UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2

PART 1- THE DECLARATION

RECORD OF DECISION
PESTICIDE WAREHOUSE I – OPERABLE UNIT 1 (SOILS) & OPERABLE UNIT 2 (GROUNDWATER) SUPERFUND SITE
ARECIBO, PUERTO RICO

September 2020

615710

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Pesticide Warehouse I – Operable Unit 1 (Soils) & Operable Unit 2 (Groundwater)
Arecibo, Puerto Rico
PRD987367349

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) documents the selected remedial action for the Pesticide Warehouse I – Operable Unit 1 (Soils) & Operable Unit 2 (Groundwater) Superfund site (Site) located at the Municipality of Arecibo, Puerto Rico, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. §§ 9601-9675, as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300. This decision document explains the factual and legal basis for selecting the remedy for the Site. This decision is based on the Administrative Record file for these remedial decisions (refer to Appendix I of Part II - Decision Summary).

The Puerto Rico Department of Natural and Environmental Recourses (DNER) concurs with the selected remedy. Refer to Appendix II of the Decision Summary for a copy of the concurrence letter.

ASSESSMENT OF SITE

The United States Environmental Protection Agency (EPA), in consultation with DNER, has determined that actual or threatened releases of hazardous substances from soils at the Site, if not addressed by the selected remedy, may present a current or potential threat to human health and the environment. Therefore, remediation is necessary. This determination is based on the conclusions of the Remedial Investigation, Human Health Risk Assessment, and the Screening Level Ecological Risk Assessment. These documents support taking a remedial action for Operable Unit 1, regarding soils at the Site, but they do not support taking an action for Operable Unit 2, regarding groundwater at the Site.

EPA has determined that the selected remedy complies with Federal and Commonwealth requirements that are legally applicable or relevant and appropriate requirements and is cost effective. As such, the selected remedy will be protective of human health and the environment. Risks to human health related to direct contact, ingestion, and inhalation would be eliminated since contaminated soil would be treated, disposed of and/or covered, and the exposure pathways would be eliminated.

DESCRIPTION OF THE SELECTED REMEDY

Based upon an evaluation of various alternatives, EPA, in consultation with DNER, selects a remedy that will address the soil contamination found at the Site. The selected remedy includes the following components:

- Excavation of contaminated soil as deep as 10 feet below ground surface;
- On-site treatment of those soils, followed by off-site disposal;
- Covering of deeper residual soils, and
- Institutional controls.

Under EPA's remedy for OU1, contaminated soil in the upper 10 feet would be excavated and treated before being transported off-Site for disposal. Because unexcavated, deeper soils (below 10 feet) would remain at levels that would not allow for unrestricted (i.e., residential) use, institutional controls will be imposed to restrict the future use of the Site to nonresidential uses. Under this remedy, soil with hazardous characteristics pursuant to the Resource Conservation and Recovery Act (RCRA) would be treated using a temporary thermal treatment unit brought to the Site. The total targeted volume of contaminated soil to be excavated under this remedy is estimated to be approximately 14,100 cubic yards (CY). Based on the RI sample results, an estimated 3,900 CY of the excavated material contains pesticide and dioxin contaminant concentrations requiring treatment to meet land disposal requirements prior to disposal at a RCRA Subtitle D landfill on the island. An estimated 1,410 CY of the excavated material would contain chromium contaminant concentrations requiring treatment and disposal as a RCRA characteristic hazardous waste at a facility in the continental United States.

The estimated present-worth cost of the selected remedy is $17,581,000.

EPA has determined that no action is necessary for groundwater (OU2) because Site-related contaminants are currently below federal maximum contaminant levels (MCLs) and risks associated with groundwater exposure do not exceed EPA's target risk range.

The environmental benefits of the selected remedy may be enhanced by giving consideration, during the design of the remedy, to technologies and practices that are sustainable in accordance with EPA Region 2 Clean and Green Energy Policy. This will include consideration of green remediation technologies and practices. Some examples of practices that would be applicable are those that reduce emissions of air pollutants, minimize freshwater consumption, incorporate native vegetation into re-vegetation plans, and consider beneficial reuse and/or recycling of materials, among others.

STATUTORY DETERMINATIONS

The selected remedy for soils meets the requirements for remedial actions set forth in CERCLA Section 121, 42 U.S.C. § 9621. It is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

Because the selected remedy for soils will result in hazardous substances, pollutants, or contaminants remaining above levels that allow for unlimited use and unrestricted exposure, a statutory review required under CERCLA Section 121(c), 42 U.S.C. § 9621(c), will be conducted no less often than once every five years to ensure that the remedial action remains 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 remedy.

- Chemicals of concern and their respective concentrations can be found in the "Site Characteristics" section of the ROD.
- Baseline risk represented by the chemicals of concern may be found in the "Summary of Site Risks" section of the ROD.
- A discussion of cleanup levels for chemicals of concern and a discussion of principal threat waste may be found in the "Remedial Action Objectives" section of the ROD.
- A discussion of current and potential future Site and resource uses can be found in the "Current and Potential Future Site and Resource Uses" section of the ROD.
- Estimated capital, annual operation and maintenance, and total present worth costs are discussed in the "Description of Alternatives" section of the ROD.
- 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 decisions) may be found in the "Evaluation of Remedy Alternatives" and "Statutory Determinations" sections of the ROD.

CERTIFICATION

This decision document includes all the elements required to support the selected remedy for soils in accordance with the *Guide to Preparing Superfund Proposed Plans, Record of Decision, and Other Remedy Selection Decision Documents* [EPA 540-R-98-031 OSWER 9200.1-23P (July 1999)].

AUTHORIZING SIGNATURE

In accordance with the requirements of CERCLA and the NCP, EPA, in consultation with DNER, has determined that no remedial action is necessary to protect human health or the environment from exposure to groundwater at the Site. Additionally, EPA, in consultation with DNER, has determined that the selected remedy for the Pesticides Warehouse I - Operable Unit 1 (Soils) as set forth herein is required in order to protect human health and the environment.

Evangelista, Pat Digitally signed by Evangelista, Pat
Date: 2020.09.30 17:21:47 -04'00'

See Signature Block

Pat Evangelista, Director
Emergency and Remedial Response Division
EPA - Region 2

Date

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2

PART II – DECISION SUMMARY

RECORD OF DECISION
PESTICIDE WAREHOUSE I – OPERABLE UNIT 1 (SOILS) & OPERABLE UNIT 1 (GROUNDWATER) SUPERFUND SITE
ARECIBO, PUERTO RICO
September 2020

TABLE OF CONTENTS

SITE NAME, LOCATION, AND DESCRIPTION 4
SITE HISTORY AND ENFORCEMENT ACTIVITIES 4
EPA Potential Source Area Investigation 4
EPA Hazard Ranking System and National Priority List Inclusion 4
Remedial Investigation/Feasibility Study 5
HIGHLIGHTS OF COMMUNITY PARTICIPATION 5
SCOPE AND ROLE OF RESPONSE ACTION 6
SITE CHARACTERISTICS 7
Conceptual Site Model 7
Contamination Overview 7
Topography 8
Regional Geology 8
Local Geology 9
Local Hydrogeology 9
Cultural Resources 9
Sampling Strategy 10
Sampling Results 11
Sources of Contamination 11
Distribution of Contamination 12
CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES 12

SUMMARY OF SITE RISKS 13
Human Health Risk Assessment 13
Hazard Identification 14
Exposure Assessment 14
Toxicity Assessment 14
Risk Characterization 15
Ecological Risk Assessment 17
Risk Assessment Summary 18
REMEDIAL ACTION OBJECTIVES 18
Remediation Goals for Soil 19

DESCRIPTION OF THE ALTERNATIVES....20
Common Elements....20
Five-Year Reviews....20
Institutional Controls....20
EPA Region 2 Clean and Green Policy....20
Remedial Alternatives....21
Alternative 1: No Action....21
Alternative 2: Excavation of Contaminated Soil to 10 feet bgs, On-site Treatment and Off-site Disposal, Covering of Remaining Residual Subsurface Soil, Institutional Controls....21
Alternative 3: On-site Consolidation with Engineered Cover, Institutional Controls....22
Alternative 4: Excavation of Contaminated Soil and On-site Treatment and Off-Site Disposal....23
EVALUATION OF REMEDIAL ALTERNATIVES....24
Overall protection of human health and the environment....24
Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)....24
Long-Term Effectiveness and Permanence....25
Reduction of Toxicity, Mobility, or Volume through Treatment....26
Short-Term Effectiveness....26
Implementability....27
Cost....27
State/Support Agency Acceptance....27
Community Acceptance....28
SELECTED REMEDY....28
Description of the Selected Remedy....28
Basis For Remedy Preference....28
STATUTORY DETERMINATIONS....30
Protection of Human Health and the Environment....30
Compliance with ARARs....30
Cost Effectiveness....30
Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to Maximum Extent Practicable....31
Preference for Treatment as a Principal Element....31
Five Year Review Requirements....31
DOCUMENTATION OF SIGNIFICANT CHANGES FROM PREFERRED ALTERNATIVE

OF PROPOSED PLAN.....31

APPENDIX I Figures & Tables

APPENDIX II Administrative Record Index

APPENDIX III Public Notices

APPENDIX IV Proposed Plan and Fact Sheet (Spanish)

APPENDIX V Transcript of the Public Meeting

APPENDIX VI List of the ARARs

APPENDIX VII Puerto Rico Department of Natural and Environmental Recourses' Concurrence Letter

SITE NAME, LOCATION, AND DESCRIPTION

The Pesticide Warehouse I Superfund site (the Site) is an inactive pesticide storage warehouse facility located at State Road No. 2, kilometer 59.7, in a rural/residential area of Arecibo, Puerto Rico. The Site occupies approximately one acre and consists of a main warehouse, a smaller secondary warehouse in the rear of the property, and a small storage shed. All on-Site buildings are in a dilapidated state. An on-Site water supply well (SW) is located about 180 feet east of the main warehouse north of Route PR-2. The Site property is bounded to the west, north, and east by the Mita Inc. facility and agricultural property. Further to the east, east of the Mita Inc. fields, is a vegetated area. The Site is bounded to the south by State Road No. 2, or PR-2. A vegetated four-foot deep ditch runs parallel to PR-2, south of the on-Site SW and opens into the topographically lower vegetated area. No obvious signs of runoff accumulation have been observed along this drainage ditch.

SITE HISTORY AND ENFORCMENT ACTIVITIES

The Puerto Rico Land Authority (PRLA) owns the Pesticide Warehouse I property and conducted pesticide mixing and storage operations from 1953 to 2003. PRLA used the Site to store and/or dilute pesticides and fertilizers for agricultural application in pineapple farming. Beginning on October 1, 1999, the property was leased to Agrocampos, Inc., which also used the Site to store and/or dilute pesticides and fertilizers for agricultural application.

During PRLA's operations at the Site, various chemicals were stored in their original containers (bags, boxes and drums) on the concrete slab floor of the warehouse building prior to use. PRLA prepared the chemicals by mixing the concentrated chemical products (typically in solid or aqueous form) with water drawn from the on-Site supply well. Mixing occurred in tanker trucks at the on-Site loading dock over bare soil. Excess chemicals were poured on the ground, and spills occurred during the mixing process, impacting surrounding soils. No institutional or engineering controls prevented spillage directly onto the Site soils. Excess chemical spills also flowed from the chemical mixing area across the ground. Empty drums and bags of chemicals were stacked behind the main warehouse building directly onto bare soil, exposed to the wind and rain.

EPA Potential Source Area Investigation

In May 1996, EPA conducted a Site Inspection (SI) sampling event that included collection of surface soil samples throughout the property and two groundwater samples from the on-Site well. Surface soil results indicated the presence of several pesticides. Groundwater results also showed the presence of pesticides. In December 2001, EPA conducted follow-up reconnaissance and again observed poor housekeeping throughout the property.

EPA Hazard Ranking System and National Priority List Inclusion

EPA prepared a Hazard Ranking System Report in order to document the results of EPA's investigations and determination to include the Site on the National Priorities List (NPL). EPA added the Site to the National Priorities List (NPL) on September 27, 2006.

Because of the complexity of the Site, EPA addressed the cleanup of the Site in two operable units (OUs). The designated two OUs for this Site are:

- OU1, to address soil contamination; and
- OU2, to address groundwater contamination.

EPA issued two Administrative Orders on Consent (Consent Orders) to Respondents PRLA and Agrocampos, Inc., which became effective on May 9, 2007. The Consent Orders required the Respondents to perform a remedial investigation and feasibility study (RI/FS) for each of the two, above-identified OUs at the Pesticide Warehouse I Site, OU1 (Soils) and OU2 (Groundwater). Respondents did not comply with the Consent Orders; therefore, EPA decided to take over both OUs and consolidate them into one comprehensive RI/FS for the Site.

REMEDIAL INVESTIGATION/FEASIBILITY STUDY

The RI Report was prepared by EPA to document the nature and extent of the soil and groundwater contamination at the Site. EPA also prepared a Baseline Human Health Risk Assessment (HHRA) Report to document the current and future effects of Site contaminants on human health and the environment associated with the contamination found at the Site. EPA also conducted a Screening-level Ecological Risk Assessment (SLERA) to evaluate any potential for ecological risks from the presence of Site contaminants in surface water and sediment. A description of the HHRA and SLERA for this Site is provided in the Summary of Risk Section of this ROD.

A Feasibility Study (FS) was prepared to present and analyze cleanup alternatives suitable for the Site. The purpose of the FS was to identify, develop, screen, and evaluate a range of remedial alternatives that are best to protect human health and the environment from potential risks at the Site and enable EPA to select a remedy for the Site. A detailed description of the cleanup alternatives evaluated for this Site is provided in the Description of Alternatives Section of this ROD.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

As part of the RI/FS, a Community Involvement Plan (CIP) was developed to assess community concerns about the Site and encourage public participation. As part of the CIP and, as required by Superfund regulations, EPA prepared a Proposed Plan for the Site. A Proposed Plan summarizes the remedial alternatives for the Site set forth in the FS and identifies EPA's preferred alternative and the rationale for the preferred remedy. This Proposed Plan was made available to the public for a 30-day public comment period that began July 30, 2020 and concluded on August 29, 2020. A notice of the availability of the Proposed Plan, and supporting documentation was published in "Primera Hora" newspaper on July 30, 2020 (Appendix III). On August 6, 2020 a virtual presentation was made available at the following Link: https://youtu.be/nq7Nb__1qnU.

On July 30, 2020, EPA also made available to the public the following documents: the Proposed Plan, the RI Report, the HHRA and SLERA Reports, and the FS Report for the Site. All of these documents along with others are included in the Administrative Record for the remedy, which was made available to the public at the following locations:

The Administrative Record file, which contains copies of the Proposed Plan and supporting documentation, was available online at: https://www.epa.gov/superfund/pesticide-warehouse-1. and On August 6, 2020 a Virtual Presentation was available at the following

link: https://youtu.be/nq7Nb__1qnU.
The Administrative Record file is also available in the following locations:
Barceloneta Municipal Library Hours: Monday – Friday 9:00 am to 3:00 pm
Office is currently closed as a result of the pandemic

U.S. Environmental Protection Agency City View Plaza II- Suite 7000 #48 PR-165 Km. 1.2 Guaynabo, PR 00968-8069 (787) 977-5865
Hours: Monday – Friday 9:00 am to 5:00 pm
Office is currently closed as a result of the pandemic

Puerto Rico Department of Natural & Environmental Recourses Emergency Response and Superfund Program Edificio de Agencias Ambientales Cruz A. Matos Urbanización San José Industrial Park 1375 Avenida Ponce de León San Juan, PR 00926-2604 (787) 767-8181 ext 3207
Hours: Monday – Friday 9:00 am to 3:00 pm
Office is currently closed as a result of the pandemic

U.S. EPA Records Center, Region 2
290 Broadway, 18th Floor New York, New York 10007-1866 (212) 637-4308Hours: Monday-Friday – 9:00 am to 5:00 pm
Office is currently closed as a result of the pandemic

A copy of the Administrative Record Index for the Site is provided in Appendix II of this ROD.

The public had the opportunity to ask questions and submit comments on the proposed remedial alternatives described in the Proposed Plan and EPA's preferred alternative through the link https://www.epa.gov/superfund/pesticide-warehouse-1, the telephone line (787) 977-5814 and by email at santos.luis@epa.gov. A notice of the availability of the Proposed Plan, and supporting documentation was published in "Primera Hora" newspaper on July 30, 2020 (Appendix III). No substantive comments were received. Refer to Appendix IV for copy of the Proposed Plan and a Proposed Plan fact sheet in Spanish.

SCOPE AND ROLE OF RESPONSE ACTION

Site remedial activities are segregated into different OUs, so that remediation of different environmental media or areas of the Site can proceed separately in an expeditious manner. EPA has designated two OUs for this Site:

- OU-1, which addresses soil contamination in the Site; and

- OU-2, which addresses the groundwater.

EPA completed one RI/FS to address both OUs, the results of which are presented in this ROD. The selected remedy for soils presented here is expected to be the final action for the Site. EPA has determined no action is necessary for groundwater to protect human health and the environment.

SITE CHARACTERISTICS

CONCEPTUAL SITE MODEL

The conceptual site model (CSM) is a description of the current understanding of the nature, distribution, and potential migration of contaminants from the source areas on the Site through Site media to points of potential exposure to human health and ecological receptors.

A variety of pesticides were stored, handled and mixed at the Site from 1953 to 2003. Primary source areas include significant spills at the mixing platform, more minor spills in the northeast corner of the Site, spills on the floor in of the warehouse (and related floor drains), and disposal of pesticides and pesticide packaging in the disposal pit in the northwest corner of the Site.

TRANSPORT OF CONTAMINATION

Pesticide and dioxin/furan contamination is largely co-located at the Site. Because many of the chemical and physical properties of pesticides and dioxin/furan are similar, the transport mechanisms are the same.

Pesticide contamination was distributed at the Site via runoff from the spills at the mixing platform, discharge to the ground on the west side of the main warehouse from floor drains, isolated spills, storage and handling of pesticides, disposal of excess or unused pesticide product and packaging in the northwest disposal pit. Pesticides spilled inside the warehouse contaminated the concrete floor and were washed through floor drains into the environment into the soil along the west side of the building.

Pesticides and dioxins/furans strongly bind to soil; once released to soil, most of the contaminant mass would likely adsorb to soil and organic matter particles. Dieldrin is practically insoluble in water and is considered hardly mobile to immobile. It has a strong affinity for organic matter and sorbs tightly to soil particulates. Dieldrin has a high potential to bioaccumulate. Dioxins and furans are virtually insoluble in water, bind to soil, and do not leach into groundwater. Dioxins and furans have very low vapor pressures and do not volatilize. Dioxins and furans are known to bioaccumulate in the food chain.

Pesticides released in liquid form, including spills at the mixing platform and discharges from the floor drains, would have percolated through the upper soils. Vertical migration of pesticides would also have been facilitated by precipitation. The ability of the soil to retard the vertical migration of pesticide mass is apparent in the decrease of pesticide concentration with increasing soil depth.

Surface runoff of spilled liquid pesticides from the mixing platform was likely a significant transport mechanism of pesticides to adjacent soils and the main drainage ditch. The overflow culvert in the main drainage ditch provides a pathway for pesticide-laden soils and sediment to be transported via runoff to the area south of PR-2. However, the field crew observed that no runoff reached the elevation of the culvert during significant rainstorm events; therefore, runoff from the Site is not considered a major contributor of pesticides to the sinkhole pond.

Pesticides were detected infrequently, and at concentrations below screening values in the shallowest Site groundwater sample (about 290 feet below ground surface (bgs)). This is consistent with the general low solubility and mobility of pesticides and the significant thickness of unsaturated materials above the water table. The source of the pesticides in groundwater is thought to be surface water runoff migrating down the outside of the poorly constructed on-Site supply well casing during significant rain events.

Similar to the distribution of the organic pesticides, arsenic contamination may have been potentially distributed at the Site through runoff from arsenic-containing pesticides spills, discharge from the warehouse floor drains, isolated spills resulting from storage and handling of pesticides, and disposal of excess or unused pesticide product and packaging in the northwest disposal pit.

Once released to soils, the arsenic would be expected to bind to soil and form immobile complexes with iron. However, given the presence of arsenic at concentrations above background down to 20 feet bgs, there is potential that arsenic was present in more mobile arsenic complexes. Vertical migration of mobile complexes of arsenic would also have been facilitated by precipitation that would have carried the arsenic deeper into the subsurface through infiltration.

Surface runoff and soil erosion from arsenic-contaminated areas was likely a significant transport mechanism of arsenic to adjacent soils and the main drainage ditch. During precipitation events surface runoff can also distribute contaminated soil particles along runoff pathways including the main drainage ditch that flows east along the north side of PR-2. The overflow culvert in the main drainage ditch provides a potential pathway for contaminated soils and sediment to be transported via runoff to the sinkhole pond south of PR-2. However, as stated above this was not observed by the field crew even during significant rain events because of the orientation of the culvert near the top of the drainage ditch.

Once in the groundwater, contaminants would be expected to move downgradient with groundwater flow, which is regionally to the north but with a northwestern component in the immediate area of the on-Site supply well. However, very limited pesticides were detected at concentrations below screening criteria in monitoring wells immediately downgradient, indicating the limited movement of pesticides detected near the on-Site supply well. Arsenic is not present in groundwater at elevated concentrations.

TOPOGRAPHY

The Site is situated within the Northern Limestone Province of Puerto Rico at an elevation of approximately 95 meters (295 feet) above mean sea level. The areas immediately surrounding the Site to the east, west, and south are relatively flat. North of the Site is an area of steep mogotes (limestone hills). The topography of the land to the south of the Site is dominated by karst features; several sinkholes are present within one mile of the Site.

REGIONAL GEOLOGY

The unconsolidated deposits at the Site are derived from the weathering of parent limestone. They consist of hard, stiff, often dry, sandy, and clayey silt, silt, and clay. The Aymamón Limestone is found at depths between 46 feet bgs to 70 feet bgs at the Site. The bedrock has an upper weathered zone up to 10 feet thick. The upper Aymamón Limestone has soft zones,

sometimes filled with clay, and the deeper zone has solution features, including cavities and fracture zones.

LOCAL HYDROGEOLOGY

Site groundwater occurs in the Upper aquifer (comprised of the Aymamón Limestone) at depths of about 290 to 310 feet below ground surface (bgs). The Upper aquifer is unconfined and is recharged from surface drainage and precipitation. Regional groundwater flow is to the north toward Caño Tiburones and the Atlantic Ocean. At the Site, groundwater flow has a northeasterly component in the western portion and a northwesterly component in the eastern portion.

DEMOGRAPHY

The Site is located approximately eight miles southeast of Arecibo in a sparsely populated rural area along road PR-2. The Site is found within the Sabana Hoyos Ward of Arecibo. The main population nucleus in the area is a residential sector located approximately one mile southwest of the Site. The Sabana Hoyos ward is composed of approximately 10,745 inhabitants according to the 2010 U.S. Census. According to the 2013 Department of Housing and Urban Development reports, median household income is $20,900 dollars.

LAND & GROUNDWATER USE

The region has been used for agriculture (primarily pineapple farming) for approximately 100 years. Land use to the south, north, and far east of the Site is mostly agricultural, although a pipe factory is located immediately south of the Site, and a former pharmaceutical plant is located about 3,500 feet east of the Site.

The Puerto Rico Planning Board (PRPB) has jurisdiction over land use and zoning in Puerto Rico. Land use, under the Land Use Plans subprogram of the PRPB by means of the approved Land Use Plan (LUP) of 2015, is under the jurisdiction of the PRPB, which has the responsibility to create physical planning instruments to promote the optimum use of the land use in Puerto Rico, establishing the parameters, guidelines, and rules on how and where specific social and economic activities will be permitted to occur. The LUP of Puerto Rico is the main planning instrument in Puerto Rico. Zoning regulations establish the use, and intensity of use, that is permitted on a parcel of land or sector as part of a planning process in order to promote development, conservation, exploitation, cultivation, and the contemplation of the landscape or the location of the infrastructures and services.

The applicable land use of the Site is “Specially Protected Rustic Soil – Agriculture.” According to the LUP, the objective of this land use is to guide the use of the lands with agricultural or livestock value, with present or potential activities to be protected in order for the land to remain dedicated to agricultural activities. EPA has consulted with municipal authorities and the Commonwealth of Puerto Rico concerning the anticipated future uses of the Site property and has concluded that future unrestricted land use (e.g., residential development) is not anticipated or currently permitted.

The Puerto Rico Aqueduct and Sewer Authority supplies most of the potable water to the Arecibo region; thus, there is no future demand for potable groundwater use expected at the Site.

SURFACE WATER DRAINAGE AND INTERACTION WITH GROUNDWATER

The Site is located within the Caño Tiburones watershed between the Río Grande de Manatí drainage area to the east and the Río Grande de Arecibo drainage area to the west. No surface water bodies or wetlands are present on-Site, however, a sinkhole pond is located south of the Site on the south side of PR-2. The sinkhole pond primarily receives runoff from adjacent fields to the south and east. A surface water drainage ditch runs from the mixing platform on the south end of the main warehouse to the east-southeast toward PR-2. The ditch discharges to the vegetated area east of the Site. The ditch is dry except during precipitation events.

Groundwater at the Site is not known to discharge in springs or surface water. Groundwater is approximately 300 feet bgs and therefore unlikely to discharge in any of the sinkholes observed near the Site. Sinkholes filled with water are most likely a result of surface water runoff and precipitation.

SAMPLING STRATEGY

The RI field investigation activities included the following primary activities:

OU1

- Surface soil (0 to 2-feet bgs) screening with pesticide field test kits;
- Surface and subsurface soil sampling and analyses for target compound list (TCL) pesticides, dioxin/furans, diuron, and target analyte list (TAL) metals (including cyanide and mercury);
- Background soil sampling and analyses for TCL pesticides, dioxin/furans, diuron, and TAL metals (including cyanide and mercury);
- Concrete chip sampling and analyses for TCL pesticides, toxicity characteristic leaching procedure (TCLP) pesticides, TAL metals (including cyanide and mercury) and TCLP metals and wipe sampling for TCL pesticides and TAL metals;
- Surface and subsurface soil sampling and analyses at the former underground storage tank (UST) for total petroleum hydrocarbons (TPH) diesel-range organics (DRO) and gasoline range organics (GRO); and
- Surface water and sediment sampling and analyses for TCL pesticides and TAL metals (including mercury and cyanide).

OU2

- Video borehole logging;
- Well installation and development;
- Long-term water level monitoring;
- Synoptic water level measurements, and
- Groundwater well sampling and analyses for TCL pesticides, diuron, dioxins/furans, and TAL metals (including cyanide and mercury). Samples were also analyzed for water quality parameters: total suspended solids (TSS), total dissolved solids (TDS), total organic carbon (TOC), major anions (nitrate, chloride, bicarbonate, sulfate, and phosphate), major cations (calcium, magnesium, sodium, and potassium) and alkalinity.

SAMPLING RESULTS

NATURE AND EXTENT OF CONTAMINATION

The nature and extent of contamination was determined by comparing analytical results for pesticides and dioxins/furans in soil, groundwater, sediment, and surface water to Site screening criteria. Soil data were compared to the Remedial Goals (RGs) developed for a similar site (in type of contamination and its distribution in the environment) - the Pesticide Warehouse III Site. Analytical results for arsenic were compared to calculated Site-specific background levels.

SELECTION OF SITE-RELATED CONTAMINANTS

To focus the evaluation of contaminant data, site-related contaminants (SRCs) were selected, based on the history of Site use and the frequency of detection in Site media, particularly in soil. The pesticide dieldrin was detected the most frequently at concentrations above screening criteria. The pesticide most frequently detected in soil was toxaphene; it is also the fourth most frequently detected pesticide above screening criteria. Aldrin was the second most frequently detected pesticide above screening criteria. Dioxin/furans, expressed as the toxic equivalent (dioxin TEQ) of 2,3,7,8 tetrachlorodibenzo-p-dioxin (TCDD), is a highly toxic by-product of some pesticides and was detected in Site soils. Arsenic, a component of certain pesticides, frequently exceeded its screening criterion and frequently exceeded its calculated Site-specific soil background level.

Therefore, dieldrin, toxaphene, aldrin, dioxin, and arsenic were selected as SRCs and were used to evaluate contaminant distribution in all Site media.

EXTENT OF SOIL CONTAMINATION

Figures 2-8, 2-9 and 4-6 reveal contamination at concentrations above the preliminary remediation goals (PRGs). Pesticide contamination was found throughout the Site in the following general areas:

- the northwest corner (near the disposal pit);
- the northeast corner (near staining and drum storage);
- the west side of the main warehouse (where floor drainage discharged to soil);
- south and east of the former mixing platform, and
- in the drainage ditch north of PR-2.

The vertical extent of pesticide contamination in soils varied from 0–2 feet bgs to 18–20 feet bgs. The deep contamination occurred in the northwest and southeast corners of the Site. In other locations, the pesticide concentrations decreased with depth. Toxaphene had the highest maximum concentration of the pesticide SRCs.

The distribution of dioxin-contaminated soil, as defined by the PRG criterion (18 nanograms/kilogram (ng/kg)) (Figure 2-8), is very similar to the pesticide contamination. Dioxin-contaminated soil is also found in surface soils (0 to 2 feet bgs) in the area along the northern property boundary.

Deeper dioxin soil contamination above the PRG extends to at least 6 feet bgs in the following four areas of the Site: the northwest corner (near the disposal pit); along the northwest side of the main warehouse; at the property line east of the mixing area, and in the drainage ditch north of PR-2. Although still above the screening criterion at these locations, the concentration of dioxin decreases significantly with depth.

The lateral distribution of arsenic in soil, as defined by the Site-specific background value of 41.5 mg/kg, is similar to the lateral distribution of pesticide contamination; however, the vertical distribution is much different. Areas with consistently elevated arsenic concentrations greater than Site-specific background include:

- the northwest corner (in the disposal pit and the soil pile area);
- south and east of the former mixing platform; and
- in the drainage pathway north of PR-2.

Unlike pesticides, arsenic contamination in surface soils (0 to 2 feet bgs) was mostly limited to the soils in the northwest corner of the Site near the waste disposal pit and soil pile area. At most areas of the Site, the highest arsenic concentrations were present in the subsurface soils, generally most elevated in the 8 to 10 feet bgs interval. The deeper contamination was found primarily in the northwest corner (the disposal pit and soil pile area), near the former mixing platform (south of the platform, and east along the "spillage" pathway), and within the eastern half of the drainage pathway north of PR-2.

A majority of the contamination exceeding the PRGs (90 percent) is in the top ten feet of soil.

EXTENT OF GROUNDWATER CONTAMINATION

Pesticide contamination in groundwater was found only in one of three sampling events and only in the shallower zone of one well (SW). Groundwater at this location may also include a component of regional contamination, as pesticides were found in current and former supply wells at sidegradient locations not considered to be impacted from the Site.

Dioxin contamination in groundwater at the on-Site SW well and the Site monitoring wells is considered to be related to Site activities but may also include regional contributions. Dioxin in groundwater did not exceed the National Primary Drinking Water Standard, or MCL, of 3 ng/L.

Arsenic and chromium were not detected above drinking water standards in any groundwater samples.

EXTENT OF SEDIMENT AND SURFACE WATER CONTAMINATION

Site-related pesticide contamination in sediment (dieldrin) and surface water (dieldrin and toxaphene) is restricted to the area on the Site of ponded surface water near the former mixing platform (SE-/SW-1).

Arsenic was detected in all sediment samples at concentrations above its sediment screening criterion but well below the Site-specific background soil level.

Arsenic was only detected above the surface water criteria at location SW-4. Sampling at this location revealed elevated concentrations of nearly every inorganic analyte as a result of its elevated turbidity.

EXTENT OF CONCRETE CHIP AND WIPE SAMPLE CONTAMINATION

Eighteen pesticides were detected in concrete chips from the main warehouse; 12 pesticides were detected in the wipe samples. Arsenic was detected in all chip samples. Mercury was detected in one sample, and cyanide was detected in all but two samples.

Eight pesticides and four metals were detected in the leachate (TCLP) analyses, but not at concentrations that exceeded the Resource Conservation and Recovery Act (RCRA) regulatory limits for hazardous waste.

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 of human health. A baseline risk assessment is an analysis of the potential adverse human health 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 and an ecological risk assessment. It provides the basis for taking action, if needed, and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. The remedial alternative that was chosen for the Site addresses contamination in the soil. The risks and hazards for the Site that were presented in the baseline risk assessment will be summarized in this section.

HUMAN HEALTH RISK ASSESSMENT

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

- Hazard Identification – in which EPA uses the analytical data collected to identify the contaminants of potential concern at a site for each medium, with consideration of a number of factors explained below;
- Exposure Assessment - in which EPA estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed;
- Toxicity Assessment - in which EPA determines the types of adverse health effects associated with the chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response); and
- Risk Characterization - in which EPA 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 that exceed acceptable levels, as defined by the NCP and discussed below as posing either an excess lifetime cancer risk greater than the range from 1×10^{-6} to 1×10^{-4} or a hazard index (HI) greater than 1. Contaminants at these concentrations are considered chemicals of concern (COCs) and are typically those that will require remediation at a site. Also included in this

section is a discussion of the uncertainties associated with such risks.

Hazard Identification

In this step, the COCs in soils were identified based on such factors as toxicity, frequency of occurrence, fate and transport of the contaminants to the environment, concentrations, mobility, persistence, and bioaccumulation. The risk assessment focused on contaminants related to the Pesticide Warehouse I property that may pose significant risk to human health. Analytical information that was collected to determine the nature and extent of contamination revealed the presence of pesticides and dioxin/furans in the soil at concentrations of potential concern. A comprehensive list of all contaminants of potential concern (COPCs) can be found in the baseline human health risk assessment (BHHRA), entitled "Final Human Health Risk Assessment – Pesticide Warehouse I, (OU) 1 and 2 Remedial Investigation/Feasibility Study" – June 2020.

Exposure Assessment

Consistent with Superfund policy and guidance, in the BHHRA EPA is a baseline human health risk assessment and assesses conditions under the assumption that no remediation or institutional controls will be implemented to mitigate or remove the impacts of hazardous substance releases. Cancer risks and noncancer hazard indices were calculated based on an estimate of the reasonable maximum exposure expected to occur under current and future conditions at a site. That exposure is defined as the highest exposure that is reasonably expected to occur at a site. For those contaminants for which the risk or hazard exceeded the acceptable levels, the central tendency estimate, or the average exposure, was also evaluated.

The Site is currently zoned for agricultural use and is connected to the public water supply. However, the property could be rezoned and redeveloped in the future for commercial or residential use.

Exposure pathways were identified for each potentially exposed population and the potential exposures to soil and groundwater. The exposure pathways assessed in the BHHRA are presented in Table 2 and include the potential exposure to future residents, future workers and current/future trespassers.

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, it may be the maximum detected concentration. A summary of the exposure point concentrations for the COCs in soil can be found in Table 1.

Toxicity Assessment

Under current EPA guidelines, the likelihood of carcinogenic risks and noncancer hazards as a result of exposure to chemicals at a site are considered separately. Consistent with current EPA policy, it was assumed that the toxic effects of 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 BHHRA were derived from the Integrated Risk Information System

(IRIS) database, or another source that is identified as an appropriate reference for toxicity values consistent with EPA's directive on toxicity values. This information for the COCs is presented in Table 3 (noncancer toxicity data summary) and Table 4 (cancer toxicity data summary). Additional toxicity information for all COPCs is presented in the BHHRA.

Risk Characterization

Noncarcinogenic risks were assessed using an HI approach, based on a comparison between expected contaminant intakes at the Site and benchmark comparison levels of intake (i.e., reference doses and reference concentrations). Reference doses (RfDs) and reference concentrations (RfCs) are estimates of daily exposure levels for humans (including sensitive individuals) that are thought to be safe over a lifetime of exposure. The estimated intake of chemicals identified in environmental media at a site (e.g., the amount of a chemical ingested from contaminated soil) 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 hazard quotients 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 adverse 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 that 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 adverse noncancer 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 noncarcinogenic hazards associated with these chemicals for each exposure pathway is contained in Table 5.

Table 5 presents a summary of the HIs for the future resident (adult and child). The total HI for the future resident is above EPAs threshold of 1. The total HI is due primarily to dieldrin and dioxins/furans (2,3,7,8-TCDD TEQ) in soil.

Noncancer hazards from exposure to groundwater were below EPA's threshold of 1 for all receptors for site-related contaminants.

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 risks (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 (1×10^{-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 NCP, the point of departure is 1×10^{-6} and the acceptable risk range for Site-related exposure is 1×10^{-6} to 1×10^{-4}.

A summary of the estimated cancer risks for the potential future resident is presented in Table 6. The cancer risks (1×10^{-3}) exceeded EPA's acceptable ranges for the future residential exposure to soil. Cancer risks at the Site are primarily related to arsenic, dieldrin, and dioxin/furans (2,3,7,8-TCDD TEQ).

When broken out by media, the risk from groundwater alone is at $4x10^{-4}$, or just at the upper end of the risk range, assuming (conservatively) that chromium is one hundred percent hexavalent. It is more likely that a majority of the chromium is in the trivalent form, which would result in risks that would be well within the risk range.

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 data;
- environmental parameter estimation;
- toxicity values, and
- risk characterization.

Two of the primary sources of uncertainty identified in the BHHRA were associated with exposure parameters and toxicological data. Uncertainty in exposure parameters was related to the calculation of exposure point concentrations and the parameter values used to estimate chemical intake. For example, 13 groundwater samples were used in the exposure point concentration determinations for pesticides and 12 samples for dioxins/furans. Since COPCs had less than four detections, maximum concentrations for dieldrin, heptachlor epoxide and TCDD were used as EPCs to estimate risk from exposure to these chemicals. The use of maximum concentrations may over or underestimate long-term exposures.

Another uncertainty with respect to environmental data was the conservative assumption that chromium would be present in the environment as one hundred percent hexavalent chromium, which is the most toxic form. It is more likely that a majority of the chromium is in the trivalent form, which would result in risks that would be well within the risk range. Therefore, hexavalent chromium is not considered a COC. This will be verified in the pre-design

investigation.

Another important source of uncertainty was toxicological data. The toxicity factors used in the quantitative evaluation of potential risks and hazards were primarily selected from IRIS. For many chemicals, there is a lack of appropriate information on effects in humans (i.e., epidemiologic studies). Therefore, animal studies are generally used to develop toxicity values in human health risk assessments, which may under- or over-estimate potential risks and hazards.

More specific information concerning uncertainty in the health risks is presented in the baseline human health risk assessment report.

ECOLOGICAL RISK ASSESSMENT

A SLERA was conducted to evaluate the potential for ecological risks from the presence of contaminants in surface soil, sediment and surface water. The SLERA focused on evaluating the potential for impacts to sensitive ecological receptors to Site-related constituents of concern through exposure to soil on the Pesticide Warehouse I property. Surface soil concentrations were compared to ecological screening values as an indicator of the potential for adverse effects to ecological receptors. A complete summary of all exposure scenarios can be found in the SLERA.

Surface Soil: There is a potential for adverse effects to ecological receptors (invertebrates, reptiles, amphibians, birds, and mammals) from exposure to contaminated surface soil. The surface soil screening criteria were exceeded for pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, aldrin, alpha-chlordane, diazinon, dieldrin, diuron, endosulfan I, endosulfan II, endrin aldehyde, gamma-BHC (lindane), gamma-chlordane, heptachlor, methoxychlor, and toxaphene), dioxin/furan congeners, and metals (antimony, arsenic, cadmium, chromium, lead, manganese, mercury, selenium, vanadium, and zinc), which resulted in HIs greater than the acceptable value of 1. The primary risk drivers were identified as pesticides and dioxin/furans. Several metals (arsenic, chromium, mercury, selenium, and vanadium) are likely Site-related compounds that also were associated with unacceptable ecological risk.

Sediment: There is a potential for adverse effects to ecological receptors from pesticides (dieldrin and gamma-chlordane) and metals (arsenic, cadmium, chromium, copper, cyanide, iron, lead, mercury, and zinc) in sediment. Given that the majority of the sediment samples were collected off the facility property, the inorganic contaminants of potential ecological concern (COPECs) found in sediment are potentially related to soil erosion and runoff from the facility property, as all of the sediment COPECs were also identified as soil COPECs. The sediment samples collected were from areas that hold water after rainfall and from drainage swales and not true sediment samples.

Surface Water: There is a potential for adverse effects to ecological receptors from metals in aluminum, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, cyanide, iron, lead, manganese, nickel, vanadium, and zinc. All the COPECs had maximum detected concentrations detected beyond the former facility property, but because of so many inorganics being detected in soils at the facility, it is likely that these inorganics are also Site-related COPECs. The surface water samples, collected were from areas that hold water after rainfall and from drainage swales, are not true surface water samples.

Overall, the SLERA results indicate risk to ecological receptors from exposure to Site soils. Primary risk drivers consist of pesticides, followed by dioxin/furans, and metals based on detected levels consistently exceeding ecological screening level (ESLs) in soil, sediment, and surface water. In addition to elevated HQs for both pesticides and dioxins, the quantity of detected contaminants was also notable. A total of 20 pesticides were detected in soil, with 13 exceeding ESLs. Seventeen dioxin/furan congeners were detected in soil, and all but one exceeded ESLs.

There is greater potential for exposure by terrestrial receptors than aquatic receptors on and adjacent to the Site. The drainage ditch to the southeast flows to a sinkhole pond, but there does not appear to be substantial surface water connections to nearby streams and rivers. There is more suitable terrestrial habitat north of the Site, in the Cambalache State Forest (Bosque Estatal de Cambalache), and the greater mobility and Site access of terrestrial receptors would increase the potential for exposure of receptors traveling to the Site from that nearby habitat to contaminated soil, sediment, and surface water; however, the terrain would limit exposure to less mobile terrestrial receptors (i.e., reptiles, small mammals). Limited on-Site vegetation could facilitate surface soil loss via erosion during high wind or rain events, thereby spreading contamination to nearby terrestrial and aquatic habitats.

Although there is little suitable habitat for ecological receptors at the Site, there is suitable habitat for mammals, birds, herpetofauna, and invertebrates surrounding the Site. Receptors with limited or no mobility, such as plants and soil invertebrates, are more at risk than more mobile species such as mammalian and avian receptors. The quantity of COPECs, the magnitude of their ESL exceedances and detection frequency, and the proximity to the state forest suggest that ecological risks from Site-related contamination are potentially substantial at the population and community level. Given this potential, a remedial action for soil contaminants to reduce or limit exposure of ecological receptors to Site soils to protect the environment from actual or threatened releases of hazardous substances is warranted.

Based on the results of the human health and ecological risk assessments, it is EPA's current judgement that the selected remedy identified in the ROD for soil, is necessary to protect public health, welfare or the environment from actual or threatened releases of hazardous substances. It is EPA's current judgement that no action is necessary for groundwater to ensure protection of public health and the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) 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.

Unacceptable human health risks were associated with exposure to soil. Ecological risks from exposure to contaminated soil have been determined to be unacceptable as well. It is assumed that risks to ecological receptors would be mitigated through implementation of remedial alternatives for human receptors. The future land use of the Site is anticipated to be industrial and not likely conducive to ecological habitat.

The impact to groundwater pathway was evaluated and there is insufficient evidence that Site soils are currently acting as an ongoing source of groundwater contamination. The water table,

between 290 to 310 feet bgs, is separated from the areas of soil contamination by more than 290 feet of unsaturated soils. Given that soil contamination has been present at the Site for as many as 60 years, there is little evidence of contaminant transport to deeper soils through rain percolation during that time. In addition, the pesticides and dioxin/furan compounds that have been identified as COCs in soil have very low water solubility, adsorb strongly to soils and, therefore, are not very mobile.

Risks from ingestion of groundwater were just at the upper end of EPA's risk range, assuming (conservatively) that chromium is one hundred percent hexavalent. It is more likely that a majority of the chromium is in the trivalent form, which would result in risks that would be well within the risk range. Groundwater results in monitoring and supply wells from field investigations were below federal MCLs and often nondetect. On-Site wells are not currently used. Pesticides found in off-Site supply wells are not considered to be related to Site activities, indicating regional impacts from pesticide use. Therefore, no action is proposed for groundwater.

The following preliminary RAOs were identified for soil contamination based on human health (future worker) risks associated with future land use conditions:

- Prevent exposures to human receptors to contaminants in soil resulting in cancer and noncancer health hazard in excess of EPA's risk range; and
- Manage the Site in a manner to minimize exposure of ecological receptors to COCs that would result in an HQ greater than 1.

REMEDIATION GOALS

The development of remediation goals (RGs) is a requirement of the NCP (40 CFR 300.430(e)(2)(i)). Identification and selection of the RGs are typically based on RAOs, the current and anticipated future land uses, and the tentatively identified ARARs. The RGs are typically presented as chemical- and media-specific values that directly address the RAOs. These values are typically used as a preliminary value in the FS to guide evaluations of remedial alternatives.

There are no promulgated federal or Commonwealth, chemical-specific ARARs for soil. Therefore, risk-based soil RGs were calculated for the industrial exposure scenario based on a $1x10^{-6}$ cancer risk and for a noncancer target hazard quotient of 1 taking into account the anticipated future land use. For arsenic, the statistical calculation of the concentrations of arsenic in non-Site (background) soil has been adapted as the RG.

Table: Remediation Goals for Soil

Contaminants of Concern	Remediation Goal (µg/kg)
Dieldrin	0.14
2,3,7,8-TCDD TEQ	2.2 x 10-5
Arsenic	41.5

DESCRIPTION OF THE ALTERNATIVES

CERCLA Section 121(b)(1), 42 U.S.C. § 9621(b)(1), mandates that remedial actions must be protective of human health and the environment, be cost-effective, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions that employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at a site. CERCLA Section 121(d), 42 U.S.C. § 9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants that 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).

The timeframes presented below for each alternative reflect only the time required to construct or implement the remedy and do 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.

The cost estimates, which are based on available information, are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 percent of the actual cost of the project.

Based on a screening of alternatives developed in the FS, several alternatives (FS Alternatives 2, 3, 4 and 7) were not carried forward to the Proposed Plan. Please refer to the FS report for more information on these alternatives.

COMMON ELEMENTS

There are several common elements that are included in all the remedial alternatives other than the no action alternative. With the exception of five-year reviews, the common elements listed below do not apply to the no action alternative.

Institutional Controls

Institutional controls (ICs) are non-engineered controls such as administrative and/or legal measures that minimize the potential for human exposure to contamination by limiting land or resource use. In this case, ICs would be used in conjunction with active control measures, such as capping or excavating and treating contaminated soils, to prevent direct contact. Different ICs would be applicable to different alternatives, as discussed below.

EPA Region 2 Clean and Green Policy

The environmental benefits of the preferred remedy may be enhanced by giving consideration, during the design, to technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green Energy Policy. This will include consideration of green remediation technologies and practices. Some examples of practices that would be applicable are those that reduce emissions of air pollutants, minimize freshwater consumption, incorporate native vegetation into revegetation plans, and consider beneficial reuse and/or recycling of materials, among others.

REMEDIAL ALTERNATIVES

The following alternatives are considered for the Site:

Alternative 1: No Action

Alternative 1 is required pursuant to the NCP to provide an environmental baseline against which impacts of various other remedial alternatives can be compared. Under this alternative, no remedial activities would be initiated at the Site to address contaminated soil above remediation goals or otherwise mitigate the associated risks to human health or the environment from exposure to soil contamination.

Alternative 2: Alternative 2 (former 5 in the FS): Excavation of Contaminated Soil to 10 feet bgs, On-Site Treatment and Off-Site Disposal, Covering of Remaining Contaminated Subsurface Soil, and Institutional Controls

Capital Cost	$17,265,000
Present Worth Operation & Maintenance (O&M) Cost	$316,000
Total Present Worth Cost	$17,581,000
Construction Time Frame	One year
Timeframe to meet RAOs	One year

Under Alternative 2, contaminated soil at concentrations exceeding RGs in the upper 10 feet would be excavated, and those excavated contaminated soils containing RCRA characteristic hazardous waste would be stockpiled on Site and thermally treated ex situ prior to disposal at a RCRA Subtitle D landfill on the island.

Ex situ thermal desorption uses heat and vacuum extraction to mobilize and remove contaminants from soil. Thermal conducting heating wells would be placed in a grid-like pattern within the soil stockpile. The thermal conducting heating wells heat the soil to the target temperature as measured by thermocouples placed throughout the stockpile. At the target temperature, the contaminant's vapor pressure and diffusivity increase, and its viscosity decreases. As a result, the evaporation rate and mobility of the contaminant is increased, and contaminants and water contained in the soil are vaporized. Soil vapor extraction wells placed in the stockpile would be used to remove the soil vapor steam. The extracted off-gas and water are treated through vapor and liquid treatment systems.

The total targeted volume of contaminated soil to be excavated under Alternative 2 is estimated to be approximately 14,100 cubic yards (CY). The footprint of the excavation would require that the remaining dilapidated buildings on-Site be demolished. Additionally, Site data suggests that contamination is likely beneath the building slab. Based on the RI sample results, an estimated 3,900 CY of the excavated material contains pesticide and dioxin contaminant concentrations, requiring treatment to meet land disposal requirements prior to disposal at a RCRA Subtitle D landfill on the island. An estimated 10%, or 1,410 CY, of the excavated material could contain chromium contaminant concentrations requiring treatment and disposal as a RCRA characteristic hazardous waste at a facility in the continental United States.

Additional sampling in the design will confirm this.

Contaminant concentrations that exceed RGs at depth beyond 10 feet bgs would be covered with a wire mesh, and a permeable plastic barrier would be installed as a warning layer that digging lower would result in possible exposure to contaminated soils. The total area of contaminated soil remaining after excavation to 10 feet bgs under this alternative is approximately 5,300 square feet. Clean fill and 6-inch topsoil would be used to replace soil removed after excavation. After the topsoil is placed, the area would be seeded to establish vegetation to restore the area.

This alternative is expected to remove ninety percent of the contamination exceeding RGs. Because unexcavated and deeper soils (below 10 feet bgs) would remain at levels that would not allow for unrestricted (i.e., residential) use, institutional controls would restrict the future use of the soil at the Site to nonresidential uses.

The wells at the Site will be protected and repaired during construction, as well as sampled, if necessary, to prevent impacts to groundwater.

Alternative 2 would require five-year reviews as required by CERCLA since contaminated soil at concentrations exceeding an unlimited use/unrestricted exposure scenario would remain on Site. Five-year reviews would evaluate whether adequate protection of human health and the environment is provided because contaminated soil would remain above RGs at depth at the Site.

Alternative 3: Alternative 3 (former 6 in the FS): On-Site Consolidation with Engineered Cover and Institutional Controls

Capital Cost	$2,599,000
Present Worth O&M Cost	$316,000
Total Present Worth Cost	$2,915,000
Construction Time Frame	One year
Timeframe to meet RAOs	One year

Alternative 3 provides protection of human health through institutional controls (administrative and access controls) coupled with remedial action (excavation, consolidation, multi-layer geosynthetic cover construction, and vegetative cover) to limit exposure to contaminants. Under this alternative, all contaminated soil in concentrations greater than RGs outside the boundaries of the consolidation area would be excavated for consolidation and covering. Excavated areas would be backfilled with clean fill. The total targeted volume of contaminated soil to be excavated and consolidated at the Site under Alternative 3 is estimated to be approximately 9,800 CY.

The existing structures and concrete slabs at the Site would be demolished and removed to enable construction of the consolidation area. Additionally, Site data suggests that contamination is likely beneath the building slab. A multi-layer geosynthetic cover would be constructed over the consolidated material to mitigate unacceptable exposure risks to human health and the environment. The estimated extent for the consolidation area under Alternative 3 is approximately 61,900 square feet, which is slightly smaller than the Site property area because the consolidation area is not in the excavation area. The consolidated mound would be roughly 10 feet in height. The wells at the Site will be protected and repaired during

construction, as well as sampled, if necessary, to prevent impacts to groundwater.

Institutional controls would involve administrative and legal measures (e.g., land use restrictions) and/or informational measures (e.g., community awareness activities) intended to safeguard the remedy and inform the public of risks from uses of contaminated soil at the Site that could pose a risk to human receptors.

A long-term inspection and maintenance program would be developed to ensure the engineered cover would provide continued protection to human health. Inspections may be scheduled annually and following each severe storm event. Inspections would monitor the vegetation, erosion, and any damage by animals. If erosion or damage to the engineered cover is observed, actions would be taken to repair the damage and maintain the integrity of the engineered cover.

Alternative 3 would require five-year reviews as required by CERCLA because contaminated soil at concentrations exceeding an unlimited use/unrestricted exposure scenario would remain on Site. Five-year reviews would evaluate whether adequate protection of human health and the environment is provided since contaminated soil would remain above RGs at the Site. Site monitoring (consisting solely of non-intrusive visual inspections) also would be conducted only as necessary to complete the five-year reviews.

Alternative 4: Alternative 4 (former 8 in the FS): Excavation of Contaminated Soil, On-Site Treatment, and Off-Site Disposal

Capital Cost	$18,217,000
Present Worth O&M Cost	$230,000
Total Present Worth Cost	$18,447,000
Construction Time Frame	One year
Timeframe to meet RAOs	One year

Alternative 4 is similar to Alternative 2, with the exception that contaminated soil would be excavated to a depth of 20 feet bgs. Alternative 4 assumes that excavated contaminated soil containing pesticide-containing RCRA characteristic hazardous waste would be stockpiled on Site and thermally treated to be "de-characterized" prior to disposal at a RCRA Subtitle D landfill on the island. Additional sampling in the design will confirm this.

The total targeted volume of contaminated soil to be excavated under Alternative 4 is estimated to be approximately 15,200 CY. An estimated 3,900 CY of the excavated material contains pesticide and dioxin contaminant concentrations requiring treatment to meet land disposal requirements prior to disposal at a RCRA Subtitle D landfill on the island. Based on the RI sample results, an estimated 1,520 CY of the excavated material would contain chromium contaminant concentrations requiring treatment and disposal as a RCRA characteristic hazardous waste at a facility in the continental United States. The footprint of the excavation would require that the remaining dilapidated buildings on-Site be demolished. Additionally, Site data suggests that contamination is likely beneath the building slab.

The wells at the Site will be protected and repaired during construction, as well as sampled, if necessary, to prevent impacts to groundwater.

Alternative 4 would require five-year reviews as required by CERCLA because contaminated soil at concentrations exceeding an unlimited use/unrestricted exposure scenario would remain

on Site. Five-year reviews would evaluate whether adequate protection of human health and the environment is provided because contaminated soil would remain above RGs at depth at the Site.

COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

In selecting the remedy, EPA considered the factors set out in CERCLA Section 121, 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 remedial alternative as against each of nine evaluation criteria and perform a comparative analysis focusing upon the relative performance of each response measure against the criteria.

Threshold Criteria *– The first two criteria 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*

OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

This criterion 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 four retained alternatives, only the no action alternative (i.e., Alternative 1) would fail to provide protection for human health (future resident or worker) and would not address the RAOs for contaminated soil.

Alternatives 2, 3, and 4 would be protective of human health and the environment. Alternative 2 achieves the soil RAOs through excavation of contaminated soil exceeding RGs to a depth of 10 feet, treatment of excavated soil as needed, and backfilling with a demarcation barrier, clean fill and topsoil over the remaining contaminated soil. Alternative 3 achieves soil RAOs through consolidation and containment (capping) of contaminated soil. The cap would provide a barrier that would break the exposure pathway to human receptors. Alternative 4 achieves soil RAOs through excavation, treatment as needed, and off-Site disposal of contaminated soil exceeding RGs to a depth of 20 feet.

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

Section 121(d) of CERCLA and NCP §300.430(f) (ii) (B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

Applicable *requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those State standards that are identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable.* ***Relevant and appropriate*** *requirements are those cleanup standards, standards of control, and other substantive*

requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, addresses problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate. Compliance with ARARs address whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides a basis for invoking a waiver.

Key location- and action-specific ARARs apply to the management and disposal of wastes generated from remediation of contaminated soil at the Site. ARARs pertaining to waste management and disposal focuses on characteristic hazardous waste that may be present in contaminated soils generated (i.e., excavated or extracted) during remediation of soil contamination.

Alternative 1 would not achieve the ARARs since no remedial action would be taken to remove or treat the contaminated soil. The remaining alternatives, Alternatives 2, 3, and 4, would achieve RGs by removal, containment, or treatment of contaminated soil. Alternatives 2, 3, and 4 would comply with action- and location-specific ARARs.

Primary Balancing Criteria *– The next five criteria, 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.*

LONG-TERM EFFECTIVENESS AND PERMANENCE

Long-term effectiveness and permanence refer to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion includes the consideration of residual risk that will remain on-site following remediation and the adequacy and reliability of controls.

Alternative 1 fails to provide long-term effectiveness and permanence since no remedial action is taken. Alternative 3 provides protection by preventing human exposure to contaminated soil through an engineered cover. However, under this alternative, soil contamination is left in place and the remedy would require long-term maintenance to ensure protectiveness. Additionally, this alternative would result in a 10-foot mound being created in a generally flat area, which could result in drainage concerns. Contaminated soil left on-Site beneath the cap and could pose an exposure risk to human receptors if the cover was compromised. Institutional controls would be implemented to protect the cover and restrict future land uses and provide awareness of risks from potential exposure to contaminated soil above Site-specific levels of concern.

Alternatives 2 and 4 both provide more significant long-term effectiveness and permanence in their ability to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. Alternative 2 includes excavation of contaminated soil exceeding RGs to a depth of 10 feet and covering of remaining contaminated soil. Alternative 4 would excavate contaminated soil to a depth of 20 feet and would not require any cover of remaining contaminated soil. Under Alternatives 2 and 4, pesticide-related RCRA characteristic hazardous waste would be thermally treated on-Site before being transported to the RCRA Subtitle D landfill on the island of Puerto Rico for disposal. Disposal of contaminated soil exceeding RGs but not containing RCRA characteristic hazardous waste

could be disposed of at the RCRA Subtitle D landfill on the island of Puerto Rico. Contaminated soil and thermally treated soil with chromium concentrations considered a RCRA characteristic hazardous waste would

REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Alternative 1 fails to provide a reduction of toxicity, mobility, or volume through treatment because treatment is not a component of these alternatives.

Alternative 3 does not satisfy the statutory preference for treatment as a principal element of the remedial action, as no active treatment remedy would be performed.

Alternatives 2 and 4 include a treatment component in the thermal treatment of excavated contaminated soil considered characteristic hazardous waste to meet land disposal requirements prior to disposal in a RCRA Subtitle D landfill on the island of Puerto Rico. However, contaminated soil and thermally treated soil with chromium concentrations considered a RCRA characteristic hazardous waste would be containerized and shipped to the continental United States for treatment (solidification/ stabilization) and disposal. Both Alternative 2 and Alternative 4 leave some contamination at depth, below ten feet and twenty feet, respectively. Therefore, these alternatives only partially meet a reduction of toxicity, mobility, or volume through treatment.

SHORT-TERM EFFECTIVENESS

Short-term effectiveness addresses the period of time 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 1 would not pose short-term risks to the community, and there would be no adverse environmental impacts; however, protection in a reasonable time frame would not be achieved under this alternative.

Alternatives 2, 3, and 4 would involve surface disturbance of contaminated soil and transport of clean soil for backfill or construction of covers. Alternatives 2 and 4 would include transportation of excavated contaminated soil for off-Site disposal. Unlike Alternative 3, Alternatives 2 and 4 would require installation of power lines and high energy usage, which could pose additional short-term impacts to the environment.

Under all three active alternatives, Site workers would follow approved health and safety plans and would wear appropriate personal protective equipment to minimize exposure to contamination and as protection from physical hazards. There would also be the potential for increased local traffic. The dust-related impacts would be mitigated through the implementation of decontamination measures and dust suppression practices. A traffic control plan would be implemented to reduce the potential for traffic accidents.

IMPLEMENTABILITY

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.

Since no remedial action is taken under Alternative 1, this alternative would be the easiest to implement, both technically and administratively, but the least effective.

Alternative 3 uses standard construction techniques, practices, and materials for cap construction. It would not require management of RCRA characteristic hazardous waste beyond consolidation, and it would not require installation and operation of a thermal treatment system.

Alternatives 2 and 4 would require mobilization of a thermal remediation treatment system to the island of Puerto Rico. These alternatives would include excavation, stockpiling, and treating hazardous waste, and the disposal of treated and nonhazardous contaminated soil at a RCRA Subtitle D landfill. However, contaminated soil and thermally treated soil with chromium concentrations rendering it a RCRA characteristic hazardous waste would be containerized and shipped to the continental United States for treatment (solidification/stabilization) and disposal.

COST

Includes estimated capital and O&M costs of the remedial action, and net present worth value of capital and O&M costs.

Present value costs for all alternatives were evaluated over a 30-year period using a seven percent discount factor.

Alternative	Capital Cost	Present Worth Operation and Maintenance Cost	Total Present Worth Cost
1	$0	$0	$0
2	$ 17,265.000	$ 316,000	$ 17,581,000
3	$ 2,599.000	$ 316,000	$ 2,915,000
4	$ 18,217,000	$ 230,000	$ 18,447,000

Modifying Criteria *– The final two evaluation criteria, 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.*

COMMONWEALTH / SUPPORT AGENCY ACCEPTANCE

Indicates whether based on its review of the RI/FS reports and the ROD, the commonwealth supports, opposes, and/or has identified any reservations with the selected response measure.

The DNER concurs with the selected remedy for soil and the no action decision for groundwater. (Appendix VIII).

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.

All the alternatives were made available for the community to review and comment. The preferred alternative was presented to the community in the Proposed Plan. A public comment period (July 30, 2020 to August 29, 2020) was established to allow the community to review and comment on all the alternatives and the proposed alternative. EPA's response to all public comments received during the comment period is presented in the Responsiveness Summary of this ROD.

Principal Threat Waste

The 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 ground water, surface water or air, or acts as a source for direct exposure. Contaminated ground water generally is not considered to be a source material; however, Non-Aqueous Phase Liquids (NAPLs) in ground water may be viewed as source material. 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. Pesticides in soil samples were not observed at concentrations that present significant risk (e.g., generally greater than $1x10^{-3}$). Additionally, contaminated soils appear to have little impact on groundwater at the Site. Based on the relatively low risk and limited mobility, contaminated soil at the Site is not considered to be a principal threat waste, but rather a low-level threat waste.

SELECTED REMEDY

Based upon an evaluation of various alternatives, EPA, in consultation with DNER, selects Alternative 2 as remedy that will address the soil contamination found at the Site. The selected remedy includes the following components:

- Excavation of contaminated soil as deep as 10 feet below ground surface;
- On-Site treatment of those soils, followed by off-Site disposal;
- Covering of deeper residual soils, and
- Institutional controls.

Under EPA's remedy for OU1, contaminated soil in the upper 10 feet would be excavated and treated before being transported off-Site for disposal. Because unexcavated, deeper soils (below 10 feet) would remain at levels that would not allow for unrestricted (i.e., residential) use, institutional controls will be imposed to restrict the future use of the Site to nonresidential uses. Under this remedy, soil with hazardous characteristics pursuant to the RCRA would be treated using a temporary thermal treatment unit brought to the Site. The total targeted volume of contaminated soil to be excavated under this remedy is estimated to be approximately 14,100 CY. Based on the RI sample results, an estimated 3,900 CY of the excavated material contains pesticide and dioxin contaminant concentrations requiring treatment to meet land disposal requirements prior to disposal at a RCRA Subtitle D landfill on the island. An estimated 1,410 CY of the excavated material would contain chromium contaminant concentrations requiring treatment and disposal as a RCRA characteristic hazardous waste at a facility in the continental United States.

The estimated present-worth cost of the selected remedy is $17,581,000.

EPA has determined that no action is necessary for groundwater (OU2) because Site-related contaminants are currently below MCLs and risks associated with groundwater exposure do not exceed EPA's target risk range.

SUMMARY OF RATIONALE FOR THE SELECTED REMEDY

The selected remedy is believed to provide the best balance of tradeoffs among the alternatives based on the information available to EPA at this time. EPA and DNER believe that the selected remedy will be protective of human health and the environment, comply with ARARs, be cost-effective, and utilize permanent solutions and alternative treatment technologies. It will require less long-term maintenance than Alternative 3 and will not result in a 10-foot mound being placed in a generally flat area, which could result in drainage concerns. Additionally, Alternative 2 will allow the Site to be returned to commercial use at a lower cost than Alternative 4.

EXPECTED OUTCOMES OF SELECTED REMEDY

The components of the selected remedy will address contaminants in Site soil. The HHRA indicates cancer risks and noncancer hazards to future Site users above EPA's thresholds from exposure to soil containing dioxin, dieldrin and arsenic. The ecological risk assessment found risk to ecological receptors from exposure to Site soils from pesticides, dioxin and metals. It is assumed that risks to ecological receptors would be mitigated through implementation of remedial alternatives for human receptors. The response actions will eliminate human health risk and ecological risks posed by soil through the removal of Site-related contaminated soil exceeding RGs.

GREEN REMEDIATION

The environmental benefits of the selected remedy for soil may be enhanced by giving consideration, during the design, to technologies and practices that are sustainable in accordance with EPA Region 2 Clean and Green Energy Policy. This will include consideration of green remediation technologies and practices. Some examples of practices that would be applicable are those that reduce emissions of air pollutants, minimize freshwater consumption,

incorporate native vegetation into re-vegetation plans, and consider beneficial reuse and/or recycling of materials, among others.

STATUTORY DETERMINATIONS

CERCLA Section 121(b)(1) mandates that a remedial action must be protective to human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions that employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at the Site. CERCLA Section 121(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 CERCLA Section 121(d)(4). For the reasons discussed below, EPA has determined that the selected remedy for soil meets the requirements of CERCLA Section 121. EPA has determined that no remedial action is necessary to protect human health or the environment from exposure to groundwater at the Site.

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The selected remedy will protect human health and the environment because achieves the RAOs through excavation of contaminated soil exceeding remediation goals to a depth of 10 feet, treatment of excavated soil as needed, and maintaining deeper residual soils in place under 10 feet of cover material.

COMPLIANCE WITH ARARS

There are no federal or Commonwealth chemical-specific ARARs for soil. EPA developed risk-based remediation goals for soil at Site. The selected remedy for soil at the Site will comply with location-specific and action-specific ARARs.

COST EFFECTIVENESS

A cost-effective remedy is one that has costs that are proportional to its overall effectiveness (NCP Section 300.430(f)(1)(ii)(D)). Overall effectiveness is based on the evaluations of long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. EPA evaluated the "overall effectiveness" of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume though treatment; and short-term effectiveness). Overall effectiveness was then compared to those alternatives' costs to determine cost-effectiveness.

Each of the alternatives underwent a detailed cost analysis. In that analysis, capital and O&M costs were estimated and used to develop present-worth costs. In the present-worth cost analysis, O&M costs were calculated for the estimated life of each alternative. The total estimated present-worth cost for implementing the selected remedy is $17.5 million.

UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT (OR RESOURCE RECOVERY) TECHNOLOGIES TO MAXIMUM EXTENT PRACTICABLE

The selected remedy provides the best balance of trade-offs among the alternatives with respect to the balancing criteria set forth in the NCP Section 300.430(f)(1)(i)(B), because they each represent the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site. The combination soil excavation at the soil source areas and in-situ thermal treatment will permanently reduce the mass of contaminants in soil thereby reducing the toxicity, mobility, and volume of contamination.

PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

By using a combination of technologies, to the maximum extent practicable, the statutory preference for remedies that employ treatment as a principal element is partially satisfied through the use of thermal treatment ex-situ to address contaminated soils at the Site.

FIVE YEAR REVIEW REQUIREMENTS

Although not part of the remedy, because the selected remedy for soil will result in hazardous substances, pollutants, or contaminants remaining above levels that would otherwise allow for unlimited use and unrestricted exposure, a statutory review must be conducted no less often than once every five years after construction of the remedy to ensure that the remedial action remains protective of human health and the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES FROM PREFERRED ALTERNATIVE OF PROPOSED PLAN

The Proposed Plan for the Site was released for public comment on July 30, 2020, and the public comment period ran from that date through August 29, 2020. The Proposed Plan identified the selected remedy as the Preferred Alternatives for the Site.

No substantive written and verbal comments were submitted during the public comment period; therefore, EPA has determined that no significant changes to the remedy, as it was originally identified in the Proposed Plan, are necessary.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2

PART III- RESPONSIVENESS SUMMARY

RECORD OF DECISION

PESTICIDE WAREHO[]SE III – OPERABLE UNIT 1 (SOILS) SUPERFUND SITE ARECIBO, PUERTO RICO

RESPONSIVENESS SUMMARY

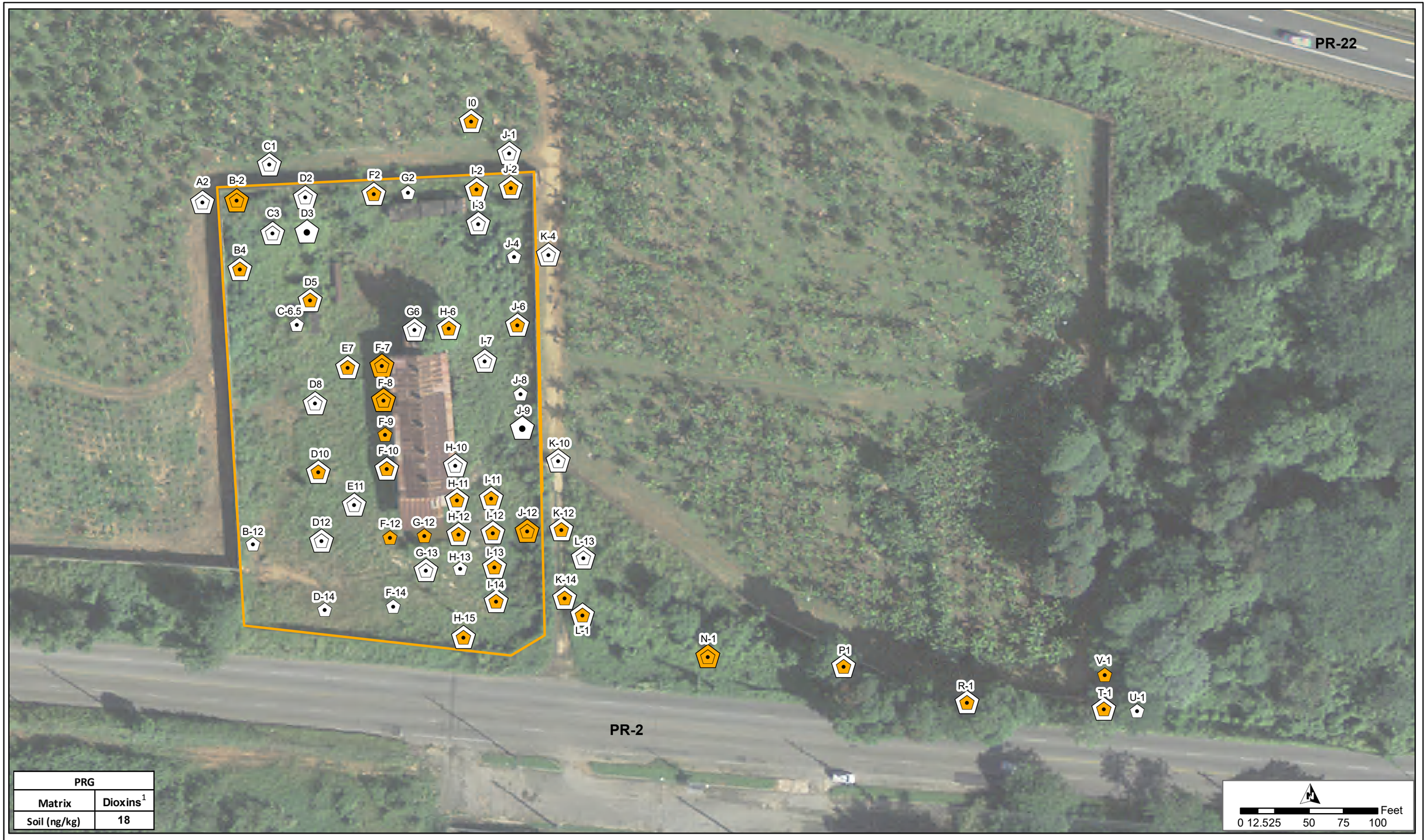
The Administrative Record file, which contains copies of the Proposed Plan and supporting documentation, was available online at: https://www.epa.gov/superfund/pesticide-warehouse-1. On August 6, 2020 a Virtual Presentation was made available to the public at the following link: https://youtu.be/nq7Nb__1qnU.

A notice of the availability of the Proposed Plan, and supporting documentation was published in "Primera Hora" newspaper on July 30, 2020. A public comment period was held from July 30, 2015 – August 29, 2020. The purpose of the Virtual Presentation was to present the Proposed Plan to the community. The public had the opportunity to ask questions and submit comments on the proposed remedial alternatives described in the Proposed Plan and EPA's preferred alternative through the link https://www.epa.gov/superfund/pesticide-warehouse-1, the telephone line (787) 977-5814 and santos.luis@epa.gov.

No substantive comments were received.

APPENDIX I

Figures & Tables



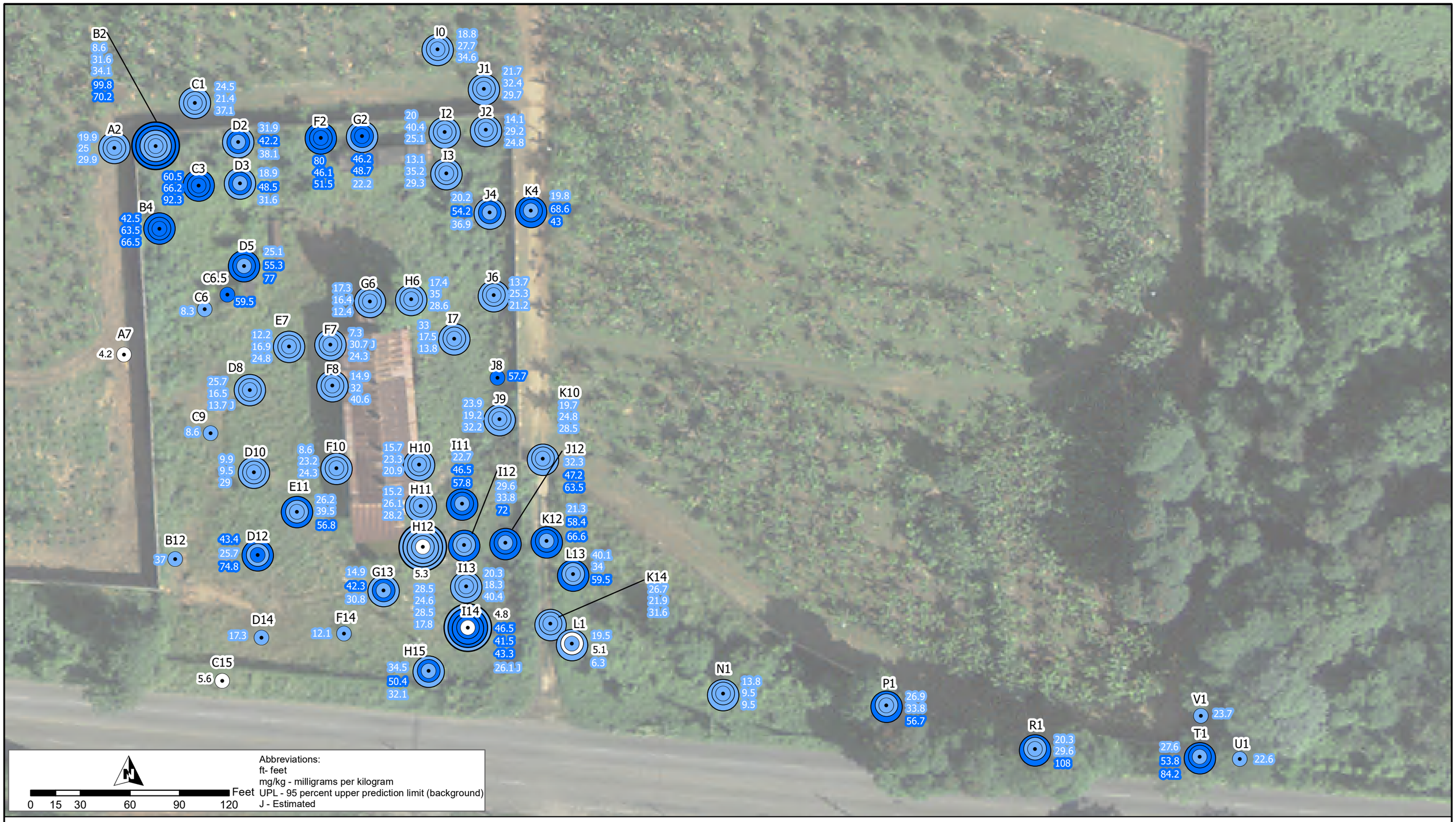
Legend

- Surface sample (0-2 ft bgs) location
- Subsurface sample (4-6 ft bgs) location
- TEQ does not exceed the preliminary remediation goal (PRG)
- TEQ exceeds PRG

Notes:
1 - Dioxin/furans toxic equivalent quotient (TEQ) value all concentrations are in nanogram per kilogram (ng/kg)

Figure 2-8
Dioxin/Furans TEQs Distribution in Soils (PRG)
Pesticide Warehouse I
Arecibo, Puerto Rico

CDM Smith



Legend

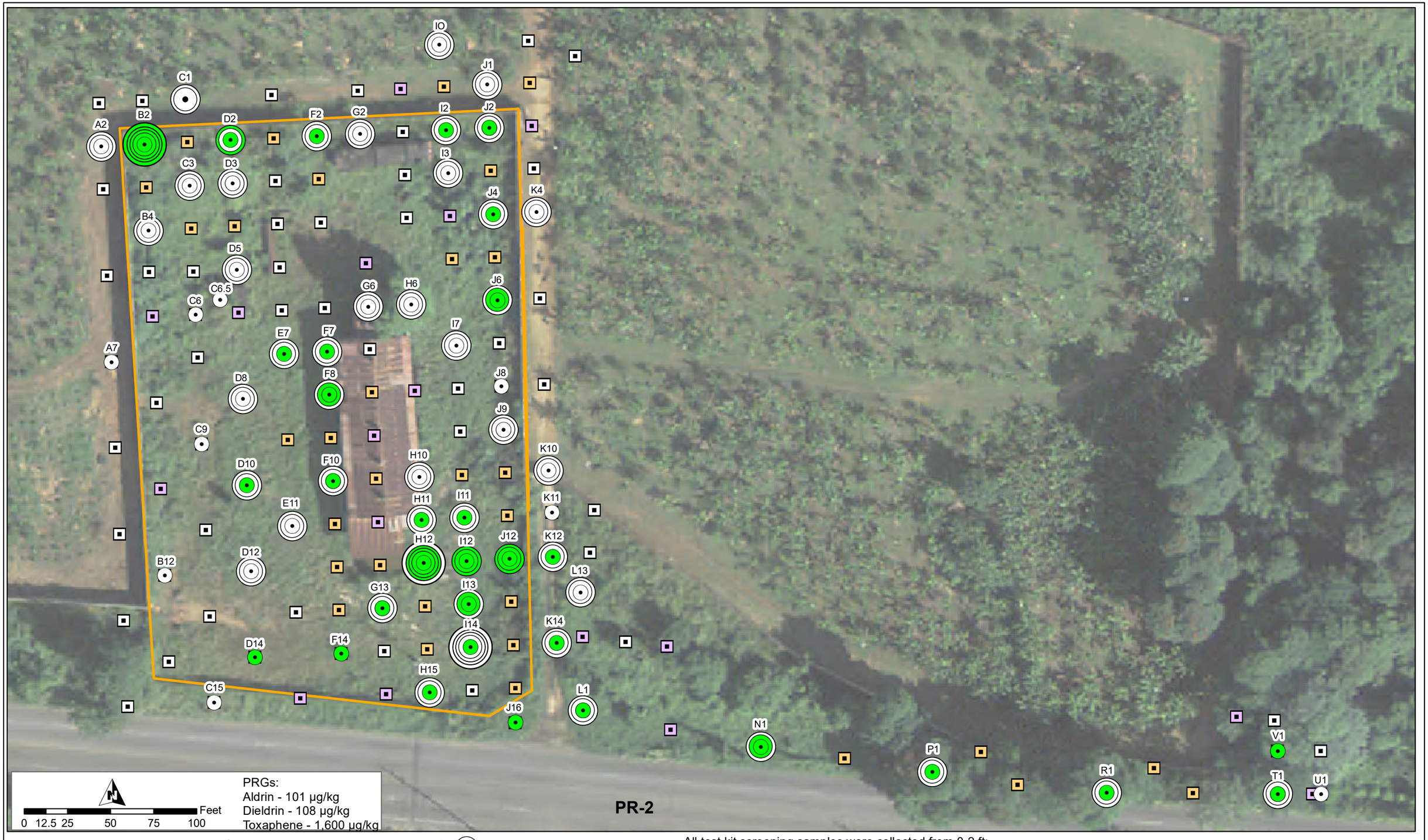
- Arsenic was either not detected or below screening 5.8 mg/kg criteria
- Arsenic screening criteria was exceeded at any interval
- Arsenic UPL of 41.5 mg/kg was exceeded at any interval
- Sampling location from 0-2 feet (ft)
- Sampling location from 4-6 ft
- Sampling location from 8-10 ft
- Sampling location from 12-14 ft
- Sampling location from 18-20 ft

I14 — Analytical results in mg/kg
- 4.8 at 0-2 ft
- 46.5 at 4-6 ft
- 41.5 at 8-10
- 43.3 at 12-14
- 26.1 J at 18-20 ft

Note:
Regional Screening Levels for Arsenic for residential soil, based on a cancer risk of $1x10^{-6}$ (0.68 mg/Kg) is not shown because all detections exceed this value.

Figure 2-9
Arsenic Soil Results
Pesticide Warehouse I
Arecibo, Puerto Rico

CDM Smith



Legend

- Preliminary remediation goal (PRG) not exceeded
- PRG exceeded
- Sampling location from 0-2 feet (ft)
- Sampling location from 4-6 ft
- Sampling location from 8-10 ft
- Sampling location from 12-14 ft
- Sampling location from 18-20 ft

µg/kg - microgram per kilogram

All test kit screening samples were collected from 0-2 ft;

- Screening sample with detections above 100 parts per billion (ppb)
- Screening sample with detections between 20 and100 ppb
- Screening sample with detections above 20 ppb

Figure 4-6
Dieldrin, Aldrin and Toxaphene Soil Results (PRG)
Pesticide Warehouse I
Arecibo, Puerto Rico

CDM Smith

Table 1
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

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

Exposure Point	Chemical of Concern[1]	Concentration Detected (Qualifier)		Concentration Units	Frequency of Detection	Exposure Point Concentration[2] (EPC)	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
Surface Soil	Arsenic	3	80	mg/kg	68/68	24.7	mg/kg	95% Approximate Gamma UCL
	Dieldrin	0.35	7200	ug/kg	63/70	5165	ug/kg	KM H-UCL
	TCDD-TEQ[3]	0.00114	7.4	ug/kg	57/59	5.63E-01	ug/kg	KM H-UCL

Footnotes:
(1) Samples were analyzed for Target Compound List (TCL) pesticides and dioxin/furans.
(2) Exposure Point concentration is lower of maximum detected concentration and UCL.
(3) TCDD-TEQ minimum and maximum detects are based on the sum of detected congener TECs.

Definitions:
TCDD-TEQ = 2,3,7,8-Tetrachlorodibenzo-p-dioxin Toxcicity Equivalence
EPC = Exposure point concentration
ug/kg = microgram per kilogram
mg/kg = milligram per kilogram
ug/l = microgram per liter
UCL = Upper confidence limit of mean

KM H-UCL = Kaplan Meier upper confidence limit of mean of lognormal distribution

Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

This table presents the chemicals of concern (COCs) along with exposure point concentrations (EPCs) for each of the COCs detected in surface soil and grounwater (*i.e.*, the concentration used to estimate the exposure and risk from each COC). The table includes the range of concentrations detected for each COC, as well as the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the EPC and how it was derived.

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	Soil	Surface Soil	Trespasser	Adolescent (12 to <18 years)	Ingestion	Quant	The PW1 property is currently inactive. However, trespassers could gain access to the site. When trespassing, these individuals may be exposed to contaminants in surface soil through incidental ingestion of and dermal contact with soil, and inhalation of particulates from surface soil.
						Dermal	Quant	
						Inhalation	Quant	
Future	Soil	Soil	Surface Soil	Worker	Adult	Ingestion	Quant	The PW1 property may be developed into an industrial/commercial property. Future workers may come in to contact with contamiannts in surface soil through incidental ingestion of and dermal contact with soil, and inhalation of particulates from surface soil.
						Dermal	Quant	
						Inhalation	Quant	
				Trespasser	Adolescent (12 to <18 years)	Ingestion	Quant	Trespassers could gain access to the site. When trespassing, these individuals may be exposed to contaminants in surface soil through the ingestion of and dermal contact with soil, and inhalation of particulates from surface aoil.
						Dermal	Quant	
						Inhalation	Quant	
				Resident	Adult and Child (birth to <6 years)	Ingestion	Quant	If residences are constructed on or near the site in the future, future residents may be exposed to contaminants in surface soil through incidental ingestion of and dermal contact with soil, and inhalation of particulates from surface soil.
						Dermal	Quant	
						Inhalation	Quant	
Future	Groundwater	Groundwater	Tap Water	Resident	Adult and Child (birth to <6 years)	Ingestion	Quant	If residences are constructed on or near the site in the future and potable wells are installed, future residents could use groundwater as tap water for drinking and bathing. Inhalation exposures while showering.bathing are expected to be limited because contamiants associated with the site are not volatile.
						Dermal	Quant	
				Worker	Adult	Ingestion	Quant	If potable wells are installed in the future on or near the site, workers could use groundwater as drinking water.
						Dermal	Quant	

Definitions:

Quant = Quantitative risk analysis performed

Summary of Selection of Exposure Pathways

This table describes the exposure pathways associated with soil and groundwater that were evaluated in the risk assessment along with the rationale for the inclusion of each pathway. Exposure media, exposure points, and characteristics of receptor populations are also included.

Table 3
Noncancer Toxicity Data Summary

Pathway: Ingestion/Dermal

Chemicals of Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Absorp. Efficiency (Dermal)[1]	Adjusted RfD for Dermal[2]	Adj. Dermal RfD Units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfD Target Organ	Date of RfD Source Publication[3]
Arsenic	Chronic	3.0E-04	mg/kg-day	1	3.0E-04	mg/kg-day	Skin	3	IRIS	4/18/2018
Dieldrin	Chronic	5.0E-05	mg/kg-day	1	5.0E-05	mg/kg-day	Liver	100	IRIS	4/18/2018
TCDD-TEQ	Chronic	7.0E-10	mg/kg-day	1	7.0E-10	mg/kg-day	Reproductive System	30	IRIS	4/18/2018

Pathway: Inhalation

Chemicals of Concern	Chronic/ Subchronic	Inhalation RfC	Inhalation RfC Units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfC Target Organ	Date of RfC Source Publication[3]
Arsenic	Chronic	1.5E-05	mg/m^3	Developmental/ Cardiovascular System/Nervous System/Lung/Skin	30	CalEPA	4/18/2018
Dieldrin	NA	NA	NA	NA	NA	NA	NA
TCDD-TEQ	Chronic	4.0E-08	mg/m^3	Liver/Reproductive System/Development/Endocrine System/Respiratory System/Hemotologic System	100	CalEPA	4/18/2018

Definitions:

IRIS = Integrated Risk Information System, U.S. EPA
CalEPA = California Environmental Protection Agency
mg/m^3 = milligram per cubic meter
mg/kg-day = Milligrams per kilogram per day
RfC = Reference Concentrations
RfD = Reference Dose

Table 4
Cancer Toxicity Data Summary

Pathway: Ingestion/ Dermal

Chemical of Concern	Oral Cancer Slope Factor	Units	Adjusted Cancer Slope Factor (for Dermal)[(1)]	Slope Factor Units	Weight of Evidence/ Cancer Guideline	Source	Date of Slope Factor Source Publication[(2)]
Arsenic	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.5E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	4/18/2018
Dieldrin	1.6E+01	$(mg/kg\text{-}day)^{-1}$	1.6E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	4/18/2018
TCDD-TEQ	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.3E+05	$(mg/kg\text{-}day)^{-1}$	B2[(3)]	Cal EPA	4/18/2018

Pathway: Inhalation

Chemical of Concern	Inhalation Unit Risk	Units	Weight of Evidence/ Cancer Guideline	Source	Date of Slope Factor Source Publication[(2)]
Arsenic	4.0E-03	$(ug/m3)^{-1}$	A	IRIS	4/18/2018
Dieldrin	4.6E-03	$(ug/m3)^{-1}$	B2	IRIS	4/18/2018
TCDD-TEQ	3.8E+01	$(ug/m3)^{-1}$	B2	CalEPA	4/18/2018

Definitions:

CalEPA = California Environmental Protection Agency
NJDEP = New Jersey Department of Environmental Protection
IRIS = Integrated Risk Information System, U.S. EPA
mg/kg-day = Per milligrams per kilogram per day
ug/m3 = microgram per cubic meter

EPA Weight of Evidence (EPA, 1986; EPA 1996):

A = Human carcinogen
B1 = Probable Human Carcinogen - based on sufficient evidence of carcinogenicity in animals and limited evidence in humans
B2 = Probable Human Carcinogen - based on sufficient evidence of carcinogenicity in animals and inadequate or no evidence in humans
C = Possible Human Carcinogen
D = Not classifiable as to human carcinogenicity

EPA Weight of Evidence Narrative (EPA 2005):

Carcinogenic to human
Likely to be carcinogenic to humans
Suggestive evidence of carcinogenic potential
Inadequate information to assess carcinogenic potential
Not likely to be carcinogenic to humans

Summary of Toxicity Assessment

This table provides carcinogenic risk information which is relevant to the contaminants of concern at the Site. Toxicity data are provided for the ingestion and dermal routes of exposure.

Table 5
Risk Characterization Summary - Noncarcinogens

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

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ[(2)]	Noncarcinogenic Hazard Quotient			
					Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Soil	Surface Soil	TCDD-TEQ	Reproductive system	1.0E+00	1.0E-01	1.0E-05	1.0E+00
							Surface Soil Hazard Index Total[1] =	**2.0E+00**
							Receptor Hazard Index[1] =	**4.0E+00**
							Reproductive System Across All Media HI =	**2**

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

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ[(2)]	Noncarcinogenic Hazard Quotient			
					Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Soil	Surface Soil	Dieldrin	Liver	1.0E+00	4.0E-01	NA	2.0E+00
			TCDD-TEQ	Reproductive system	1.0E+01	8.0E-01	1.0E-05	1.0E+01
							Surface Soil Hazard Index Total[1] =	**2.0E+01**
							Receptor Hazard Index[1] =	**2.0E+01**
							Liver Across All Media HI =	**2**
							Reproductive System Across All Media HI =	**13**

Footnotes:
(1) The Hazard Index (HI) shown in this table represents the summed Hazard Quotients (HQs) for all chemicals of potential concern (COPCs) at the site, not just those requiring remedial action (*i.e.*, the chemicals of concern [COCs]), which are identified in this table.
(2) RfD target organ or effect/ RfC target organ or effect

Definitions:
NA = Not applicable

Table 6
Risk Characterization Summary - Carcinogens

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

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Soil	Surface Soil	Surface Soil	Arsenic	3.0E-05	5.0E-06	3.0E-08	4.0E-05
			Dieldrin	1.0E-04	4.0E-05	6.0E-09	2.0E-04
			TCDD-TEQ	1.0E-04	1.0E-05	6.0E-09	1.0E-04
						Surface Soil Risk Total[1]=	**7.0E-04**
						Receptor Total[1] =	**1.0E-03**

Footnotes:.
(1) Total Risk values represent cumulative estimates from exposure to all chemicals of potential concern (COPCs) as identified in the RAGS D table 2 series, and not only from those identified in this table (i.e, the chemicals of concern [COCs]).

APPENDIX II

Administrative Record Index

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

07/30/2020 **REGION ID: 02**

Site Name: PESTICIDE WAREHOUSE I
CERCLIS ID: PRD987367349
OUID: 01 & 02
SSID: 02RW
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
615360	07/30/2020	ADMINISTRATIVE RECORD INDEX FOR OU1 AND OU2 FOR THE PESTICIDE WAREHOUSE I SITE	2	Administrative Record Index		(US ENVIRONMENTAL PROTECTION AGENCY)
319844	06/09/2011	FINAL WORK PLAN VOLUME 1 FOR OU1 FOR THE PESTICIDE WAREHOUSE I SITE	63	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CDM FEDERAL PROGRAMS CORPORATION)
319867	06/09/2011	FINAL WORK PLAN VOLUME 1 FOR OU2 FOR THE PESTICIDE WAREHOUSE I SITE	56	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(CDM FEDERAL PROGRAMS CORPORATION)
615354	04/12/2019	FINAL SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT FOR OU1 AND OU2 FOR THE PESTICIDE WAREHOUSE I SITE	71	Report	SANTOS,LUIS (US ENVIRONMENTAL PROTECTION AGENCY)	VALENTINO,MICHAEL (CDM SMITH)
615356	06/24/2020	REVISED FINAL HUMAN HEALTH RISK ASSESSMENT FOR OU1 AND OU2 FOR THE PESTICIDE WAREHOUSE I SITE	256	Work Plan	SANTOS,LUIS (US ENVIRONMENTAL PROTECTION AGENCY)	VALENTINO,MICHAEL (CDM SMITH)
615358	06/24/2020	REVISED REMEDIAL INVESTIGATION REPORT FOR OU1 AND OU2 FOR THE PESTICIDE WAREHOUSE I SITE	574	Report	SANTOS,LUIS (US ENVIRONMENTAL PROTECTION AGENCY)	VALENTINO,MICHAEL (CDM SMITH)
615223	07/24/2020	PUERTO RICO DEPARTMENT OF NATURAL AND ENVIRONMENTAL RESOURCES CONCURRENCE OF THE PROPOSED PLAN FOR OU1 AND OU2 FOR THE PESTICIDE WAREHOUSE I SITE	1	Letter	SANTOS,LUIS (US ENVIRONMENTAL PROTECTION AGENCY)	(GOVERNMENT OF PUERTO RICO)

615710

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

07/30/2020 **REGION ID: 02**

Site Name: PESTICIDE WAREHOUSE I
CERCLIS ID: PRD987367349
OUID: 01 & 02
SSID: 02RW
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
598784	07/29/2020	REVISED FINAL FEASIBILITY STUDY REPORT FOR OU1 AND OU2 FOR THE PESTICIDE WAREHOUSE I SITE	380	Report	SANTOS,LUIS (US ENVIRONMENTAL PROTECTION AGENCY)	VALENTINO,MICHAEL (CDM SMITH)
598783	07/29/2020	PROPOSED PLAN FOR OU1 AND OU2 FOR THE PESTICIDE WAREHOUSE I SITE	22	Publication		(US ENVIRONMENTAL PROTECTION AGENCY)
598789	08/03/2020	PROPOSED PLAN FOR OU1 AND OU2 (SPANISH VERSION) FOR THE PESTICIDE WAREHOUSE I SITE	19	Publication		(US ENVIRONMENTAL PROTECTION AGENCY)

APPENDIX III

Public Notices

Gobierno de Puerto Rico

AVISO DE EXAMEN DE REVÁLIDA

Exámenes Teóricos y Prácticos 2020

LA OFICINA DE JUNTAS EXAMINADORAS DEL DEPARTAMENTO DE ESTADO, anuncia que estará ofreciendo los exámenes teóricos y prácticos para las Juntas Examinadoras, según se detalla a continuación:

CONVOCATORIA OTOÑO 2020

Junta Examinadora	Fecha de inicio y límite para solicitar Examen y Re-examen	Fecha de comienzo de Examen Teórico	Fecha de Examen Práctico
Peritos Electricistas	03 de agosto al 02 de septiembre de 2020	06 de octubre de 2020	2, 3 y 4 de octubre de 2020
Ayudantes de Peritos Electricistas	03 de agosto al 02 de septiembre de 2020	06 de octubre de 2020	**NO APLICA**
Barberos	01 de septiembre al 31 de octubre de 2020	23 de noviembre de 2020	8 y 22 de noviembre de 2020
Técnicos de Refrigeración y Aire Acondicionado	03 de agosto al 30 de septiembre de 2020	20 de octubre de 2020	**NO APLICA**
Químicos	01 de septiembre al 31 de octubre de 2020	12 de noviembre de 2020	**NO APLICA**
Delineantes Profesionales	01 de septiembre al 31 de octubre de 2020	10 de noviembre de 2020	10 de noviembre de 2020
Diseñadores -Decoradores de Interiores	05 de agosto al 04 de octubre de 2020	19 de octubre de 2020	26 de octubre de 2020
Técnicos en Electrónica	01 de octubre al 30 de noviembre de 2020	22 de diciembre de 2020	22 de diciembre de 2020
Maestros y Oficiales Plomeros	01 de septiembre al 31 de octubre de 2020	18 de noviembre de 2020	14 de noviembre de 2020
Planificadores Profesionales	10 de septiembre al 09 de noviembre de 2020	01 de diciembre de 2020	**NO APLICA**

CONVOCATORIA INVIERNO 2020

Operadores de Plantas de Tratamiento de Agua Potable y Aguas Usadas	01 de octubre al 30 de noviembre de 2020	07 de diciembre de 2020	**NO APLICA**
Especialistas en Belleza	01 de octubre al 30 de noviembre de 2020	21 de diciembre de 2020	13 y 14 de diciembre de 2020
Peritos Electricistas	01 de octubre al 3 de noviembre de 2020	14 de diciembre de 2020	4, 5 y 6 de diciembre de 2020
Ayudantes de Peritos Electricistas	01 de octubre al 3 de noviembre de 2020	14 de diciembre de 2020	**NO APLICA**

La fecha exacta, hora, lugar y otros detalles específicos se indicarán en el boleto de admisión a examen que recibirá el solicitante.

COSTO DE EXAMEN Y RE-EXAMEN

El costo del examen teórico es $100.00. El costo del examen práctico es de $60.00. El costo del examen de **Técnicos en Electrónica** es de $100.00 por cada parte del examen. Los exámenes teóricos serán ofrecidos en computadora. El examen práctico de **Delineantes Profesionales** se estará ofreciendo a computadora y en mesa.

PARA SOLICITAR EXAMEN TEÓRICO Y/O PRÁCTICO:

El proceso de Solicitud de Exámenes se podrá realizar completamente a través de Internet. Las instrucciones, requisitos y para realizar la solicitud en línea deberán acceder a www.didaxispr.com. El candidato debe tener un correo electrónico válido para poder crear una cuenta y registrarse. Los documentos requeridos (transcripción de grado, diploma, copia de licencia, etc.) pueden ser escaneados y añadidos al sistema después que el candidato haya creado su cuenta. Tele – Servicios Didaxis: 787-296-8385

Este Anuncio se publica de conformidad con el Artículo 3.6 del Reglamento Núm. 8644, aprobado el 14 de septiembre de 2015, mejor conocido como Reglamento Uniforme de las Juntas Examinadoras adscritas al Departamento de Estado de Puerto Rico y las leyes: Ley Núm. 115 de 2 de junio de 1976, según enmendada; Ley Núm. 146, de 27 de junio de 1968, según enmendada; Ley Núm. 36 de 20 de mayo de 1970, según enmendada; Ley Núm. 97 de 4 de junio de 1983, según enmendada; Ley Núm. 54 de 21 de mayo de 1976, según enmendada; Ley Núm. 125 de 8 de junio de 1973, según enmendada; Ley Núm. 99 de 30 de junio de 1975, según enmendada; Ley Núm. 88 de 4 de mayo de 1939, según enmendada; Ley Núm. 160 de 23 de agosto de 1996, según enmendada; Ley Núm. 53 de 13 de julio de 1978, según enmendada; Ley Núm. 431 de 15 de mayo de 1976, según enmendada.

Autorizado por la Comisión Estatal
de Elecciones (CEE)
OCE-SA-2020-106

Lcda. María L. Varas García
Secretaria Auxiliar
de Registros y Juntas

La Agencia Federal de Protección Ambiental
Anuncia el Plan Propuesto y Periodo de Comentarios
Para el Lugar de Superfondo Almacén de Plaguicidas I
Unidades Operacionales 1 y 2 – Suelo y Agua Subterránea
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 comienzo de un periodo de treinta (30) días de comentario público sobre el Plan Propuesto para la remediación del lugar conocido como Almacén de Plaguicidas I (el Lugar), localizado en el municipio de Arecibo, Puerto Rico. La alternativa preferida por la EPA es la Alternativa 2 que corresponde a la excavación de suelos contaminados hasta 10 pies por debajo de la superficie del suelo, tratamiento en el Lugar y disposición fuera del Lugar, cubierta del restante subsuelo contaminado y controles institucionales. El Plan Propuesto describe las alternativas recomendadas y las razones para estas recomendaciones. Antes de seleccionar un remedio final, la EPA va a considerar los comentarios escritos y verbales recibidos durante este periodo de comentario público. Todos los comentarios (verbales y/o escritos) deberán ser recibidos en o antes del 29 de agosto de 2020. La EPA proveerá un resumen de todos los comentarios y sus respuestas en el Récord de Decisión para este Lugar.

A tales fines, y ante la emergencia de COVID-19, la EPA tendrá una presentación pregrabada del plan propuesto, la cual estará disponible a partir de 6 de agosto de 2020. Para información sobre el enlace de esta presentación electrónica puede llamar al 787-977-5814. El propósito de esta presentación es informarle a la comunidad sobre los hallazgos, conclusiones y recomendaciones de la investigación realizada en el Lugar para la remediación del suelo, bajo la unidad operacional 1 (OU-1, por sus siglas en inglés) y agua subterránea, bajo la unidad operacional 2 (OU-2, por sus siglas en inglés). Además, se discutirá la alternativa de remediación recomendada. La EPA contestará preguntas o comentarios que el público pueda tener con relación a la investigación realizada y a la alternativa preferida presentada.

Las copias del Plan Propuesto y otros documentos relacionados al lugar estarán disponibles en el siguiente enlace de internet que provee acceso al repositorio de información:

Enlace al repositorio de información: www.epa.gov/superfund/pesticide-warehouse-1

Comentarios escritos y por medio de mensaje de voz al Plan Propuesto deben ser enviados al siguiente enlace de internet y número telefónico, respectivamente:

Comentarios escritos: santos.luis@epa.gov
Comentarios por mensaje de voz: 787-977-5814

Para más información, favor llamar al señor Luis Santos al (787) 977-5865.

Luis Santos
Gerente de Proyectos
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
Fax: (787) 289-7104
Email: santos.luis@epa.gov

Gobierno de Puerto Rico

AVISO DE EXAMEN DE REVÁLIDA

Exámenes Teóricos y Prácticos 2020

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Planificadores Profesionales	10 de septiembre al 09 de noviembre de 2020	01 de diciembre de 2020	NO APLICA

CONVOCATORIA INVIERNO 2020

Operadores de Planta de Tratamiento de Agua Potable y Aguas Usadas	01 de octubre al 30 de noviembre de 2020	07 de diciembre de 2020	NO APLICA
Especialistas en Refrigeración	01 de octubre al 30 de noviembre de 2020	21 de diciembre de 2020	13 y 14 de diciembre de 2020
Peritos Electricistas	01 de octubre al 3 de noviembre de 2020	14 de diciembre de 2020	4, 5 y 6 de diciembre de 2020
Ayudantes de Peritos Electricistas	01 de octubre al 3 de noviembre de 2020	14 de diciembre de 2020	NO APLICA

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Autorizado por la Comisión Estatal de Elecciones (CEE)
OCE-SA-2020-106

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La Agencia Federal de Protección Ambiental
Anuncia el Plan Propuesto y Periodo de Comentarios
Para el Lugar de Superfondo Almacén de Plaguicidas I
Unidades Operacionales 1 y 2 – Suelo y Agua Subterránea
Arecibo, Puerto Rico

La Agenda Federal de Protección Ambiental (EPA por sus siglas en inglés) en colaboración con el Departamento de Recursos Naturales y Ambientales (DRNA), anuncia el comienzo de un periodo de treinta (30) días de comentario público sobre el Plan Propuesto para la remediación del lugar conocido como Almacén de Plaguicidas I (el Lugar), localizado en el municipio de Arecibo, Puerto Rico. La alternativa preferida por la EPA es la Alternativa 2 que corresponde a la excavación de suelos contaminados hasta 10 pies por debajo de la superficie del suelo, tratamiento en el Lugar y disposición fuera del Lugar; cubierta del restante subsuelo contaminado y controles institucionales. El Plan Propuesto describe las alternativas recomendadas y las razones para estas recomendaciones. Antes de seleccionar un remedio final, la EPA va a considerar los comentarios escritos y verbales recibidos durante este periodo de comentario público. Todos los comentarios (verbales y/o escritos) deberán ser recibidos en o antes del 29 de agosto de 2020. La EPA proveerá un resumen de todos los comentarios y sus respuestas en el Récord de Decisión para este Lugar.

Ataliales fines, y ante la emergencia de COVID-19, la EPA tendrá una presentación pregrabada del plan propuesto, la cual estará disponible a partir de 6 de agosto de 2020. Para información sobre el enlace de esta presentación electrónica puede llamar al 787-977-5814. El propósito de esta presentación es informarle a la comunidad sobre los hallazgos, conclusiones y recomendaciones de la investigación realizada en el lugar para la remediación del suelo, bajo la unidad operacional 1 (OU-1, por sus siglas en inglés) y agua subterránea, bajo la unidad operacional 2 (OU-2, por sus siglas en inglés). Además, se discutirán las alternativas de remediación recomendada. La EPA contestará preguntas o comentarios que el público pueda tener con relación a la investigación realizada y a la alternativa preferida presentada.

Las copias del Plan Propuesto y otros documentos relacionados al lugar estarán disponibles en el siguiente enlace de Internet que provee acceso al repositorio de información:

Enlace al repositorio de información: www.epa.gov/superfund/la-plata-warehouse-1

Comentarios escritos y por medio de mensaje de voz al Plan Propuesto deben ser enviados al siguiente enlace de Internet y número telefónico, respectivamente:

Comentarios escritos: santos.luis@epa.gov
Comentarios por mensaje de voz: 787-977-5814

Para más información, favor llamar al señor Luis Santos al (787) 977-5865.

Luis Santos
Gerente de Proyectos
Agenda Federal de Protección Ambiental, Región 2
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City View Plaza II- Suite 7000
48 RD. 165 Km. 1.2
Guaynabo, PR 00968-8069
Fax: (787) 289-7104
Email: santos.luis@epa.gov

U.S. Environmental Protection Agency
Announces Proposed Plan and Comment Period
For Pesticide Warehouse I Superfund Site
Operable Units 1 and 2 - Soil and Groundwater
Arecibo, Puerto Rico

The Environmental Protection Agency (EPA), in collaboration with the Department of Natural and Environmental Resources (DNER), is initiating a thirty (30) day public comment period on the Proposed Plan for the Remediation of the site known as Pesticide Warehouse I (Site), located in the municipality of Arecibo, Puerto Rico. EPA's preferred alternative is Alternative 2: Excavation of Contaminated Soil to 10 feet below ground surface, Onsite Treatment and Offsite Disposal, Covering of Remaining Contaminated Subsurface Soil, and Institutional Controls. The Proposed Plan describes the recommended alternatives and the reasons for these recommendations. Before deciding on a final remedial alternative EPA will consider the written and verbal comments received during this public comment period. All comments (written and/or verbal) must be received by August 29, 2020. EPA will provide a summary of all the comments and their responses in the Record of Decision for this Site.

To carry out this process, and in the wake of the COVID-19 emergency, EPA will make available a pre-recorded presentation on the proposed plan by August 6, 2020. For more information on the link to said presentation please call 787-977-5814. The purpose of this presentation is to inform the community about the findings, conclusions and recommendations of the research conducted at the Site for soil remediation under Operable Unit 1 (OU-1) and groundwater under Operable Unit 2 (OU-2). The recommended remediation alternative will also be discussed. EPA will be answering questions and comments from the public regarding the investigation and the preferred alternative.

Copies of the Proposed Plan and other supported documentation can be found in the following online link which holds the information repository:

Link to the Information Repository: https://www.epa.gov/superfund/pesticide-warehouse-1

Written comments can be sent to the following link and verbal comments can be left on the following phone number:

Written comments: santos.luis@epa.gov
Verbal comments: 787-977-5814

Feel free to contact Luis Santos (787) 977-5865 for more information

Luis Santos
Remedial Project Manager
U.S. Environmental Protection Agency
Caribbean Division
City View Plaza II – Suite 7000
48 RD, 165 Km. 1.2
Guaynabo, PR 00968-8069
Fax: (787) 289-7104
Email: santos.luis@epa.gov

CERTIFICATE OF TRANSLATOR

I, Aledawi Figueroa, hereby certify that I translated the attached document from Spanish into English and that, to the best of my ability, it is a true and correct translation. I further certify that I am competent in both Spanish and English to render and certify such translation. Should there be a misinterpretation in the translation, the original document in Spanish will prevail.

I also certify that I have no interest in the outcome of this matter and I have no relationship to any degree of consanguinity with the parties involved in it.

In Isabela, Puerto Rico, September 24, 2020.

Aledawi Figueroa Martínez
Smile Again Learning Center, Corp.
(787)872-5151 / (787)225-6332

APPENDIX IV

Proposed Plan and Fact Sheet (Spanish)

Almacen de Plaguicidas I
Unidad Operacional 1 – Suelo
Unidad Operacional 2 – Agua Subterránea

Arecibo, Puerto Rico
Julio 2020

EPA United States Environmental Protection Agency

APUNTE EN SUS CALENDARIO

PERIODO DE COMENTARIO PÚBLICO
30 de julio de 2020 - 29 de agosto de 2020

REPOSITORIO Y PRESENTACIÓN VIRTUAL
El 6 de agosto de 2020 una Presentación Virtual estará disponible en el siguiente enlace:
http://www.epa.gov/superfund/pesticide-warehouse-1

REPOSITORIO DE INFORMACIÓN

El Archivo de Registro Administrativo, que contiene copias del Plan Propuesto y la documentación de respaldo, está disponible en las siguientes ubicaciones:

Biblioteca municipal de Barceloneta
Horario: lunes a viernes de 9:00 a.m. a 3:00 p.m.

Agencia de Protección Ambiental de EE.UU.
City View Plaza II - Suite 7000
#48 RD, 165 Km. 1.2
Guaynabo, PR 00968-8069
(787) 977-5865
Horario: lunes a viernes de 9:00 a.m. a 5:00 p.m.
La oficina se encuentra cerrada debido a la pandemia.

Departamento de Recursos Naturales y Ambientales de Puerto Rico

Programa de Respuesta de Emergencia y Superfondo
Edificio de Agencias Ambientales Cruz A. Matos
Urbanización San José Industrial Park
1375 Avenida Ponce de León
San Juan, PR 00926-2604
(787) 767-8181 ext 3207
La oficina se encuentra cerrada debido a la pandemia.

Centro de Registros de la EPA de EE. UU., Región 2
290 Broadway, 18th Floor
New York, New York 10007-1866
(212) 637-4308
Horario: lunes a viernes de 9:00 a.m. a 5:00 p.m.
La oficina se encuentra cerrada debido a la pandemia.

HOJA INFORMATIVA
PROGRAMA DE SUPERFONDO
Almacén de Plaguicidas I

Arecibo, Puerto Rico
Julio 2020

Esta hoja informativa describe las alternativas de correctivas desarrolladas para el Almacén de Plaguicidas I (el Lugar), Unidad Operacional 1 (OU1, por sus siglas en inglés) que se ocupa de los suelos y la Unidad Operacional 2 (OU2, por sus siglas en inglés) que se ocupa del agua subterránea. El Lugar está ubicado en Arecibo, Puerto Rico, y la Agencia de Protección Ambiental de EE. UU. (EPA, por sus siglas en inglés) identifica en esta hoja informativa la alternativa preferida para el Lugar con la justificación de esta preferencia. Este documento fue desarrollado por la EPA, la agencia designada para coordinar las actividades del Lugar, en consulta con el Departamento de Recursos Naturales y Ambientales de Puerto Rico (DRNA), la agencia de apoyo. La EPA está emitiendo el Plan Propuesto como parte de sus responsabilidades de participación pública bajo la Sección 117 (a) de la Ley Integral de Respuesta, Compensación y Responsabilidad Ambiental, 42 U.S.C. § 9617 (a) (CERCLA, comúnmente conocido como Superfondo), y las Secciones 300.430 (f) y 300.435 (c) del Plan de Contingencia Nacional por la Contaminación de Petróleo y Sustancias Peligrosas (National Contingency Plan, NCP, por sus siglas en inglés).

La naturaleza y el alcance de la contaminación en el Lugar y las alternativas de remediación que se resumen en este documento se describen en detalle en los informes de Investigación de Remediación (RI, por sus siglas en inglés) y el Estudio de Viabilidad (FS, por sus siglas en inglés). Como se mencionó anteriormente, la EPA aborda el Lugar en dos unidades operacionales (OUs, por sus siglas en inglés) separadas. OU1 aborda la contaminación en el suelo y OU2 aborda las aguas subterráneas de todo el Lugar.

La alternativa preferida de la EPA para OU1 es la alternativa 2 (anteriormente la alternativa 5 en el FS):

598789

Excavación del suelo contaminado a una profundidad de 10 pies por debajo de la superficie del suelo, tratamiento en el Lugar y disposición fuera del Lugar, cubierta del restante subsuelo contaminado. Bajo esta alternativa, se excavará el suelo contaminado en los 10 pies superiores y se tratará antes de ser transportado fuera del Lugar para su disposición. Debido a que los suelos no excavados y más profundos (por debajo de 10 pies) permanecerían en niveles que no permitirían el uso sin restricciones (es decir, residencial), los controles institucionales restringirían el uso futuro del Lugar a usos no residenciales. La EPA ha determinado que no es necesaria ninguna acción para el agua subterránea (OU2).

ROL DE LA COMUNIDAD EN EL PROCESO DE SELECCIÓN

La EPA solicita el insumo del público para asegurar que las preocupaciones de la comunidad sean consideradas en la selección de una alternativa efectiva para cada Lugar de Superfondo. Para ello, este Plan Propuesto ha sido puesto a la disposición del público para un período de comentarios de 30 días que comienza con la emisión de este Plan Propuesto y concluye el 29 de agosto de 2020.

La EPA estará proporcionando información sobre la investigación y limpieza del Lugar al público por medio de una reunión pública y los repositorios de información, que contienen el expediente administrativo de esta decisión correctiva. La EPA anima al público a obtener una comprensión más completa sobre el lugar y sobre las actividades de Superfondo que se han realizado en el mismo.

La reunión pública a celebrarse durante el periodo de comentarios proporcionará información sobre las investigaciones completadas en el Lugar, las alternativas consideradas y la alternativa preferida, así como para recibir comentarios del público. Los comentarios recibidos en la reunión pública, así como los comentarios escritos recibidos, serán documentados en la sección “Resumen de Respuestas” del Récord de Decisión (ROD, por sus siglas en inglés), el documento que formaliza la selección de la alternativa.

Los comentarios escritos sobre este Plan Propuesto deben dirigirse a:

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ALCANCE Y ROL DE LA ACCIÓN A TOMAR

Debido a la complejidad del Lugar, la EPA está abordando la limpieza del Lugar en dos fases o unidades operacionales. La EPA ha designado dos unidades operacionales para este Lugar.

- OU1, aborda la contaminación del suelo
- OU2, contaminación del agua subterránea.

La EPA completó los estudios RI / FS para ambas unidades operacionales, cuyos resultados se presentan en el Plan Propuesto. Se espera que la Alternativa Preferida presentada aquí sea la acción final para el Lugar.

ANTECEDENTES DEL LUGAR

Descripción del Lugar

El Lugar es un almacén de plaguicidas inactivo ubicado en la carretera estatal PR 2, kilómetro 59.7, en un área rural / residencial de Arecibo, Puerto Rico. El Lugar cubre aproximadamente un acre y consta de un almacén principal, un almacén secundario más pequeño en la parte trasera de la propiedad y una pequeña cabaña de almacenamiento. Todos los edificios dentro del Lugar están en mal estado. Un pozo de suministro de agua (SW, por sus siglas en ingles) en el Lugar se encuentra a unos 180 pies al este del almacén principal, al norte de la ruta PR-2. La propiedad del Lugar está limitada al oeste, norte y este por las instalaciones de Mita Inc. y la propiedad agrícola. Más al este, al este de los campos de Mita Inc., hay un área con vegetación. El Lugar está limitado al sur por la carretera estatal No. 2 o PR-2.

Una zanja con vegetación de cuatro pies de profundidad corre paralela a la PR-2, al sur del SW en el Lugar y se expande hacia el área vegetada topográficamente más baja. No se han observado signos obvios de acumulación de escorrentía a lo largo de esta zanja de drenaje.

Historia del Lugar

La Autoridad de Tierras de Puerto Rico (PRLA, por sus siglas en inglés) es dueño de la propiedad Almacén de Plaguicidas I y realizó operaciones de mezcla y almacenamiento de plaguicidas desde 1953 hasta 2003. PRLA usó el Lugar para almacenar y / o diluir plaguicidas y fertilizantes para aplicaciones agrícolas en el cultivo de piña. A partir del 1 de octubre de 1999, la propiedad fue arrendada a Agrocampos, Inc., que también utilizó el Lugar para almacenar y / o diluir plaguicidas y fertilizantes para aplicaciones agrícolas.

Topografía

El Lugar está situado dentro de la provincia norteña de piedra caliza de Puerto Rico a una elevación de aproximadamente 95 metros (295 pies) sobre el nivel del mar. Las áreas que rodean el Lugar inmediatamente al este, oeste y sur son relativamente planas. Al norte del Lugar hay un área de mogotes empinados (colinas de piedra caliza). La topografía de la tierra al sur del Lugar está dominada por características kársticas; varios sumideros se encuentran dentro de una milla del Lugar.

Geología Regional Específica del Lugar

Los depósitos no consolidados en el Lugar se derivan de la erosión de la piedra caliza principal. Consisten en limo, limo y arcillas duras, rígidos, a menudo secos, arenosos y arcillosos. La piedra caliza de Aymamón se encuentra a profundidades entre 46 pies por debajo de la superficie del suelo y 70 pies por debajo de la superficie del suelo en el Lugar. La roca principal tiene una zona intemperizada superior de hasta 10 pies de espesor. La piedra caliza de Aymamón superior tiene zonas blandas, a veces llenas de arcilla, y la zona más profunda tiene características de solución, que incluyen cavidades y zonas de fractura.

Hidrogeología Regional Específica del Lugar

El agua subterránea del Lugar es parte del acuífero superior (compuesto por la roca caliza de Aymamón) a profundidades de aproximadamente 290 a 310 pies por debajo de la superficie del suelo. El acuífero superior no está confinado y se recarga a partir del drenaje superficial y la precipitación. El flujo de agua subterránea regional se dirige hacia el norte hacia Caño Tiburones y el Océano Atlántico. En el Lugar, el flujo de agua subterránea tiene un componente noreste en la porción oeste y un componente noroeste en la porción este.

Demografía

El Lugar está ubicado aproximadamente a ocho millas al sureste de Arecibo en una zona rural escasamente poblada a lo largo de la carretera PR 2. El Lugar se encuentra dentro del Barrio Sabana Hoyos de Arecibo. El núcleo principal de la población en el área es un sector residencial ubicado aproximadamente a una milla al suroeste del Lugar. El Barrio de Sabana Hoyos está compuesto por aproximadamente 10,745 habitantes según el Censo de los Estados Unidos de 2010. Según los informes del Departamento de Vivienda y Desarrollo Urbano de los Estados Unidos en el 2013, el ingreso familiar promedio es de $20,900 dólares.

Uso del Suelo y Agua Subterránea

La región se ha utilizado para la agricultura (principalmente el cultivo de piña) durante aproximadamente 100 años. El uso del suelo hacia el sur, el norte y el extremo este del Lugar es principalmente agrícola, aunque una fábrica de tuberías se encuentra inmediatamente al sur del Lugar y una antigua planta farmacéutica se encuentra a unos 3,500 pies al este del Lugar.

La Junta de Planificación de Puerto Rico (JP) tiene jurisdicción sobre el uso del terreno y la zonificación en Puerto Rico. El uso de la tierra, bajo el subprograma de Planes de Uso de Terrenos de la JP por medio del Plan de Uso de Terrenos (PUT) aprobado en el 2015, tiene la responsabilidad de crear instrumentos de planificación física para promover el uso óptimo del uso de la tierra en Puerto Rico, estableciendo los parámetros, pautas y reglas sobre cómo y dónde se permitirán actividades sociales y económicas específicas como base para la toma de decisiones y de conformidad con las normas y estrategias de desarrollo adoptadas por la JP. El PUT de Puerto Rico es el principal instrumento de planificación en Puerto Rico. La zonificación establece el uso y la intensidad de uso que es aplicable a una parcela de tierra o sector, como parte de un proceso de planificación para promover el desarrollo, la conservación, la construcción, la explotación, el cultivo, la contemplación del paisaje o la ubicación del terreno. infraestructuras y servicios.

El uso del terreno que aplica en el Lugar es Suelo Rústico Especialmente Protegido - Agricultura (SREP-A). Según el PUT, el objetivo de SREP-A es guiar el uso de las tierras con valor agrícola o ganadero, con actividades presentes o potenciales, para protegerlas a fin de que la tierra se dedique a actividades agrícolas. La EPA ha consultado con las autoridades municipales y el Estado Libre Asociado de Puerto Rico sobre los usos futuros esperados de la propiedad y ha concluido que el uso futuro de la tierra sin restricciones (por ejemplo, desarrollo residencial) no está planificado.

La Autoridad de Acueductos y Alcantarillados de Puerto Rico suministra la mayor parte del agua potable a la región de Arecibo; por lo tanto, no se espera un uso futuro de agua subterránea potable en el Lugar.

Drenaje de Aguas Superficiales e Interacción con el Agua Subterránea

El Lugar está ubicado dentro de la cuenca del Caño Tiburones entre el área de drenaje del Río Grande de Manatí al este y el área de drenaje del Río Grande de Arecibo al oeste. No hay cuerpos de agua superficiales ni humedales en el Lugar; sin embargo, un estanque de sumidero se encuentra al sur del Lugar en el lado sur de

PR 2. El estanque de sumidero recibe principalmente escorrentía de los campos adyacentes al sur y al este. Una zanja de drenaje de aguas superficiales corre desde la plataforma de mezcla en el extremo sur del almacén principal hacia el este-sureste hacia PR-2. La zanja se descarga al área con vegetación al este del Lugar. La zanja está seca, excepto durante los eventos de precipitación.

Investigaciones Previas del Área de Estudio

Reconocimiento del Lugar Realizado por la EPA (marzo de 1996)

La EPA realizó una investigación de reconocimiento del Lugar y observó vegetación estresada o falta de esta en la propiedad, pero se encontró vegetación sin estrés inmediatamente fuera de la verja de la propiedad. La EPA también observó una limpieza deficiente y disposición en el Lugar de botellas vacías de plaguicidas, etiquetas y bolsas de productos; residuos visibles de plaguicidas en varios lugares de la propiedad; y un residuo blanco a lo largo de un camino de escorrentía superficial que comenzó en la plataforma de mezcla frente al almacén principal y continuó a lo largo de una zanja de drenaje paralela a la PR 2, pasando un pozo de suministro de agua en la propiedad del Lugar y entrando en un área con vegetación.

Inspección del Lugar por la EPA (mayo de 1996)

En mayo de 1996, la EPA realizó una Investigación del Lugar (SI, por sus siglas en inglés) que incluyó la toma de muestras de suelo superficial en toda la propiedad y dos muestras de agua subterránea del pozo que se encuentra en el Lugar. Los resultados del suelo superficial indicaron la presencia de varios plaguicidas. Los resultados del agua subterránea también mostraron la presencia de plaguicidas. En diciembre de 2001, la EPA realizó un reconocimiento de seguimiento y nuevamente observó una limpieza deficiente en toda la propiedad.

Orden Administrativa (mayo de 2007)

La EPA emitió dos Órdenes Administrativas de Consentimiento (Órdenes de Consentimiento), que entraron en vigor el 9 de mayo de 2007. Las Órdenes de Consentimiento requerían que los Demandados realizaran un RI / FS para cada unidad operable en el Lugar de Almacén de Plaguicida I, OU1 (Suelos) y OU2 (Agua subterránea). PRLA no cumplió con las órdenes de consentimiento; por lo tanto, la EPA decidió hacerse cargo de ambas unidades operacionales y consolidarlas en un solo RI / FS.

Área de Estudio Investigaciones Correctivas

Las actividades de investigación de campo de RI incluyeron las siguientes actividades principales:

OU1

- Detección de suelo superficial (0 a 2 pies por debajo de la superficie del suelo) utilizando kits de prueba de campo para plaguicidas
- Muestras y análisis de suelos superficiales y subsuperficiales para plaguicidas de la lista de objetivos compuestos (TCL), dioxinas / furanos, diuron y metales de la lista de analitos objetivo (TAL) (incluyendo el cianuro y el mercurio)
- Muestras y análisis de suelo de trasfondo para plaguicidas TCL, dioxinas / furanos, diuron y metales TAL (incluyendo el cianuro y mercurio)
- Muestras y análisis de pedazos de concreto para plaguicidas TCL, plaguicidas del procedimiento de lixiviación característica de toxicidad (TCLP), metales TAL (incluyendo el cianuro y mercurio) y metales TCLP y muestras de toallas para plaguicidas TCL y metales TAL
- Muestras y análisis de suelos superficiales y subsuperficiales en el antiguo tanque de almacenamiento subterráneo (UST, por sus siglas en inglés) para los compuestos orgánicos de la gama diésel (DRO, por sus siglas en inglés) de hidrocarburos totales de petróleo (TPH, por sus siglas en inglés) y los compuestos orgánicos de la gama de gasolina (GRO, por sus siglas en inglés)
- Muestras y análisis de aguas superficiales y sedimentos para plaguicidas TCL y metales TAL (incluyendo el mercurio y cianuro)

OU2

- Video de registro de los pozos
- Instalación y desarrollo de pozos.
- Monitoreo a largo plazo del nivel del agua.
- Mediciones sinópticas del nivel del agua.
- Muestras y análisis de los pozos de agua subterránea para plaguicidas TCL, diuron, dioxinas / furanos y metales TAL (incluyendo el cianuro y mercurio). Las muestras también se analizaron para los parámetros de calidad del agua: sólidos suspendidos totales (TSS, por sus siglas en inglés), sólidos disueltos totales (TDS, por sus siglas en inglés), carbono orgánico total (TOC, por sus siglas en inglés), aniones principales (nitrato, cloruro, bicarbonato, sulfato y fosfato), cationes principales (calcio, magnesio, sodio y potasio) y alcalinidad.

Naturaleza y Alcance de la Contaminación

La naturaleza y el alcance de la contaminación se determinó comparando los resultados analíticos de plaguicidas y dioxinas / furanos en el suelo, el agua subterránea, los sedimentos y las aguas superficiales con los criterios de detección del Lugar. Los datos del suelo se compararon con los Objetivos de Remediación Preliminares (PRGs, por sus siglas en inglés) desarrollados para el Lugar OU1 del Almacén de Plaguicidas III los cuales son ambientalmente similar. Los resultados analíticos para el arsénico se compararon con los niveles de trasfondo calculados específicamente para el Lugar.

Selección de Contaminantes Relacionados con el Lugar

Para enfocar la evaluación de los datos de contaminantes, se seleccionaron contaminantes relacionados con el Lugar (SRCs, por sus siglas en inglés), en función del historial de uso del Lugar y la frecuencia de detección en los medios del Lugar, particularmente en el suelo. El plaguicida dieldrín se detectó con mayor frecuencia a concentraciones superiores a los criterios de detección. El plaguicida más frecuentemente detectado en el suelo fue el toxafeno; también es el cuarto plaguicida detectado con mayor frecuencia por encima de los criterios de detección. Aldrina fue el segundo plaguicida detectado con mayor frecuencia por encima de los criterios de detección. La dioxina / furanos, expresada como el equivalente tóxico (dioxin TEQ, por sus siglas en inglés) de 2,3,7,8 tetraclorodibenzo-p-dioxina (TCDD, por sus siglas en inglés), es un subproducto altamente tóxico de algunos plaguicidas y se detectó en los suelos del Lugar. El arsénico, un componente de ciertos plaguicidas, frecuentemente excedió su criterio de detección y con frecuentemente excedió su nivel de trasfondo de suelo específico calculado para el Lugar.

Por lo tanto, se seleccionaron dieldrín, toxafeno, aldrina, dioxina y arsénico como SRCs y se utilizaron para evaluar la distribución de contaminantes en todos los medios del Lugar.

Alcance de la Contaminación del Suelo

Las figuras 2-8, 2-9 y 4-6 muestran la contaminación a concentraciones superiores a los PRGs. Se encontró contaminación por plaguicidas en todo el Lugar en las siguientes áreas generales:

- La esquina noroeste (cerca de la fosa de disposición);
- La esquina noreste (cerca del manchado y dron de almacenamiento);
- El lado oeste del almacén principal (donde el drenaje del piso descargaba al suelo);
- Sur y este de la antigua plataforma de mezcla
- En la zanja de drenaje al norte de PR 2.

El alcance vertical de la contaminación por plaguicidas en los suelos varia de 0 a 2 pies por debajo de la superficie del suelo a 18 a 20 pies por debajo de la superficie del suelo. La contaminación profunda ocurrió en las esquinas noroeste y sureste del Lugar. En otros lugares, las concentraciones de plaguicidas disminuyeron a mayor profundidad. El toxafeno tuvo la concentración máxima más alta de los SRCs para plaguicidas.

La distribución del suelo contaminado con dioxinas, según definido por el criterio de PRG (18 ng / kg) (Figura 2-8), es muy similar a la contaminación por plaguicidas. El suelo contaminado con dioxinas también se encuentra en suelos superficiales (0 a 2 pies por debajo de la superficie) en el área a lo largo del límite norte de la propiedad.

La contaminación más profunda del suelo con dioxinas sobre el PRG se extiende al menos a 6 pies por debajo de la superficie del suelo en cuatro áreas del Lugar: la esquina noroeste (cerca de la fosa de disposición), a lo largo del lado noroeste del almacén principal, en la línea de propiedad al este del área de mezcla, y en la zanja de drenaje al norte de PR-2. Aunque todavía está por encima del criterio de detección en estos lugares, la concentración de dioxina disminuye significativamente con la profundidad.

El alcance lateral de arsénico en el suelo, según lo definido por el valor específico de trasfondo para el Lugar de 41.5 mg / kg, es similar al alcance lateral de la contaminación por plaguicidas; sin embargo, el alcance vertical es muy diferente. Las áreas con concentraciones de arsénico elevadas consistentemente mayores que las concentraciones de trasfondo específicos para el Lugar incluyen:

- La esquina noroeste (en la fosa de disposición y el área de la pila de tierra);
- Sur y este de la antigua plataforma de mezcla; y
- En la vía de drenaje al norte de PR-2.

A diferencia de los plaguicidas, la contaminación por arsénico en los suelos superficiales (0 a 2 pies por debajo de la superficie del suelo) se limitó mayormente a los suelos en la esquina noroeste del Lugar cerca de la fosa de disposición de residuos y el área de la pila de suelo. En la mayoría de las áreas del Lugar, las concentraciones más altas de arsénico estaban presentes en los suelos subsuperficiales, estando generalmente más elevadas en el intervalo de 8 a 10 pies por debajo de la superficie del suelo. La contaminación más profunda se encontró

principalmente en la esquina noroeste (la fosa de disposición y el área de la pila de tierra), cerca de la antigua plataforma de mezcla (al sur de la plataforma y al este a lo largo de la vía de "derrame"), y dentro de la mitad del este de la vía de drenaje al norte de PR-2.

La mayoría de la contaminación que excede los PRGs (90 por ciento) se encuentra en los diez pies de la parte superior del suelo.

Alcance de la Contaminación del Agua Subterránea

La contaminación por plaguicidas en el agua subterránea se encontró solo en uno de los tres eventos de muestreo y solo en la zona menos profunda de un pozo (SW). El agua subterránea en esta ubicación también puede incluir un componente de contaminación regional, ya que se encontraron plaguicidas en los pozos de suministro actuales y anteriores en ubicaciones de gradientes laterales que no se consideran afectados por el Lugar.

Se considera que la contaminación por dioxinas en el agua subterránea en el SW del Lugar y los pozos de monitoreo del Lugar está relacionada con las actividades del Lugar, pero también puede incluir contribuciones regionales. La dioxina en el agua subterránea no excedió el Estándar Nacional de Agua Potable Primaria, o MCL, de 3 ng / L.

El arsénico y el cromo no se detectaron por encima de los estándares de agua potable en ninguna de las muestras de agua subterránea.

Alcance de la Contaminación de Sedimentos y Aguas Superficiales

La contaminación por plaguicidas relacionada con el Lugar en los sedimentos (dieldrín) y las aguas superficiales (dieldrín y toxafeno) está restringida al área del agua estancada cerca de la antigua plataforma de mezcla (SE-1 / SW-1).

Arsénico se detectó en todas las muestras de sedimentos en concentraciones superiores a su criterio, pero muy por debajo de los niveles de trasfondo del Lugar para el suelo.

El arsénico solo se detectó por encima de los criterios de aguas superficiales en la ubicación de SW-4. En esta ubicación se encontraron concentraciones elevadas de casi todos los analitos inorgánicos debido a su elevada turbidez.

Extensión de la Contaminación de la Muestra de Pedazos y Paños de Concreto

Dieciocho plaguicidas fueron detectados en pedazos de concreto del almacén principal; se detectaron 12 plaguicidas en las muestras de paños. Se detectó arsénico en todas las muestras. Se detectó mercurio en una muestra y se detectó cianuro en la mayoría de las muestras excepto en dos muestras.

Se detectaron ocho plaguicidas y cuatro metales en los procedimientos de lixiviación característico de toxicidad (TCLP, por sus siglas en inglés), pero no en concentraciones que excedieran los límites reglamentarios de la Ley de Conservación y Recuperación de Recursos (RCRA) para desechos peligrosos.

Desperdicio de Amenaza Principal

El NCP establece una expectativa de que la EPA utilizará el tratamiento para abordar las principales amenazas que se plantean para un lugar en la medida 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 de Superfondo. Un material de origen es un material que incluye o contiene sustancias peligrosas, contaminantes que actúan como reservorio para la migración de la contaminación al agua subterránea, superficial o al aire, o que actúa como fuente de exposición directa. El agua subterránea contaminada generalmente no se considera un material de origen; sin embargo, los líquidos de fase no acuosa (NAPLs, por sus siglas en inglés) en el agua subterránea se pueden ver como material de origen. El desperdicio de amenaza principal son aquellos materiales de origen considerados altamente tóxicos o altamente móviles que generalmente no se pueden contener de manera confiable, o presentarían un riesgo significativo para la salud humana o el medio ambiente en caso de exposición. No se observaron plaguicidas en muestras de suelo a concentraciones que presentan un riesgo significativo (por ejemplo, generalmente mayor que $1x10^{-3}$). Además, los suelos contaminados parecen tener poco impacto en las aguas subterráneas. Basado en el riesgo relativamente bajo y la movilidad limitada, el suelo contaminado en el Lugar no se considera un desperdicio de amenaza principal, sino más bien un desperdicio de amenaza de bajo nivel.

RESUMEN DE RIESGOS DEL LUGAR

El propósito de la evaluación del riesgo es identificar riesgos potencialmente cancerígenos y no-cancerígenos, peligros a la salud en un Lugar, asumiendo que no se tome ninguna acción correctiva. Se realizó una evaluación para riesgo a la salud humana

(HHRA, por sus siglas en inglés) para evaluar los riesgos de cáncer actuales y futuros, y los riesgos para la salud no relacionados con el cáncer basados en los resultados del RI.

Una evaluación de riesgo ecológico a nivel de detección (SLERA, por sus siglas en inglés) también se llevó a cabo para evaluar el riesgo que representa la contaminación relacionada con el Lugar a los receptores ecológicos.

Evaluación para Riesgo a la Salud Humana

El HHRA caracterizó los riesgos potenciales para la salud humana asociados con el Lugar en ausencia de cualquier acción correctiva. Las potenciales vías de exposición se definen en función a las posibles áreas de origen, los mecanismos de descarga y los usos actuales y futuros del Lugar. Basado en la zonificación actual y el uso potencial futuro, la evaluación de riesgos se enfocó en varios receptores potenciales al suelo. Estos receptores incluyen un intruso actual / futuro, un futuro residente, un futuro trabajador y un futuro trabajador de la construcción. No hay usuarios actuales de aguas subterráneas no tratadas en el Lugar; sin embargo, la evaluación de riesgos evaluó la posible exposición de los residentes y trabajadores a las aguas subterráneas, en caso de que se utilice para fines de consumo de agua potable en el futuro.

Para caracterizar los posibles efectos en la salud no relacionados al cáncer, se hacen comparaciones entre el consumo estimado de sustancias y los umbrales de toxicidad. Los efectos potenciales del cáncer se evalúan calculando las probabilidades de que una persona desarrolle cáncer durante una exposición de por vida según las ingestas proyectadas y la información de dosis-respuesta específica del producto químico. En general, la EPA recomienda un rango de riesgo de cáncer de 1×10^{-6} (1 en 1 millón) a 1×10^{-4} (1 en 10,000) y un índice no cancerígeno de riesgo para la salud (HI, por sus siglas en inglés) de la unidad (1) como valores de umbral para el potencial impactos a la salud humana.

¿QUÉ ES EL RIESGO Y CÓMO SE CALCULA?

Evaluación de Riesgos para la Salud Humana:
Una evaluación de riesgo de salud humana base de Superfundo es un análisis de los posibles efectos adversos para la salud causados por la liberación de sustancias peligrosas de un Lugar en ausencia de acciones para controlar o mitigar estos usos actuales y futuros de la tierra. Se utiliza un proceso de cuatro pasos para evaluar los riesgos de salud humana relacionados con el Lugar para escenarios razonables de exposición máxima.

Identificación de Riesgos: En este paso, los contaminantes primarios de preocupación potencial (COPCs, por sus siglas en ingles) en el Lugar en varios medios (es decir, suelo, aguas subterráneas, aguas superficiales y aire) se identifican en función de factores como la toxicidad, la frecuencia de ocurrencia y el destino y transporte de contaminantes en el medio ambiente, concentraciones de contaminantes en medios específicos, movilidad, persistencia y bioacumulación.

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

Evaluación de Toxicidad: en este paso, se determinan los tipos de efectos adversos para la salud asociados con 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 químicos específicos y pueden incluir el riesgo de desarrollar cáncer a lo largo de la vida u otros riesgos para la salud no cancerígenos, como cambios en las funciones normales de los órganos dentro del cuerpo (por ejemplo, cambios en la efectividad del sistema inmune). Algunas sustancias químicas son capaces de causar riesgos para la salud tanto cancerígenos como no cancerígenos.

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 riesgos para la salud no cancerígenos. La probabilidad de que un individuo desarrolle cáncer se expresa como una probabilidad. Por ejemplo, un riesgo de cáncer de 10^{4} significa "uno de cada diez mil de riesgo de cáncer en exceso"; 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 regulaciones actuales de Superfundo para exposiciones identifican el rango para determinar si la acción correctiva es necesaria como un riesgo de cáncer individual excesivo de por vida de 10^{-4} a 10^{-6}, correspondiente a un riesgo de cáncer excesivo de uno en diez mil a uno en un millón. Para efectos sobre la salud no cancerosos, se calcula un "índice de peligro" (HI). El concepto clave para un HI no cancerígeno es que existe un umbral (medido como un HI menor o igual a 1) por debajo del cual no se espera que ocurran riesgos de salud no cancerosos. El objetivo de la protección es 10^{-6} para el riesgo de cáncer y un HI de 1 para un peligro para la salud no relacionado con el cáncer. Los productos químicos que exceden un riesgo de cáncer de 10^{-4} o un HI de 1 son típicamente aquellos que requerirán una acción correctiva en el Lugar y se denominan contaminantes de interés (COC por sus siglas en inglés) en la decisión correctiva final o en el Registro de la Decisión.

El riesgo total estimado de cáncer para el futuro residente ($1x10^{-3}$) excede el rango de riesgo de la EPA bajo una exposición máxima razonable (RME, por sus siglas en inglés), cuando se consideraron todas las rutas de exposición. Sin embargo, cuando lo separan los medios, el riesgo del agua subterránea solamente es de $4x10^{-4}$, o solo en el extremo superior del rango de riesgo, suponiendo (conservadoramente) que el cromo es cien por ciento hexavalente. Es más probable que la mayoría del cromo esté en forma trivalente, lo que daría lugar a riesgos que estarían dentro del rango de riesgo. El riesgo solo del suelo fue de $7x10^{-4}$, principalmente por la

exposición a dioxina, dieldrín y cromo. Los riesgos estimados de cáncer para futuros trabajadores ($2x10^{-4}$) estaban en el límite superior del rango de riesgo de la EPA, principalmente debido a dieldrín, arsénico y cromo en aguas subterráneas y dieldrín, dioxina, arsénico y cromo en el suelo superficial. Sin embargo, cuando los medios se separan, el riesgo solo del agua subterránea es $1x10^{-4}$, o solo en el extremo superior del rango de riesgo. El riesgo solo del suelo fue de $9x10^{-5}$, que está dentro del rango de riesgo de cáncer. Los riesgos estimados de cáncer RME para los intrusos actuales / futuros y la exposición de los futuros trabajadores de la construcción al suelo en el Lugar, están dentro del rango de riesgo de cáncer de la EPA.

El total de HIs no cancerígenos se evaluaron para ambos adultos y niños residentes. El HI total no cancerígeno para el futuro residente está por encima del umbral de unidad (1) de la EPA bajo el escenario de RME y se debe principalmente a la posible exposición a dioxina y dieldrín en el suelo. Para el niño residente bajo el escenario de RME, el HI total (20) no cancerígeno esta por encima del umbral de unidad de la EPA debido a las posibles exposiciones a la dieldrín y la dioxina en el suelo. El total de HI no cancerígeno para los trabajadores está por encima del nivel de unidad de la EPA; sin embargo, los HI de órgano / efecto de objetivo individuales son menores o iguales a 1. El total de HI no cancerosos de RME para el intruso actual o futuro y el futuro trabajador de la construcción están por debajo del nivel 1 de la EPA, lo que indica que no se espera que ocurran efectos no cancerígenos debido a exposición al suelo en el Lugar. Los riesgos no cancerígenos por la exposición al agua subterránea estaban por debajo del umbral de 1 de la EPA para todos los receptores de contaminantes relacionados con el Lugar.

Evaluación De Riesgos Ecológicos

Evaluación de Riesgos Ecológicos del Nivel de Detección (SLERA)

Se realizó un SLERA para evaluar el potencial de riesgos ecológicos por la presencia de contaminantes en el suelo superficial, los sedimentos y las aguas superficiales. El SLERA se enfocó en evaluar el potencial de impactos a receptores ecológicos sensibles a los componentes de interés relacionados con el Lugar por medio de la exposición al suelo en la propiedad del Almacén de Plaguicidas I. Las concentraciones del suelo superficial se compararon con los valores de detección ecológica como un indicador del potencial de efectos adversos para los receptores ecológicos. Se puede encontrar un resumen completo de todos los escenarios de exposición en el SLERA.
Suelo superficial: existe la posibilidad de efectos adversos para los receptores ecológicos (invertebrados, reptiles, anfibios, aves y mamíferos) por la exposición al suelo superficial contaminado. Se excedieron los criterios de detección del suelo superficial para plaguicidas (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, aldrín, alfa-clordano, diazinón, dieldrín, diuron, endosulfán I, endosulfán II, endrina aldehído, gamma-BHC (lindano), gamma-clordano, heptacloro, metoxicloro y toxafeno), congéneres de dioxina / furano y metales (antimonio, arsénico, cadmio, cromo, plomo, manganeso, mercurio, selenio, vanadio y zinc), que dio como resultado HIs superiores al valor aceptable de 1. Los principales factores de riesgo fueron identificados como plaguicidas y dioxinas / furanos. Es probable que varios metales (arsénico, cromo, mercurio, selenio y vanadio) sean compuestos relacionados con el Lugar que también se asociaron con un riesgo ecológico inaceptable.

Sedimento: existe la posibilidad de efectos adversos a los receptores ecológicos de los plaguicidas (dieldrín y gamma-clordano) y metales (arsénico, cadmio, cromo, cobre, cianuro, hierro, plomo, mercurio y zinc) en los sedimentos. Dado que la mayoría de las muestras de sedimentos se tomaron fuera del Lugar, los COPECs inorgánicos encontrados en los sedimentos están potencialmente relacionados con la erosión del suelo y la escorrentía del sitio, ya que todos los COPECs de sedimentos también se identificaron como COPECs del suelo. Las muestras que se tomaron de sedimento provenían de áreas que retienen agua después de la lluvia y de los canales de drenaje y no de muestras de sedimento verdaderas.

Agua superficial: existe la posibilidad de efectos adversos a los receptores ecológicos de los metales en aluminio, bario, berilio, cadmio, calcio, cromo, cobalto, cobre, cianuro, hierro, plomo, manganeso, níquel, vanadio y zinc. Todos los COPECs tenían concentraciones máximas detectadas fuera del Lugar, pero debido a que se detectaron tantos inorgánicos en suelos en el Lugar, es probable que estos inorgánicos también sean COPECs relacionados con el Lugar. Las muestras tomadas de agua superficial provenían de áreas que retienen agua después de la lluvia y de los canales de drenaje, no son verdaderas muestras de agua superficial.

En general, los resultados de SLERA indican un riesgo para los receptores ecológicos por la exposición a los suelos del Lugar. Los principales factores de riesgo consisten en plaguicidas, seguidos de dioxinas / furanos y metales basados en niveles detectados que exceden consistentemente el nivel de detección ecológica (ESLs, por sus siglas en inglés) en el suelo, los sedimentos y las aguas superficiales. Además de los HQs elevados tanto para plaguicidas como para dioxinas, la cantidad de contaminantes detectados también fue notable. Se detectaron un total de 20 plaguicidas en el suelo, con 13 excedentes de ESL. Se detectaron diecisiete

congéneres de dioxina / furano en el suelo, y todos menos uno, excedieron los ESL.

Existe un mayor potencial de exposición por los receptores terrestres que los receptores acuáticos en y adyacentes al Lugar. La zanja de drenaje hacia el sureste fluye hacia un estanque de sumidero, pero no parece haber conexiones sustanciales de agua superficial a arroyos y ríos cercanos. Hay un hábitat terrestre más adecuado al norte del Lugar, en el Bosque Estatal de Cambalache, y la mayor movilidad y acceso al Lugar de los receptores terrestres aumentaría el potencial de exposición de los receptores que viajan al Lugar desde ese hábitat cercano a suelos contaminados, sedimentos y aguas superficiales; sin embargo, el terreno limitaría la exposición a receptores terrestres menos móviles (es decir, reptiles, pequeños mamíferos). La vegetación limitada en el Lugar podría facilitar la pérdida de suelo superficial por medio de la erosión durante vientos fuertes o eventos de lluvia, extendiendo así la contaminación a los hábitats terrestres y acuáticos cercanos.

Aunque existe poco hábitat adecuado para receptores ecológicos en el Lugar, hay hábitat adecuado para mamíferos, aves, herpetofauna e invertebrados que rodean el Lugar. Los receptores con movilidad limitada o ninguna movilidad, como las plantas y los invertebrados del suelo, están en mayor riesgo que las especies más móviles como receptores como es el caso de los mamíferos y las aves. La cantidad de COPECs, la magnitud de sus excedencias de ESL y la frecuencia de detección, y la proximidad al bosque estatal sugieren que los riesgos ecológicos debido a la contaminación relacionada con el Lugar son potencialmente sustanciales a nivel de la población y la comunidad. Dado este potencial, se justifica una acción correctiva para los contaminantes del suelo para reducir o limitar la exposición de los receptores ecológicos a los suelos del Lugar para proteger el medio ambiente de las emisiones reales o amenazadas de sustancias peligrosas.

Basado en los resultados de las evaluaciones de riesgo ecológico y de salud humana, la EPA considera que la Alternativa Preferida identificada en el Plan Propuesto para el suelo es necesaria para proteger la salud pública, el bienestar o el medio ambiente de las emisiones reales o amenazadas de sustancias peligrosas. La opinión actual de la EPA es que no es necesaria alguna acción para el agua subterránea para garantizar la protección de la salud pública y el medio ambiente.

OBJETIVOS DE ACCIÓN CORRECTIVA

Los objetivos de acción remedial (RAOs, por sus siglas en inglés) son metas específicas para proteger la salud humana y el ambiente. Estos objetivos están basados en información disponible y estándares, tales como requisitos aplicables o relevante y apropiados (ARARs, por sus siglas en inglés), guías a ser consideradas (TBC, por sus siglas en inglés) y niveles específicos basados en el Lugar.

Los riesgos inaceptables para la salud humana se asociaron con la exposición al suelo. Se ha determinado que los riesgos ecológicos de la exposición al suelo contaminado son inaceptables. Se asume que los riesgos para los receptores ecológicos se mitigarían mediante la implementación de alternativas correctivas para los receptores humanos. El uso futuro de la tierra del Lugar también sería industrial y probablemente no conduciría a un hábitat ecológico.

Se evaluó el impacto en la ruta del agua subterránea y no hay pruebas suficientes de que los suelos del Lugar estén actuando actualmente como una fuente continua de contaminación del agua subterránea. El nivel freático, que se encuentra entre 290 y 310 pies por debajo de la superficie del suelo, está separado de las áreas de contaminación del suelo por más de 290 pies de suelos no saturados. Dado que la contaminación del suelo ha estado presente en el Lugar por hasta 60 años, hay poca evidencia de transporte de los contaminantes a suelos más profundos por medio de la filtración de lluvia durante ese tiempo. Además, los plaguicidas y los compuestos de dioxina / furano que se han identificado como COCs en el suelo tienen una solubilidad muy baja en el agua, se adsorben fuertemente en los suelos y, por lo tanto, no son muy móviles.

Los riesgos de la ingestión de agua subterránea estaban justo en el extremo superior del rango de riesgo de la EPA, suponiendo (conservadoramente) que el cromo es cien por ciento hexavalente. Es más probable que la mayoría del cromo esté en forma trivalente, lo que daría lugar a riesgos que estarían dentro del rango de riesgo.

Los resultados de las aguas subterráneas en el monitoreo y los pozos de suministro de las investigaciones de campo estuvieron por debajo de los MCLs federales y, a menudo, no se detectaron. Los pozos en el Lugar, no se utilizan actualmente. Los plaguicidas encontrados en pozos de suministro fuera del Lugar no se consideran relacionados a las actividades del Lugar, lo que indica un impacto regional por el uso de plaguicidas. Por lo tanto, no se propone ninguna acción para las aguas subterráneas.

Se identificaron los siguientes RAOs preliminares para la contaminación del suelo en función de los riesgos para la salud humana (futuro trabajador) asociados con las condiciones futuras del uso del suelo:

- Prevenir exposición de receptores humanos de los contaminantes en el suelo que resulten en peligros cancerígenos y no cancerígenos en la salud en exceso del rango de riesgo aceptable de la EPA; y
- Administrar el Lugar de manera que se minimice la exposición de los receptores ecológicos a los COCs que resulten en un HQ mayor que 1

Objetivos Preliminares de Remediación

El desarrollo de los PRGs es un requisito del NCP (40 CFR 300.430 (e) (2) (i)). La identificación y selección de los PRGs se basa típicamente en RAOs, los usos actuales y futuros del suelo y los ARARs identificados tentativamente. Los PRGs típicamente se presentan como valores específicos de químicos y medios que abordan directamente los RAOs. Estos valores se usan típicamente como un valor preliminar en el FS para guiar las evaluaciones de alternativas correctivas.

No existen ARARs federales promulgados o del Estado Libre Asociado, específicos de químicos para el suelo. Por lo tanto, los PRGs para suelos basados en el riesgo se calcularon para el escenario de exposición industrial en función de un riesgo de cáncer de $1x10^{-6}$ y para un cociente de riesgo objetivo no cancerígeno de 1 tomando en cuenta el uso futuro anticipado del suelo. Para el arsénico, el cálculo estadístico de las concentraciones de arsénico en suelos que no son del Lugar (de trasfondo) se ha adaptado como el PRG.

PRGs para Contaminantes de Preocupación en el Suelo (todas las concentraciones en mg / kg)	
Contaminantes de Preocupación	**Objetivo de Remediación**
Dieldrina	0.14
2,3,7,8-TCDD TEQ	2.2×10^{-5}
Arsénico	41.5

RESUMEN DE ALTERNATIVAS REMEDIALES

La ley de CERCLA § 121 (b) (1), 42 U.S.C. § 9621 (b) (1), exige que las medidas correctivas sean de protección a la salud humana y el medio ambiente, sean costo efectivas, y utilicen soluciones permanentes y tecnologías alternativas de tratamiento y alternativas de recuperación de recursos en la mayor medida que se posible. La Sección 121 (b) (1) también establece una preferencia por las medidas remediales que emplean, como elemento principal, el tratamiento para reducir de forma permanente y significativamente el volumen, toxicidad, o la movilidad de las sustancias peligrosas, y contaminantes en un Lugar. CERCLA § 121 (d), 42 USC § 9621 (d), específica además que una acción correctiva debe alcanzar un nivel o un estándar de control en las sustancias peligrosas y contaminantes, que al menos alcance los ARARs bajo las leyes federales y estatales, a menos que una dimisión puede justificarse en virtud de CERCLA § 121 (d) (4), 42 USC § 9621 (d) (4).

Los plazos de tiempo que se presentan a continuación para cada alternativa sólo reflejan el tiempo necesario para construir o implementar el remedio y no incluyen el tiempo requerido para diseñar el remedio, negociar el desempeño del remedio de existir partes potencialmente responsables, o procurar contratos para el diseño y construcción.

Los estimados de gastos, que se basan en la información disponible, son estimados de orden de magnitud de costos de ingeniería que se espera que estén dentro de +50 a -30 por ciento del costo real del proyecto.

Basado en una selección de las alternativas desarrolladas en el FS, varias alternativas (Alternativas 2, 3, 4 y 7 del FS) no se llevaron al Plan Propuesto. Por favor refiérase al reporte del FS para obtener más información sobre estas alternativas.

Las siguientes alternativas se consideran en este Plan propuesto:

Alternativa 1: No requiere Acción

Costo Capital Total	$ 0
Costo del O&M	$ 0
Valor Neto Presente	$ 0
Tiempo Estimado de Construcción	N/A
Tiempo Estimado para Lograr RAOs	N/A

El NCP requiere la Alternativa 1 como base ambiental comparativa para que proporcione una guía para comparar los impactos de las otras alternativas correctivas. No se iniciarían actividades de remoción y / o remediación en el Lugar para abordar el suelo contaminado por encima de las PRGs o de otra manera mitigar los riesgos asociados a la salud humana por la exposición a la contaminación del suelo por encima de las PRGs.

Alternativa 2 (anteriormente 5 en el FS): Excavación de Suelo Contaminado hasta 10 pies por debajo de la superficie del suelo, Tratamiento en el Lugar y Disposición fuera del Lugar, Cubierta del Restante Subsuelo Contaminado y Controles Institucionales

Costo Capital Total	$17,265,000
Costo del O&M	$316,000
Valor Neto Presente	$17,581,000
Tiempo Estimado de Construcción	Un año
Tiempo Estimado para Lograr RAOs	Un año

Bajo la Alternativa 2, el suelo contaminado en concentraciones que exceden los PRGs en los 10 pies superiores se excavará y el suelo contaminado excavado que contiene residuos peligrosos característicos de RCRA se ubicarán en una pila en el Lugar y se trataría térmicamente ex situ antes de su disposición en un vertedero RCRA Subtitulo D en la isla.

La desorción térmica ex situ utiliza extracción por calor y al vacío para movilizar y eliminar contaminantes del suelo. Los pozos de calentamiento por conducción térmica (TCH, por sus siglas en inglés) se colocarían en un patrón de cuadricula dentro de la pila de suelo. Los pozos de TCH calientan el suelo a la temperatura deseada que se medirá por termopares colocados en la pila de suelo. A la temperatura deseada, la presión de vapor y la difusividad del contaminante aumentan, y su viscosidad disminuye. Como resultado, aumenta la velocidad de evaporación y la movilidad del contaminante, y los contaminantes y el agua contenida en el suelo se vaporizan. Los pozos de extracción de vapor del suelo colocados en la en la pila se utilizarían para eliminar el vapor del suelo. El gas extraído y el agua se tratan por medio de sistemas de tratamiento de vapor y líquido.

El objetivo del volumen total de suelo contaminado para ser excavado bajo la Alternativa 2 es de aproximadamente 14,100 yardas cúbicas (YC). La huella de la excavación requiere que los edificios restantes deteriorados en el Lugar sean demolidos. Además, los datos del Lugar sugieren que es probable que haya contaminación debajo de la losa del edificio. Según los resultados de las muestras del RI, aproximadamente 3,900 YC del material excavado contiene concentraciones de plaguicidas y contaminantes de dioxinas, que requieren tratamiento para cumplir con los requisitos de disposición del suelo antes de la disposición en un vertedero RCRA Subtítulo D. Se estima que 1,410 CY del material excavado puede tener concentraciones de contaminantes de cromo que requieran tratamiento y se dispongan como residuos peligrosos característicos de RCRA en una instalación en los Estados Unidos continentales. Un muestreo adicional en el diseño lo confirmará.

Las concentraciones de contaminantes que exceden los PRGs a profundidad se cubrirían con una malla de alambre, se instalaría una barrera de plástico permeable como advertencia de que excavar más abajo es posible estar expuestos a los contaminantes del suelo. El área total del suelo contaminado que queda después de la excavación a 10 pies por debajo de la superficie del suelo bajo esta alternativa es de aproximadamente 5,300 pies cuadrados. El relleno limpio y la capa superficial del suelo de 6 pulgadas se usarían para reemplazar el suelo removido después de la excavación. Después de colocar la capa superficial del suelo, el área se sembraría para establecer vegetación para restaurar el área.

Se espera que esta alternativa elimine el noventa por ciento de la contaminación que excede los PRGs. Debido a que los suelos no excavados y más profundos (por debajo de 10 pies) permanecerían en niveles que no permitirían el uso sin restricciones (es decir, residencial), los controles institucionales restringirían el uso futuro del suelo en el Lugar a usos no residencial.

Los pozos en el Lugar serán protegidos y reparados durante la construcción, así como muestreados, si es necesario para evitar impactos al agua subterránea.

La Alternativa 2 requeriría revisiones de cinco años como lo exige CERCLA ya que el suelo contaminado a concentraciones que exceden un escenario de uso ilimitado / exposición sin restricciones permanecería en el Lugar. Las revisiones de cinco años del Lugar evaluarían si se proporciona una protección adecuada de la salud humana ya que el suelo contaminado se mantendría por encima de las PRGs a una profundidad de 10 pies en el Lugar.

Alternativa 3 (anteriormente 6 en el FS): Consolidación en el Lugar con un Recubrimiento Diseñado, Controles Institucionales y Monitoreo

Costo Capital Total	$2,599,000
Costo del O&M	$316,000
Valor Neto Presente	$2,915,000
Tiempo Estimado de Construcción	Un año
Tiempo Estimado para Lograr RAOs	Un año

La Alternativa 3 proporciona protección de la salud humana por medio de controles institucionales (controles administrativos y de acceso) junto con medidas correctivas (excavación, consolidación, construcción de cubierta geosintética de múltiples capas y cubierta vegetal) para limitar la exposición a los contaminantes. Bajo esta alternativa, todo el suelo

contaminado en concentraciones mayores que los PRGs fuera de los límites del área de consolidación se excavaría para su consolidación y recubrimiento.

Las áreas excavadas se rellenarían con relleno limpio. El objetivo del volumen total de suelo contaminado para ser excavado y consolidado en el Lugar bajo la Alternativa 3 es de aproximadamente 9,800 YC.

Las estructuras existentes y las losas de concreto en el Lugar serían demolidas y removidas para permitir la construcción del área de consolidación. Además, los datos del Lugar sugieren que es probable que haya contaminación debajo de la losa del edificio. Se construiría una cubierta geosintética de múltiples capas sobre el material consolidado para mitigar los riesgos de exposición inaceptables para los humanos. La extensión estimada para el área de consolidación bajo la Alternativa 3 es de aproximadamente 61,900 pies cuadrados, que es un poco más pequeña que el área de la propiedad del Lugar porque el área de consolidación no está en el área de excavación. El montículo consolidado tendría aproximadamente 10 pies de altura. Los pozos en el Lugar estarían protegidos y reparados durante la construcción, y se tomarían muestras, si es necesario para evitar impactos al agua subterránea.

Los controles institucionales implicarían medidas administrativas y legales (por ejemplo, restricciones de uso de la tierra) y / o medidas informativas (por ejemplo, actividades de concienciación en la comunidad) destinadas a informar al público sobre los riesgos y controlar actividades o usos del suelo contaminado en el Lugar que podrían representar un riesgo a receptores humanos por encima de los PRGs y para salvaguardar la integridad de esta alternativa.

Se desarrollaría un programa de inspección y mantenimiento a largo plazo para garantizar que el recubrimiento diseñado proporcionaría protección continua a la salud humana. Las inspecciones pueden programarse anualmente y después de cada evento de tormenta severa. Las inspecciones controlarían la vegetación, la erosión y cualquier daño causado por los animales. Si se observa erosión o daño al recubrimiento diseñado, se tomarían medidas para reparar el daño y mantener la integridad del recubrimiento diseñado.

La Alternativa 3 requeriría revisiones cada cinco años como lo exige CERCLA ya que el suelo contaminado en concentraciones que exceden un escenario de uso ilimitado / exposición sin restricciones permanecería en el Lugar. Las revisiones de cinco años del Lugar evaluarían si se proporciona una protección adecuada de la salud humana, ya que el suelo contaminado permanecería por encima de los PRGs en el Lugar. El monitoreo del Lugar (que consiste únicamente en inspecciones visuales no intrusivas) también se realizaría solo según sea necesario para completar las revisiones del Lugar de cinco años.

Alternativa 4 (anterior 8 en el FS): Excavación de Suelo Contaminado, Tratamiento en el Lugar y Disposición Fuera del Lugar

Costo Capital Total	$18,217,000
Costo del O&M	$230,000
Valor Neto Presente	$18,447,000
Tiempo Estimado de Construcción	One Año
Tiempo Estimado para Lograr RAOs	One Año

La Alternativa 4 es similar a la Alternativa 2, con la excepción de que el suelo contaminado se excavaría a una profundidad de 20 pies por debajo de la superficie del suelo. La Alternativa 4 supone que el suelo contaminado excavado que contiene residuos peligrosos característicos de RCRA que contienen plaguicidas se almacenaría en el Lugar y se trataría térmicamente para que se "des-caracterice" antes de disponerlo en un vertedero de RCRA Subtítulo D en la isla. Un muestreo adicional en el diseño lo confirmará.

El volumen total identificado de suelo contaminado para ser excavado bajo la Alternativa 4 es de aproximadamente 15,200 YC. Se estima que 3,900 YC del material excavado contiene concentraciones de plaguicidas y contaminantes de dioxinas que requieren tratamiento para cumplir con los requisitos de disposición de la tierra antes de la disposición en un vertedero RCRA Subtítulo D en la isla. Según los resultados de las muestras del RI, un estimado de 1,520 YC del material excavado contendría concentraciones de contaminantes de cromo que requieren tratamiento y disposición como residuos peligrosos característicos de RCRA en una instalación en los Estados Unidos continentales. La huella de la excavación requeriría que los edificios restantes deteriorados en el Lugar sean demolidos. Además, los datos del Lugar sugieren que es probable que haya contaminación debajo de la losa del edificio.

Los pozos en el Lugar serán protegidos y reparados durante la construcción y tomar muestras si es necesario para evitar impactos al agua subterránea.

La Alternativa 4 requeriría revisiones de cinco años como lo exige CERCLA, ya que el suelo contaminado a concentraciones que exceden un escenario de uso ilimitado / exposición sin restricciones permanecería en el Lugar. Las revisiones de cinco años del Lugar evaluarían si se proporciona una protección adecuada de la salud humana, ya que los PRGs no residenciales se están aplicando al Lugar.

NUEVE CRITERIOS DE EVALUACIÓN PARA ALTERNATIVAS CORRECTIVAS 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 cumpliera 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 implementar una alternativa y los riesgos que la alternativa puede representar para los trabajadores, los residentes y el medio ambiente durante la implementación.
La implementación es la viabilidad técnica y administrativa de implementar 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 considera si el Estado Libre Asociado (la agencia de apoyo, DRNA) está de acuerdo, se opone o no tiene comentarios sobre la alternativa preferida.
La aceptación de la comunidad se evaluará en el ROD y se refiere a la respuesta general del público sobre las alternativas descritas en el Plan Propuesto y los informes del RI / FS. Los comentarios recibidos sobre el Plan Propuesto es un indicador importante de la aceptación de la comunidad.

EVALUACIÓN DE ALTERNATIVAS CORRECTIVAS

Estos criterios se desarrollaron para abordar los requisitos legales y las consideraciones para acciones correctivas según el NCP y consideraciones técnicas y políticas adicionales que han demostrado ser importantes para seleccionar entre alternativas correctivas (EPA 1988). Las siguientes subsecciones describen los nueve criterios de evaluación alternativos utilizados en el análisis detallado de alternativas correctivas y la prioridad en la que se consideran los criterios.

Protección General De La Salud Humana Y El Medio Ambiente

De las cuatro alternativas retenidas, solo la alternativa de no acción (es decir, la Alternativa 1) no proporcionaría protección para la salud humana (futuro residente o trabajador) y no abordaría los RAOs para los suelos contaminados.

Las Alternativas 2, 3 y 4 protegerían la salud humana y el medio ambiente. La Alternativa 2 logra los RAO del suelo por medio de la excavación del suelo contaminado que excede los PRGs a una profundidad de 10 pies, el tratamiento del suelo excavado según sea necesario y el relleno con una barrera de demarcación, relleno limpio y capa vegetal sobre el suelo contaminado restante. La Alternativa 3 logra los RAOs del suelo por medio de la consolidación y contención (recubrimiento) del suelo contaminado. El recubrimiento proporcionaría una barrera que rompería la vía de exposición a los receptores humanos. La alternativa 4 logra los RAO del suelo por medio de la excavación, el tratamiento según sea necesario y la disposición fuera del Lugar del suelo contaminado que excede los PRGs a una profundidad de 20 pies.

Cumplimiento con los ARARs

Los ARAR claves específicos y de acción se aplican al manejo y disposición de desechos generados por la remediación de suelos contaminados en el Lugar. Los ARAR relacionados con la gestión y disposicion de residuos se centran en los residuos peligrosos que pueden estar presentes en los suelos contaminados generados (es decir, excavados o extraídos) durante la remediación de la contaminación del suelo.

La Alternativa 1 no alcanzaría los ARARs ya que no se tomarían medidas correctivas para eliminar o tratar el suelo contaminado. Las alternativas restantes, Alternativas 2, 3 y 4, alcanzarían los PRGs mediante la remoción, contención o tratamiento del suelo contaminado. Las Alternativas 2, 3 y 4 se implementarían para cumplir con los ARARs específicos de acción y ubicación.

Efectividad a Largo Plazo y Permanencia

La Alternativa 1 no proporciona efectividad y permanencia a largo plazo ya que no se toman medidas correctivas. La alternativa 3 brinda protección al evitar la exposición humana al suelo contaminado por medio de un recubrimiento diseñado. Sin embargo, bajo esta alternativa, la contaminación del suelo se deja en su lugar y el remedio requeriría mantenimiento a largo

plazo para garantizar la protección. Además, esta alternativa resultaría en la creación de un montículo de 10 pies en un área generalmente plana, lo que podría generar problemas de drenaje. El suelo contaminado que se queda en el Lugar debajo de la cubierta y podría presentar un riesgo de exposición a los receptores humanos si las cubiertas estuvieran comprometidas. Se implementarían controles institucionales para proteger las cubiertas y restringir los usos futuros del suelo y proveer concienciación sobre los riesgos de la posible exposición al suelo contaminado por encima de los niveles de preocupación específicos del Lugar.

La Alternativa 2 incluye la excavación del suelo contaminado que excede los PRGs a una profundidad de 10 pies y cubierta del restante subsuelo contaminado. La Alternativa 4 excavaría el suelo contaminado a una profundidad de 20 pies y no requeriría ninguna cubierta del suelo contaminado restante. Bajo las Alternativas 2 y 4, los residuos peligrosos característicos de RCRA relacionados con plaguicidas serían tratados térmicamente en el Lugar antes de ser transportados al vertedero RCRA Subtítulo D en la isla de Puerto Rico para su disposición. La disposición del suelo contaminado que exceda los PRGs pero que no contenga residuos peligrosos característicos de RCRA podría eliminarse en el vertedero de RCRA Subtítulo D en la isla de Puerto Rico. El suelo contaminado y el suelo tratado térmicamente con concentraciones de cromo consideradas como residuos peligrosos característicos de RCRA se dispondrán en una instalación de tratamiento y disposición permitida en los Estados Unidos.

Reducción de la Toxicidad, Movilidad o Volumen por Medio de Tratamiento

La Alternativa 1 no proporciona una reducción de la toxicidad, la movilidad o el volumen por medio del tratamiento, ya que el tratamiento no es un componente de estas alternativas.

La Alternativa 3 no satisface la preferencia legal para el tratamiento como elemento principal de la acción correctiva, ya que no se realizaría un remedio de tratamiento activo.

Las alternativas 2 y 4 incluyen el tratamiento térmico del suelo contaminado excavado que se considera residuo peligroso característico para cumplir con los requisitos de disposición del suelo antes de su disposición en un vertedero RCRA Subtítulo D en la isla de Puerto Rico. Sin embargo, el suelo contaminado y el suelo tratado térmicamente con concentraciones de cromo consideradas como residuos peligrosos característicos de RCRA se colocarían en contenedores y se enviarían RCRA Subtítulo D. Sin embargo, el suelo contaminado y el suelo tratado térmicamente con concentraciones de a los Estados Unidos continentales para su tratamiento (solidificación / estabilización) y disposición. Dado que la Alternativa 2 deja algo de contaminación por debajo de diez pies. Por lo tanto, esta alternativa solo cumple parcialmente con una reducción de toxicidad, movilidad o volumen por medio del tratamiento.

Efectividad a Corto Plazo

La Alternativa 1 no representaría riesgos a corto plazo para la comunidad, y no habría impactos ambientales adversos; sin embargo, la protección en un plazo razonable no se lograría con esta alternativa.

Las Alternativas 2, 3 y 4 involucrarían la alteración de la superficie del suelo contaminado y el transporte de suelo limpio para relleno o construcción de cubiertas. Las Alternativas 2 y 4 incluirían el transporte de la contaminación excavada para su disposición fuera del Lugar. A diferencia de la Alternativa 3, las Alternativas 2 y 4 requerirían la instalación de líneas eléctricas y un alto uso de energía, lo que podría plantear impactos adicionales a corto plazo para el medio ambiente.

Bajo las tres alternativas, los trabajadores del Lugar seguirían los planes de salud y seguridad aprobados y usarían el equipo de protección personal apropiado para minimizar la exposición a la contaminación y como protección contra riesgos físicos. También habría la posibilidad de aumentar el tráfico local. Los impactos relacionados con el polvo se mitigarían mediante la implementación de medidas de descontaminación y prácticas de supresión de polvo. Se implementaría un plan de control de tráfico para reducir la posibilidad de accidentes de tráfico.

Implementación

Como no se toman medidas correctivas bajo la Alternativa 1, esta alternativa sería la más fácil de implementar, tanto técnica como administrativamente.

La Alternativa 3 utiliza técnicas, prácticas y materiales de construcción estándar para la construcción de recubrimiento; no requeriría el manejo de los residuos peligrosos característicos de RCRA; y no requeriría la instalación y operación de un sistema de tratamiento térmico.

Las Alternativas 2 y 4 requerirían la movilización de un sistema de tratamiento de remediación térmica a la isla de Puerto Rico. Estas alternativas incluirían la excavación, el almacenamiento en pila y el tratamiento de residuos peligrosos, y la disposición de suelos contaminados tratados y no peligrosos en el vertedero

cromo consideradas como residuos peligrosos característicos de RCRA se colocarían en contenedores

y se enviarían a los Estados Unidos continentales para su tratamiento (solidificación / estabilización) y disposición.

Costo

Los costos de valor presente para todas las alternativas se evaluaron durante un período de 30 años utilizando una tasa de descuento del siete por ciento. Los costos de estas alternativas se resumen en la siguiente tabla:

Alt	Costo Capital Total/$	Costo del O&M/$	Valor Neto Presente/$
1	0	0	0
2	$17,265,000	$316,000	$17,581,000
3	$ 2,599,000	$316,000	$2,915,000
4	$18,217,000	$230,000	$18,447,000

Estado Libre Asociado/ Aceptación de Agencia de Apoyo

El DRNA está de acuerdo con el remedio preferido en esta Hoja Informativa.

Aceptación comunitaria

La aceptación de la comunidad de la Alternativa Preferida será evaluada después de que termine el periodo público de comentarios y se describirá en la sección “Resumen de Respuestas” del ROD. El ROD es el documento que formaliza la selección del remedio para el Lugar.

ALTERNATIVA PREFERIDA

La Alternativa Preferida de la EPA es la alternativa 2: excavación de suelos contaminados hasta 10 pies por debajo de la superficie del suelo, tratamiento en el Lugar y disposición fuera del Lugar, cubierta del restante subsuelo contaminado con una barrera de demarcación, relleno limpio y capa vegetal, y controles institucionales.

La Alternativa Preferida tratará el suelo con características peligrosas de RCRA usando tratamiento térmico, usando una unidad de tratamiento temporera traída al Lugar. El volumen total esperado de suelo contaminado para ser excavado bajo esta alternativa es de aproximadamente 14,100 YC. Según los resultados de las muestras del RI, se estima que 3,900 YC del material excavado contiene concentraciones de plaguicidas y contaminantes de dioxina que requieren tratamiento para cumplir con los requisitos de disposición de la tierra antes de la eliminación en un vertedero RCRA Subtítulo D en la isla. Se estima que 1,410 YC del material excavado contienen concentraciones de contaminantes de cromo que requieren tratamiento y disposición como residuos peligrosos característicos de RCRA en una instalación en los Estados Unidos continentales.

Debido a que los suelos no excavados y aquellos por debajo de 10 pies por debajo de la superficie del suelo permanecerían cubiertos a niveles que no permitirían el uso sin restricciones (es decir, residencial), los controles institucionales restringirían el uso futuro del suelo en el Lugar a usos no residenciales. El estimado costo actual de la alternativa preferida es de $17,581,000.

Este remedio también incluye revisiones cada cinco años para asegurar la protección a largo plazo del remedio

Bases para la Preferencia de Remediación

Se cree que la Alternativa Preferida proporciona el mejor equilibrio de compensaciones entre las alternativas basadas en la información disponible para la EPA en este momento. La EPA y el DRNA creen que la alternativa preferida sería proteger la salud humana y el medio ambiente, cumplir con los ARARs, ser costo efectivo y utilizar soluciones permanentes y tecnologías de tratamiento alternativas. Requerirá menos mantenimiento a largo plazo que la Alternativa 3 y no dará como resultado que se coloque un montículo de 10 pies en un área generalmente plana, lo que podría generar problemas de drenaje. Además, la Alternativa 2 permitirá que el Lugar sea devuelto a uso comercial a un costo menor que la Alternativa 4.

Los beneficios ambientales del remedio preferido pueden ser potenciados por la consideración, durante el diseño, de tecnologías y prácticas que sean sostenibles, de acuerdo con la Política Energética Verde de la EPA

Región 2. Esto incluiría la consideración de tecnologías prácticas de remediación verdes. La EPA y el DRNA esperan que la alternativa preferida pueda satisfacer los siguientes requisitos reglamentarios de la sección de CERCLA 121 (b): 1) ser de protección de la salud humana y el medio ambiente; 2) cumplir con ARARs; 3) ser costo efectivo; 4) utilizar soluciones permanentes y tecnologías de tratamiento alternativas o tecnologías de recuperación de recursos a la medida posible; y 5) satisfacer la preferencia por el tratamiento como elemento principal. La EPA evaluará la modificación de criterios de aceptación de la comunidad en el ROD al cierre del período de comentarios público.

PARTICIPACIÓN COMMUNITARIA

La EPA y el DRNA proporcionan información sobre la limpieza del Lugar al público por medio de reuniones, el archivo de registro administrativo del Lugar y los anuncios publicados en el periódico local. La EPA y el DRNA alientan al público a obtener una comprensión más integral del Lugar y las actividades de Superfondo que se han llevado a cabo allí.

La EPA, en consulta con el DRNA, seleccionará el remedio final para el sitio después de revisar y considerar toda la información presentada durante un período de comentarios públicos de 30 días. La EPA, en consulta con el DRNA, puede modificar la alternativa preferida o seleccionar otra acción presentada en esta Hoja Informativa basado en nueva información o comentarios públicos. Por lo tanto, se alienta al público a revisar y comentar sobre todas las alternativas presentadas en este documento.

Las fechas para el período de comentario público; la fecha, el lugar y la hora de la reunión pública; y las ubicaciones de los archivos de Registro Administrativo se proporcionan en la portada de esta Hoja Informativa.

Para obtener más información sobre el Lugar del Superfondo, Almacén de Plaguicidas I, comuníquese con:

Luis Santos
Gerente de Proyectos Remediales
787-977-5824
santos.luis@epa.gov

Brenda Reyes
Enlace Comunitaria
787-977-5869
reyes.brenda@epa.gov

Los comentarios por escrito sobre el Plan Propuesto deben enviarse en o antes del 29 de agosto de 2020 al Sr. Luis Santos a la dirección o correo electrónico a continuación.

Agencia de Protección Ambiental de los Estados Unidos
City View Plaza II - Suite 7000
48 RD, 165 Km. 1.2
Guaynabo, PR 00968-8069
santos.luis@epa.gov

El enlace público para la Región 2 de la EPA es:
George H. Zachos
Enlace Publico Regional
Número gratuito: (888) 283-7626
(732) 321-6621

EPA Región 2 de EE. UU.
2890 Woodbridge Avenue, MS-211
Edison, New Jersey 08837-3679

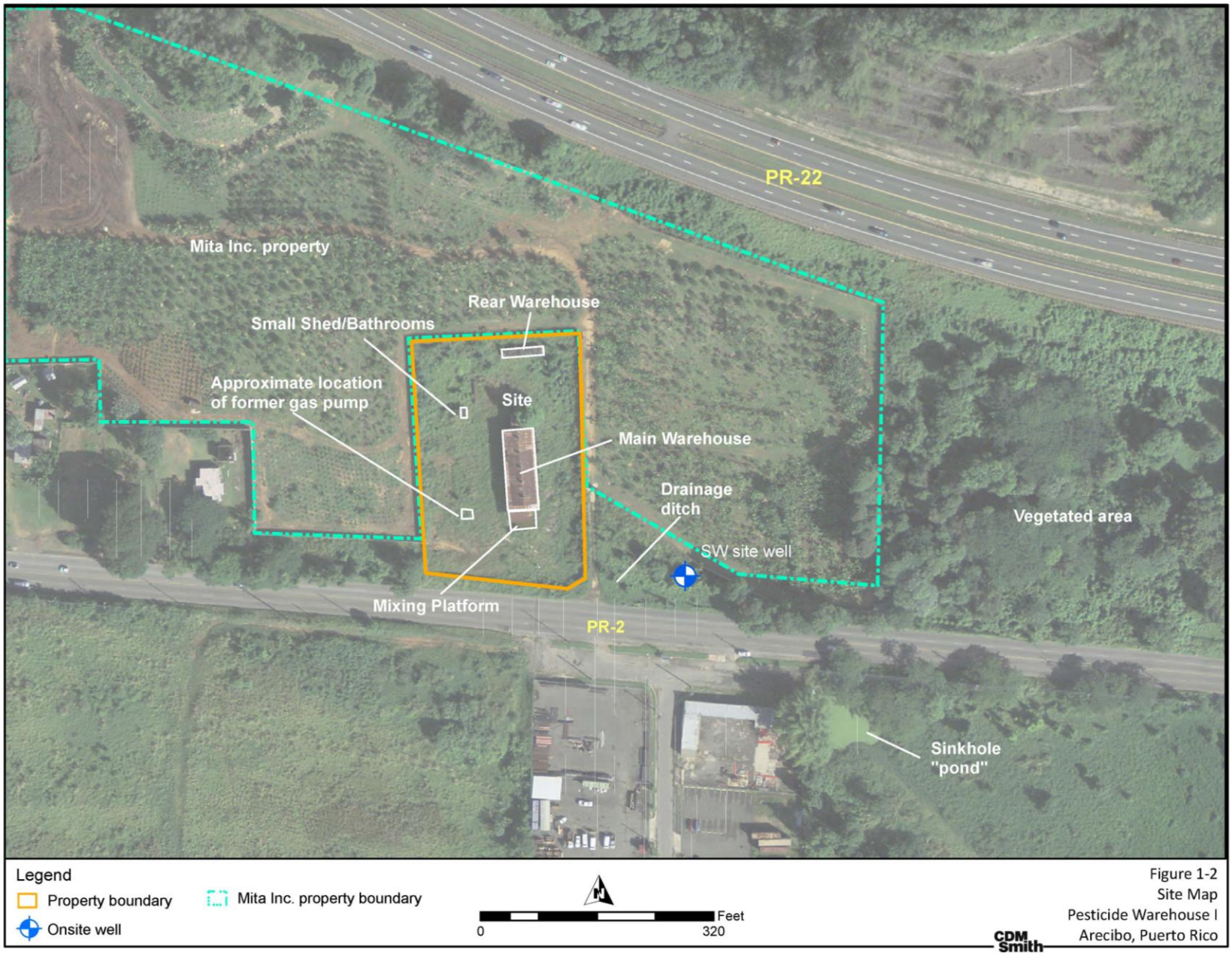

Figure 1-2
Site Map
Pesticide Warehouse I
Arecibo, Puerto Rico

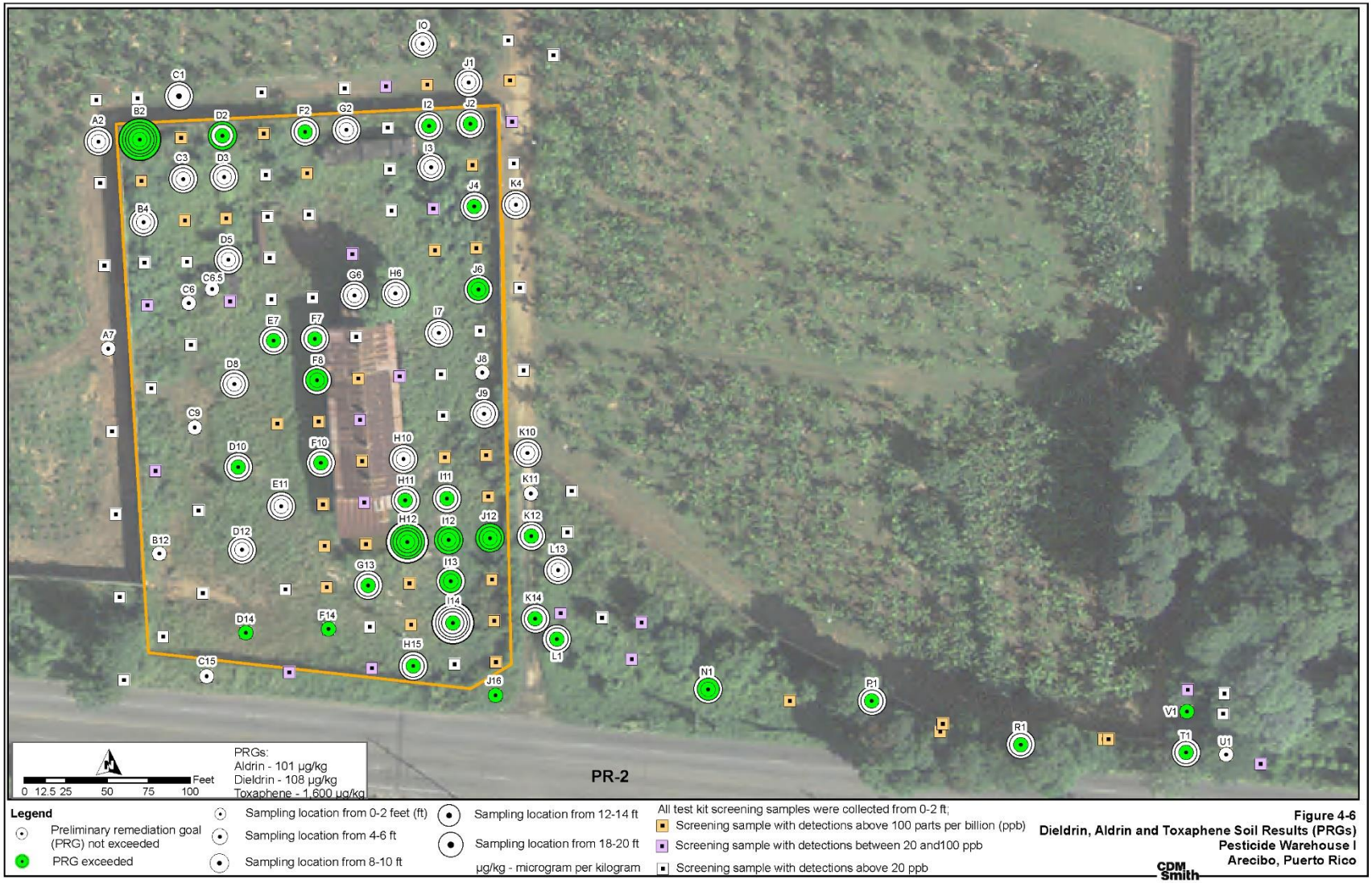

Figure 4-6
Dieldrin, Aldrin and Toxaphene Soil Results (PRGs)
Pesticide Warehouse I
Arecibo, Puerto Rico

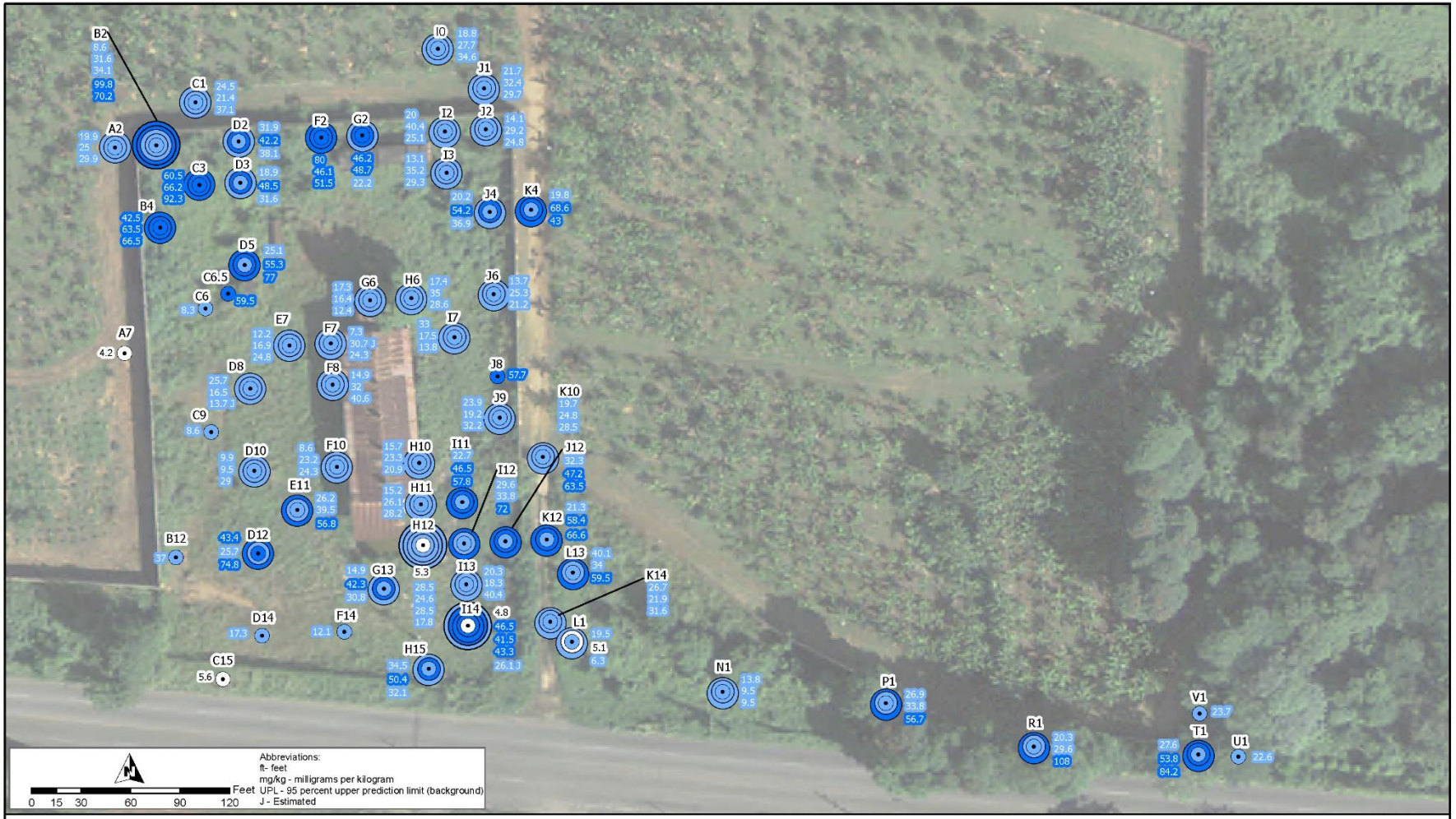

Figure 2-9
Arsenic Soil Results
Pesticide Warehouse I
Arecibo, Puerto Rico

Superfund Program
U.S. Environmental Protection Agency
Region 2
Proposed Plan

Pesticide Warehouse I
Operable Units (OUs) 1 and 2
Arecibo, Puerto Rico

July 2020

EPA ANNOUNCES PROPOSED CLEANUP PLAN

This Proposed Plan describes the remedial alternatives developed for the Pesticide Warehouse I Superfund Site (Site), Operable Unit 1 (OU1) that addresses soils and Operable Unit 2 (OU2) that addresses groundwater. The Site is located in Arecibo, Puerto Rico, and the U.S. Environmental Protection Agency (EPA) identifies in this Proposed Plan the preferred alternative for the Site with the rationale for this preference. This document was developed by EPA, the lead agency for Site activities, in consultation with the Puerto Rico Department of Natural and Environmental Recourses (DNER), the support agency. 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, 42 U.S.C. § 9617(a) (CERCLA, commonly known as Superfund), and Sections 300.430(f) and 300.435(c) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The nature and extent of the contamination at the Site and the remedial alternatives summarized in this document are described in detail in the Remedial Investigation (RI) and Feasibility Study (FS) reports. As mentioned above, EPA is addressing the Site in two operable units (OUs). OU1 addresses the contamination of the soil media, and OU2 addresses the site-wide groundwater.

EPA's Preferred Alternative for OU1 is Alternative 2 (formerly Alternative 5 in the FS):

MARK YOUR CALENDAR

PUBLIC COMMENT PERIOD
July 30, 2020 – August 29, 2020

VIRTUAL PRESENTATION
On August 6, 2020 a Virtual Presentation will be available at the following link: www.epa.gov/superfund/pesticide-warehouse-1

INFORMATION REPOSITORY
The Administrative Record file, which contains copies of the Proposed Plan and supporting documentation, is available online at:

https://www.epa.gov/superfund/pesticide-warehouse-1
and the following locations:

Barceloneta Municipal Library
Hours: Monday – Friday 9:00 am to 3:00 pm

U.S. Environmental Protection Agency
City View Plaza II- Suite 7000
#48 PR-165 Km. 1.2
Guaynabo, PR 00968-8069
(787) 977-5865
Hours: Monday – Friday 9:00 am to 5:00 pm
Office is closed due to the pandemic.

Puerto Rico Department of Natural & Environmental Recourses
Emergency Response and Superfund Program
Edificio de Agencias Ambientales Cruz A. Matos
Urbanización San José Industrial Park
1375 Avenida Ponce de León
San Juan, PR 00926-2604
(787) 767-8181 ext 3207
Hours: Monday – Friday 9:00 am to 3:00 pm
Office is closed due to the pandemic.

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
Office is closed due to the pandemic.

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Excavation of Contaminated Soil to 10 feet below ground surface, Onsite Treatment and Offsite Disposal, Covering of Remaining Contaminated Subsurface Soil, and Institutional Controls. Under this Alternative, contaminated soil in the upper 10 feet would be excavated and treated before being transported off-site for disposal. Because unexcavated and deeper soils (below 10 feet) would remain at levels that would not allow for unrestricted (i.e., residential) use, institutional controls would restrict the future use of the Site to nonresidental uses. EPA has determined that no action is necessary for groundwater (OU2).

COMMUNITY ROLE IN SELECTION PROCESS

EPA relies 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, this Proposed Plan has been made available to the public for a 30-day public comment period, which begins with the issuance of this Proposed Plan and concludes on August 29, 2020.

EPA is providing information regarding the investigation and cleanup of the Site to the public through a public meeting and the public repositories, which contain the administrative record file for this remedial decision. EPA encourages the public to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted there.

The public meeting held during the comment period is to provide information regarding the Site investigations, the alternatives considered, and the preferred alternative, as well as to receive public comments. Comments received at the public meeting, as well as written comments during the public comment period, will be documented in the Responsiveness Summary Section of the Record of Decision (ROD), the document that formalizes the selection of the remedy.

Written comments on this Proposed Plan should be addressed to:

Luis E. Santos
Remedial Project Manager
U.S. Environmental Protection Agency
City View Plaza II - Suite 7000
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Telephone: (787) 977-5869
E-mail: santos.luis@epa.gov

SCOPE AND ROLE OF ACTION

Because of the complexity of the Site, EPA is addressing the cleanup of the Site in two phases or OUs. EPA has designated two operable units for this Site.

- OU1, addresses soil contamination
- OU2, groundwater contamination

EPA completed RI/FS studies for both OUs, the results of which are presented in this Proposed Plan. The Preferred Alternative presented here is expected to be the final action for the Site.

SITE BACKGROUND

Site Description

The Site is an inactive pesticide storage warehouse facility located at State Road No. 2, kilometer 59.7, in a rural/residential area of Arecibo, Puerto Rico. The Site occupies approximately one acre and consists of a main warehouse, a smaller secondary warehouse in the rear of the property, and a small storage shed. All onsite buildings are in a dilapidated state. An onsite water supply well (SW) is located about 180 feet east of the main warehouse, north of Route PR-2. The Site property is bounded to the west, north, and east by the Mita Inc. facility and agricultural property. Further to the east, east of the Mita Inc. fields, is a vegetated area. The Site is bounded to the south by State Road No. 2, or PR-2.

A vegetated four-foot deep ditch runs parallel to PR-2, south of the onsite SW and opens into the

topographically lower vegetated area. No obvious signs of runoff accumulation have been observed along this drainage ditch.

Site History

The Puerto Rico Land Authority (PRLA) owns the Pesticide Warehouse I property and conducted pesticide mixing and storage operations from 1953 to 2003. PRLA used the Site to store and/or dilute pesticides and fertilizers for agricultural application in pineapple farming. Beginning on October 1, 1999, the property was leased to Agrocampos, Inc., which also used the Site to store and/or dilute pesticides and fertilizers for agricultural application.

Topography

The Site is situated within the Northern Limestone Province of Puerto Rico at an elevation of approximately 95 meters (295 feet) above mean sea level. The areas immediately surrounding the Site to the east, west, and south are relatively flat. North of the Site is an area of steep mogotes (limestone hills). The topography of the land to the south of the Site is dominated by karst features; several sinkholes are present within one mile of the Site.

Regional Site-Specific Geology

The unconsolidated deposits at the Site are derived from the weathering of parent limestone. They consist of hard, stiff, often dry, sandy, and clayey silt, silt, and clay. The Aymamón Limestone is found at depths between 46 feet bgs to 70 feet bgs at the Site. The bedrock has an upper weathered zone up to 10 feet thick. The upper Aymamón Limestone has soft zones, sometimes filled with clay, and the deeper zone has solution features, including cavities and fracture zones.

Regional Site-Specific Hydrogeology

Site groundwater occurs in the Upper aquifer (comprised of the Aymamón Limestone) at depths of about 290 to 310 feet below ground surface (bgs). The Upper aquifer is unconfined and is recharged from surface drainage and precipitation. Regional groundwater flow is to the north toward Caño Tiburones and the Atlantic Ocean. At the Site, groundwater flow has a northeasterly component in the western portion and a northwesterly component in the eastern portion.

Demography

The Site is located approximately eight miles southeast of Arecibo in a sparsely populated rural area along road PR-2. The Site is found within the Sabana Hoyos Ward of Arecibo. The main population nucleus in the area is a residential sector located approximately one mile southwest of the Site. The Sabana Hoyos ward is composed of approximately 10,745 inhabitants according to the 2010 U.S. Census. According to the 2013 Department of Housing and Urban Development reports, median household income is $20,900 dollars.

Land & Groundwater Use

The region has been used for agriculture (primarily pineapple farming) for approximately 100 years. Land use to the south, north, and far east of the Site is mostly agricultural, although a pipe factory is located immediately south of the Site and a former pharmaceutical plant is located about 3,500 feet east of the Site.

The Puerto Rico Planning Board (PRPB) has jurisdiction over land use and zoning in Puerto Rico. Land use, under the Land Use Plans subprogram of the PRPB by means of the approved Land Use Plan (LUP) of 2015, has the responsibility to create physical planning instruments to promote the optimum use of the land use in Puerto Rico, establishing the parameters, guidelines, and rules on how and where specific social and economic activities will be permitted to occur as the basis for decision making and in conformance with development regulations and strategies adopted by the PRPB. The LUP of Puerto Rico is the main planning instrument in Puerto Rico. Zoning establishes the use and intensity of use that is

applicable to a parcel of land or sector, as part of a planning process in order to promote development, conservation, building, exploitation, the cultivation, the contemplation of the landscape or the location of the infrastructures and services.

The applicable land use to the Site is Specially Protected Rustic Soil - Agriculture (SREP-A). According to the LUP, the objective of SREP-A is to guide the use of the lands with agricultural or livestock value, with present or potential activities, to be protected in order for the land to be dedicated to agricultural activities. EPA has consulted with municipal authorities and the Commonwealth of Puerto Rico concerning the expected future uses of the property and has concluded that future unrestricted land use (e.g., residential development) is not planned.

The Puerto Rico Aqueduct and Sewer Authority supplies most of the potable water to the Arecibo region; thus, there is no future potable groundwater use expected at the Site.

Surface Water Drainage and Interaction with Groundwater

The Site is located within the Caño Tiburones watershed between the Río Grande de Manatí drainage area to the east and the Río Grande de Arecibo drainage area to the west. No surface water bodies, or wetlands are present onsite; however, a sinkhole pond is located south of the Site on the south side of PR-2. The sinkhole pond primarily receives runoff from adjacent fields to the south and east. A surface water drainage ditch runs from the mixing platform on the south end of the main warehouse to the east-southeast toward PR-2. The ditch discharges to the vegetated area east of the Site. The ditch is dry except during precipitation events.

Groundwater at the Site is not known to discharge in springs or surface water. Groundwater is approximately 300 feet bgs and therefore unlikely to discharge in any of the sinkholes observed near the Site. Sinkholes filled with water are most likely a result of surface water runoff and precipitation.

Previous Study Area Investigations

EPA Site Reconnaissance (March 1996)

EPA conducted a reconnaissance investigation of the Site and observed distressed or missing vegetation at the property but unstressed vegetation immediately outside the property fence. EPA also observed poor housekeeping and onsite disposal of empty pesticide bottles, labels, and bags of product; visible pesticide residue at several locations throughout the property; and a white residue along a surface runoff pathway that began at the mixing platform in front of the main warehouse and continued along a drainage ditch paralleling PR-2, passing a water supply well on the Site property and entering a vegetated area.

EPA Site Inspection (May 1996)

In May 1996, EPA conducted a Site Inspection (SI) sampling event that included collection of surface soil samples throughout the property and two groundwater samples from the onsite well. Surface soil results indicated the presence of several pesticides. Groundwater results also showed the presence of pesticides. In December 2001, EPA conducted follow-up reconnaissance and again observed poor housekeeping throughout the property.

Administrative Order (May 2007)

EPA issued two Administrative Orders on Consent (Consent Orders), which became effective on May 9, 2007. The Consent Orders required the Respondents to perform an RI/FS for each operable unit at the Pesticide Warehouse I Site, OU1 (Soils) and OU2 (Groundwater). PRLA did not comply with the Consent Orders; therefore, EPA decided to take over both OUs and consolidate them into one RI/FS.

Study Area Remedial Investigations

The RI field investigation activities included the following primary activities:

OU1

- Surface soil (0 to 2-feet bgs) screening with pesticide field test kits
- Surface and subsurface soil sampling and analyses for target compound list (TCL) pesticides, dioxin/furans, diuron, and target analyte list (TAL) metals (including cyanide and mercury)
- Background soil sampling and analyses for TCL pesticides, dioxin/furans, diuron, and TAL metals (including cyanide and mercury)
- Concrete chip sampling and analyses for TCL pesticides, toxicity characteristic leaching procedure (TCLP) pesticides, TAL metals (including cyanide and mercury) and TCLP metals and wipe sampling for TCL pesticides and TAL metals
- Surface and subsurface soil sampling and analyses at the former underground storage tank (UST) for total petroleum hydrocarbons (TPH) diesel-range organics (DRO) and gasoline range organics (GRO)
- Surface water and sediment sampling and analyses for TCL pesticides and TAL metals (including mercury and cyanide)

OU2

- Video borehole logging
- Well installation and development
- Long-term water level monitoring
- Synoptic water level measurements
- Groundwater well sampling and analyses for TCL pesticides, diuron, dioxins/furans, and TAL metals (including cyanide and mercury). Samples were also analyzed for water quality parameters: total suspended solids (TSS), total dissolved solids (TDS), total organic carbon (TOC), major anions (nitrate, chloride, bicarbonate, sulfate, and phosphate), major cations (calcium, magnesium, sodium, and potassium) and alkalinity

Nature and Extent of Contamination

The nature and extent of contamination was determined by comparing analytical results for pesticides and dioxins/furans in soil, groundwater, sediment, and surface water to Site screening criteria. Soil data were compared to the Preliminary Remedial Goals (PRGs) developed for the environmentally similar Pesticide Warehouse III OU1 Site. Analytical results for arsenic were compared to calculated site-specific background levels.

Selection of Site-Related Contaminants

To focus the evaluation of contaminant data, site-related contaminants (SRCs) were selected, based on the history of Site use and the frequency of detection in Site media, particularly in soil. The pesticide dieldrin was detected the most frequently at concentrations above screening criteria. The pesticide most frequently detected in soil was toxaphene; it is also the fourth most frequently detected pesticide above screening criteria. Aldrin was the second most frequently detected pesticide above screening criteria. Dioxin/furans, expressed as the toxic equivalent (dioxin TEQ) of 2,3,7,8 tetrachlorodibenzo-p-dioxin (TCDD), is a highly toxic by-product of some pesticides and was detected in Site soils. Arsenic, a component of certain pesticides, frequently exceeded its screening criterion and frequently exceeded its calculated site-specific soil background level.

Therefore, dieldrin, toxaphene, aldrin, dioxin, and arsenic were selected as SRCs and were used to evaluate contaminant distribution in all site media.

Extent of Soil Contamination

Figures 2-8, 2-9 and 4-6 show contamination at concentrations above the preliminary remediation goals (PRGs). Pesticide contamination was found throughout the site in the following general areas:

- the northwest corner (near the disposal pit);

- the northeast corner (near staining and drum storage);
- the west side of the main warehouse (where floor drainage discharged to soil);
- south and east of the former mixing platform
- in the drainage ditch north of PR-2.

The vertical extent of pesticide contamination in soils varied from 0–2 feet bgs to 18–20 feet bgs. The deep contamination occurred in the northwest and southeast corners of the site. In other locations, the pesticide concentrations decreased with depth. Toxaphene had the highest maximum concentration of the pesticide SRCs.

The distribution of dioxin-contaminated soil, as defined by the PRG criterion (18 ng/kg) (Figure 2-8), is very similar to the pesticide contamination. Dioxin-contaminated soil is also found in surface soils (0 to 2 feet bgs) in the area along the northern property boundary.

Deeper dioxin soil contamination above the PRG extends to at least 6 feet bgs in four areas of the Site: the northwest corner (near the disposal pit), along the northwest side of the main warehouse, at the property line east of the mixing area, and in the drainage ditch north of PR-2. Although still above the screening criterion at these locations, the concentration of dioxin decreases significantly with depth.

The lateral distribution of arsenic in soil, as defined by the site-specific background value of 41.5 mg/kg, is similar to the lateral distribution of pesticide contamination; however, the vertical distribution is much different. Areas with consistently elevated arsenic concentrations greater than site-specific background include:

- the northwest corner (in the disposal pit and the soil pile area);
- south and east of the former mixing platform; and
- in the drainage pathway north of PR-2.

Unlike pesticides, arsenic contamination in surface soils (0 to 2 feet bgs) was mostly limited to the soils in the northwest corner of the Site near the waste disposal pit and soil pile area. At most areas of the Site, the highest arsenic concentrations were present in the subsurface soils, generally most elevated in the 8 to 10 feet bgs interval. The deeper contamination was found primarily in the northwest corner (the disposal pit and soil pile area), near the former mixing platform (south of the platform, and east along the "spillage" pathway), and within the eastern half of the drainage pathway north of PR-2.

A majority of the contamination exceeding the PRGs (90 percent) is in the top ten feet of soil.

Extent of Groundwater Contamination

Pesticide contamination in groundwater was found only in one of three sampling events and only in the shallower zone of one well (SW). Groundwater at this location may also include a component of regional contamination, as pesticides were found in current and former supply wells at sidegradient locations not considered to be impacted from the Site.

Dioxin contamination in groundwater at the onsite SW and the Site monitoring wells is considered to be related to Site activities but may also include regional contributions. Dioxin in groundwater did not exceed the National Primary Drinking Water Standard, or MCL, of 3 ng/L.

Arsenic and chromium were not detected above drinking water standards in any groundwater samples.

Extent of Sediment and Surface Water Contamination

Site-related pesticide contamination in sediment (dieldrin) and surface water (dieldrin and toxaphene) is restricted to the area on the Site of ponded surface water near the former mixing platform (SE-1/SW-1).

Arsenic was detected in all sediment samples at concentrations above its sediment screening

criterion but well below the site-specific background soil level.

Arsenic was only detected above the surface water criteria at location SW-4. This location found elevated concentrations of nearly every inorganic analyte due to its elevated turbidity.

Extent of Concrete Chip and Wipe Sample Contamination

Eighteen pesticides were detected in concrete chips from the main warehouse; 12 pesticides were detected in the wipe samples. Arsenic was detected in all chip samples. Mercury was detected in one sample and cyanide was detected in all but two samples.

Eight pesticides and four metals were detected in the leachate (TCLP) analyses, but not at concentrations that exceeded the Resource Conservation and Recovery Act (RCRA) regulatory limits for hazardous waste.

Principal Threat Waste

The 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 ground water, surface water or air, or acts as a source for direct exposure. Contaminated ground water generally is not considered to be a source material; however, Non-Aqueous Phase Liquids (NAPLs) in ground water may be viewed as source material. 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. Pesticides in soil samples were not observed at concentrations that present significant risk (e.g., generally greater than $1x10^{-3}$). Additionally, contaminated soils appear to have little impact on groundwater. Based on the relatively low risk and limited mobility, contaminated soil at the Site is not considered to be a principal threat waste, but rather a low-level threat waste.

SUMMARY OF SITE RISKS

The purpose of the risk assessment is to identify potential cancer risks and noncancer health hazards at the Site assuming that no further remedial action is taken. A baseline human health risk assessment was performed to evaluate current and future cancer risks and noncancer health hazards based on the results of the RI.

A screening-level ecological risk assessment (SLERA) was also conducted to assess the risk posed to ecological receptors due to site-related contamination.

Human Health Risk Assessment

The HHRA characterized potential human health risks associated with the Site in the absence of any remedial action. Potential exposure pathways are defined based on potential source areas, release mechanisms, and current and potential future uses of the Site. Based on the current zoning and potential future use, the risk assessment focused on several potential receptors to soil. These receptors include a current/future trespasser, future resident, future worker and future construction worker. There are no current users of untreated groundwater from the Site; however, the risk assessment evaluated potential resident and worker exposure to groundwater should it be used for potable purposes in the future.

To characterize potential noncancer health effects, comparisons are made between estimated intakes of substances and toxicity thresholds. Potential cancer effects are evaluated by calculating probabilities that an individual will develop cancer over a lifetime exposure based on projected intakes and chemical-specific dose-response information. In general, EPA recommends a cancer risk range of 1×10^{-6} (1 in 1 million) to 1×10^{-4} (1 in 10,000) and noncancer

WHAT IS RISK AND HOW IS IT CALCULATED?

Human Health Risk Assessment:
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 in air, water, soil, etc. 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 non-cancer 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 non-cancer 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 non-cancer 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 non-cancer health effects, a "hazard index" (HI) is calculated. The key concept for a non-cancer HI is that a threshold (measured as an HI of less than or equal to 1) exists below which non-cancer health hazards are not expected to occur. The goal of protection is 10^{-6} for cancer risk and an HI of 1 for a non-cancer 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 and are referred to as Chemicals of Concern or COCs in the final remedial decision or Record of Decision.

health hazard index (HI) of unity (1) as threshold values for potential human health impacts.

The total estimated cancer risks for the future resident ($1x10^{-3}$) exceed EPA's risk range under a reasonable maximum exposure (RME), when all exposure routes were considered. However, when broken out by media, the risk from groundwater alone is at $4x10^{-4}$, or just at the upper end of the risk range, assuming (conservatively) that chromium is one hundred percent hexavalent. It is more likely that a majority of the chromium is in the trivalent form, which would result in risks that would be well within the risk range. The risk from soil alone was $7x10^{-4}$, primarily from exposure to dioxin, dieldrin and chromium. Estimated cancer risks for future workers (2×10^{-4}) were at the upper bound of EPA's risk range, primarily due to dieldrin, arsenic and chromium in groundwater and dieldrin, dioxin, arsenic and chromium in surface soil. However, when broken out by media, the risk from groundwater alone is $1x10^{-4}$, or just at the upper end of the risk range. The risk from soil alone was $9x10^{-5}$, which is within the cancer risk range. Estimated RME cancer risks for current/future trespassers and future construction workers exposure to soil at the Site, are within EPA's cancer risk range.

The total noncancer HIs were evaluated for both adult and child residents. The total noncancer HI for the future resident is above EPA's threshold of unity (1) under the RME scenario and is driven primarily by potential exposure to dioxin and dieldrin in soil. For the child resident under the RME scenario, the total noncancer HI (20) is a above EPAs threshold of unity due to potential exposures to dieldrin and dioxin in soil. The total noncancer HI for workers is above EPAs threshold of unity; however, individual target organ/effect HIs are less than or equal to 1. The total RME noncancer HIs for the current/future trespasser and future construction worker are below EPA's threshold of 1, indicating that noncancer effects would not be expected to occur for those receptors due to exposure to soil at the site. Noncancer hazards from exposure to

groundwater were below EPA's threshold of 1 for all receptors for site-related contaminants.

Ecological Risk Assessment

Screening Level Ecological Risk Assessment (SLERA)

A screening-level ecological risk assessment (SLERA) was conducted to evaluate the potential for ecological risks from the presence of contaminants in surface soil, sediment and surface water. The SLERA focused on evaluating the potential for impacts to sensitive ecological receptors to site-related constituents of concern through exposure to soil on the Pesticide Warehouse I property. Surface soil concentrations were compared to ecological screening values as an indicator of the potential for adverse effects to ecological receptors. A complete summary of all exposure scenarios can be found in the SLERA.

Surface Soil: There is a potential for adverse effects to ecological receptors (invertebrates, reptiles, amphibians, birds, and mammals) from exposure to contaminated surface soil. The surface soil screening criteria were exceeded for pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, aldrin, alpha-chlordane, diazinon, dieldrin, diuron, endosulfan I, endosulfan II, endrin aldehyde, gamma-BHC (lindane), gamma-chlordane, heptachlor, methoxychlor, and toxaphene), dioxin/furan congeners, and metals (antimony, arsenic, cadmium, chromium, lead, manganese, mercury, selenium, vanadium, and zinc), which resulted in HIs greater than the acceptable value of 1. The primary risk drivers were identified as pesticides and dioxin/furans. Several metals (arsenic, chromium, mercury, selenium, and vanadium) are likely site-related compounds that also were associated with unacceptable ecological risk.

Sediment: There is a potential for adverse effects to ecological receptors from pesticides (dieldrin and gamma-chlordane) and metals (arsenic, cadmium, chromium, copper, cyanide, iron, lead, mercury, and zinc) in sediment. Given that the majority of the sediment samples were collected off-site, the inorganic COPECs found in sediment are potentially related to soil erosion and runoff from the site, as all of the sediment COPECs were also identified as soil COPECs. The sediment samples collected were from areas that hold water after rainfall and from drainage swales and not true sediment samples.

Surface Water: There is a potential for adverse effects to ecological receptors from metals in aluminum, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, cyanide, iron, lead, manganese, nickel, vanadium, and zinc. All the COPECs had maximum detected concentrations detected off-site, but due to so many inorganics being detected in soils on-site, it is likely that these inorganics are also site-related COPECs. The surface water samples, collected were from areas that hold water after rainfall and from drainage swales, are not true surface water samples.

Overall the SLERA results indicate risk to ecological receptors from exposure to site soils. Primary risk drivers consist of pesticides, followed by dioxin/furans, and metals based on detected levels consistently exceeding ecological screening level (ESLs) in soil, sediment, and surface water. In addition to elevated HQs for both pesticides and dioxins, the quantity of detected contaminants was also notable. A total of 20 pesticides were detected in soil, with 13 exceeding ESLs. Seventeen dioxin/furan congeners were detected in soil, and all but one exceeded ESLs.

There is greater potential for exposure by terrestrial receptors than aquatic receptors on and adjacent to the Site. The drainage ditch to the southeast flows to a sinkhole pond, but there does not appear to be substantial surface water connections to nearby streams and rivers. There is more suitable terrestrial habitat north of the Site, in the Cambalache State Forest (Bosque Estatal de Cambalache), and the greater mobility and site access of terrestrial receptors would increase the potential for exposure of receptors traveling to the site from that nearby habitat to contaminated soil, sediment, and surface water;

however, the terrain would limit exposure to less mobile terrestrial receptors (i.e., reptiles, small mammals). Limited on-site vegetation could facilitate surface soil loss via erosion during high wind or rain events, thereby spreading contamination to nearby terrestrial and aquatic habitats.

Although there is little suitable habitat for ecological receptors at the Site, there is suitable habitat for mammals, birds, herpetofauna, and invertebrates surrounding the Site. Receptors with limited or no mobility, such as plants and soil invertebrates, are more at risk than more mobile species such as mammalian and avian receptors. The quantity of COPECs, the magnitude of their ESL exceedances and detection frequency, and the proximity to the state forest suggest that ecological risks due to site-related contamination are potentially substantial at the population and community level. Given this potential, a remedial action for soil contaminants to reduce or limit exposure of ecological receptors to site soils to protect the environment from actual or threatened releases of hazardous substances is warranted.

Based on the results of the human health and ecological risk assessments, it is EPA's current judgement that the Preferred Alternative identified in the Proposed Plan for soil, is necessary to protect public health, welfare or the environment from actual or threatened releases of hazardous substances. It is EPA's current judgement that no action is necessary for groundwater to ensure protection of public health and the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) 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.

Unacceptable human health risks were associated with exposure to soil. Ecological risks from exposure to contaminated soil have been determined to be unacceptable. It is assumed that risks to ecological receptors would be mitigated through implementation of remedial alternatives for human receptors. The future land use of the site would also be industrial and not likely conducive to ecological habitat.

The impact to groundwater pathway was evaluated and there is insufficient evidence that site soils are currently acting as an ongoing source of groundwater contamination. The water table, between 290 to 310 feet bgs, is separated from the areas of soil contamination by more than 290 feet of unsaturated soils. Given that soil contamination has been present at the Site for as many as 60 years, there is little evidence of contaminant transport to deeper soils through rain percolation during that time. In addition, the pesticides and dioxin/furan compounds that have been identified as COCs in soil have very low water solubility, adsorb strongly to soils and, therefore, are not very mobile.

Risks from ingestion of groundwater were just at the upper end of EPA's risk range, assuming (conservatively) that chromium is one hundred percent hexavalent. It is more likely that a majority of the chromium is in the trivalent form, which would result in risks that would be well within the risk range. Groundwater results in monitoring and supply wells from field investigations were below federal MCLs and often nondetect. Onsite wells are not currently used. Pesticides found in offsite supply wells are not considered to be related to Site activities, indicating regional impacts from pesticide use. Therefore, no action is proposed for groundwater.

The following preliminary RAOs were identified for soil contamination based on human health (future worker) risks associated with future land use conditions:

- Prevent exposures to human receptors to contaminants in soil resulting in cancer and noncancer health hazard in excess of EPA's acceptable risk range; and

- Manage the Site in a manner to minimize exposure of ecological receptors to COCs that would result in a HQ greater than 1.

Preliminary Remediation Goals

The development of 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. These values are typically used as a preliminary value in the FS to guide evaluations of remedial alternatives.

There are no promulgated federal or commonwealth, chemical-specific ARARs for soil. Therefore, risk-based soil PRGs were calculated for the industrial exposure scenario based on a $1x10^{-6}$ cancer risk and for a noncancer target hazard quotient of 1 taking into account the anticipated future land use. For arsenic, the statistical calculation of the concentrations of arsenic in non-Site (background) soil has been adapted as the PRG.

PRGs for Contaminants of Concern in Soil (all concentrations in mg/kg)	
Contaminants of Concern	**Remediation Goal**
Dieldrin	0.14
2,3,7,8-TCDD TEQ	2.2×10^{-5}
Arsenic	41.5

SUMMARY OF REMEDIAL ALTERNATIVES

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

The timeframes presented below for each alternative reflect only the time required to construct or implement the remedy and do 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.

The cost estimates, which are based on available information, are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 percent of the actual cost of the project.

Based on a screening of alternatives developed in the FS, several alternatives (FS Alternatives 2, 3, 4 and 7) were not carried forward to the Proposed Plan. Please refer to the FS report for more information on these alternatives.

The following alternatives are considered in this Proposed Plan:

Alternative 1: No Action

Capital Cost	$ 0
Present Worth O&M Cost	$ 0
Total Present Worth Cost	$ 0
Construction Time Frame	N/A
Timeframe to meet RAOs	N/A

Alternative 1 is required by the NCP to provide an environmental baseline against which impacts of various other remedial alternatives can be compared. No removal and/or remedial activities would be initiated at the Site to address contaminated soil above PRGs or otherwise mitigate the associated risks to human health from exposure to soil contamination above PRGs.

Alternative 2 (former 5 in the FS): Excavation of Contaminated Soil to 10 feet bgs, Onsite Treatment and Offsite Disposal, Covering of Remaining Contaminated Subsurface Soil, and Institutional Controls

Capital Cost	$17,265,000
Present Worth O&M Cost	$316,000
Total Present Worth Cost	$17,581,000
Construction Time Frame	One year
Timeframe to meet RAOs	One year

Under Alternative 2, contaminated soil in concentrations exceeding PRGs in the upper 10 feet would be excavated and excavated contaminated soil containing RCRA characteristic hazardous waste would be stockpiled on Site and thermally treated ex situ prior to disposal at a RCRA Subtitle D landfill on the island.

Ex situ thermal desorption uses heat and vacuum extraction to mobilize and remove contaminants from soil. Thermal conducting heating wells would be placed in a grid-like pattern within the soil stockpile. The TCH wells heat the soil to the target temperature as measured by thermocouples placed throughout the stockpile. At the target temperature, the contaminant's vapor pressure and diffusivity increase, and its viscosity decreases. As a result, the evaporation rate and mobility of the contaminant is increased, and contaminants and water contained in the soil are vaporized. Soil vapor extraction wells placed in the stockpile would be used to remove the soil vapor steam. The extracted off-gas and water are treated through vapor and liquid treatment systems.

The total targeted volume of contaminated soil to be excavated under Alternative 2 is approximately 14,100 cubic yards (CY). The footprint of the excavation would require that the remaining dilapidated buildings onsite be demolished. Additionally, Site data suggests that contamination is likely beneath the building slab. Based on the RI sample results, an estimated 3,900 CY of the excavated material contains pesticide and dioxin contaminant concentrations, requiring treatment to meet land disposal requirements prior to disposal at a RCRA Subtitle D landfill on the island. An estimated 1,410 CY of the excavated material could contain chromium contaminant concentrations requiring treatment and disposal as a RCRA characteristic hazardous waste at a facility in the continental United States. Additional sampling in the design will confirm this.

Contaminant concentrations that exceed PRGs at depth would be covered with a wire mesh, permeable plastic barrier would be installed as a warning that digging lower would result in possible exposure to contaminated soils. The total area of contaminated soil remaining after excavation to 10 feet bgs under this alternative is approximately 5,300 square feet. Clean fill and 6-inch topsoil would be used to replace soil removed after excavation. After the topsoil is placed, the area would be seeded to establish vegetation to restore the area.

This alternative is expected to remove ninety percent of the contamination exceeding PRGs. Because unexcavated and deeper soils (below 10 feet) would remain at levels that would not allow for unrestricted (i.e., residential) use, institutional controls would restrict the future use of the soil at the Site to nonresidential uses.

The wells at the Site will be protected and repaired during construction, as well as sampled, if necessary, to prevent impacts to groundwater.

Alternative 2 would require five-year reviews as required by CERCLA since contaminated soil at concentrations exceeding an unlimited use/unrestricted exposure scenario would remain on Site. Five-year site reviews would evaluate whether adequate protection of human health is provided since contaminated soil would remain above PRGs at depth at the Site.

Alternative 3 (former 6 in the FS): Onsite Consolidation with Engineered Cover, Institutional Controls, and Monitoring

Capital Cost	$2,599,000
Present Worth O&M Cost	$316,000

Total Present Worth Cost	$2,915,000
Construction Time Frame	One year
Timeframe to meet RAOs	One year

Alternative 3 provides protection of human health through institutional controls (administrative and access controls) coupled with remedial action (excavation, consolidation, multi-layer geosynthetic cover construction, and vegetative cover) to limit exposure to contaminants. Under this alternative, all contaminated soil in concentrations greater than PRGs outside the boundaries of the consolidation area would be excavated for consolidation and covering.

Excavated areas would be backfilled with clean fill. The total targeted volume of contaminated soil to be excavated and consolidated at the Site under Alternative 3 is approximately 9,800 CY.

The existing structures and concrete slabs at the Site would be demolished and removed to enable construction of the consolidation area. Additionally, Site data suggests that contamination is likely beneath the building slab. A multi-layer geosynthetic cover would be constructed over the consolidated material to mitigate unacceptable exposure risks to humans. The estimated extent for the consolidation area under Alternative 3 is approximately 61,900 square feet, which is slightly smaller than the Site property area because the consolidation area is not in the excavation area. The consolidated mound would be roughly 10 feet in height. The wells at the Site will be protected and repaired during construction, as well as sampled, if necessary, to prevent impacts to groundwater.

Institutional controls would involve administrative and legal measures (e.g., land use restrictions) and/or informational measures (e.g., community awareness activities) intended to inform the public of risks and control activities or uses of contaminated soil at the Site that could pose a risk to human receptors above PRGs and to safeguard the integrity of this alternative.

A long-term inspection and maintenance program would be developed to ensure the engineered cover would provide continued protection to human health. Inspections may be scheduled annually and following each severe storm event. Inspections would monitor the vegetation, erosion, and any damage by animals. If erosion or damage to the engineered cover is observed, actions would be taken to repair the damage and maintain the integrity of the engineered cover.

Alternative 3 would require five-year reviews as required by CERCLA since contaminated soil at concentrations exceeding an unlimited use/unrestricted exposure scenario would remain on site. Five-year site reviews would evaluate whether adequate protection of human health is provided since contaminated soil would remain above PRGs at the Site. Site monitoring (consisting solely of non-intrusive visual inspections) also would be conducted only as necessary to complete the five-year site reviews.

Alternative 4 (former 8 in the FS): Excavation of Contaminated Soil, Onsite Treatment, and Offsite Disposal

Capital Cost	$18,217,000
Present Worth O&M Cost	$230,000
Total Present Worth Cost	$18,447,000
Construction Time Frame	One year
Timeframe to meet RAOs	One year

Alternative 4 is similar to Alternative 2, with the exception that contaminated soil would be excavated to a depth of 20 feet bgs. Alternative 4 assumes that excavated contaminated soil containing pesticide-containing RCRA characteristic hazardous waste would be stockpiled on site and thermally treated to be "de-characterized" prior to disposal at a RCRA Subtitle D landfill on the island. Additional sampling in the design will confirm this.

The total targeted volume of contaminated soil to be excavated under Alternative 4 is approximately 15,200 CY. An estimated 3,900 CY of the excavated material contains pesticide

and dioxin contaminant concentrations requiring treatment to meet land disposal requirements prior to disposal at a RCRA Subtitle D landfill on the island. Based on the RI sample results, an estimated 1,520 CY of the excavated material would contain chromium contaminant concentrations requiring treatment and disposal as a RCRA characteristic hazardous waste at a facility in the continental United States. The footprint of the excavation would require that the remaining dilapidated buildings onsite be demolished. Additionally, Site data suggests that contamination is likely beneath the building slab.

The wells at the Site will be protected and repaired during construction, as well as sampled, if necessary, to prevent impacts to groundwater.

Alternative 4 would require five-year reviews as required by CERCLA since contaminated soil at concentrations exceeding an unlimited use/unrestricted exposure scenario would remain on site. Five-year site reviews would evaluate whether adequate protection of human health is provided since nonresidential PRGs are being applied to the Site.

NINE EVALUATION CRITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES
Overall protection of human health and the environment determines whether 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 would meet all of the applicable or relevant and appropriate requirements of federal and state environmental statutes and other requirements that pertain to the site, or provide grounds for invoking a waiver.
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 through treatment is the anticipated performance of the treatment technologies an alternative may employ.
Short-term effectiveness considers the period of time needed to implement an alternative and the risks the alternative may pose to workers, residents, and the environment during implementation.
Implementability is the technical and administrative feasibility of implementing the alternative, including the availability of materials and services.
Cost includes estimated capital and annual operation and maintenance costs, as well as present-worth costs. 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.
Commonwealth acceptance considers whether the Commonwealth (the support agency) concurs with, opposes, or has no comments on the preferred alternative.
Community acceptance will be assessed in the ROD and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports. Comments received on the Proposed Plan are an important indicator of community acceptance.

EVALUATION OF REMEDIAL ALTERNATIVES

These criteria were developed to address statutory requirements and considerations for remedial actions per the NCP and additional technical and policy considerations that have proven to be important for selecting among remedial alternatives (EPA 1988). The following subsections describe the nine alternative evaluation criteria used in the detailed analysis of remedial alternatives and the priority in which the criteria are considered.

Overall Protection of Human Health and the Environment

Of the four retained alternatives, only the no action alternative (i.e., Alternative 1) would fail

to provide protection for human health (future resident or worker) and would not address the RAOs for contaminated soil.

Alternatives 2, 3, and 4 would be protective of human health and the environment. Alternative 2 achieves the soil RAOs through excavation of contaminated soil exceeding PRGs to a depth of 10 feet, treatment of excavated soil as needed, and backfilling with a demarcation barrier, clean fill and topsoil over the remaining contaminated soil. Alternative 3 achieves soil RAOs through consolidation and containment (capping) of contaminated soil. The cap would provide a barrier that would break the exposure pathway to human receptors. Alternative 4 achieves soil RAOs through excavation, treatment as needed, and off-site disposal of contaminated soil exceeding PRGs to a depth of 20 feet.

Compliance with ARARs

Key location- and action-specific ARARs apply to the management and disposal of wastes generated from remediation of contaminated soil at the Site. ARARs pertaining to waste management and disposal focuses on characteristic hazardous waste that may be present in contaminated soils generated (i.e., excavated or extracted) during remediation of soil contamination.

Alternative 1 would not achieve the ARARs since no remedial action would be taken to remove or treat the contaminated soil. The remaining alternatives, Alternatives 2, 3, and 4, would achieve PRGs by removal, containment, or treatment of contaminated soil. Alternatives 2, 3, and 4 would be implemented to comply with action- and location-specific ARARs.

Long-Term Effectiveness and Permanence

Alternative 1 fails to provide long-term effectiveness and permanence since no remedial action is taken. Alternative 3 provides protection by preventing human exposure to contaminated soil through an engineered cover. However, under this alternative, soil contamination is left in place and the remedy would require long-term maintenance to ensure protectiveness. Additionally, this alternative would result in a 10-foot mound being created in a generally flat area, which could result in drainage concerns. Contaminated soil left on-site beneath the cap and could pose an exposure risk to human receptors if the covers were compromised. Institutional controls would be implemented to protect the covers and restrict future land uses and provide awareness of risks from potential exposure to contaminated soil above site-specific levels of concern.

Alternative 2 includes excavation of contaminated soil exceeding PRGs to a depth of 10 feet and covering of remaining contaminated soil. Alternative 4 would excavate contaminated soil to a depth of 20 feet and would not require any cover of remaining contaminated soil. Under Alternatives 2 and 4, pesticide-related RCRA characteristic hazardous waste would be thermally treated on-site before being transported to the RCRA Subtitle D landfill on the island of Puerto Rico for disposal. Disposal of contaminated soil exceeding PRGs but not containing RCRA characteristic hazardous waste could be disposed of at the RCRA Subtitle D landfill on the island of Puerto Rico. Contaminated soil and thermally treated soil with chromium concentrations considered a RCRA characteristic hazardous waste would be disposed of at a permitted treatment and disposal facility in the continental United States.

Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative 1 fails to provide a reduction of toxicity, mobility, or volume through treatment since treatment is not a component of these alternatives.

Alternative 3 does not satisfy the statutory preference for treatment as a principal element of the remedial action, as no active treatment remedy would be performed.

Alternatives 2 and 4 include thermal treatment of excavated contaminated soil considered characteristic hazardous waste to meet land

disposal requirements prior to disposal in a RCRA Subtitle D landfill on the island of Puerto Rico. However, contaminated soil and thermally treated soil with chromium concentrations considered a RCRA characteristic hazardous waste would be containerized and shipped to the continental United States for treatment (solidification/ stabilization) and disposal. Since Alternative 2 leaves some contamination below ten feet. Therefore, this alternative only partially meet a reduction of toxicity, mobility, or volume through treatment.

Short-Term Effectiveness

Alternative 1 would not pose short-term risks to the community, and there would be no adverse environmental impacts; however, protection in a reasonable time frame would not be achieved under this alternative.

Alternatives 2, 3, and 4 would involve surface disturbance of contaminated soil and transport of clean soil for backfill or construction of covers. Alternatives 2 and 4 would include transportation of excavated contamination for off-site disposal. Unlike Alternative 3, Alternatives 2 and 4 would require installation of power lines and high energy usage, which could pose additional short-term impacts to the environment.

Under all three alternatives, site workers would follow approved health and safety plans and would wear appropriate personal protective equipment to minimize exposure to contamination and as protection from physical hazards. There would also be the potential for increased local traffic. The dust-related impacts would be mitigated through the implementation of decontamination measures and dust suppression practices. A traffic control plan would be implemented to reduce the potential for traffic accidents.

Implementability

Since no remedial action is taken under Alternative 1, this alternative would be the easiest to implement, both technically and administratively.

Alternative 3 uses standard construction techniques, practices, and materials for cap construction; would not require management of RCRA characteristic hazardous waste; and would not require installation and operation of a thermal treatment system.

Alternatives 2 and 4 would require mobilization of a thermal remediation treatment system to the island of Puerto Rico. These alternatives would include excavation, stockpiling and treating hazardous waste, and disposal of treated and nonhazardous contaminated soil at the RCRA Subtitle D landfill. However, contaminated soil and thermally treated soil with chromium concentrations considered a RCRA characteristic hazardous waste would be containerized and shipped to the continental United States for treatment (solidification/stabilization) and disposal.

Cost

Present value costs for all alternatives were evaluated over a 30-year period using a seven percent discount rate. The costs for these alternatives are summarized in following table:

Alt	Capital Cost / $	Present Worth O&M Cost / $	Total Present Worth Cost / $
1	0	0	0
2	$17,265,000	$ 316,000	$17,581,000
3	$ 2,599,000	$ 316,000	$ 2,915,000
4	$18,217,000	$ 230,000	$18,447,000

Commonwealth/Support Agency Acceptance

The PRDNER concurs with the Preferred Alternative.

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 ROD for this Site. The ROD is the document that formalizes the selection of the remedy for a site.

PREFERRED ALTERNATIVE

EPA's Preferred Alternative is Alternative 2: excavation of contaminated soil to 10 feet bgs, onsite treatment and offsite disposal, covering of remaining contaminated subsurface soil with a demarcation barrier, clean fill and topsoil, and Institutional Controls.

The Preferred Alternative would treat soil with RCRA hazardous characteristics using thermal treatment, using a temporary treatment unit brought to the Site. The total targeted volume of contaminated soil to be excavated under this Alternative is approximately 14,100 CY. Based on the RI sample results, an estimated 3,900 CY of the excavated material contains pesticide and dioxin contaminant concentrations requiring treatment to meet land disposal requirements prior to disposal at a RCRA Subtitle D landfill on the island. An estimated 1,410 CY of the excavated material would contain chromium contaminant concentrations requiring treatment and disposal as a RCRA characteristic hazardous waste at a facility in the continental United States.

Because unexcavated soils and those below 10 feet bgs would remain covered at levels that would not allow for unrestricted (i.e., residential) use, institutional controls would restrict the future use of the soil at the Site to nonresidential uses. The estimated present-worth cost of the preferred alternative is $17,581,000.

This remedy also includes reviews every five years to assure the long-term protectiveness of the remedy.

Basis for Remedy Preference

The Preferred Alternative is believed to provide the best balance of tradeoffs among the alternatives based on the information available to EPA at this time. EPA and PRDNER believe that the Preferred Alternative would be protective of human health and the environment, comply with ARARs, be cost-effective and utilize permanent solutions and alternative treatment technologies. It will require less long-term maintenance than Alternative 3 and will not result in a 10-foot mound being placed in a generally flat area, which could result in drainage concerns. Additionally, Alternative 2 will allow the Site to be returned to commercial use at a lower cost than Alternative 4.

The environmental benefits of the preferred alternative may be enhanced by consideration, during the design, of technologies and practices that are sustainable in accordance with EPA Region 2's Clean and Green Energy Policy.[1] This would include consideration of green remediation technologies and practices.

The EPA and PRDNER expect the preferred alternative to satisfy the following statutory requirements of CERCLA Section 121(b): 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost effective; 4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and 5) satisfy the preference for treatment as a principal element. EPA will assess the modifying criteria of community acceptance in the ROD following the close of the public comment period.

[1] https://www.epa.gov/greenercleanups/epa-region-2-clean-and-green-policy

COMMUNITY PARTICIPATION

EPA and PRDNER provide information regarding the cleanup of the site to the public through meetings, the Administrative Record file for the site, and announcements published in the local newspaper. EPA and PRDNER encourage the public to gain a more comprehensive understanding of the site and the Superfund activities that have been conducted there.

EPA, in consultation with PRDNER, will select the final remedy for the site after reviewing and considering all information submitted during a 30-day public comment period. EPA, in consultation with PRDNER, may modify the preferred alternative or select another 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.

The dates for the public comment period; the date, location, and time of the public meeting; and the locations of the Administrative Record files are provided on the front page of this Proposed Plan.

For further information on the Pesticide Warehouse I Superfund Site, please contact:

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Written comments on this Proposed Plan should be submitted on or before August 29, 2020 to Mr. Luis Santos at the address or email below.

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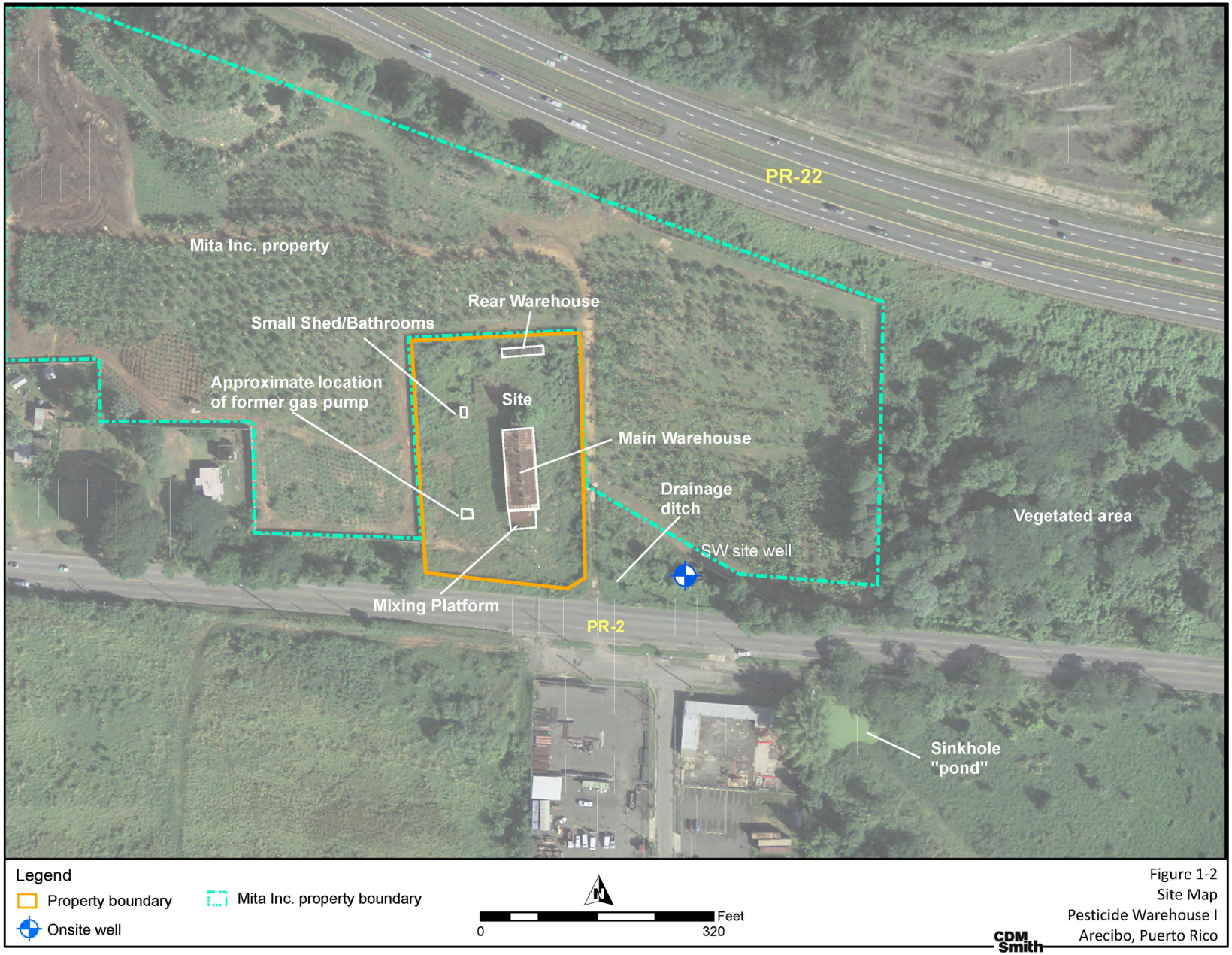


Figure 1-2
Site Map
Pesticide Warehouse I
Arecibo, Puerto Rico

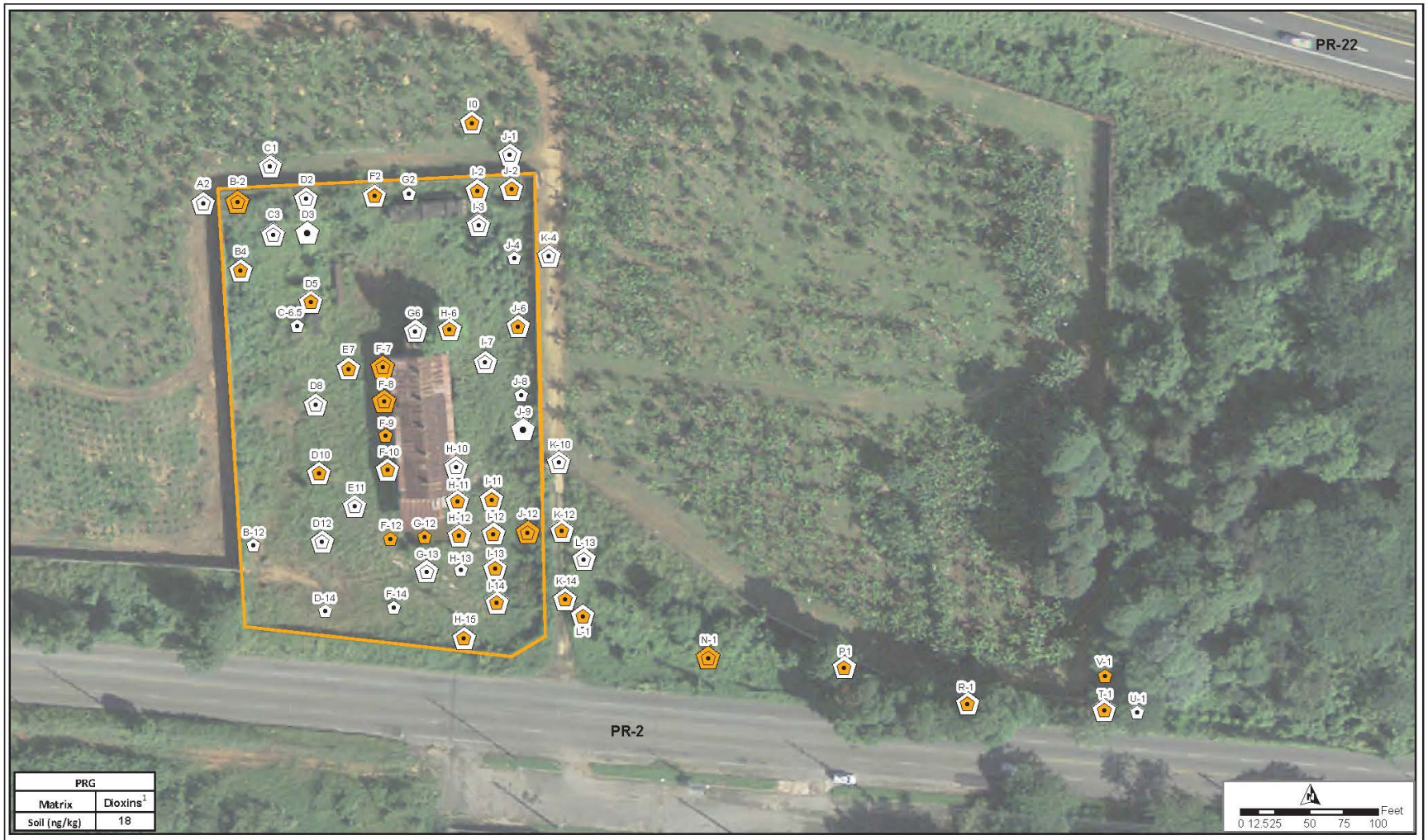
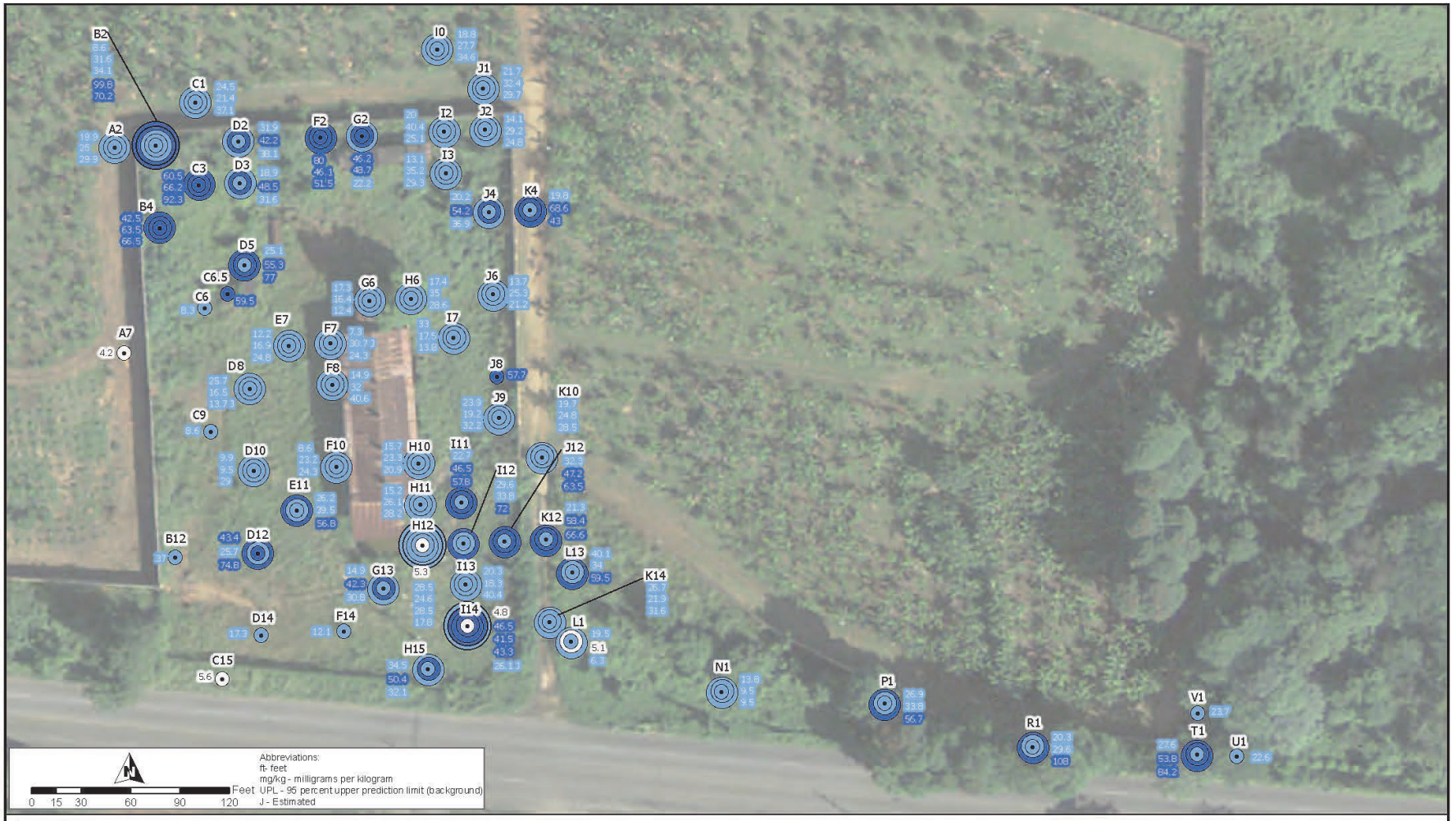


Figure 2-8
Dioxin/Furans TEQs Distribution in Soils (PRG)
Pesticide Warehouse I
Arecibo, Puerto Rico

CDM Smith



Legend

- Arsenic was either not detected or below screening 5.8 mg/kg criteria
- Arsenic screening criteria was exceeded at any interval
- Arsenic UPL of 41.5 mg/kg was exceeded at any interval
- Sampling location from 0-2 feet (ft)
- Sampling location from 4-6 ft
- Sampling location from 8-10 ft
- Sampling location from 12-14 ft
- Sampling location from 18-20 ft

I14 Analytical results in mg/kg
4.8 at 0-2 ft
46.5 at 4-6 ft
41.5 at 8-10
43.3 at 12-14
26.1 J at 18-20 ft

Note:
Regional Screening Levels for Arsenic for residential soil, based on a cancer risk of $1x10^{-5}$ (0.68 mg/Kg) is not shown because all detections exceed this value.

Figure 2-9
Arsenic Soil Results
Pesticide Warehouse I
Arecibo, Puerto Rico

CDM Smith

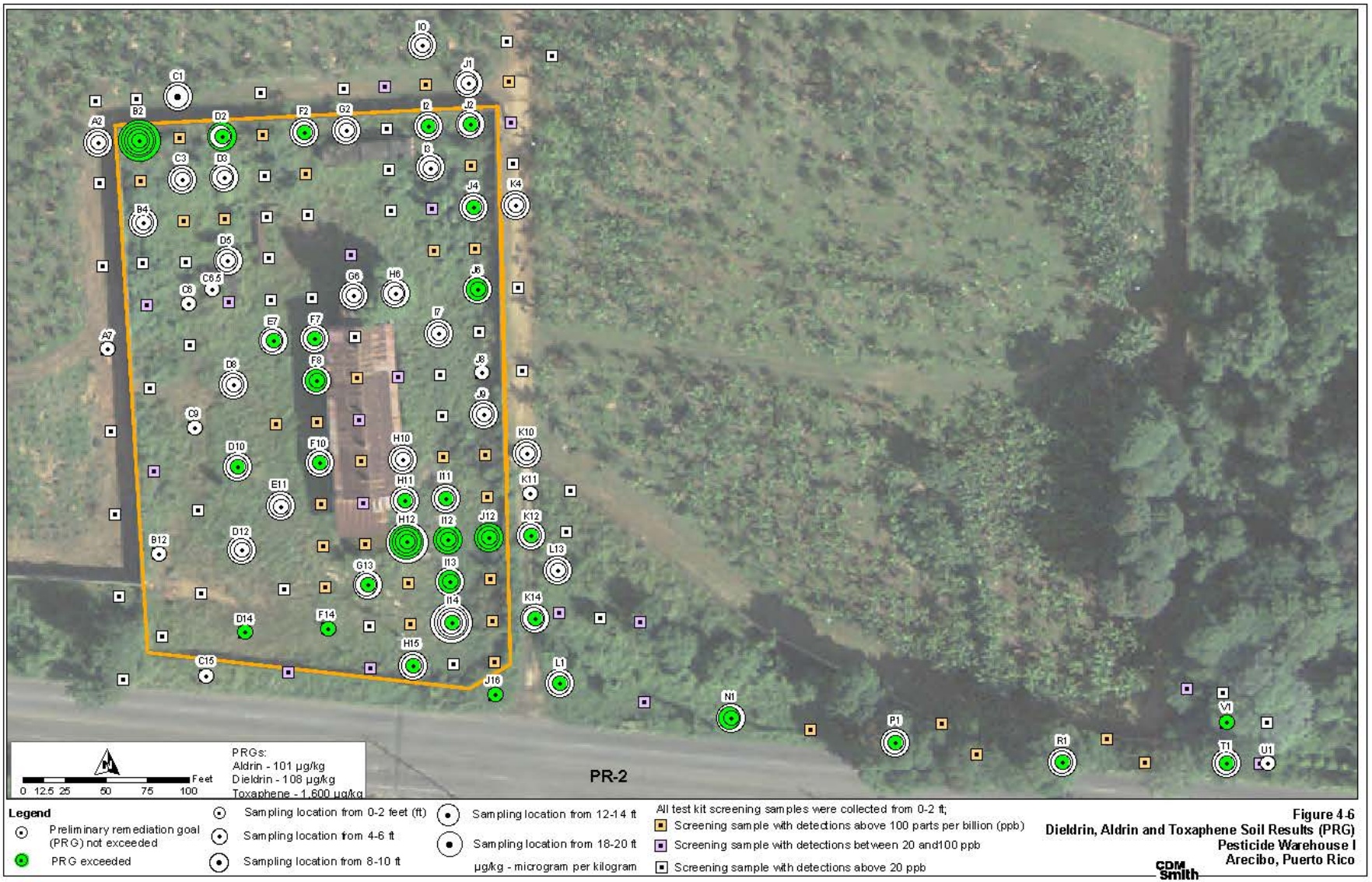


Figure 4-6
Dieldrin, Aldrin and Toxaphene Soil Results (PRG)
Pesticide Warehouse I
Arecibo, Puerto Rico

CDM Smith

APPENDIX V

Transcript of the Public Meeting

Transcripción de Presentación
PESTICIDE WAREHOUSE I
Unidad Operacional No.1 Suelos &
 # 2 Agua Subterránea
Lugar de Superfondo

Notas de transcripción:
Esta transcripción es basada en el audio de la presentación de Power Point titulada
"Pesticide Warehouse I,
Unidad Operacional No.1 Suelos &
 # 2 Agua Subterránea
Lugar de Superfondo"
La misma fue presentada y grabada por el Sr. Luis Santos, Gerente de Proyectos del Programa Superfondo de la Agencia Federal de Protección Ambiental

(Nota de la transcriptora - Se pasa a la laminilla 1: Pesticide Warehouse I, Unidad Operacional No.1 Suelos & # 2 Agua Subterránea Lugar de Superfondo)

Luis Santos: Mi nombre es Luis Santos, gerente de proyectos para el programa de Superfondo para la Agencia Federal de Protección Ambiental. Hoy les quiero presentar la toma de decisión para el plan propuesto para el lugar Pesticida Warehouse 1, conocido en español como almacén de pesticidas número 1, para las unidades 1 que es suelo, 2 que es agua subterránea.

(Nota de la transcriptora - Se pasa a la laminilla 2: Enfoque de los estudios)

El enfoque de este estudio tiene los objetivos generales. Estos son definir la naturaleza, alcance y las fuentes de contaminación en el suelo y en el agua subterránea. Además, evaluaremos el riesgo a la salud y al medio ambiente.

(Nota de la transcriptora - Se pasa a la laminilla 3: Mapa de localización)

La localización del lugar se encuentra en la parte norte de la isla de Puerto Rico, en el municipio de Arecibo. En el norte se encuentra el Expreso Número 22, por el sur se encuentra la Carretera Número 2.

(Nota de la transcriptora - Se pasa a la laminilla 4: Proceso Superfondo)

El proceso de Superfondo consta de diferentes fases de evaluación. La primera es descubrir el lugar. La segunda es el estudio preliminar del lugar. Luego se hace un CERCLIST, que esto quiere decir que se investiga. Un “site inspection”. Se hace un modelo matemático y este modelo matemático lleva al lugar a ser nominado para Lista Nacional de Prioridad o no. Todo esto que está en amarillo podemos decir que todavía no se ha tomado una decisión. Luego que el lugar está en la Lista Nacional de Prioridad se pasa a buscar una parte responsable. De no haberla, el gobierno federal toma acción. Y sería… se conduce el estudio de investigación que consta de dos partes: un estudio de investigación remedial y un estudio de viabilidad; con el propósito de definir cuál va a ser la acción a tomar para remediar el caso y de esta manera salvaguardar la salud pública y el medio ambiente. El lugar en este momento se encuentra donde lo vemos en la estrella, donde dice estamos aquí. Completamos el estudio de remediación, completamos el estudio de viabilidad y se lo estamos presentando a ustedes. Luego de 30 días pasaremos a producir o firmar el récord de decisión, que luego de esto pasa por otras etapas hasta que se completa y el lugar queda libre de contaminación.

(Nota de la transcriptora - Se pasa a la laminilla 5: Áreas de Estudio)

Aquí en ésta podemos ver en el área anaranjada es el área del lugar de contaminación. Si vemos detalles podemos ver por el norte la PR #22, que ese es el expreso. Podemos ver en amarillo la Carretera número 2. Lo que está en verde entrecortado sería unos terrenos de la congregación Mita que circundan todo. O sea, que este lugar por el norte tiene a la congregación Mita, por el sur tiene la Carretera Número 2, este y oeste tiene los terrenos de la Congregación Mita. Aquí ellos tienen unas fincas de agricultura y de cosecha en el terreno.

(Nota de la transcriptora - Se pasa a la laminilla 6: Contaminantes)

Luego de muestrear el suelo y el agua subterránea, para todos los parámetros listados en la Lista Nacional de Prioridad, reconocemos cuáles son los contaminantes de interés. Los contaminantes de interés sólo se encontraron en el suelo y éstos son dieldrín, dioxinas/furanos y arsénico. En el agua subterránea no encontramos contaminantes de interés.

(Nota de la transcriptora - Se pasa a la laminilla 7: Riesgos)

Luego de pasar estos resultados por el proceso de riesgo, buscando cuál riesgo hay a la salud pública y al medio ambiente, descubrimos que el resultado es que en la facilidad

Mita, que circunda toda esta propiedad, no hay riesgo a la salud y al medio ambiente. Al igual en el agua subterránea que tampoco hay riesgo a la salud y al medio ambiente. Los contaminantes antes mencionados sólo se encuentran en el área verjada y en el canal de drenaje.

(Nota de la transcriptora - Se pasa a la laminilla 8: Dieldrín)

Aquí vemos el primer contaminante que es dieldrín. Pongo en verde el nombre de "dieldrín" para que vean que los puntos verdes en la diapositiva son los lugares donde se encontró dieldrín a varias concentraciones, pero las concentraciones mayores exceden el riesgo a la salud y al medio ambiente.

(Nota de la transcriptora - Se pasa a la laminilla 9: Dioxinas/Furanos)

Próximo, está en anaranjado y dentro de la gráfica pueden ver los lugares en anaranjado. Estos lugares en anaranjado son donde se encontró este contaminante que sí es riesgo a la salud y al medio ambiente.

(Nota de la transcriptora - Se pasa a la laminilla 10: Arsénico)

En azul tenemos arsénico. Volvemos a la misma descripción. Todos los puntos azules pertenecen a muestras donde el arsénico dio sobre los estándares de calidad, de tal manera de que confirma que es un riesgo a la salud y al medio ambiente.

(Nota de la transcriptora - Se pasa a la laminilla 11: Alternativas evaluadas para Remediación)

La alternativa propuesta para el lugar. Se evaluaron varias alternativas. La alternativa #1 es una alternativa de No Acción. Eso es parte del proceso de estudio. Hay que tomar una acción y ver qué riesgos tendría a la salud y al medio ambiente, en este caso no es una alternativa. La alternativa número 2 es la alternativa. Tenemos la alternativa número 3 y la alternativa número 4, que cumplen con los objetivos pero no fueron las consideradas como la alternativa preferida.

De querer más información sobre estas alternativas pueden accesar a www.epa.gov/superfund/pesticide-warehouse-1 *(Nota de la transcriptora: El audio dice www.epa.gov/superfondo/pesticida-warehouse-1, se dialogó con el conferenciante ya que es diferente a la dirección de la presentación y se confirmó que la dirección correcta para acceder a los documentos es la que aparece en la presentación, por lo que se editó la transcripción del audio para que lea* www.epa.gov/superfund/pesticide-warehouse-1*)*

(Nota de la transcriptora - Se pasa a la laminilla 12: Plan Propuesto)

La alternativa #2 contempla excavación de los suelos contaminados hasta una profundidad de 10 pies por debajo de la superficie. Se tratará en el lugar el suelo y luego se dispondrá en un lugar apropiado para recibir desperdicios no peligrosos industriales. Luego se reemplazará la cubierta, la cantidad de terreno que se sacó y se volverá a poner en lugar, sobre los 10 pies. A esto aplicarían controles institucionales que podrían

ser unas restricciones a las escrituras, tanto para excavación o manejo y uso de estos terrenos.

(Nota de la transcriptora - Se pasa a la laminilla 13: ¿Preguntas?)

Con esto completo la presentación, tienen las preguntas. Doy las gracias por haber accesado este portal. Para comunicarse conmigo y dar sus comentarios hay varias alternativas. Pueden llamar al 787-977-5814 y dejar su comentario. Este comentario será analizado antes de tomar la decisión para el lugar. Además pueden dejar sus comentarios en la página www.epa.gov/superfund/pesticide-warehouse-1 *(Nota de la transcriptora: El audio dice www.epa.gov/superfondo/pesticide/warehouse/1, se dialogó con el conferenciante ya que es diferente a la dirección de la presentación y se confirmó que la dirección correcta para acceder a los documentos es la que aparece en la presentación, por lo que se editó la transcripción del audio para que lea* www.epa.gov/superfund/pesticide-warehouse-1*)* y también pueden dejarlo en mi correo virtual santos.luis@epa.gov. Todos estos comentarios serán recibidos y analizados. Esperamos que puedan hacerlo antes del 29 de agosto. Muchísimas gracias.

CERTIFICADO DE TRANSCRIPTORA

Yo, Aledawi Figueroa Martínez, transcriptora de Smile Again Learning Center, Corp. CERTIFICO:

Que la que antecede constituye la transcripción fiel y exacta de la presentación provista por CDM Smith.

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 4 de agosto de 2020.

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Presentation Transcript
PESTICIDE WAREHOUSE I
Operational Unit No.1 Soils &
 # 2 Groundwater
Superfund Site

Transcript notes:
This transcript is based on the audio of the PowerPoint presentation entitled "Pesticide Warehouse I, Operational Unit No.1 Soils & # 2 Groundwater Superfund Site"
It was presented and recorded by Mr. Luis Santos, Project Manager of the Superfund Program of the Environmental Protection Agency

(Transcriber's Note - Go to Sheet 1: Pesticide Warehouse I, Operational Unit No.1 Soils & #2 Groundwater Superfund Site)

Luis Santos: My name is Luis Santos, project manager for the Superfund Program for the Environmental Protection Agency. Today I want to present to you the decision making on the Proposed Plan for the Pesticide Warehouse 1 site, known in Spanish as “almacén de pesticidas número 1”, for units 1 which is soil, 2 which is groundwater.

(Transcriber's Note - We move on to slide 2: Study Focus)

The focus of this study is on the general objectives. These are to define the nature, extent, and sources of pollution in the soil and groundwater. In addition, we will assess the risk to public health and the environment.

(Transcriber's note - We move on to slide 3: Location map)

The location of the site is in the northern part of the island of Puerto Rico, in the municipality of Arecibo. Puerto Rico Highway 22 is located to the north and the PR-2 to the south.

(Transcriber's note - We move on to slide 4: Superfund process)

The Superfund process consists of different evaluation phases. The first is to discover the site. The second is the preliminary study of the site. Then a CERCLIST is made, which means that it is investigated. A "site inspection". A mathematical model is made, and this mathematical model leads to the site being nominated for the National Priority List or not. All this that is in yellow we can say that a decision has not been made yet. After the site is on the National Priority List, a responsible party is found. If there is no responsible party, the federal government takes action. This would lead to the research study that consists of two parts: an initial remedial investigation and a feasibility study; with the purpose of defining what action will be taken to remediate the site and in this way safeguard public health and the environment. At this moment, the site is where we see the star, where it says "we are here". We have completed the remedial investigation; we have completed the feasibility study and we are presenting it to you. After 30 days we will go on to produce or sign the record of decision, which then goes through other stages until it is completed, and the site is free of contamination.

(Transcriber's note - We move on to slide 5: Study Areas)

Here we can see that the orange area is the area of the contamination site. If we look at details we can see PR-22, which is the highway, to the north. We can see in yellow the PR-2. The green part is land that belongs to the Mita Congregation that surrounds everything. In other words, the site is bounded to the north by Mita congregation, to the south by the PR-2, and to the east and west by the vegetated areas that belong to the Mita congregation. Here they have some agricultural and harvesting farms on the land.

(Transcriber's note - We move on to slide 6: Contaminants)

After sampling the soil and groundwater, for all parameters listed on the National Priority List, we recognize which contaminants are of concern. The contaminants of concern were only found in the soil and these are dieldrin, dioxins/furans and arsenic. No contaminants of concern were found in groundwater.

(Transcriber's note - We move on to slide 7: Risks)

After running these results through the risk process, looking for possible risks to health and the environment, we discovered that in the Mita facility, which surrounds this entire property, there is no risk to health and the environment. As with the groundwater, there is no risk to health or the environment. The above-mentioned contaminants are only found in the fenced area and in the drainage channel

(Transcriber's note - We move on to slide 8: Dieldrin)

Here we see the first contaminant that is dieldrin. I have written "dieldrin" in green so you can see that the green dots on the slide are the locations where dieldrin was found at various concentrations, but the higher concentrations exceed the risk to health and the environment.

(Transcriber's note - We move on to slide 9: Dioxin/Furans)

Next, it is in orange and inside the graph you can see the locations in orange. These orange locations are where this contaminant was found, which is a risk to health and the environment.

(Transcriber's note - We move on to slide 10: Arsenic)

In blue we have arsenic. We're back to the same description. All the blue dots belong to samples where the arsenic has exceeded the quality standards, which confirms that it is a risk to health and the environment.

(Transcriber's note - We move on to slide 11: Evaluated Alternatives for Remediation)

The preferred alternative for the site. Several alternatives were evaluated. Alternative #1 is a No Action alternative. This is part of the study process. You have to take an action

and see what risks it would have to health and environment, in this case it is not an alternative. Alternative #2 is the alternative. We have alternative number 3 and alternative number 4, which meet the objectives but were not considered as the preferred alternative.

For more information on these alternatives go to www.epa.gov/superfund/pesticide-warehouse-1 *(Transcriber's note: The audio says www.epa.gov/superfondo/pesticida-warehouse-1, we discussed it with the speaker as it is different from the presentation address and confirmed that the correct address to access the documents the one in the presentation, therefore we edited the audio transcript to read www.epa.gov/superfund/pesticide-warehouse-1)*

(Transcriber's note - We move on to slide 12: Proposed Plan)

Alternative #2 involves excavation of the contaminated soils to a depth of 10 feet below the surface. The soil will be treated on site and then disposed of in a suitable location for receiving non-hazardous industrial waste. The amount of soil that was removed, will be replaced and put back in place, over 10 feet. Institutional controls would apply to this, which could be deed restrictions, either for excavation or management and use of these lands.

(Transcriber's note - We move on to slide 13: Questions?)

This completes the presentation. Here you have the questions' slide. I thank you for accessing this portal. There are several alternatives to contact me and provide your feedback. You can call 787-997-5814 and leave your comment. This comment will be analyzed before making the decision for the site. You can also leave your comments on the page www.epa.gov/superfund/pesticide-warehouse-1 *(Note from the transcriber: The audio says www.epa.gov/superfondo/pesticide/warehouse/1, we discussed it with the speaker because it is different from the address written in the presentation and we confirmed that the correct address to access the documents is the one that appears in the presentation, so we edited the transcript of the audio so it reads www.epa.gov/superfund/pesticide-warehouse-1)* and you can also leave it in my virtual mail santos.luis@epa.gov. All these comments will be received and analyzed. We ask you to send your comments before August 29th. Thank you very much.

CERTIFICATE OF TRANSLATOR

I, Aledawi Figueroa, hereby certify that I translated the attached document from Spanish into English and that, to the best of my ability, it is a true and correct translation. I further certify that I am competent in both Spanish and English to render and certify such translation. Should there be a misinterpretation in the translation, the original document in Spanish will prevail.

I also certify that I have no interest in the outcome of this matter and I have no relationship to any degree of consanguinity with the parties involved in it.

In Isabela, Puerto Rico, August 18, 2020.

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APPENDIX VI

List of the ARARs

Appendix A
Summary of Federal and Commonwealth Applicable or Relevant and Appropriate Requirements (ARARs)
Pesticide Warehouse I, OUs 1 and 2
Arecibo, Puerto Rico

Statues, Regulations, Standard, Or Requirement	Regulatory Level	Citation Or Reference	ARAR Determination	Description	Feasibility Study Consideration	Chemical	Location	Action
Federal ARARs and TBCs								
EPA Regional Screening Levels	Federal	EPA, May 2018	To Be Considered	Establishes risk-based screening levels for the protection of human health.	The RSLs will be considered in the development of the PRGs if there are no applicable standards.	✓		
Clean Water Act, Ambient Water Quality Criteria	Federal	40 CFR 131	To Be Considered	Sets criteria for water quality based on protection of human health and protection of aquatic life.	These standards will be used as guidelines to assess the effect of source removal on groundwater quality.	✓		
OSWER Guidance for Developing Ecological Soil Screening Levels (SSLs)	Federal	OSWER 9285.7.55	Applicable	Regulates the movement of soil from Puerto Rico into or through any other State, Territory, or District of the United States.	Soil exported to the continental United States for treatment, storage, and disposal will need to meet the container and substantive permit requirements. Treatment, storage and disposal facilities receiving contaminated soil will need to be an authorized and APHIS inspected facility.			✓
National Historic Preservation Act	Federal	40 CFR 6.301 or 16 United States Code (U.S.C.) 470 36 CFR Part 800	Applicable	This requirement establishes procedures to take into account the effect of this response action upon any district, site, building, structure, or object that is included in or eligible for the National Register of Historic Places (generally, 50 years old or older).	If cultural resources on or eligible for the national register are present, it will be necessary to determine if there will be an adverse effect and if so how the effect may be minimized or mitigated. The unauthorized removal of archaeological resources from public lands is prohibited without a permit, and any archaeological investigations at a site must be conducted by a professional archaeologist. To date, no such resources have been found at the site. If any are found, consultation with the State Historic Preservation Office (SHPO) and the NHPA will be addressed during remedial design.		✓	
Archaeological and Historic Preservation Act and Implementing Regulations	Federal	16 U.S.C. 469 43 CFR 7	Applicable	This statute and implementing regulations establish 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.			✓	
Fish and Wildlife Coordination Act and Implementing Regulations	Federal	50 CFR 83 33 CFR 320-330	Applicable	This statute and implementing regulations require coordination with federal and state agencies for federally funded projects to ensure that any modification of any stream or other water body affected by any action authorized or funded by the federal agency provides for adequate protection of fish and wildlife resources.	If the remedial action involves activities that affect wildlife and/or non-game fish, federal agencies must first consult with the U.S. Fish and Wildlife Service and the relevant state agency with jurisdiction over wildlife resources. Wildlife species were observed at the site within/around the sinkhole pond.		✓	
Migratory Bird Treaty Act and Implementing Regulations	Federal	16 U.S.C. 703, et seq. 50 CFR 10.13	Applicable	This requirement establishes a federal responsibility for the protection of the international migratory bird resources and requires continued consultation with the U.S. Fish and Wildlife Service during remedial design and remedial construction to ensure that the cleanup of the site does not unnecessarily impact migratory birds.	The selected remedial actions will be carried out in a manner to avoid adversely affecting migratory bird species, including individual birds or their nests.		✓	

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Federal ARARs and TBCs								
OSHA Recording and Reporting Occupational Injuries and Illnesses	Federal	29 CFR 1904	Applicable	This regulation outlines the recordkeeping and reporting requirements for an employer under OSHA.	These regulations apply to the companies contracted to implement the remedy. All applicable requirements will be met.			✓
OSHA Occupational Safety and Health Standards	Federal	29 CFR 1910	Applicable	These regulations specify an 8-hour time-weighted average concentration for worker exposure to various organic compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 1910.120.	Proper respiratory equipment will be worn if it is not possible to maintain the work atmosphere below the 8-hour time-weighted average at these specified concentrations.			✓
OSHA Safety and Health Regulations for Construction	Federal	29 CFR 1926	Applicable	This regulation specifies the type of safety equipment and procedures to be followed during site remediation.	All appropriate safety equipment will be on site, and appropriate procedures will be followed during remediation activities.			✓
RCRA Identification and Listing of Hazardous Wastes	Federal	40 CFR 261	Applicable	This regulation describes methods for identifying hazardous wastes and lists known hazardous wastes.	This regulation is applicable to the identification of hazardous wastes that are generated, treated, stored, or disposed during remedial activities.	✓		✓
RCRA Standards Applicable to Generators of Hazardous Wastes	Federal	40 CFR 262	Applicable	Describes standards applicable to generators of hazardous wastes.	Standards will be followed if any hazardous wastes are generated on site.			✓
RCRA Standards for Transportation of Hazardous Waste	Federal	40 CFR 263	Applicable	Specifies requirements for transporters of hazardous waste to obtain a EPA identification number, compliance with manifest procedures and spill response.	Any company contracted to transport hazardous material from the site will be required to comply with this regulation.			✓
RCRA Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities – General Facility Standards	Federal	40 CFR 264 and 265	Applicable	This regulation lists general facility requirements, including general waste analysis, security measures, inspections, and training requirements.	If hazardous waste is treated, stored, or disposed of onsite, the facility will be designed, constructed, and operated in accordance with this requirement. All workers will be properly trained.			✓
Land Disposal Restrictions (LDRs)	Federal	40 CFR 268	Applicable	Places specific restrictions (concentration or treatment) on RCRA hazardous wastes prior to their placement in a land disposal unit.	Hazardous wastes will be treated to meet disposal requirements.	✓		✓
Hazardous Waste Permit Program	Federal	40 CFR 270	Applicable	Establishes basic EPA permitting requirements, such as application requirements, standard permit conditions, and monitoring and reporting requirements.	All permitting requirements of EPA must be complied with. Permits are not required, but substantive requirements of the permits would need to be met.			✓
Off-Site Rule	Federal	40 CFR 300.440	Applicable	The purpose of the Off-Site Rule is to avoid having CERCLA wastes from response actions authorized or funded under CERCLA contribute to present or future environmental problems by directing these wastes to management units determined to be environmentally sound.	Contaminated soil sent to a TSD facility acceptable for the receipt of CERLCA wastes from response actions authorized or funded under CERCLA.			✓

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Federal ARARs and TBCs								
U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) Soil from foreign countries or Territories or possessions	Federal	7 CFR 330.300	Applicable	Regulates the movement of soil from Puerto Rico into or through any other State, Territory, or District of the United States.	Soil exported to the continental United States for treatment, storage, and disposal will need to meet the container and substantive permit requirements. Treatment, storage and disposal facilities receiving contaminated soil will need to be an authorized and APHIS inspected facility.			✓
National Pollutant Discharge Elimination System	Federal	40 CFR 100 et seq.	Applicable	NPDES permit requirements for point source discharges must be met, including the NPDES Best Management Practice (BMP) Program. These regulations include, but are not limited to, requirements for compliance with water quality standards, a discharge monitoring system, and records maintenance.	Project will meet NPDES permit requirements for point source discharges.			✓
Clean Air Act —National Ambient Air Quality Standards	Federal	40 CFR 50	Applicable	These provide air quality standards for particulate matter, lead, NO_2, SO_2, CO, and volatile organic matter.	During excavation, treatment, and/or stabilization, air emissions will be properly controlled and monitored to comply with these standards.	✓		✓
Standards of Performance for New Stationary Sources	Federal	40 CFR 60	Relevant and Appropriate	Set the general requirements for air quality.	During excavation, treatment, and/or stabilization, air emissions will be properly controlled and monitored to comply with these standards.			✓
National Emission Standards for Hazardous Air Pollutants	Federal	40 CFR 61	Applicable	These provide air quality standards for hazardous air pollutants.	During excavation, treatment, and/or stabilization, air emissions will be properly controlled and monitored to comply with these standards.	✓		✓
Commonwealth of Puerto Rico ARARs and TBCs								
Puerto Rico Water Quality Standards Regulation	Commonwealth of Puerto Rico	PREQB, April 2016, Regulation #7837 Amended by Regulation #8512	Applicable	This regulation is to preserve, maintain, and enhance the quality of the waters of Puerto Rico and regulate any discharge of any pollutant to the waters of Puerto Rico by establishing water quality standards. Water quality standards and use classifications are promulgated for the protection of the uses assigned to coastal, surface, estuarine, wetlands, and ground waters of Puerto Rico. Water quality standards for Puerto Rico ground waters are based on protection of surface waters.	These standards were considered in the development of the PRGs.	✓		✓
Regulation for the Control of Hazardous and Non-Hazardous Solid Waste	Commonwealth of Puerto Rico	PREQB, Regulation #5717	Applicable	Establishes standards for management and disposal of hazardous wastes.	All remedial activities must adhere to these regulations while handling hazardous waste during remedial operations.	✓		✓
Regulation for the Management of Non-Hazardous Solid Waste	Commonwealth of Puerto Rico	PREQB, Regulation #2863, Amended by Regulation #5807	Applicable	Establishes the requirements for the handling, storage, transportation, processing and disposal of non-hazardous solid waste	Applies to all non-hazardous solid waste, including special waste generated, handled, transported, destroyed, or dumped within the jurisdiction of Puerto Rico. Control activities for the non-hazardous wastes must comply with the treatment and disposal standards.			✓

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Statues, Regulations, Standard, Or Requirement	Regulatory Level	Citation Or Reference	ARAR Determination	Description	Feasibility Study Consideration	Chemical	Location	Action
Commonwealth of Puerto Rico ARARs and TBCs								
Regulation of the PREQB for the Prevention and Control of Noise Pollution	Commonwealth of Puerto Rico	PREQB, December 1974, Regulation #8019	Applicable	This standard provides standards and requirements to control, reduce, or eliminate noise that might be harmful to health and disturb the public well-being.	This standard will be applied to any remediation activities performed at the site.			✓
Regulation for the Control of Erosion and Prevention of Sedimentation	Commonwealth of Puerto Rico	PREQB, Regulation #5754	Applicable	Establishes standards and requirements to control, reduce, or eliminate soil erosion during construction.	Applies to any activities that may cause or result in the erosion of the soil. Includes, but not limited to, clearing of trees; removal of the vegetative cover of the ground; the construction or demolition of structures; extraction, storage or disposal of soil; or any other activity that includes the alteration of the conditions of the ground or soil.			✓
Act for the Protection and Preservation of Puerto Rico's Karst Regions	Commonwealth of Puerto Rico	PREQB, August 1999, Regulation #292	To Be Considered	This regulation requires the protection and conservation of the karst regions physiography and prevents the transportation and sale of natural materials without permits.	The requirement will be considered during the development of alternatives.		✓	
PREQB Regulation for the Control of Atmospheric Pollution	Commonwealth of Puerto Rico	PREQB, July 1995, Regulation #5300 Amended by Regulations #6302, #6303, #6630, #6824, #8484, and #8485	Applicable	Describes requirements and procedures for obtaining air permits and certificates; rules that govern the emission of contaminants into the ambient atmosphere.	Applies to any remediation activities performed at the site. Permits are not required, but substantive requirements of the permits would need to be met. During excavation, treatment, stabilization, or discharging off-gas, air emissions will be properly controlled and monitored to comply with these standards.	✓		✓

Acronyms:

APHIS - Animal and Plant Health Inspection Service
ARARs - applicable or relevant and appropriate requirements
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act of 1980
CFR - Code of Federal Regulations
EPA - Environmental Protection Agency
FEMA - Federal Emergency Management Agency
PREQB - Puerto Rico Environmental Quality Board
PRWQS - Peurto Rico Water Quality Standards
MCLs - Maximum Contaminant Levels
OSHA - Occupational Safety and Health Administration
OSWER - Office of Solid Waste and Emergency Response
PRGs - preliminary remediation goals
RCRA - Resource Conservation and Recovery Act
TBC - to be considered
NPDES - National Pollution Discharge Elimination System
U.S.C. - United States Code
NO_2 - nitrogen dioxide
SO_2 - sulfur dioxide
CO - carbon monoxide
RSL - regional screening level
BMP - best management practices
EO - executive order

APPENDIX VII

Puerto Rico Department of Natural and Environmental Resources' Concurrence Letter

GOVERNMENT OF PUERTO RICO
Department of Natural and Environmental Resources

September 25, 2020

VIA EMAIL: santos.luis@epa.gov

Mr. Luis Santos, Remedial Project Manager
US Environmental Protection Agency
Caribbean Environmental Protection Division
City View Plaza II – Suite 7000
#48 Road 165 km 1.2
Guaynabo, PR 00968-8069

Dear Mr. Santos:

RE: PESTICIDE WAREHOUSE I, OPERABLE UNIT 1 (SOIL) & OPERABLE UNIT 2 (GROUNDWATER) SUPERFUND SITE RECORD OF DECISION CONCURRENCE LETTER

The Department of Natural and Environmental Resources (DNER) has completed its review of the aforementioned document. This Draft ROD includes the preferred remedial alternative presented in the USEPA Proposed Plan (PP) to address the contamination of the soil media in the Operable Unit 1 (OU1) and the site wide groundwater contamination of the Operable Unit 2 (OU2) at the Pesticide Warehouse I Superfund Site. The preferred remedy includes Excavation of Contaminated Soil to 10 feet below ground surface, Onsite Treatment and Offsite Disposal, Covering of Remaining Contaminated Subsurface Soil, and Institutional Controls. The PP also establishes that no action is necessary for groundwater (OU2); however, the soil remedy includes monitoring of the groundwater to ensure that remediation of the soils does not result in negative impacts to the aquifer.

All DNER's comments and concerns were addressed through several meetings and conference calls with USEPA and CDM Smith (USEPA contractor) representatives. Therefore, DNER concurs with the Draft ROD issued by the USEPA for the Pesticide Warehouse I Operable Unit 1 (OU1).

DNER also concurs with the Draft ROD issued by the USEPA for the Pesticide Warehouse I Operable Unit 2 (groundwater). Although DNER has reviewed the complete document, this letter is intended solely to grant its concurrence to the USEPA preferred remedy for the Operable Unit 1 (soil) contamination included in the ROD.

If you have any question, please feel free to contact Ms. Mariangely Aleman Gaetán, Remedial Project Manager assigned to this case at (787) 767-8181 extension 2414 or by e-mail at mariangelyaleman@jca.pr.gov

Cordially,

Melvin Menendez Figueroa, Manager
Environmental Emergencies Response and Superfund Area

MAG