esté en la administración, dice pues aquí va a ser el Lugar. Arecibo está cansado de los abusos ambientales, porque ese no es el único abuso ambiental. Hay muchos abusos ambientales, incluyendo el vertedero que está un poco más abajo. Entonces, es parte del problema. Cuando ustedes mencionan llevar esos terrenos a un vertedero como una de las alternativas que evaluaron. Uno dice ¿a cuál vertedero? Porque el problema es que seguimos haciéndole daño a las personas nuevas. No evaluamos. Nos tardamos 23 años en evaluar esto. 23 años que las personas han estado expuestos. Llevas allí 50 años del vertedero de Arecibo, la gente quejándose y no se evalúa. Vamos a ser un poco más responsables con la salud y la seguridad de las personas. Así que es importante que ese terreno se le quite eso de industrial. Porque después viene desarrollo económico y dice "ahí vamos a poner una industria". Así que mejor que se le quite eso y se convierta en terreno protegido, ecológico y de conservación. Además de eso, que se hable de lo que causan estas enfermedades. No que se ponga solamente en el documento, perdóname. Es que se hable para que la gente esté claro de lo que puede suceder. Porque cuando Head Start se enteró de que sus niños estaban contaminados, les explicó a los padres lo que estaba sucediendo y muchos de ellos se fueron de Puerto Rico. Porque aquí no había asuntos de salud para tratar a esos niños y no sabemos lo que puede suceder. Es importante, porque le estamos haciendo daño a nuestro futuro. Ese futuro ya tiene 23 años, pero siguen llegando otros futuros y los hijos de las personas que están llegando a comprar en esos negocios, que uno los auspicia, pero sabe lo que existe allí al lado, y eso es importante. Y lo otro, básicamente, que hablen también de esa cuestión del viento. O sea, ¿cómo va a funcionar y cómo vamos a controlar cuando ustedes estén manejando allí estos suelos? ¿Cómo vamos a controlar todo lo demás? Porque dice que los van a limpiar in situ, o sea, que vas a trabajar allí, vas a levantar en algún momento viento, porque la máquina va a levantar tierra. O sea, que es mucho riesgo que no se está presentando. Bueno, a lo mejor se analizó, pero no se está presentando y es importante que lo evaluemos. Gracias. Ah, y nos gusta que sea un Superfondo para que tengamos ese tipo de dinero por lo menos para invertir, aunque no le hagan responsable a Battery Recycling, pero por lo menos se considera limpiar.

Zolymar Luna:

Sí, exacto. Son varias preguntas. Yo creo que la más importante, la que mencionó (del viento). De hecho, los objetivos es prevenir exposición. Porque conocemos las consecuencias y los efectos que esto puede tener en la salud. Ese es el norte de este remedio. En el proceso de construcción y de excavación sí se consideró. Hay procesos que se pueden utilizar, o mecanismos que se pueden utilizar, o mecanismos para controlar o mitigar lo que conocemos como el polvo fugitivo o el material particulado que pueda moverse fuera del Lugar. Se van a tomar esas medidas y es parte de la consideración que se tuvo para tomar esta decisión. Pero sí, primordialmente lo que se considera es evitar y limitar la fuente. Para evitar la fuente es necesario hacer esa excavación y removerlo para poder limitar esa fuente. Es como un paso primero para poder llegar a hacer lo que usted muy bien mencionó, eliminarlo y prevenir que esto vuelva a ocurrir en otra ocasión. Básicamente, eso es. Porque entendemos las consecuencias que hubo en aquel momento. Y claro, el norte es proteger la salud del ser humano y el medio ambiente. Que siempre eso se va a mantener en perspectiva. Había otra pregunta que era...

Carmen Guerrero:

La parte de la información y orientación a los trabajadores.

Zolymar Luna:

Creo que había algo que usted mencionó sobre informarle a los empleados. Yo estoy pensando que estamos hablando cuando se vaya a hacer la actividad de remediación. Estamos hablando de cuando eso ocurra, que se les notifique. Eso es una nota que se puede hacer, que sí, que vamos a estar notificando. Hay estaciones de monitoreo justo frente a la instalación de la antigua planta, precisamente para eso, para verificar si se cumple. En cuanto a los análisis de salud a los empleados. Nuevamente, es algo que lo tenemos en perspectiva. Pero esta investigación y este Plan Propuesto, no incluye ese componente. Sí trabajamos y estamos colaborando, de hecho, con el programa de Vigilancia de Plomo por si se presenta alguna persona con alguna preocupación, proveerle la orientación. Y, de hecho, hay una persona aquí. Si te quieres poner de pie, enfocada precisamente en atender esa preocupación.

Nota de la Transcriptora:

Nayda se pone de pie en el público.

Carmen Guerrero:

Sí, y dejar saber que aparte de Nayda, también la Dra. Gredia Huerta se hizo disponible para ese proceso. Así que con ambas podemos trabajar esa colaboración en términos de orientación. Exhortamos a las personas que estén interesadas en la orientación sobre el tema de salud, que se puedan comunicar con ellas para poder atenderlo. Quiero también aprovechar y reconocer a la Dra. Ingrid Padilla, de la Universidad de Puerto Rico en Mayagüez. Gracias mil, Ingrid, por estar aquí también.

Nota de la Transcriptora:

La Dra. Ingrid Padilla saluda desde el público.

Lilliana Alemán:

El caballero tiene una pregunta más.

Iván Elías:

Iván Elías, de nuevo. La pregunta es sobre la reglamentación de las diferentes agencias. ¿Cómo esa reglamentación se hace cumplir en este proceso de remediación o, inclusive, en el proceso de identificación del historial al que hice referencia horita? Estuve pensando que hay un acuerdo con el gobierno de Estados Unidos y el Departamento de Recursos Naturales y la Junta de Planificación. Es el reglamento y el plan de manejo de zona costanera. Evidentemente ese proyecto está en zona costanera. Entonces, se supone que hay cosas que no se permiten por las condiciones que plantea el plan de manejo de zona costanera. El gobierno no lo ha hecho cumplir, pero está ahí el reglamento. Yo lo que quiero saber es si se va a aplicar lo que dispone ese reglamento u otros reglamentos que pudiera haber.

Carmen Guerrero:

Sí. Ahí para añadir a la pregunta, Iván, y esa es una de las preguntas y comentarios que nos llevamos para asegurar que se responde como parte del proceso de respuesta a los comentarios y que se va a documentar. Algo bien importante es que las distintas agencias también tienen oportunidad de comentar en este proceso. Así que el mismo municipio de Arecibo, a través de su plan de ordenamiento territorial, Junta de Planificación, Recursos, que trabajamos mano a mano en el proceso, han revisado el plan, han emitido los comentarios. O sea, que, dentro de ese proceso, hay una conversación con las agencias locales.

Zolymar Luna:

También, el proceso para escoger el remedio hace una evaluación para cumplir, tanto con la ley local y la ley federal. Por ejemplo, un aspecto que se toma en consideración es si hay aves en peligro de extinción en el área, áreas de anidar, áreas protegidas. Todo eso se toma en consideración en el proceso de decisión.

José Cintrón:

Buenas tardes, José Cintrón de Bajadero. La pregunta es de la profundidad. En el agua ¿cuán profundo fue el muestreo? ¿Y en el suelo?

Zolymar Luna:

El del suelo te lo debo. Se detectó en profundidades de 20 a 80 pies bajo la superficie. Suelo varía bastante, pero te puedo dar ese dato.

José Cintrón:

Entonces, ¿cuán profundo tiene que ser la excavación para eliminar la contaminación en el suelo?

Zolymar Luna:

Está bien superficial. Al primer pie, básicamente. A un pie de lo que sería toda la superficie del Lugar y básicamente lo mismo aplica en el canal de drenaje. Porque todo fue básicamente relacionado a las descargas de las aguas de escorrentía y emisiones de aire que se quedan en la primera capa del suelo.

José Cintrón:

Y entonces, la última pregunta. ¿Después de Fiona hicieron muestreo en el agua de nuevo? Después de Fiona.

Zolymar Luna:

No, después de Fiona no se hizo muestreo. Puedo quizás enfatizar algo. Las distintas áreas que nos preocupaban, relacionadas a las descargas al río, ya confirmamos con esta investigación que no está conectada a las descargas que ocurren de las corrientes en la planta hacia el Río Grande. Igual el canal, la forma en que está drenando, pues lo mismo, se queda bastante - en los datos que tenemos - se queda bastante cercano en el canal.

José Cintrón:

Entonces, hacia la ferretería no hay...

Zolymar Luna:

Ese drenaje, pues lo que hemos confirmado hasta ahora, no conecta con la escorrentía que sale del Lugar.

José Cintrón:

Gracias.

Zolymar Luna:

De nada. Nuevamente, yo puedo entender que es mucha información y pueden surgir otras preguntas luego de hoy. Pueden compartir esas preguntas y recomendaciones a través de correo electrónico.

Carmen Guerrero:

¿Alguna otra pregunta o comentario? Veo a Biaggi encaminándose.

Javier Biaggi:

Saludos. Un gusto saludarlos a todos. Muy buenas tardes a todos. Mi nombre es Javier Biaggi. Represento a Basura Cero Arecibo y soy presidente del Comité Municipal del PIP aquí en Arecibo. Quiero recordar varias cosas en ese lugar. Primero, ahí estaba la planta que le decíamos nosotros, la Petroquímica de Arecibo, la Cardinal. ¿Cuánto de esa contaminación, de esa facilidad, existe todavía allí? Porque allí no se hicieron ningunos remedios, sabemos que hubo derrame de tanques y cosas de eso.

Zolymar Luna:

Entiendo que se está refiriendo a la Puerto Rico Chemical Company. Sí, los compuestos orgánicos volátiles que encontramos están directamente relacionados a las operaciones que esta compañía realizó a aquella fecha. Porque en este caso, Battery Recycling, no tiene esos usos y debido a la degradación de cloruro de vinilo que está presente en el site, podemos hacer la relación. Sí tomó varios años en detectarla, pero como parte de esta investigación, se confirmó que esa compañía sí fue responsable. Es una parte responsable de la contaminación que está ahí.

Javier Biaggi:

La compañía fue responsable, pero los dueños no. Y lo mismo pasa aquí, ¿verdad? Yo no sé qué responsabilidad se le ha adjudicado a esa gran contaminación a los dueños de esas facilidades. Que sabemos quiénes fueron, pero de momento, cuando buscamos otra vez los récords, le habían cambiado el nombre del dueño. Que primero era un tal Ricardo Roselló y después cambió el nombre. Pero no sé qué pasó ahí.

Zolymar Luna:

No tengo mucho detalle del cambio de dueño. Sí entiendo que, al principio, cuando operó la Puerto Rico Chemical Company, el dueño de la propiedad era Fomento Industrial de Puerto Rico, como le decimos, PRIDCO. Y la compañía que en el momento estaba... Ahora mismo la compañía se llama Occidental, son las subsidiarias. Y después la compañía de Battery Recycling, que operó poquitos años después, en el 94.

Javier Biaggi:

Exactamente.

Zolymar Luna:

En términos de identificar personas responsables o partes responsables, la compañía de Battery Recycling, en este caso su dueño, que es el Sr. Luis Figueroa, son partes responsables oficialmente en récord. La agencia empezó un proceso nuevamente ahora, cuando se detectan los compuestos orgánicos volátiles en el agua subterránea, a identificar, en este caso a notificar a las otras posibles partes responsables. Ese proceso se comenzó.

Javier Biaggi:

También quiero recordar que, dentro de esa misma cuenca, obviamente tenemos la contaminación que genera el vertedero del Caño Tiburones. Pero también en el aeropuerto de Arecibo, como para el 1988, el Departamento de la Defensa de los Estados Unidos se contactó conmigo, porque a mí me gustaba la historia, pues ellos querían saber dónde había bases militares en Arecibo, por la contaminación de plomo, porque usaban "range" de disparos y ese tipo de cosas. Y una era el área de lo que se llama Duamel, que ahí fue donde fue el cuartel, y los soldados disparaban a las tarjetas de blanco que daban hacia el mar. Así que allá tiene que haber plomo que se acabó. Lo otro era que, en 1944, el ejército de Estados Unidos comenzó a hacer unas pruebas de DDT antes de regar el DDT en Corea para controlar la malaria y otras enfermedades que se estaban desarrollando allá. Y para esa época, también ellos estaban tratando, ya para el 2008, estaban tratando de averiguar dónde estaba esa base aérea, porque el DDT que regaron en esa base aérea, salió del aeropuerto de Arecibo, y los drones y las cosas que sobraban y las cosas que limpiaban, estaban allí contaminando allí aquella área. La pregunta es si saben que eso existe. Y la segunda es, ¿qué van a hacer con eso? También en esa misma investigación que estaba haciendo el Departamento de la Defensa, en la base militar de Sabana Seca, el Navy, también tenían otro centro que sacaban los aviones para entonces fumigar toda el área de San Juan. Entonces, ellos lo que hicieron allí fue que le pusieron un tope de cemento donde estaban enterradas esas cosas y lo dejaron allá abajo. O sea, que siguen siendo fuentes de contaminación, porque eso no acabó ahí.

Zolymar Luna:

Posiblemente.

Javier Biaggi:

El nivel freático allí es igual que el de acá, que es bien alto, y hay un subibaja del nivel freático todo el tiempo. O sea, que, no tan solo es horizontal la transportación de esos materiales dentro de los estratos que pueda haber ahí, sino también hay un movimiento horizontal. Tenemos que tener en cuenta que Arecibo, además de la planta del centro ese de Superfondo que tienen allí en Santa Ana, podríamos decir, por Sabana Hoyo, de la contaminación de productos pesticidas y que ya sabemos, y ustedes saben, allí, yo no creo que se ha hecho nada allí, eso se quedó allí. El almacén que tenía la Autoridad de Tierra, que usaban para los plaguicidas y herbicidas.

Zolymar Luna:

Ok, ya. Pesticide Warehouse. Es un lugar súper fondo.

Javier Biaggi:

Exacto. Sí, que está investigado y todo. Más el tolueno. O sea, Arecibo tenía tantas cosas de esas. Centros así de descarga. Y encima de eso, teníamos la contaminación que venía de la Papelera de Utuado, que hizo unas descargas al río y pues, obviamente, nosotros estamos en la cuenca de ellos. Que también ese tipo de cosas venía a tener acá. Tenemos una serie de cosas que también venían a exacerbar eso, la aprobación que le dio la EPA a la planta de incineración de basura que iban a poner en Arecibo. Y ahora viene la pregunta grande. ¿Estamos limpiando esto y estamos preparando el terreno para que Energy Answers vuelva otra vez a solicitar un permiso ya sin una zona de no cumplimiento de plomo? Y esa es la gran pregunta, porque yo sé que esa gente está todavía activa, que están buscando la forma de establecer un incinerador otra vez en Arecibo o en Puerto Rico. Y sabemos que la EPA no ha hecho firme un compromiso con el reciclaje total, que es lo que podría evitar esa cosa. Y entonces, estamos nerviosos porque sabemos que eso va a venir y queremos ver si eso es parte de eso.

Zolymar Luna:

En este proyecto en sí lo que buscamos es reducir fuentes de emisión. Atender la contaminación que está en el Lugar. Tengo conocimiento de algunos de los lugares que usted mencionó. El Pesticide Warehouse y Papelera son también lugares Superfondo. Le puedo sí decir, de este proyecto, como otros proyectos Superfondo, que siempre la prioridad de los proyectos es atender la fuente de contaminación y evitar exposición. Toma tiempo, a veces, como mencionaron, pueden tomar 20 años, 10 años. En el caso de Battery Recycling, el plan es atender, decidir en un remedio para precisamente eso, atender la necesidad que existe, la contaminación. Los usos futuros, es importante considerarlos también en el proceso de decisión, qué se va a estar utilizando allí, cuál es el plan. Si el plan es conservación, se pueden buscar alternativas que sean compatibles con la conservación. Eso también es una es una opción que se puede incluir en el proceso para identificar remedios. Pero, en términos generales, de qué puede ocurrir en un futuro incierto, honestamente, prácticamente nosotros, nadie, yo creo que la agencia, de una manera de responsable, no le podemos decir. Sí le podemos decir que se trabaja con permisos. Que, en el caso de este proyecto, en el proceso de remediación, se va a estar enfocado en que se cumpla, en evitar exposición a los vecinos, evitar exposición a las distintas industrias que están alrededor. Porque el fin del proyecto es evitar exposición. Eso es parte también del remedio. Están las estaciones de monitoreo y, de ser necesario, durante la parte preliminar de diseño, hay otros métodos que se pueden incorporar para comunicarle a la comunidad que está aledaña que estos remedios no están impactando la salud. Se pueden instalar monitoreos en lo que sería el límite de la propiedad, adicional a lo que ya existe, si es necesario. El compromiso es atender las preocupaciones que puede tener la comunidad y expresar y tener un diseño que es compatible con los usos y con lo que la comunidad entiende que es pertinente para ese lugar. Pero, primordialmente, también eso, verificar que es un remedio que es viable, que se pueda dar y en un tiempo razonable, porque yo creo que han esperado demasiado.

Javier Biaggi:

Yo creo que sí, pero el remedio para el sitio tal vez sea satisfactorio, pero recuerdo que la zona de contaminación eran cuatro kilómetros a la redonda del proyecto.

Zolymar Luna:

No. El área de investigación. No es el área de contaminación. Porque tuvimos que movernos para verificar dónde estaba, incluyendo canales hacia el Caño de Tiburones, canales hacia el Río Grande. Pero el área realmente impactada es el predio con lo que era la antigua planta y el canal de descarga. Esas son las áreas primordialmente que están impactadas.

Javier Biaggi:

Lo que pasa es que las vacas que estaban en el pastoreo las tuvieron que eliminar porque tenían plomo en la leche. La leche pesaba. Y tuvieron que... Y creo que no le pagaron absolutamente un chavo al agricultor, según tengo entendido. Pero la cosa es que las siembras que habían alrededor de la Central Cambalache, hasta llegando a Pueblo Extra, al otro lado del río, yo me acuerdo de que nosotros teníamos un proyecto planificado con la Autoridad de Tierra y nos llamaron y nos dijeron "mira, nos pasó esto. Está dentro de una zona de cuatro kilómetros de la redonda de esto y hay una contaminación de plomo y estos terrenos no se pueden utilizar." Y ahí, todas las fincas de papayas y cosas que habían alrededor de eso se eliminó todo eso. Entonces, si nosotros vamos a atender solamente eso, ¿y el resto qué pasa?

Zolymar Luna:

Sí, entiendo. Creo que... No me atrevo a especular. Tengo una sospecha de dónde pudo haber surgido la preocupación. Entiendo que pudo haber sido por el asunto del área, el permiso, el permiso en un "attainment area" de calidad de aire, pero no. Podríamos hacer una nota para aclarar realmente de qué fue lo que ocurrió, pero la contaminación realmente que está en este informe, está específica al Lugar.

Javier Biaggi:

Claro.

Zolymar Luna:

Sí, existió ese detalle que usted mencionó. No quiero decirle que no, porque sí. Eso se atendió bajo otro programa, porque durante el proceso de descubrimiento de contaminación, se identificó como un área que necesitaba atención inmediata. Y entonces se procedió a hacer esa excavación, remover esos suelos, se trataron los suelos y entiendo que hubo ganado que estuvo afectado.

Javier Biaggi:

Yo creo que la investigación debe ir un poquito más allá del predio.

Zolymar Luna:

Fuimos más allá del predio. Así que confirmamos que no está. Positivamente se hizo la evaluación, los estudios necesarios para confirmar dónde está la contaminación. Donde está la extensión es en ese canal de drenaje a 2,000 pies, aproximadamente, de extensión horizontal y, entonces, en el predio, específicamente, donde estaban operando. Pero sí, estaba en lo correcto. Lo que pasa es que se hizo un remedio y se atendió en años anteriores el área de pastoreo.

Javier Biaggi:

Entonces, ¿se le puede dar la buena noticia a la Autoridad de Tierra de que esas tierras las podemos seguir usando para uso agrícola de siembra de plantas y toda esa cosa?

Zolymar Luna:

Sí. Claro, yo entiendo que sí. No sé si hay otras, más condiciones, ¿verdad? Porque no soy... Pero no va a ser por el Lugar de Battery Recycling.

Javier Biaggi:

Bien, muchas gracias.

Zolymar Luna:

Sí, no, de nada.

Javier Biaggi:

Te voy a añadir una cosita.

Zolymar Luna:

Sí. Creo que es positivo hablar también de usos de los terrenos. Eso es importante.

Carmen Guerrero:

Añadiendo a lo que mencionas, Javier. Entidades como la Autoridad de Tierras, Municipio de Arecibo y otras entidades que tengan terrenos aledaños, que sepan que estamos disponibles para reunirnos para aclararle la extensión de los hallazgos que tuvimos.

Javier Biaggi:

¿Hay alguien del municipio de Arecibo?

Carmen Guerrero:

Tenemos representación de legisladores municipales, incluyendo el vicepresidente de la Legislatura.

Javier Biaggi:

Qué bueno. Por último, no podemos olvidarnos de lo que se llama la bioacumulación. Dentro de las especies que están rodeándonos ahí, durante todo este tiempo, que han estado expuestos a esto, pues eso ha ido acumulándose de generación en generación, esos contaminantes. Y la pesca recreativa, allí, de jaivas y de peces, es bastante activa, y cangrejos también. Pero lo que se convendría hacer es también hacer un estudio de esas especies y ver si hay contaminación en ellas y hacer un aviso a la gente. Porque francamente, la gente no sabe si eso está contaminado o no y están haciendo fiesta.

Zolymar Luna:

Es un punto válido. Hay una recomendación de parte de ATSDR - ahora mismo no recuerdo la definición en español. Por eso se hizo estudios en sedimentos. Porque, por ejemplo, el cangrejo, entre otras, es el área de su hábitat. Se fue enfocado, y ese muestreo en los sedimentos fue precisamente para confirmar si esto era un riesgo para ese tipo de animales y entonces para los receptores, los seres humanos. Sí se hizo ese proceso, y de manera positiva le puedo indicar que esas áreas no estaban impactadas con plomo. Por lo tanto, todo, como mencioné, también se hizo de agua superficial, al agua superficial que corre al Caño de Tiburones. También esos fueron positivos, en el sentido que no se detectó plomo. Lo que significa que no hay. Esto no representa un riesgo para esos receptores en el área y para los receptores ecológicos de esa área, que es algo positivo. Nuevamente, durante las actividades de remedio se van a tomar los controles necesarios para evitar descargas que lleguen entonces al canal y, consecuentemente, puedan afectar el Caño. Pero le puedo decir que los hallazgos son positivos en ese aspecto.

Javier Biaggi:

Fíjese, existe un mercado de la tyfa angustifolia, que es la enea, que se utiliza mucho para hacer artesanía, forrar muebles, etcétera, etcétera. Y hay gente que viene de otros pueblos, por cantidades importantes, a cosechar esas hojas para hacer eso. ¿Qué quiere decir eso? La tyfa angustifolia sabemos que es uno de los grandes filtros de contaminantes que tenemos en el ambiente y convendría hacer también un estudio en ello. Podemos estar lo más tranquilos sentados sobre el plomo.

Zolymar Luna:

Sí, no. Yo, verdad, lo que le puedo comentar sobre ese tema es que, si no está en el sedimento, no puede estar en la planta, en este caso. Al extender ese estudio y confirmar que solamente está en el canal y, de hecho, obviamente, son pruebas que se hicieron en varias secciones de la extensión que está aledaña al terreno de lo que era la planta, pues confirmamos que entonces debe estar seguro. También utilizar este material. Nunca he usado para hacer sillas ni muebles, pero puedo entender lo que quiere decir. O sea, que, si el sedimento no está afectado, en este caso la flora no debe estar afectada.

Javier Biaggi:

Bueno, la familia Villalobos de Orocovis.

Zolymar Luna:

Sí, vienen acá, pero esa sería...

Javier Biaggi:

Y, por último, último. Recuerdo que cuando se hizo la remediación del fuego que ocurrió en Peñuelas, en una planta de neumáticos. Nosotros dimos la alerta de que todavía aquello estaba ardiendo allá abajo. Habían hecho un horno pirolítico, extraño. La decisión de la EPA en ese momento no fue remover el material de allí, que era lo que prescribe el reglamento, sino convirtieron aquello en un vertedero clandestino. Porque en aquel momento no le pidieron permiso al gobierno para hacer un vertedero allí. Sino que decidieron apagar el fuego y enterrar la cosa allí. Yo estaba el día ese, en la presentación que hicieron del remedio. Hicimos esa pregunta y todo el mundo se quedó patidifuso, incluyéndolos. La gente de la EPA que estaba ahí sabía que eso no se debió haber hecho así. Porque lo que está contaminado, que está peligroso, no se puede dejar ahí, hay que sacarlo de aquí. La remediación de la alternativa 4 de hacer una geomembrana, que es tipo arcilla o alguna cosa, para meter eso allí, ¿cuánta duración tiene eso versus el plomo? Y yo creo que lo que quiero decir es que, tanto lo que pasó en Garrochales, en el almacén de pesticidas, como lo que pasó en RCA, como lo que pasó en el vertedero, como lo que pasó en Battery Recycling, es enterrar otra vez en el mismo sitio la cosa. O sea que, "the bomb is ticking", como dicen los americanos, la bomba está sonando. En algún momento, vamos, nos va a cobrar la vida.

Zolymar Luna:

Se va a hacer nota.

Javier Biaggi:

Gracias y disculpen la molestia.

Zolymar Luna:

Sí, no, pero se va a hacer nota.

Carmen Guerrero:

Bueno, tenemos que ir cerrando y tenemos algunas preguntas. Si pueden ser rápidos, porque tenemos a los servicios que se tienen que ir. Nosotros de la EPA nos vamos a quedar aquí para poder contestar sus preguntas, pero si pudieran hacer las preguntas rápidamente, se los agradecemos.

Carmen Quintana:

Buenas tardes, mi nombre es Carmen Quintana, legisladora municipal de Arecibo. No soy funcionaria del municipio, sino legisladora municipal. Es breve, dos cositas brevemente. Lo que argumentó el caballero sobre la inundación, que si guardan todo ahí. En los mapas de FEMA, aparece como área inundable. O sea, que no es algo nuevo. O sea, que actualmente es área inundable y todos los residentes de Arecibo sabemos que para María todo eso se inundó. Igualmente sería bueno, luego de Fiona, tratar de hacer no tantas muestras como ya ustedes han realizado, que han sido muchas muestras, hacer varias en el área. Ese sería uno de los puntos. Entonces, una pregunta, no sé si son ustedes exactamente los que tratan el tema. La pregunta de la dama sobre las personas afectadas, ¿es EPA el que hace una recopilación de datos sobre las personas afectadas o esa información ustedes la delegan en otras agencias? Porque actualmente no sabemos si hubo algún tipo de recopilación de su agencia o de otras agencias, ya sean estatales o federales, que hayan recopilado la información de los seres humanos afectados. Porque sabemos de las vacas que estaban y todo lo que tenían. Pero no sabemos de las personas, si han tenido esa recopilación de datos.

Zolymar Luna:

En un momento dado, eso se trabajó en colaboración con el Departamento de Salud bajo el Programa de Vigilancia de Plomo. Lo que tengo entendido es que ese programa continuó, pero muchas personas no continuaron participando por diversas razones. Pero en este momento no hemos tenido contacto nuevamente con las personas. Tampoco se han acercado las personas que precisamente fueron afectadas. Pero sí, por eso estamos colaborando con el Departamento de Salud y en este caso con el equipo de la Dra. Gredia Huertas Montañez y Nayda, que estaba aquí sentada, por si hay preocupaciones sobre ese tema, dirigir a las personas, a las agencias que trabajan y tienen el conocimiento y el peritaje para atender esas preocupaciones.

Carmen Quintana:

O sea, que no sería la EPA. Ustedes lo refirieron al Departamento de Salud.

Zolymar Luna:

De hecho, todos los análisis se hicieron bajo el CDC y el Departamento de Salud de Puerto Rico.

Julio Negrón:

Muy buenas noches. Mi nombre es Julio Negrón. Represento a la compañía Clean Harbors en Puerto Rico. He trabajado varios proyectos con la EPA y quería verificar exactamente ¿qué tiempo toma la limpieza? ¿Qué tipo de tratamiento se le va a dar a ese terreno? Pero específicamente con el cloruro de vinilo que comentaste hace unos minutos atrás, ¿qué tipo de tratamiento se le va a dar a ese en específico? ¿Y qué tiempo tomaría asegurarse de que la tierra que se trató ya está completamente... ¿Los niveles hayan bajado dramáticamente para que esté en el nivel que verdaderamente debería estar?

Zolymar Luna:

Sí, que sea aceptable para el proyecto. Sí, el cloruro de vinilo lo que se va a estar haciendo es un programa de monitoreo, porque cumple. Tenemos datos que nos confirman que está ocurriendo lo que le llamamos atenuación natural, porque son biodegradables. Eventualmente con el tiempo, ellos van a desvanecer, en pocas palabras, por la forma, por la naturaleza, de este tipo de compuesto. En el caso de los suelos contaminados con plomo, se va a hacer una mezcla con fosfato. Unos fosfatos que es un tipo de... Esto es probado, esto no es ciencia nueva, esto se hace para reducir toxicidad y se va a estar entonces encapsulando. Una vez se reduzcan estos niveles aceptables para prevenir la exposición y básicamente identificar el área, también es importante. Básicamente, yo creo que eso es lo que es. El tiempo pues no le puedo decir precisamente. Sí se estima que puede ser hasta dos años o puede ser menos, dependiendo.

Julio Negrón:

¿Eso es después de la fecha del 16 de octubre?

Zolymar Luna:

No. Primero hay un proceso de que tenemos que decidir que todo el mundo esté de acuerdo. El tiempo de implementación puede variar, definitivamente. Pero una vez se empieza el proyecto, eso puede ser de uno a dos años.

Julio Negrón:

Ok, muchísimas gracias.

Zolymar Luna:

Yo creo que eso es todo.

Carmen Guerrero:

Pues muchísimas gracias a cada uno de ustedes por su tiempo y por participar de esta reunión. Todavía aquí el equipo de la EPA está disponible, así que, si se quieren acercar a los mapas, hacer preguntas, otra información, estamos aquí disponibles para ustedes. Recuerden, por favor, firmar la lista de asistencia para asegurar que nos mantenemos en contacto y los mantenemos al día de cómo va el proceso de la implementación del plan propuesto para la limpieza. Muchísimas gracias y que cada uno llegue bien a sus hogares. Buenas noches.

Zolymar Luna:

Buenas noches.

Se dan por terminadas las labores y se cierra récord a las 7:15pm.

CERTIFICADO DE TRANSCRIPTORA

Yo, Aledawi Figueroa Martínez, transcriptora de Smile Again Learning Center, Corp. CERTIFICO:

Que la que antecede constituye la transcripción de la grabación realizada durante la reunión celebrada en el sitio y la fecha que se indican en la página uno de esta transcripción. Que se refrasearon levemente oraciones, se eliminaron palabras repetidas y conjunciones no aplicables para que no se perdiera el sentido de lo que el orador quiso decir. Que, de haber alguna discrepancia en lo escrito en esta transcripción, prevalecerá el audio de la misma.

Certifico además que no tengo interés en el resultado de este asunto y que no tengo parentesco en ningún grado de consanguinidad con las partes involucradas en él.

En Isabela, Puerto Rico, a 15 de septiembre de 2023.

Aledawi Figueroa Mtz

Aledawi Figueroa Martínez
Smile Again Learning Center, Corp.
787-872-5151 / 787-225-6332
widy.figueroa@smileagainpr.com
www.smileagainpr.com

Responsiveness Summary
Attachments D
Written Comments

From:
Hosea A. Santiago-Cruz
hsantiag@andrew.cmu.edu
amos.santiago.ao@gmail.com
Cel. 787-692-0999

September 14, 2023

To:
Zolymar Luna
Remedial Project Manager, EPA Region 2
Caribbean Environmental Protection Division (CEPD)
#48 Rd, PR-165 Km 1.2
City View Plaza II, Suite 7000
Guaynabo, P.R. 00968-8069

Public Comment for The Battery Recycling Company, Arecibo, PR, Superfund Site

Dear Zolymar Luna,

My name is Hosea A. Santiago-Cruz. I would like to submit and have the agency (EPA) consider my public comment on the proposed remedial plan for The Battery Recycling Company (BRC) Superfund Site in Arecibo, Puerto Rico.

I am an Environmental Engineering Ph.D. student at Carnegie Mellon University researching remediation techniques for emerging contaminants, specifically PFAS. I am also the Grant Proposal Manager of the environmental nonprofit organization *AmandOcéano,* whose mission is to promote action to preserve the marine and coastal ecosystems of Puerto Rico. Additionally, I am a graduate of the University of Puerto Rico at Mayagüez with a BS in Chemical Engineering. Finally, I am a concerned citizen and resident of Puerto Rico. I write this comment as an individual and also representing *AmandOcéano.* This comment does not represent the opinion of any other entity, individual, or institution other than myself and *AmandOcéano*.

I have identified concerning issues while reading the Remedial Investigation (RI), Feasibility Study (FS), and the Proposed Plan for the BRC Site. Therefore, I offer the following comments that should be seriously considered before signing the Record of Decision (ROD). This statement addresses four (4) key issues: **(1) Threatened and Endangered Species, (2) Selection of Remediation Strategy, (3) Climate Considerations,** and, most importantly, **(4) Environmental Justice**. I hope this comment provides an updated perspective on analyzing and selecting appropriate remediation strategies for this Site to adequately protect human health and the environment.

The FS determined the following Preliminary Remedial Action Objectives (PRAO):
Soil:

- PRAO 1: Prevent human exposure to contaminated soil via ingestion and inhalation that poses an unacceptable risk.
- PRAO 2: Prevent exposure to contaminated soil by ecological receptors (via direct contact, ingestion, and uptake into the food chain) that pose an unacceptable risk.
- PRAO 3: Prevent the migration of contaminated soil to surface water, sediment, and groundwater.

Groundwater:

- PRAO 4: Prevent human exposure via direct contact, ingestion, or inhalation of vapors to contaminated groundwater at concentrations that pose an unacceptable risk.
- PRAO5: Restore contaminated groundwater to its beneficial reuse as a drinking water source.

PRAOs 1 through 4 were conserved for the Remedial Action Objectives (RAO). However, PRAO 5 was eliminated because the estimation of groundwater contamination levels showed that MCLs would not be reached within a reasonable timeframe. With these objectives, the following Proposed Cleanup Plan was selected:

Soil:

- The proposed plan includes excavating and treating soil, demolishing on-site buildings, onsite containment of treated soil, institutional controls (ICs) to limit exposure via soil or vapor intrusion, and long-term monitoring.

Groundwater:

- The interim plan includes monitored natural attenuation (MNA) and institutional controls (ICs) to restrict groundwater use until a final remedy for groundwater is selected.

This public comment will address the implications of the Proposed Cleanup Plan and RAOs, providing recommendations and suggestions for the agency to re-evaluate the Proposed Plan and manage the particular vulnerabilities of the Site location.

1. **Threatened and Endangered Species:**

Many species of marine turtles use the coasts of Puerto Rico as nesting sites, including *Dermochelys coriacea* (Leatherback Sea Turtle), *Eretmochelys imbricata* (Hawksbill Sea Turtle), *Chelonia mydas* (Green Sea Turtle), and, recently identified on the coast of Arecibo, *Lepidochelys olivacea* (Olive Ridley Sea Turtle) (González-García et al. 2021). These species are categorized on a spectrum of conservation statuses based on the IUCN Red List:

- *Vulnerable:* Leatherback and Olive Ridley Sea Turtles
- *Endangered:* Green Sea Turtle
- *Critically endangered:* Hawksbill Sea Turtle

From these species, Leatherback, Hawksbill, and Olive Ridley Sea Turtles are known to nest on the beaches of Arecibo, including Playa Abacoa, which is located next to the river mouth of Rio

Grande de Arecibo (González-García et al. 2021). These nesting areas are downstream and downgradient from the BRC Site, less than 2 miles from Playa Abacoa (measured with Google Maps). The Site's proximity to the protected nesting areas may constitute a location-specific ARAR that should have been considered in the RI/FS and Proposed Plan. Although the RI/FS lists the threatened and endangered species inside and surrounding the Site, there was no mention of the marine turtles that nest on the beaches of Arecibo. Given the extent of contamination and the magnitude of the groundwater plume, we propose that the previously mentioned marine turtles be included in the list of threatened and endangered species near the BRC Site. With this update, the FS should be reassessed to verify if the proposed plan reduces this ecological risk and that the remedial activities do not disturb their habitat. Furthermore, we suggest including additional monitoring campaigns sampling sediment, air, and water surrounding the nesting area to ensure no hazardous material migration has occurred throughout the cleanup process, regardless of the remediation strategy chosen.

2. **Selection of Remediation Strategy:**

The primary land uses near the BRC Site are agricultural, residential, and commercial. The proposed cleanup plan for soil and groundwater would indefinitely affect current and future land use on and near the Site. We give our opinion on the proposed plans for both matrices.

Soil:

On-site containment would challenge future land use of the site, especially for agricultural and farming purposes. Despite the unappealing decision of containing the contaminated soil on site, we consider this option will lead to less exposure than transporting the hazardous materials for off-site disposal. However, measures should be taken to increase the resilience and adaptability of the cleanup operation and containment method to the threats of climate change, including but not limited to increased intensity and frequency of hurricanes, flooding, and sea level rise.

Groundwater:

Monitored natural attenuation (MNA) was chosen as the interim remedy for groundwater contamination primarily because of cost considerations and the evidence of biodegradation of chlorinated volatile organic compounds (CVOC). However, the FS estimated that MNA would decrease contaminant concentrations to safe levels after **2 to 3 centuries.** We consider that this is an unacceptable time period for a remedy. The modeling also predicted that in situ treatments would take centuries to achieve remedial goals. The main reason for the slow degradation in both cases is the presence of low-conductivity zones that slowly back-diffuse contamination over time. Thus, the diffusive process is the limiting step.

However, monitoring at these timescales can be extremely costly and unpredictable. Moreover, the Remedial Investigation mentions that “the CVOC distribution in groundwater suggests an on-site source of CVOC contamination. The presence of CVOCs in BRC property soils is a data gap.” Until this data gap is filled and proper cleanup of the CVOC source is achieved, other treatment options should be considered.

This is an unacceptable risk to the sensitive ecosystem and the vulnerable Puerto Rican population, thus jeopardizing future land development. We detail several additional issues regarding natural attenuation screening and modeling:

(a) TCE is believed to have been the primary source of the CVOC contamination at the site. TCE dechlorination byproducts, cis-1,2-DCE, and vinyl chloride are the main concerns for the site. Trans-1,2-DCE was also detected in the plume. Moreover, the presence of ethene and ethane along the plume led to the conclusion that complete dechlorination occurs at the Site. However, to our knowledge, no data on the background concentration of ethene and ethane were reported in the public documents. Knowing the background levels of these compounds is relevant because the Cambalache Power Plant is approximately 1.1 miles north of the BRC Site. This Power Plant might be an alternate source of ethene or ethane in the area due to the Plant's handling and combustion of fuels (natural gas or diesel). Therefore, there might be uncertainty about whether complete dechlorination occurs naturally on-site. If the source of the dechlorinated products differs, the scoring for anaerobic degradation potential would be lowered.

(b) EPA guidance for natural attenuation suggests that organic carbon concentrations exceeding 20 mg/L are sufficient to drive continuing biodegradation. However, organic carbon levels for all monitored groundwater samples were below 20 mg/L. The highest concentration for the shallow wells observed was 11.3 mg/L. This parameter was accounted for in scoring anaerobic degradation potential. We suggest that biostimulation and bioaugmentation could be viable options to enhance biodegradation in this system, assuming the reductive environment.

(c) For the degradation modeling, the fraction of organic carbon (foc) was assumed to be 0.001 and 0.002 for the sand and clay, respectively. However, a site-specific value for foc was not measured during the RI/FS. In the absence of site-specific data, values of foc were assumed to be consistent with the observed plume length. To refine the evaluation, site-specific data should have been implemented before relying on this modeling assessment to choose the appropriate remediation strategy.

Given the limitations and data gaps, a combination of technologies should be reassessed to reduce the mass of groundwater contamination within a shorter period of time. Appropriate remediation technologies and strategies can manage backdiffusion without resorting to extremely long timescales as proposed for this Site (Brooks et al., 2021). For example, novel field-tested technologies should also be assessed, such as electrokinetics (EK) and EK-enhanced bioaugmentation, which has been shown to facilitate in situ biodegradation of CVOCs in low conductivity zones leading to a reduction in backdiffusion (Brooks et al., 2021; Blue et al., 2023). Low-temperature thermal treatments could also enhance bioremediation rates at relatively low costs (Brooks et al., 2021). Moreover, considering that the cost is a major limiting factor for technology implementation and consideration, these destructive techniques should be focused on contamination hotspots to reduce the mass and avoid further dispersion significantly. Moreover, extracting CVOC from hotspots using more economical methods, such as in situ air sparging to accelerate volatilization, should be reconsidered to achieve the goal of reducing hot spot concentrations. ISCR or ISCO may follow this to address contamination desorbing through back diffusion or target low conductivity zones with engineered nanomaterials such as nZVI (Zhang et al., 2019). After addressing the hotspots, the diffuse plume can be appropriately managed through less intrusive methods such as MNA. Ultimately, combining different approaches may balance each other's advantages and limitations. Exploration of these alternatives to address each contamination zone of the plume distinctly might be a feasible option considering the time, cost, and effectiveness of the treatment train, compared to employing a 300+ year monitoring campaign.

3. Climate Considerations

Puerto Rico has been ravaged by extreme climatic events in the past decade. This should not be overlooked. Instead, this reality should be integral in the design, assessment, and management of the Superfund program in Puerto Rico. Very few but notable acknowledgments of the impacts of recent extreme weather events on the Site were described in the RI Section 1.5 Current Site Conditions:

i) "A 1-foot-high flood line marked by 2017 hurricanes was observed on the walls in this area."

ii) "Deposited debris from flooding caused by Hurricane Maria in 2017 was observed along the fenceline in this area, evidence that site material may have run off toward the cattle pasture area to the north."

Understanding the Site's vulnerability, all aspects of the remediation process should address and implement strategies that are resilient to Climate Change and the particular vulnerabilities of Puerto Rico. Some vulnerabilities specific to Puerto Rico include but are not limited to increased hurricane frequency and intensity, a fragile power grid with frequent power outages, extreme heat events, and sea level rise. Taken from an EPA Memorandum evaluating climate resilience throughout the remedy selection and implementation process under CERCLA (EPA, 2021):

a) Regions should assess the vulnerability of a remedial action's components, including its associated site infrastructure, and evaluate whether adverse effects of climate change may impair the long-term integrity of a selected remedy.
b) Based on potential vulnerabilities, regions should evaluate adaptation measures that increase the system's resilience to a changing climate and ensure continued protectiveness of human health and the environment.
c) Regions should consider implementing adaptation measures to ensure the long-term integrity of CERCLA remedial actions and their protectiveness of human health and the environment. Multiple adaptation measures may be appropriate based on the evaluation; in such cases, the site team should prioritize the resilience measures to maximize return on limited resources based on the best professional judgment regarding factors such as cost and impact on-site operations.

These considerations, implementations, and language were severely lacking in all aspects of the publicly available documents, such as RI/FS and Proposed Plan, despite being a region and Site that has already been impacted by extreme weather events. We propose an updated focus of the Proposed Plan to include these implementations and prioritize climate resilience and adaptability of the selected remedies for this and all Superfund Sites in Puerto Rico.

4. Environmental Justice: *Unacceptable Risk for Puerto Ricans*

Superfund sites disproportionately burden Puerto Rico (PR) compared to the rest of the US. Based on EPA's EJScreen, the entire PR population falls within the 80th national percentile of the count of proposed and listed NPL sites within 5 km, illustrated in Figure 1. Reviewing the Environmental Justice (EJ) Index for Superfund site proximity accounting for many socioeconomic factors, the entire PR population lies within the 93rd national percentile, as shown in Figure 2. Any remediation activity performed in Puerto Rico should consider this regrettable and unjust fact. Therefore, we argue that cost should not be the main determining factor for or against a remedial alternative. Environmental Justice and intersecting issues such as climate vulnerability should also be integral to all process aspects. For example, although ICs, through restrictions on land use, would decrease the exposure to contaminants, they also indefinitely challenge the sustainable redevelopment of the Site and surrounding areas. Additionally, an acceptable risk in any other State or region in the US may be unacceptable for Puerto Rico as it has many other intersecting risk factors that further aggravate our quality of life. Despite working with a highly vulnerable population, environmental justice considerations were severely lacking in all publicly available documents of the Site. We strongly encourage increased community involvement throughout the process to adequately and seriously address community concerns. Hence, including the community in discussions about Remedial Objectives, remediation plans, and future land development. Experts in the EJ field should be integrated into this process. Finally, we propose updated reports rigorously acknowledging, understanding, and addressing Puerto Rico's distinct environmental injustice landscape.

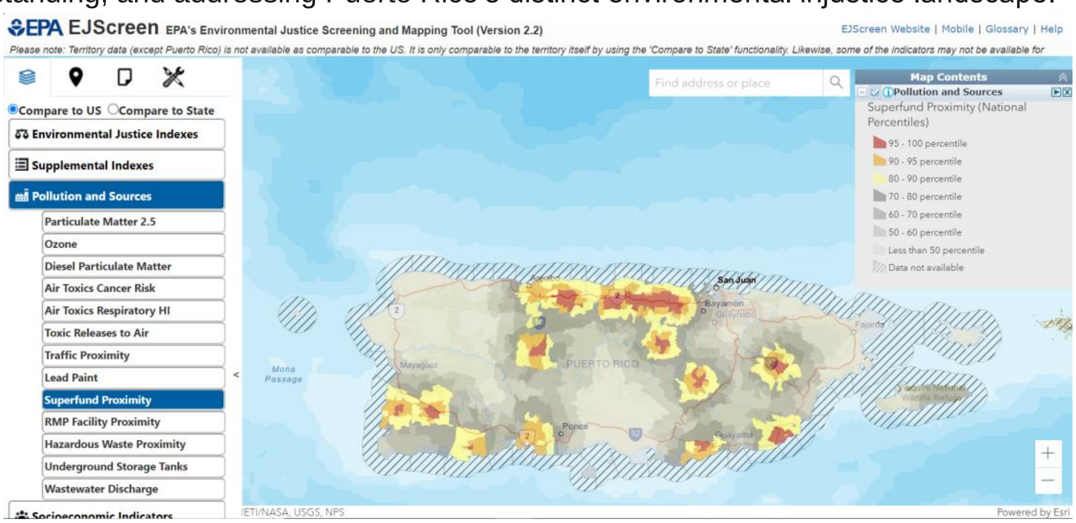


Figure 1. Superfund proximity map in Puerto Rico from EPA's EJScreen. (Accessed Sep 12, 2023)

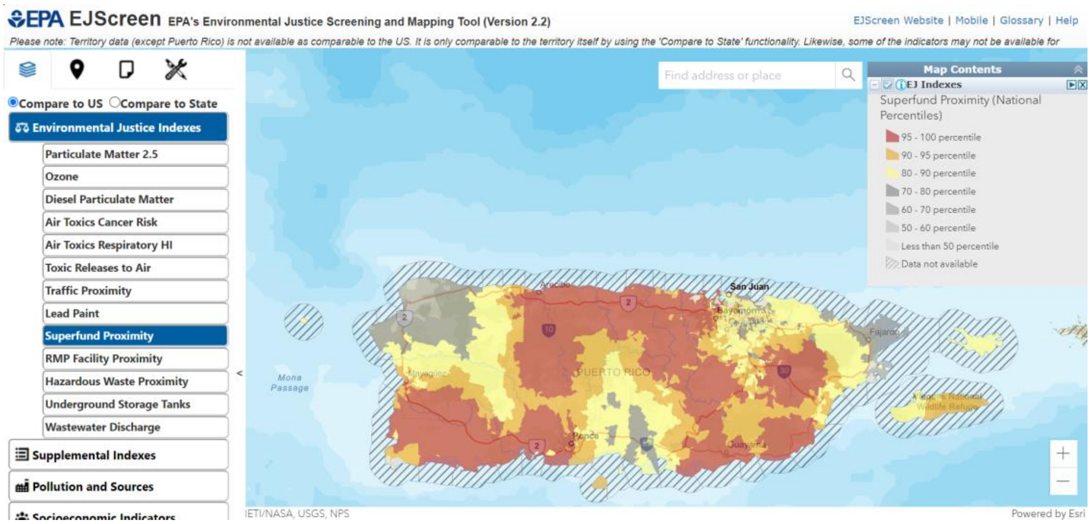


Figure 2. Superfund proximity EJ Index map in Puerto Rico from EPA's EJScreen. (Accessed Sep 12, 2023)

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Glenn Springs Holdings, Inc.
14555 Dallas Parkway, Suite 400
Dallas, Texas 75254

October 13, 2023

Via Email and
Via Overnight Delivery

Zolymar Luna-Díaz
Remedial Project Manager
City View Plaza II Building, Suite 7000
Km 1.2, Road PR-165
Guaynabo, PR 00969
Luna.zolymar@epa.gov

Re: The Battery Recycling Company Superfund Site - Arecibo, Puerto Rico
Comments on EPA's Proposed Plan

Dear Ms. Luna-Díaz:

These comments are being submitted on behalf of Occidental Chemical Corporation, acting by and through its affiliate, Glenn Springs Holdings, Inc. (collectively, "OxyChem"), regarding the United States Environmental Protection Agency's ("EPA" or "Agency") Proposed Plan that describes the Agency's preferred remedial alternative for soil and the interim remedial alternative for groundwater for the Battery Recycling Company ("BRC") Superfund Site in Arecibo, Puerto Rico (the "Site").

OxyChem is offering the attached comments in a good faith effort to facilitate the selection of remedies that are protective of human health and the environment, that are efficient, and that minimize impacts to the community in Arecibo.

OxyChem thanks the Agency for its consideration of these comments in making its decision on the soil and groundwater remedies for the Site.

Sincerely,

Juan P. Somoano
PRESIDENT
GLENN SPRINGS HOLDINGS, INC.
Juan_Somoano@oxy.com
214.608.0168

Glenn Springs Holdings, Inc.
14555 Dallas Parkway, Suite 400
Dallas, Texas 75254

cc: Via Email

Laura Whiting (Laura_Whiting@oxy.com)
Amanda Soler (Amanda_Soler@oxy.com)
Paul Bluestein (Paul_Bluestein@oxy.com)
Enrique Castro (Enrique_Castro@oxy.com)
Bruce White (bruce.white@btlaw.com)

Encl. Attachment A, Comments on EPA's Proposed Plan

Attachment A
Comments on EPA's Proposed Plan

RECOMMENDATIONS FOR PROPOSED PLAN

The United States Environmental Protection Agency's ("EPA" or the "Agency") Proposed Plan ("Proposed Plan") notes at the outset that: "The Site is being addressed as one operable unit." (Page 3.) However, as set forth below, the differences in both the scope and the constituents being addressed by the proposed soil and interim groundwater remedies support division of the soil and groundwater remedial actions into separate operable units ("OUs").

According to the Proposed Plan, there is a clear distinction between the proposed soil remedy, which is focused primarily on the *final* remediation of lead in shallow soils, and the proposed *interim* groundwater remedy that will have an adaptive approach focused on monitoring of chlorinated volatile organic compounds ("VOCs") and implementation of institutional controls ("ICs"). Additionally, while the Agency's preferred remedial action for lead in soils is to commence upon final remedy selection, the Agency is proposing to implement an interim groundwater remedy until a final remedy for groundwater is selected by EPA sometime in the future.

Under similar circumstances, at the San German Groundwater Contamination Site in Puerto Rico, the Agency separated the soil and groundwater remedial actions into separate OUs. The San German Site involves groundwater contaminated with PCE and TCE that is the result, at least in part, of activities at facilities on two parcels located in an industrial park owned by the Puerto Rico Industrial Development Company ("PRIDCO"). Soils and other contaminant sources are being addressed under OU1 and sitewide groundwater is being addressed under OU2. The Record of Decision ("ROD") for OU1 was issued in 2015, and after the source material was reduced, the OU2 ROD for sitewide groundwater was issued in 2019.

In addition to these technical bases for separation, the use of different OUs for soils and groundwater should also help facilitate coordination of potentially responsible parties ("PRPs") for implementation of the remedies that are selected. Separating the cleanup of lead in soils from the remediation of organics in groundwater into two separate OUs should help avoid the divisibility issues that will necessarily arise if the ROD addresses all Site issues together and soil and groundwater are managed as a single OU. This separation would allow for more efficient management of the two distinct remedies, would allow for easier tracking and completion of independent timelines or milestones, and would result in more streamlined communications to the community and relevant stakeholders.

Additionally, the use of separate OUs could help simplify the Agency's coordination with other PRPs associated with lead. Having separate OUs would facilitate PRP settlements by potentially limiting the responsibility of PRPs to the OU to which they have a nexus. Similarly, any orphan share could be allocated to the soil and groundwater OU costs in proportion to the respective orphans' responsibility for lead, organics, or both.

Set forth below are specific technical recommendations regarding EPA's proposed interim groundwater remedy and the final soil remedy.

- **Recommendations for Proposed Interim Groundwater Remedy**

  - Institutional Controls ("ICs"). *EPA should consider acknowledging that the BRC Property[1] owners have and will support implementation of ICs (Proposed Plan, pages 14 and 21).* ICs are an important element of the proposed soil remedy and groundwater interim remedy. Engagement by EPA and the cooperation of the BRC Property owners is necessary to ensure ICs are implemented and maintained to protect human health and the environment.

  - Pre-Design Investigation. *Background concentrations of the constituents of concern should be considered as part of the design of the PDI (Proposed Plan, pages 14 and 21).* The purpose of the PDI is to determine if additional monitoring wells should be installed at the Site to monitor the groundwater and to verify the absence of VOC source material in the vadose zone. Background concentrations were assessed for various parameters in soil, sediment, and surface water during the Remedial Investigation, but it does not appear that potential contributions to groundwater quality from background concentrations were evaluated for groundwater.

  - Screening Criteria for Groundwater. *EPA should consider establishing interim remedy preliminary remedial goals ("PRGs") for groundwater (Proposed Plan, page 13).* EPA's Proposed Plan indicates use of screening criteria, *i.e.*, Federal Maximum Contaminant Levels or Puerto Rico Water Quality Standards, to evaluate groundwater data collected in the future. These criteria are applicable to a final remedy. Development of PRGs more aligned with the objective(s) of an interim remedy and an adaptive management approach (see Interim Remedy Approach comment below) would facilitate evaluation of interim remedy progress and selection of a final remedy in the long-term.

  - Interim Remedy Approach. *EPA should consider formally adopting the adaptive management ("AM") approach for the interim groundwater remedy, which would also help to keep stakeholders informed about progress (Proposed Plan, pages 14, 17, 21, and 22).* EPA's Proposed Plan includes a step-wise approach to remediating the groundwater that includes collection of data over time to determine what long-term action(s) may be needed. In the short-term, ICs will protect human health and the environment. This approach will provide flexibility during implementation of the interim groundwater remedy, will allow for necessary optimizations or modifications in response to data collected, and is consistent with EPA's AM approach to remediation of Superfund sites.

- **Recommendations for Proposed Soil Remedy**

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[1] As defined in the Proposed Plan.

- <u>Residential Soil Excavation.</u> *EPA should consider consolidating the soils excavated from the residential area with the other soils/sediments that will be contained at the BRC Property, as described in Alternative S2A, instead of transporting and disposing of the soils at a landfill (Proposed Plan, pages 14, 18, and 19).* The Proposed Plan includes the containment of on-property and off-property soils from the eastern drainage ditch, but provides that the soils from the residential area will be disposed of off-Site. The volume of soils from the residential area is a small percentage (<0.5%) of the total volume of soils/sediments and could easily be incorporated into the on-site containment design instead of being disposed of off-Site. There is little or no incremental benefit for the proposed remedy to dispose of these soils at an off-Site facility. As stated in the Proposed Plan, difficulties may be encountered for off-Site disposal "because of the limited number of disposal facilities within Puerto Rico" and the potential regulatory requirement to meet Land Disposal Restrictions ("LDRs") if the material is managed. On the other hand, diverting the soils from a landfill would be beneficial. Some additional benefits of consolidating these soils at the Site include reduced greenhouse gas emissions ("GHG") from transportation, reduced potential for transportation accidents, and control of the impacted soils/sediments at one location. The consolidation of these soils on the BRC Property would not affect overall protectiveness of human health and the environment or the long-term effectiveness and permanence of the proposed remedy. On the contrary, this on-Site containment approach is more easily implementable and more cost effective than off-Site disposal.

- <u>Building Decommissioning and Demolition.</u>

  - *<u>Above Ground Building Materials</u>. EPA should consider consolidating the above ground building materials that cannot be readily decontaminated and recycled (e.g., metal) with the soils/sediments that will be contained at the BRC Property instead of transporting and disposing of these materials at an off-Site landfill (Proposed Plan, pages 15 and 20).* There are risks associated with decontamination of building demolition debris that EPA should consider. These risks include not being able to decontaminate the material effectively and additional exposure to workers and the surrounding community when handling of the demolition debris during the decontamination process. Alternatively, consolidating these materials at the BRC Property would reduce GHG from transportation, reduce potential for accidents, preserve solid waste landfill capacity, and control materials at one location. Additionally, the local community would benefit if some of these materials were contained at the BRC Property instead of added to landfills in the area, as there are a limited number of off-Site disposal facilities within Puerto Rico. This also mitigates the difficulties and costs regarding identifying a suitable off-Site disposal facility and the potential requirement to meet LDRs.

- <u>Foundations and Sump</u>. *EPA should consider leaving the foundations and impermeable surfaces in place on the BRC Property, as described in Alternative S2A, but adding cover soil to eliminate potential contact with impacted materials/soils instead of resurfacing the areas with concrete or asphalt (Proposed Plan, pages 15, 20, and 21).* This action would be done in lieu of decontaminating, transporting, and disposing the debris at a landfill. Leaving the impermeable surfaces in place would add another layer of protection and help to minimize potential infiltration of rainwater in those areas. There are risks associated with demolition, removal, and decontamination of building demolition debris that EPA should consider. These risks include: short-term exposure to on-property workers and nearby populations (human and ecological) from the debris and exposed underlying soils; potential flooding (flooding has been documented in the past) during removal that could exacerbate the problems on the BRC Property and potentially affect off-property lands; being unable to decontaminate the material effectively; and additional potential exposure to workers and the surrounding community when handling of the debris during the decontamination process. Alternatively, leaving the existing impermeable surfaces in place on the BRC Property would reduce risks during construction. The short-term risks are also reduced by limiting worker exposure, limiting potential exposure to nearby populations (human and ecological), and limiting transportation of the materials. There would be minimal negative impact to the reduction of toxicity, mobility, and volume of the contaminants because the material would be contained. This approach would be easily implementable and cost effective.

- <u>Containment of Soils/Sediments on Property</u>. *EPA should consider that a low-profile cover over the entire BRC Property with proper grading to promote surface water drainage off the BRC Property would be more resilient to the effects of climate change and flooding and could pose less short-term risks when compared to consolidating material in a smaller and sloped containment area that is 12 feet high (Proposed Plan, pages 17, 19, 20, 21, and 22).* The Proposed Plan states the following with respect to the footprint of covers placed over contaminated soil under Alternatives S2A and S2B: "Alternatives S2A and S2B could be more susceptible to the effects of climate (i.e., increasing frequency of severe storms and flooding) as compared to the smaller footprint of cover installed at the on-site disposal repository under Alternative S4, if not properly installed, monitored, and maintained over the long term." A low-profile cover would be less susceptible to the potential erosion effects of high winds and heavy rain that could result in erosion or a slope failure of the 12-foot high containment area. A low-profile cover would also promote slower and more dispersed surface water drainage to minimize potential erosion following a flooding event. A low-profile cover over a larger area that promotes surface water runoff would also be beneficial in limiting infiltration through the soils on the property. EPA should also consider that there are more risks associated with excavation and consolidating material in a smaller sloped containment area that could be mitigated by leaving material in place covered with a low-profile soil cover. The short-term risks of excavation and consolidation include: higher potential exposure to workers during soil excavation, movement, and re-compaction of materials; potential migration of contaminants with wind and surface water runoff during construction that could affect nearby populations (human and ecological); the potential need to collect and manage potentially impacted water during construction; potential flooding during excavation and construction of the containment area that could exacerbate the already existing flooding problems on the BRC Property and potentially affect off-property lands; the potential that post-excavation sampling could be added excavation volume to meet PRGs at the base of the excavations that would increase the size of the containment area (vertically and horizontally); and added truck traffic required to transport fill to the BRC Property to place in the excavations. A long-term risk is the potential for the mass of the smaller sloped containment area to alter the natural groundwater flow regime, which could affect contaminant migration. Alternatively, a low-profile cover would be designed to match surrounding lands and be less visually obtrusive to the local community compared to a smaller sloped containment area that is 12-feet high.

- <u>Lead as Principal Threat Waste.</u> *Regarding the Proposed Plan's position that the lead in soil/sediment is a principal threat waste, EPA should consider that lead in soil/sediment can be reliably contained and will not present a significant risk to human health or the environment once consolidated and covered on the property.* (*Proposed Plan, pages 8 and 22*). The Proposed Plan considers lead in soil/sediment to be a principal threat waste. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur. The proposed soil remedy includes excavation of soils and sediment and stabilization treatment of an assumed portion of the soils/sediments impacted with lead followed by consolidation of lead impacted soils/sediments with concentrations above the PRG in a containment area that includes a cover. Lead in soil is not highly mobile and therefore containment of the soils is a reliable means to prevent future exposures. Maintaining the cover and applying restrictions on the property (such as through ICs) to prevent potential disturbance of the containment area will reliably eliminate the direct contact exposure pathway. Maintaining the cover will also significantly reduce potential contact of rainwater with the consolidated soils, further reducing the already low potential mobility of the lead.

- <u>Stabilization Treatment.</u> *EPA should re-consider the need for ex situ stabilization treatment of some of the soil/sediment prior to containment (Proposed Plan, pages 2, 16, 17, 19, 21, and 22).* Stabilizing treatment will not change the reliability of the containment aspect of the remedy or reduce the volume of soil requiring containment. The Proposed Plan states: "Alternatives S4 and S5 include ex-situ treatment (stabilization) of a portion of excavated contaminated soil, which involves using reagents that would result in reducing the bioavailability (and thus toxicity) and mobility of contaminants within the excavated soil." Containment of the contaminated soil will effectively achieve the same outcome by eliminating the exposure pathway and isolating the material from the environment. Maintaining the cover will also significantly reduce potential contact of rainwater with the consolidated soils, further reducing the already low potential mobility of the lead. The Proposed Plan also states that "[t]his process of physically and chemically isolating [the excavated contaminated soil] may increase the volume." EPA should also consider the risks associated with stabilization treatment. The short-term risks include: higher potential exposure to dust from the soil or stabilizing agent to workers and nearby population (human and ecological) while managing the stabilization chemicals and during the chemical/soil mixing process; potential migration of contaminants with wind and surface water runoff during the chemical/soil mixing process; potential difficultly in identifying a suitable contractor to implement this part of the proposed remedy; the potential need to collect and manage water impacted with contaminants and the chemical reagent; and potential flooding during mixing that could exacerbate the problems at the BRC Property and at off-Site residential areas.

Diana M. Batlle-Barasorda, Esq.
Direct No. (787)523-3579
E-Mail: dianabatlle@gmail.com

October 16, 2023

Zolymar Luna
Remedial Project Manager
U.S. Environmental Protection Agency
Caribbean Environmental Protection Division
City View Plaza II, Suite 7000
#48 PR-165 Km. 1.2
Guaynabo, PR 000969

Vía Email: *luna.zolymar@epa.gov*

Re: The Battery Recycling Superfund Site
Arecibo, Puerto Rico

Dear Mrs. Luna:

As the legal representatives to the Puerto Rico Industrial Development Company ("PRIDCO"), we would like to participate in this public comment process for the Battery Recycling Company Superfund Site. The United States Environmental Protection Agency ("EPA") published on August 15, 2023 a Proposed Cleanup Plan for the soil and groundwater of the Battery Recycling Company ("BRC") site under the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. §9601, *et seq*. The EPA notice informed the general public of the availability of this Proposed Cleanup Plan and the administrative record, to allow comments to be submitted before the September 14, 2023 public comment period deadline. This deadline was further extended until today, allowing comments to be presented by the general public.

In the Proposed Cleanup Plan for this BRC site, the EPA identified that:

> "Prior to BRC operations, the BRC Property was owned by the Puerto Rico Industrial Development Company (PRIDCO) from 1964 through 1982. PRIDCO leased the BRC Property to the Puerto Rico Chemical Company, Inc. (PRCC) for the manufacture of organic chemicals using oxylene to produce fumaric acid and phthalic acid from 1966 until closure of the facility due to an explosion in 1979. PRCC was a wholly owned subsidiary of Hooker Chemical Corporation, which changed its name to Occidental Chemical Corporation (Occidental) on April 1, 1982. After the explosion in 1979, PRCC relinquished the Site back to PRIDCO. The Site was sold by PRIDCO to Luis Figueroa and his spouse Awilda Carrasquillo for the operations of BRC at the BRC Property. Luis Figueroa was the President of BRC while it was in operation.

> On September 30, 1986, EPA entered into an Administrative Order on Consent, Index Number-II RCRA-3013-60302, with Occidental, which documented the release of trichloroethylene (TCE), dichloroethane (DCE) and vinyl chloride during the PRCC operations at the Site. During and after PRCC operations, several spills of o-xylene were reported outside the BRC Property. Subsequent assessments by the Puerto Rico Environmental Quality Board (PREQB) (known today as the Department of Natural and Environmental Resources or DNER) noted stressed vegetation east of the o-xylene tank, and east of the facility boundary. In the years following the 1979 explosion and plant shutdown, PREQB performed an inspection and found approximately 30,000 55-gallon containers of phthalic anhydride on the BRC Property in deteriorated condition. In addition, a large quantity of hazardous waste was observed inadequately stored, with liquid waste staining the ground surface. Groundwater sampling at the BRC Property detected elevated concentrations of 1,1- DCE,trans-1,2-DCE, toluene, trichloroethene, and vinyl chloride. Groundwater contamination was also found near the BRC Property."

Since PRIDCO was notified on July 17, 2023 to be a Potentially Responsible Party ("PRP") for only the groundwater contamination with volatile organic compounds ("VOCs"), such as vinyl chloride ("VC"), dichloroethylene ("DCE"), and trichloroethylene ("TCE"), among others; we hereby focus our comments exclusively on the results, analysis and conclusions related to the groundwater and VOCs contamination, its extent and the determination that its potential source area is the BRC site, owned in the past by PRIDCO.

A) PRIDCO is not an Owner, but holds indicia of ownership to protects the security interest

PRIDCO was established as a public corporation and an instrumentality of the Puerto Rico government for the purpose of promoting the development of Puerto Rico's economy by stimulating the formation of new local firms and encouraging firms in the United States and foreign countries to establish and expand operations in Puerto Rico. To accomplish its mission, PRIDCO maintains a continuing infrastructure development program, including facilities for lease or sale to qualified private industrial and commercial investors, and the construction of industrial and commercial facilities for lease. In addition, PRIDCO disburses legislative appropriations in accordance with various special incentives programs to assist manufacturers in offsetting allowable startup costs. The basic purpose underlying PRIDCO's supporting role to Puerto Rico's economic development program is the creation of jobs and the consequent improvement of living standards in Puerto Rico. In order to conduct its legislative-created authority, PRIDCO has the power, among other things, to acquire, own, sell, and lease property, all for the purpose of assisting and enhancing Puerto Rico's economy.

While PRIDCO does not operate any facilities it owns or has owned in the past, it does own the land and/or buildings to be used by commercial and industrial entities for economic development purposes. That was exactly the case for the BRC site, which was owned in the past by PRIDCO in Arecibo. PRIDCO previously held title primarily to secure the money it has advanced to purchase and develop the facilities it leases to its industrial tenants; to protect its interest in advancing industrial development. By owning the property and leasing it to several manufacturing operators, such as the Puerto Rico Chemical Corporation, Inc. ("PRCC") which was a wholly owned subsidiary of Hooker Chemical Corporation ("HCC"), which later changed its name to Occidental Chemical Corporation ("OCC"), said operators would benefit from low cost lease and different incentives that could be passed along through PRIDCO. PRIDCO collects the rent proceeds from the operators or tenants to secure the repayment of principal and interest on the bonds used for the property acquisition. Thus, PRIDCO has never participated in the operation of the business of its tenants at the BRC site, and thus should not be held liable for the actions of said tenants, particularly when they are also identified as PRP's in this process.

It is important to note that under the CERCLA "ownership", it **does not include** a person that, without participating in the management of the facility, merely holds **indicia of ownership** primarily to protect the security interest of the person in the facility. 42 U.S.C. §9601(20)(A). This was exactly the case for PRIDCO in the present case.

B) PRIDCO should not be identified as a PRP, when the operator of the site and responsible entity of the contamination has been clearly identified.

CERCLA Section 107(a), 42 U.S.C. §9607(a), identifies the following persons or entities as potentially liable parties for the response actions:

(1) the current owner or operator of a facility;
(2) any owner or operator of a facility at the time of disposal of the hazardous substances;
(3) any person who arranged for the disposal or treatment of hazardous substances at the facility; and
(4) any person who accepted the hazardous substance for transport to the facility.

The EPA has established in the Proposed Cleanup Plan, and the Final Feasibility Study Report that PRIDCO is a PRP due to their past "ownership" of the BRC property, while activities that generated VOCs contamination were detected and documented. However, this conclusion needs to be qualified as PRIDCO has previously argued in this letter that the ownership definition under CERCLA, Section 101(20), exempts from liability entities that hold indicia ownership. Thus, as previously mentioned, PRIDCO has never operated any of their facilities, thus has not contributed to the active generation of any contamination at any of their sites, including the previously owned BRC site. Hence, it is important to summarize some of the actions related to VOCs that are documented in the EPA and EQB/DNER record that occurred at the site, while PRCC, Hooker Chemical Corporation and OCC operated the facility:

- **November 1981** – PRCC presented a report prepared by Walker Wello Inc. that identified that no contamination was identified at the site. However, the EQB (now known as the DNER), issued a determination to this report concluding that it did show the presence of groundwater contamination.
- **March 1982** – several investigations were made by the USGS and EPA, including sampling of on-site monitoring wells, which indicated the presence of TCE, DCE; trans 1,2 trichloroethylene; and VC. The EQB requested that PRCC install monitoring wells to continue detection of possible contamination.

- **October 1982** – PRIDCO sent a letter HCC stating that EPA and USGS groundwater reports have identified that groundwater contamination had been detected, and further studies by the regulatory agencies were being coordinated.
- **1983** – the EPA Superfund Program conducted sampling of the 4 USGS MWs nearby the property. The study concluded that significant groundwater contamination was present at the site's surroundings.
- **1986** – The OCC entered into an Administrative Order on Consent ("AOC") with the EPA were it recognized that PRCC had operated at the site from 1966 to 1979, when operations were discontinued due to an explosion. The AOC clearly identified that OCC had used TCE as a degreasing agent. The AOC required that a Hydrogeologic plan and sampling of 10 monitoring wells be executed, among other things.
- **June 1987 –** The OCC submitted to EPA the Hydrogeologic Study prepared by Conestoga Rovers & Associates, where it concluded that TCE was detected in wells GW-3 and GW-7 at concentrations ranging between 310 to 1,600 ug/L, and VC from 210 to 880 ug/L. These concentrations are significantly higher than the Minimum Contaminant Level ("MCL") for these parameters and also higher than the comparison criteria presented in EPA's Remedial Investigation Report (0.22 ug/L for VC and 5 ug/L TCE).

This simple and brief summary of the several actions that are documented in the EPA record, clearly identify that OCC (including PRCC and HCC) was the entity responsible for the VOCs contamination that has been detected at the BRC site. The EPA has been well aware of this situation for years, dating back as far as 1981, thus said entity should be the responsible party to address any of the contamination that needs to be remediated at the site, not PRIDCO.

In this Proposed Cleanup Plan, the EPA identifies that a groundwater plume has been identified containing chlorinated VOC's, hence it proposes that an Interim Remedy be implemented comprising of monitoring and Institutional Controls to limit the groundwater use until a final remedy is selected in the future. This Interim Remedy will consider the effects of the final soil remedy to be implemented, and the attenuation and migration of the contaminants in the groundwater.

Based on the discussion above, and since the EPA has identified the entity clearly responsible for the contamination with VOCs that were detected at the groundwater plume in the superfund site, it is requested that EPA consider pursuing a remedy against the true culprit, which clearly is OCC, instead of PRIDCO that has no responsibility in the contamination identified at the site.

We sincerely hope that these comments allow the EPA to revise its determination, before pursuing any further action against PRIDCO.

Sincerely,

<u>*s/Diana Batlle*</u>
Diana Batlle
Professional Legal Counsels, LLC

Carlos W. López Freytes
CWL Legal Services, PSC.