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Environmental Protection
Agency

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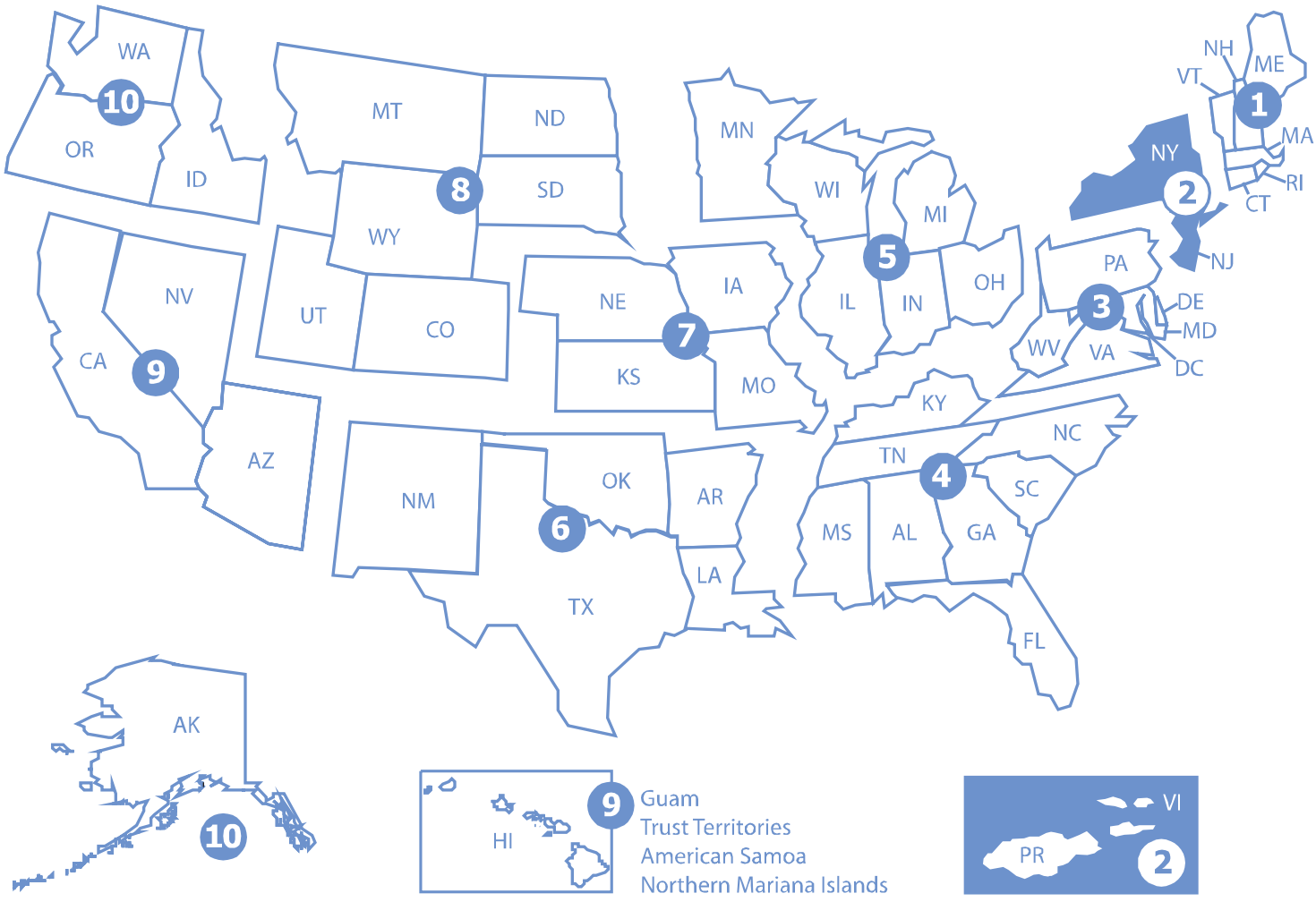
Washington, DC 20460

May 2019

Office of Land and Emergency Management

Support Document for the Revised National Priorities List Final Rule – PROTECO



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Support Document for the Revised National Priorities List Final Rule

PROTECO

May 2019

Site Assessment and Remedy Decisions Branch
Office of Superfund Remediation and Technology Innovation
Office of Land and Emergency Management
U.S. Environmental Protection Agency
Washington, DC 20460

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Executive Summary

Section 105(a)(8)(B) of CERCLA, as amended by SARA, requires that the EPA prepare a list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States. An original National Priorities List (NPL) was promulgated on September 8, 1983 (48 FR 40658). CERCLA requires that EPA update the list at least annually.

This document provides responses to public comments received on PROTECO site, proposed on May 17, 2018 (83 FR 22918). This site is being added to the NPL based on an evaluation under EPA's Hazard Ranking System (HRS) in a final rule published in the *Federal Register* in May 2019.

Introduction

This document explains the rationale for adding the PROTECO site in Peñuelas, Puerto Rico to the National Priorities List (NPL) of uncontrolled hazardous waste sites and provides responses to public comments received on this site listing proposal. The EPA proposed this site to the NPL on May 17, 2018 (83 FR 22918). This site is being added to the NPL based on an evaluation under the Hazard Ranking System (HRS) in a final rule published in the *Federal Register* in May 2019.

Background of the NPL

In 1980, Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. Sections 9601 *et seq*. in response to the dangers of uncontrolled hazardous waste sites. CERCLA was amended on October 17, 1986, by the Superfund Amendments and Reauthorization Act (SARA), Public Law No. 99-499, stat., 1613 *et seq.* To implement CERCLA, EPA promulgated the revised National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300, on July 16, 1982 (47 FR 31180), pursuant to CERCLA Section 105 and Executive Order 12316 (46 FR 42237, August 20, 1981). The NCP, further revised by EPA on September 16, 1985 (50 FR 37624) and November 20, 1985 (50 FR 47912), sets forth guidelines and procedures needed to respond under CERCLA to releases and threatened releases of hazardous substances, pollutants, or contaminants. On March 8, 1990 (55 FR 8666), EPA further revised the NCP in response to SARA.

Section 105(a)(8)(A) of CERCLA, as amended by SARA, requires that the NCP include:

> criteria for determining priorities among releases or threatened releases throughout the United States for the purpose of taking remedial action and, to the extent practicable, taking into account the potential urgency of such action, for the purpose of taking removal action.

Removal action involves cleanup or other actions that are taken in response to emergency conditions or on a short-term or temporary basis (CERCLA Section 101). Remedial action is generally long-term in nature and involves response actions that are consistent with a permanent remedy for a release (CERCLA Section 101). Criteria for placing sites on the NPL, which makes them eligible for remedial actions financed by the Trust Fund established under CERCLA, were included in the HRS. EPA promulgated the HRS as Appendix A of the NCP (47 FR 31219, July 16, 1982). On December 14, 1990 (56 FR 51532), EPA promulgated revisions to the HRS in response to SARA, and established the effective date for the HRS revisions as March 15, 1991. On January 9, 2017, EPA promulgated a further revision to the HRS that added a component for evaluating the threats posed by the intrusion of subsurface contamination into regularly occupied structures. These changes are consistent with, and comply with, the statutory requirements of SARA.

Section 105(a)(8)(B) of CERCLA, as amended, requires that the statutory criteria provided by the HRS be used to prepare a list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States. The list, which is Appendix B of the NCP, is the NPL.

An original NPL of 406 sites was promulgated on September 8, 1983 (48 FR 40658). At that time, an HRS score of 28.5 was established as the cutoff for listing because it yielded an initial NPL of at least 400 sites, as suggested by CERCLA. The NPL has been expanded several times since then, most recently on September 13, 2018 (83 FR 46408). The Agency also has published a number of proposed rulemakings to add sites to the NPL. The most recent proposal was on September 13, 2018 (83 FR 46460).

Development of the NPL

The primary purpose of the NPL is stated in the legislative history of CERCLA (Report of the Committee on Environment and Public Works, Senate Report No. 96-848, 96th Cong., 2d Sess. 60 [1980]).

> The priority list serves primarily informational purposes, identifying for the States and the public those facilities and sites or other releases which appear to warrant remedial actions. Inclusion of a facility or site on the list does not in itself reflect a judgment of the activities of its owner or operator, it does not require those persons to undertake any action, nor does it assign liability to any person. Subsequent government actions will be necessary in order to do so, and these actions will be attended by all appropriate procedural safeguards.

The NPL, therefore, is primarily an informational and management tool. The identification of a site for the NPL is intended primarily to guide EPA in determining which sites warrant further investigation to assess the nature and extent of the human health and environmental risks associated with the site and to determine what CERCLA-financed remedial action(s), if any, may be appropriate. The NPL also serves to notify the public of sites EPA believes warrant further investigation. Finally, listing a site may, to the extent potentially responsible parties are identifiable at the time of listing, serve as notice to such parties that the Agency may initiate CERCLA-financed remedial action.

CERCLA Section 105(a)(8)(B) directs EPA to list priority sites among the known releases or threatened release of hazardous substances, pollutants, or contaminants, and Section 105(a)(8)(A) directs EPA to consider certain enumerated and other appropriate factors in doing so. Thus, as a matter of policy, EPA has the discretion not to use CERCLA to respond to certain types of releases. Where other authorities exist, placing sites on the NPL for possible remedial action under CERCLA may not be appropriate. Therefore, EPA has chosen not to place certain types of sites on the NPL even though CERCLA does not exclude such action. If, however, the Agency later determines that sites not listed as a matter of policy are not being properly responded to, the Agency may consider placing them on the NPL.

Hazard Ranking System

The HRS is the principle mechanism EPA uses to place uncontrolled waste sites on the NPL. It is a numerically based screening system that uses information from initial, limited investigations -- the preliminary assessment and site inspection -- to assess the relative potential of sites to pose a threat to human health or the environment. HRS scores, however, do not determine the sequence in which EPA funds remedial response actions, because the information collected to develop HRS scores is not sufficient in itself to determine either the extent of contamination or the appropriate response for a particular site. Moreover, the sites with the highest scores do not necessarily come to the Agency's attention first, so that addressing sites strictly on the basis of ranking would in some cases require stopping work at sites where it was already underway. Thus, EPA relies on further, more detailed studies in the remedial investigation/feasibility study that typically follows listing.

The HRS uses a structured value analysis approach to scoring sites. This approach assigns numerical values to factors that relate to or indicate risk, based on conditions at the site. The factors are grouped into three categories. Each category has a maximum value. The categories are:

- likelihood that a site has released or has the potential to release hazardous substances into the environment;

- characteristics of the waste (e.g., toxicity and waste quantity); and
- targets (e.g., people or sensitive environments) affected by the release.

Under the HRS, four pathways can be scored for one or more components and threats as identified below:

- Ground Water Migration (S_{gw})
  - population

- Surface Water Migration (S_{sw})
  The following threats are evaluated for two separate migration components, overland/flood migration and ground water to surface water.
  - drinking water
  - human food chain
  - sensitive environments

- Soil Exposure and Subsurface Intrusion (S_{sessi})
  - Soil Exposure Component:
    - resident population
    - nearby population
  - Subsurface Intrusion Component
    - population

- Air Migration (S_a)
  - population

After scores are calculated for one or more pathways according to prescribed guidelines, they are combined using the following root-mean-square equation to determine the overall site score (S), which ranges from 0 to 100**:**

$$S = \sqrt{\frac{S_{gw}^2 + S_{sw}^2 + S_{sessi}^2 + S_a^2}{4}}$$

If all pathway scores are low, the HRS score is low. However, the HRS score can be relatively high even if only one pathway score is high. This is an important requirement for HRS scoring because some extremely dangerous sites pose threats through only one pathway. For example, buried leaking drums of hazardous substances can contaminate drinking water wells, but -- if the drums are buried deep enough and the substances not very volatile -- not surface water or air.

Other Mechanisms for Listing

There are two mechanisms other than the HRS by which sites can be placed on the NPL. The first of these mechanisms, authorized by the NCP at 40 CFR 300.425(c)(2), allows each State and Territory to designate one site as its highest priority regardless of score. The last mechanism, authorized by the NCP at 40 CFR 300.425(c)(3), allows listing a site if it meets the following three requirements:

- Agency for Toxic Substances and Disease Registry (ATSDR) of the U.S. Public Health Service has issued a health advisory that recommends dissociation of individuals from the release;
- EPA determines the site poses a significant threat to public health; and

- EPA anticipates it will be more cost-effective to use its remedial authority than to use its emergency removal authority to respond to the site.

Organization of this Document

The following section contains EPA responses to site-specific public comments received on the proposal of PROTECO site on May 17, 2018 (83 FR 22918). The site discussion begins with a list of commenters, followed by a site description, a summary of comments, and Agency responses to each comment. A concluding statement indicates the effect of the comments on the HRS score for the site.

Glossary

The following acronyms and abbreviations are used throughout the text:

ACD	Amended Consent Decree
Agency	U.S. Environmental Protection Agency
APA	Administrative Procedure Act
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	Below ground surface
CAMU	Corrective action management unit
CEPD	Caribbean Environmental Protection Division
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. Sections 9601 *et seq*., also known as Superfund
CFR	Code of Federal Regulations
cm/s	Centimeter per second
Ecosystems	Ecosystems, Inc.
EPA	U.S. Environmental Protection Agency
FR	Federal Register
FS	Feasibility Study
HRS	Hazard Ranking System, Appendix A of the NCP
HRS score	Overall site score calculated using the Hazard Ranking System; ranges from 0 to 100
MCL	Maximum concentration level
MRL	Minimum reporting limit
MW	Monitoring Well
NCP	National Oil and Hazardous Substances Pollution Contingency Plan, 40 C.F.R. Part 300
NPL	National Priorities List
OLEM	EPA Office of Land and Emergency Management
OSWER	EPA's Office of Solid Waste and Emergency Response; now called Office of Land and Emergency Management

PCBs	Polychlorinated Biphenyls
PCE	Tetrachloroethene
PCP	Post-Closure Permit
PRP	Potentially responsible party
PREPA	Puerto Rico Electrical Power Authority
PREQB	Puerto Rico Environmental Quality Board
PROTECO	Protección Técnica Ecológica
PVL	Peñuelas Valley Landfill
RCRA	Resource Conservation and Recovery Act
RI	Remedial investigation
RI/FS	Remedial investigation/feasibility study
RMI	Resources Management, Inc.
RML	Removal management level
SARA	Superfund Amendments and Reauthorization Act
SVOCs	Semi volatile organic compounds
TDL	Target Distance Limit
USGS	United States Geological Survey
VOC	Volatile organic compound
WESTON	Weston Solutions, Inc.
WM	Waste Management, Inc.

1. List of Commenters and Correspondence

EPA-HQ-OLEM-2018-0253-0004	Correspondence, dated January 25, 2018, from Tania Vázquez Rivera, Chairman of the Government of Puerto Rico Environmental Quality Board.
EPA-HQ-OLEM-2018-0253-0005	Comment, submitted May 22, 2018, by an anonymous public commenter.
EPA-HQ-OLEM-2018-0253-0006	Comment, submitted May 22, 2018, by an anonymous public commenter.
EPA-HQ-OLEM-2018-0253-0007	Comment and attachments, submitted June 7, 2018, by Peñuelas Valley Landfill, LLC.
EPA-HQ-OLEM-2018-0253-0008	Correspondence, dated July 16, 2018, from Douglas Ammon of Office of Superfund Remediation and Technology Innovation, Chief of Site Assessment and Remedy Decisions Branch.
EPA-HQ-OLEM-2018-0253-0009	Correspondence, dated July 16, 2018, from Terry Jeng of United States Environmental Protection Agency.
EPA-HQ-OLEM-2018-0253-0010	Comment attachment, submitted July 17, 2018, by Patricio Martínez-Lorenzo, on behalf of Resources Management Inc. (RMI).
EPA-HQ-OLEM-2018-0253-0011	Comment, submitted July 24, 2018, by an anonymous public commenter.
EPA-HQ-OLEM-2018-0253-0012	Comment, submitted August 7, 2018, by an anonymous public commenter.
EPA-HQ-OLEM-2018-0253-0013	Comment, submitted September 5, 2018, by an anonymous public commenter.
EPA-HQ-OLEM-2018-0253-0014	Comment and attachments, submitted September 9, 2018, by Patricio Martínez-Lorenzo, on behalf of Resources Management Inc. (RMI).

2. Site Description

The PROTECO site (the Site) is located in Barrio Tallaboa, Peñuelas, Puerto Rico. The Site as scored for HRS purposes consists of three sources of hazardous substances at the former PROTECO landfill, as well as groundwater contaminated with mercury and chlorinated volatile organic compounds (VOCs) as a result of releases from the sources.

PROTECO was a treatment, storage, and disposal facility for hazardous and nonhazardous wastes. Operations at the PROTECO facility began in 1975 under the name Servicios Carbareon, Inc. In 1985, the name was changed to Protección Técnica Ecológica (PROTECO), which was succeeded by Resources Management, Inc. doing business as PROTECO. During its years of operation the landfill accepted a variety of wastes, including electroplating sludge, wastewater treatment plant sludge, slurries, petroleum waste, pesticide waste, pharmaceutical waste, and manufacturing waste.

In 1987, the EPA and PROTECO entered into a Consent Decree stipulating PROTECO would perform injunctive relief with respect to Resource Conservation and Recovery Act (RCRA) violations. In 1997, the EPA and PROTECO entered into an Amended Consent Decree requiring PROTECO to meet RCRA closure and post-closure care requirements for the landfill based on PROTECO's violations of RCRA regulations and of provisions of the original Consent Decree. PROTECO conducted closure of waste units at the facility from November 1997 through February 1999; some waste units were closed in place by capping, while others were excavated for disposal into an on-site corrective action management unit. PROTECO conducted some post-closure maintenance, but stopped sometime between 2001 and 2009; since then the site remains abandoned. RCRA-required groundwater monitoring activities have not been performed by PROTECO, and a required groundwater monitoring system has not been installed at the Site.

The Site sources are evaluated as landfills (Source 1 and Source 3) and a surface impoundment (Source 2) (see Figure 2 of the HRS documentation record at promulgation). Sources 1 and 2 consist of aggregated sub-sources. Source 1 includes four unlined drum burial landfills, collectively occupying approximately 0.83 acre, where drums containing hazardous substances were buried directly above native soil and were not removed during landfill closure (i.e., the drum burial areas were capped in place). Source 2 includes seven unlined surface impoundments that were used for the disposal of liquid wastes containing hazardous substances that together contain over 50,000 cubic yards of waste material. Source 3 consists of a 10-acre, unlined landfill that accepted industrial and special wastes generated by industries and commercial establishments within Puerto Rico. Prior to its use as a landfill, the Source 3 unit was used as a landfarm for sludges designated as nonhazardous. A variety of wastes were deposited in Sources 1-3. The sources lack liners to contain wastes and prevent hazardous substances from migrating to groundwater.

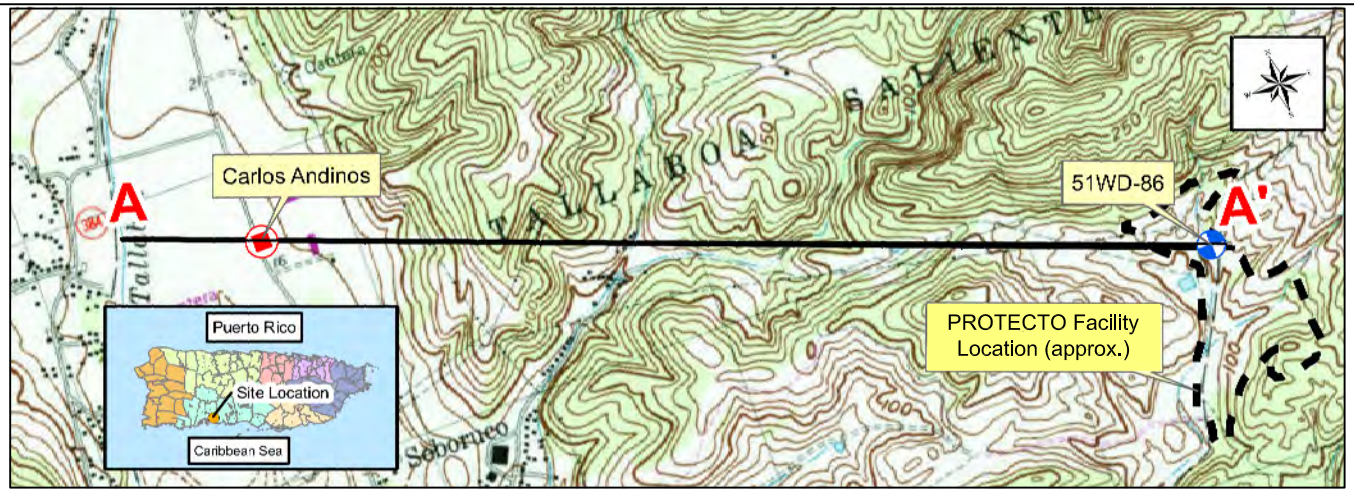
The single hydrologic unit evaluated for HRS purposes includes four layers/formations. The hydrogeological conditions underlying the PROTECO facility consist of three interconnected aquifer layer/formations: these are the alluvial deposits starting at the surface, the upper Juana Díaz Formation (calcareous silty clay[1]) below the alluvial aquifer, and below that the lower Juana Díaz Formation (reef limestone). The Tallaboa alluvial aquifer, while not present directly below the PROTECO facility, is an additional aquifer that is located approximately 1.5 miles west and approximately 300 feet lower in elevation than the PROTECO facility in the Tallaboa Valley (see Figure A-1 of this support document below). The Tallaboa alluvial aquifer consists of alluvial deposits of varying thicknesses (40-200 feet) that are recharged, at least in part, by the surrounding upgradient limestone formations, including the Juana Díaz Formation (See HRS documentation record figures 1-3, Reference 24, and Reference 27). Wells in the Tallaboa aquifer are also documented to be screened across multiple aquifer layers. For HRS purposes, all of these aquifers are documented to be interconnected within 2 miles of the Site sources and are considered one hydraulic unit.

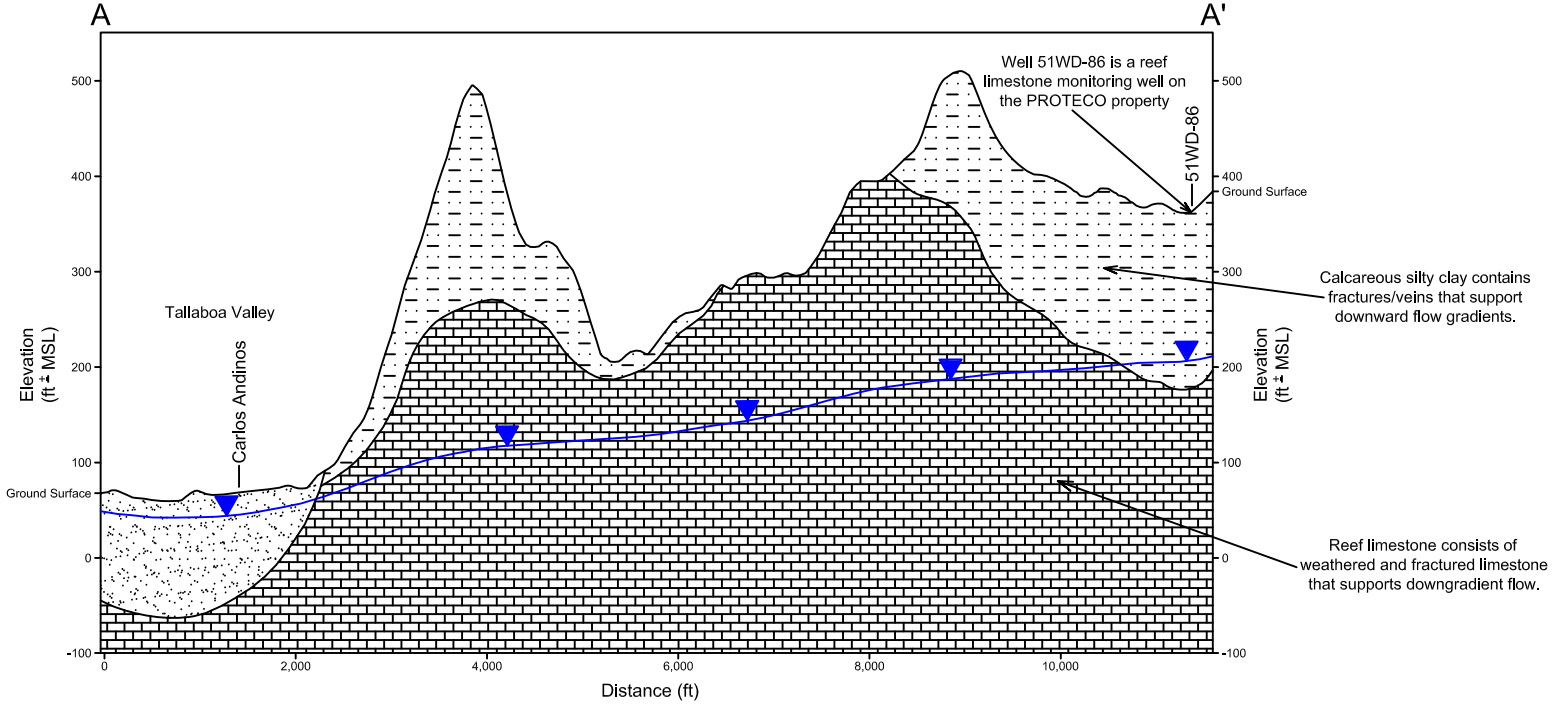
Sampling of existing on-site monitoring wells from 1986 to 1994 indicates that VOC contamination has migrated to the upper water-bearing zone of alluvial deposits and calcareous silty clay underneath the Site, as well as the underlying reef limestone in the Ponce-Juana Díaz aquifer. The samples from on-site monitoring wells establish

[1] EPA notes that RMI references a document that refers to this layer as a "thick sequence of clayey sediments." As noted on pages 35 and 36 of the HRS documentation record at proposal, the EPA refers to clayey sediments in this layer collectively as "calcareous silty clay," as the layers all exhibit similar properties such as varying amounts of clay, silt, sand, limestone clasts, fractures, gypsum veins, and calcareous deposits.

an observed release by chemical analysis for the Site. Additionally, an observed release by direct observation to the alluvial zone and possibly the principal water bearing zone is established at the Site. This is established based on: Source 2 Waste Unit 9 is located in contact with alluvial deposits, oily liquids attributed to Waste Unit 9 were observed in alluvial deposits, gypsum veins were documented at depths as great as 42 feet below ground surface, and previous analyses of the oily liquids in Waste Unit 9 document that it contained hazardous substances.

Targets evaluated at the Site are three domestic wells, the Carlos Andinos public supply well, and four Puerto Rico Electrical Power Authority (PREPA) wells that serve residents and workers in the area. The target wells are evaluated as being subject to potential contamination.





Cross-Section Legend:

- Alluvial Deposits
- Juana Díaz Formation-calcareous silty clay
- Juana Díaz Formation-reef limestone
- Potentiometric Surface

References:

1. The source of this map image is Esri, used by the EPA with Esri's permission.
2. HRS Refs. 4, p. 1; 7, pp. 524, 528; 17, pp. 2, 5; 24, p. 1; 25, pp. 17, 34, 64–65; 27, pp. 1–5; 36, pp. 64–67, 232–341, 378–379.

SCALE: 1,000 0 1,000 2,000
HORIZONTAL SCALE 1 inch = 2,000 ft.
[Vertical Exaggeration=10x]
100 0 100 200
VERTICAL SCALE 1 inch = 200 ft.

PROJECT: 0004/1707-02

CLIENT NAME: EPA

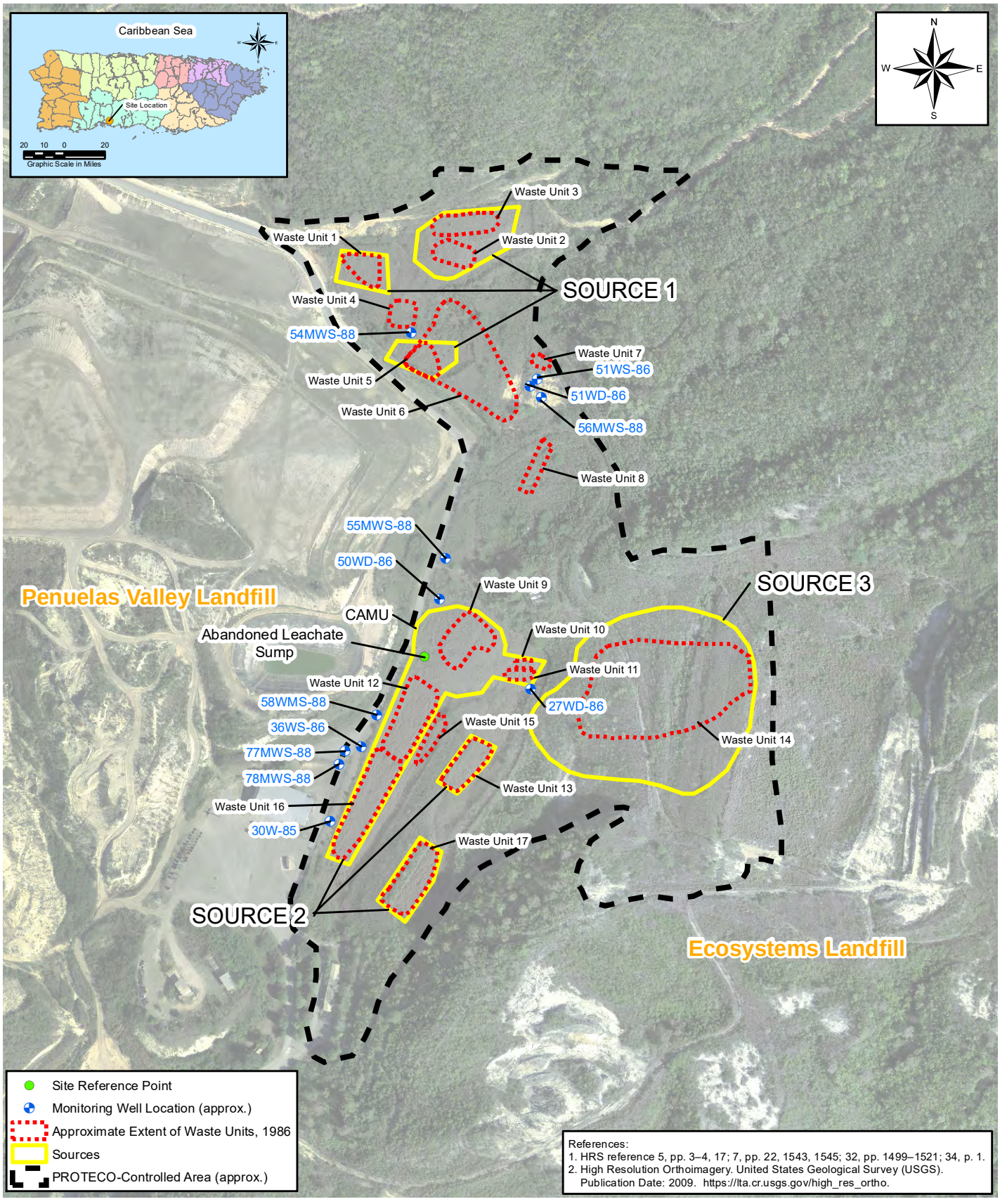
TITLE:

Conceptual Hydrogeological Cross Section

PROTECO Site
Peñuelas, Puerto Rico

DATE: Mar 2019

FIGURE #: A-1



LEGEND:

400 200 0 400

Graphic Scale in Feet

TITLE:

Site and Sources Map
PROTECO
Peñuelas, Puerto Rico

PROJECT: 0004/1707-02

CLIENT NAME: EPA

WESTON SOLUTIONS

DATE: March 2018

FIGURE #: 2

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3. Summary of Comments

Ms. Tania Vázquez Rivera, Chairman of the Government of Puerto Rico Environmental Quality Board (PREQB), expressed support for placing the Site on the NPL and acknowledged that the Site poses a risk to human health and the environment.

Peñuelas Valley Landfill, LLC (PVL) [herein referred to as PVL] submitted comments questioning the accuracy of statements about PVL in the HRS documentation record and in Reference 7 of the HRS documentation record at proposal, and questioning the threat the Site poses to residents. PVL requested that statements regarding its date of operation and that it may have inadvertently received hazardous waste and released hazardous substances be corrected. PVL stated that it operates a landfill that is RCRA compliant. PVL also commented that the PROTECO site is not located within the Peñuelas Valley Landfill property, as stated on page 2 of Reference 7 of the HRS documentation record at proposal and requested that this reference be revised to accurately reflect the location of PVL relative to the PROTECO site. PVL commented that the negative stigma of being erroneously associated with the PROTECO site and potentially incurring negative economic impacts from the listing have the potential to impact it and adjacent property owners and businesses, through the loss of business and through a perceived liability issue created by the inaccurate statements. PVL commented that groundwater flow is to the south, rather than the west towards the Tallaboa valley. PVL stated that the EPA should gather valid data, such as installing additional monitoring wells, before making damaging conclusions that could economically disparage a fully compliant RCRA Subtitle D facility. PVL commented that the community in the Tallaboa valley is very attentive to environmental matters that could impact residents' health and stated that publishing incorrect allegations will only affect the emotional wellbeing of the residents. PVL requested that the EPA sample threatened wells to bring peace of mind to residents.

Mr. Patricio Martínez-Lorenzo writing on behalf of Resources Management, Inc. [herein referred to as RMI] requested an extension of 30 days to the comment period to allow the commenter time to finalize review of the record (in addition to relevant data not in the docket). RMI submitted comments opposed to the listing, stating that it "disagrees with EPA's proposed use of the NPL to address matters that should be managed with other tools and nonadversarial instruments." RMI stated that it is willing to reestablish housekeeping and control activities at the Site and engage in mutual examination of available data supported by any necessary additional groundwater analysis. RMI asserted this approach is a cost-effective alternative to NPL listing and will show there is no risk posed by Site conditions to potable groundwater. RMI commented that there is insufficient evidence (or even contradictory evidence) in the "HRS Record" to support a claim that uncontained waste sources threaten contamination of the supply wells. RMI stated that the PREQB has 20,000 pages of records documenting groundwater and aquifer conditions in and around PROTECO. It claims it has not been able to examine these records during the comment period for the Site, and that RMI expects that these records will contradict EPA's assertion that groundwater flow at the Site is northwesterly and EPA's assertion of the related potential impact to groundwater wells.

RMI submitted comments questioning the risk posed by the Site and Site conditions. RMI commented that the Site poses no risk to drinking water sources and individuals in the community around the Site. RMI asserted that the groundwater at the Site flows to the south, away from potable water supply wells. RMI commented that the landfill contains an intact engineered cover and that the "HRS Record" lacks information to support the assertion that severe erosion and runoff have resulted in the loss of integrity of the landfill cover.

PVL and RMI both submitted comments questioning the interconnection of the Juana-Díaz and the Tallaboa aquifers within 2 miles of the Site. PVL commented that there is no data to support the EPA's assertion that wells constructed across an aquifer boundary (i.e., across the Juana Díaz and the Tallaboa aquifer boundary) lead to an interconnection between the two aquifers as noted in the HRS documentation record at proposal. RMI submitted numerous comments asserting that aquifer interconnections are not present and concluded there is no flow path between the groundwater associated with the PROTECO facility and that of the groundwater in the Tallaboa

valley. In support of its assertion, RMI stated that a calcareous silty clay formation acts as a barrier to groundwater flow; water levels vary by as much as 100 feet; there are dry deposits below wet zones which suggest the presence of an aquiclude; contamination in monitoring wells may be due to well construction; fate and transport conclude that contaminants would not reach the Tallaboa valley; specific conductivity between the reef limestone and the calcareous silty clay of the Juana-Díaz formation indicates that the two layers are not hydraulically interconnected; the reef limestone dips southward and consists of water quality too poor to be considered an aquifer; and water would not flow towards the Tallaboa valley.

Four anonymous commenters [EPA-HQ-OLEM-2017-0603-0005, -0006, -0011, and -0013] submitted comments not relevant to the PROTECO listing.

3.1 Support for Listing and Other Non-opposition Comments

Comment: Ms. Tania Vázquez Rivera, Chairman of the Government of Puerto Rico Environmental Quality Board (PREQB), expressed support for listing the site on the NPL. Ms. Vázquez Rivera concurred with the EPA's assessment that PROTECO's noncompliance history and the current conditions of the abandoned former hazardous waste facility pose a risk to public health and the environment, which requires an immediate action to mitigate the situation.

Response: The EPA has added the PROTECO site to the NPL. Listing makes a site eligible for remedial action funding under CERCLA, and the EPA will examine the site to determine what response, if any, is appropriate. Actual funding may not necessarily be undertaken in the precise order of HRS scores, however, and upon more detailed investigation, may not be necessary at all in some cases. The EPA will determine the need for using Superfund monies for remedial activities on a site-by-site basis, taking into account the NPL ranking, State priorities, further site investigation, other response alternatives, and other factors as appropriate.

3.2 Extension of Comment Period

Comment: Resources Management, Inc. (RMI) requested an extension of 30 days to the comment period. RMI commented that the additional time will allow RMI to finalize a review of the extensive record (in addition to relevant data not in the docket) and to submit pertinent comments to assist the rulemaking process.

Response: The EPA granted a 30-day extension of the comment period until August 15, 2018, to all interested parties to allow additional time to submit comments. The extension was documented in a memorandum to the docket from Douglas Ammon, Chief of the EPA Office of Superfund Remediation and Technology Innovation, dated July 16, 2018 (docket ID EPA-HQ-OLEM-2018-0253-0008) and from Terry Jeng, Office of Superfund Remediation and Technology Innovation, on July 16, 2018 (docket ID EPA-HQ-OLEM-2018-0253-0009).

It is the EPA's general policy to only extend the comment period on a site-specific basis to address any procedural errors, such as incomplete or missing references in the public docket. While no procedural errors were identified for this Site and all documentation supporting the proposed NPL listing was made available to the public at the time of proposal, giving all interested parties ample time to review the information and prepare comments, the EPA allowed an extra 30 days for the public to prepare comments.

This comment results in no change to the HRS score and no change in the decision to place the Site on the NPL.

3.3 Definition of Site

Comment: PVL submitted comments related to the location and extent of the Site, as well as whether PVL is part of the Site.

PVL took issue with the implication that the PVL may have inadvertently received hazardous substances and the possibility of a release from PVL to groundwater based on statements on page 43 of the HRS documentation record at proposal. PVL stated that the "possibility of a release from PVL is left open ended since the HRS document states that '. . . the release of hazardous substances to the aquifer being evaluated is at least partially, if not wholly, attributable to the Proteco site.'" PVL commented that its landfill is fully compliant with current regulations and took issue with HRS documentation record implications that PVL is part of the PROTECO site. Specifically, PVL commented that it operates a landfill that is RCRA compliant with a liner and leachate collection system and that the operations at the PVL landfill have not resulted in a release of hazardous substances to the underlying aquifer.

Additionally, PVL commented that the PROTECO site is not located inside the Peñuelas Valley Landfill property, as stated on page 2[2] of Reference 7 of the HRS documentation record at proposal, and commented that PVL "is a separate operation that is on land adjacent to the PROTECO site".

Response: As set out below, the full extent of the Site is not determined at the time of listing; the focus for HRS purposes is on the release of contamination and where the contaminants have come to be located. Site boundaries are not established at the listing stage of the Superfund process. As described on page 10 of the HRS documentation record at proposal, the PROTECO site as scored for HRS purposes, consists of three sources of hazardous substances at the former PROTECO landfill and groundwater contaminated with mercury and chlorinated volatile organic compounds (VOC) as a result of releases from Site sources; PVL is not part of the Site as scored for HRS purposes (See Figure 2 of the HRS documentation record at proposal for the location of the PVL facility); PVL was discussed in the HRS documentation record at proposal as part of an exploration of *possible* nearby sources, and is not concluded to have contributed to Site contamination.

Placing a site on the NPL is based on an evaluation, in accordance with the HRS, of a release or threatened release of hazardous substances, pollutants, or contaminants. However, the fact that the EPA initially identifies and lists the release based on a review of contamination at a certain parcel of property does not necessarily mean that the site boundaries are limited to that parcel.

CERCLA Section 105(a)(8)(A) requires the EPA to list national priorities among the known "releases or threatened releases" of hazardous substances; thus, the focus is on the release, not precisely delineated boundaries. Further, CERCLA Section 101(a) defines a "facility" as the "site" where a hazardous substance has been "deposited, stored, placed, or otherwise come to be located." The "come to be located" language gives the EPA broad authority to clean up contamination when it has spread from the original source. On March 31, 1989 (54 FR 13298), the EPA stated:

> HRS scoring and the subsequent listing of a release merely represent the initial [emphasis added] determination that a certain area may need to be addressed under CERCLA. Accordingly, EPA contemplates that the preliminary description of facility boundaries at the time of scoring will need to be refined and improved as more information is developed as to where the contamination has come to be located; this refining step generally comes during the RI/FS [remedial investigation/feasibility study] stage.

The revised HRS (55 FR 51587, December 14, 1990) elaborates on the "come to be located" language, defining "site" as "area(s) where a hazardous substance has been deposited, stored, disposed, or placed, or has otherwise come to be located. Such areas may include multiple sources and may include the area between the sources."

[2] EPA notes that PVL cited to page 2 of the Site Reassessment Letter contained within Reference 7. The EPA notes that this reference contains two different sets of page numbers on each page (one set in the top right corner, and another set on the bottom of the page) and EPA notes it consistently cites to the page number on the bottom of the page. EPA's citation to page 3 is the same reference to PVL's citation to page 2 of this reference.

Until the site investigation process has been completed and a remedial action (if any) selected, the EPA can neither estimate the extent of contamination at the NPL site, nor describe the ultimate dimensions of the site. Even during a remedial action (e.g., the removal of buried waste) the EPA may find that the contamination has spread further than previously estimated, and the site definition may be correspondingly expanded. In addition, if another, unrelated area of contamination is discovered elsewhere on the property, the EPA may decide to evaluate that release for the NPL. See Washington State DOT v. EPA, 917 F.2d 1309 - 1312 (D.C. Cir. 1990) (citing Eagle-Picher Indus. v. EPA, 822 F.2d 132, 144 (D.C. Cir. 1987)).

Regarding the relation of PVL to the Site, PVL is not scored as part of the PROTECO site for HRS purposes, it is discussed in the HRS documentation record at proposal only as part of an exploration of possible nearby sources, and is not concluded to have contributed to Site contamination. The EPA agrees that the PROTECO landfill is not located within the PVL property. The EPA also acknowledges that there are no indications that the operations at the PVL facility are out of compliance with the RCRA permits issued to the facility.

Page 10 of the HRS documentation record at proposal clarifies the Site for HRS purposes, stating that "[t]he PROTECO site as scored for HRS purposes, consists of three sources of hazardous substances . . . at the former PROTECO landfill, as well as groundwater contaminated with mercury and chlorinated volatile organic compounds (VOC) as a result of releases from site sources." PVL is not identified as being part of the Site.

Page 43 of the HRS documentation record at proposal discusses PVL as part of the "Other Possible Non-Site Sources" section and states that "[t]wo separate, active RCRA Subtitle D nonhazardous industrial waste landfills border the site to the east (Ecosystems, Inc. [Ecosystem]) and west (Peñuelas Valley Landfill [PVL])." The HRS documentation record at proposal recognizes that these landfills are authorized to accept only nonhazardous solid waste. The HRS documentation record at proposal considers the ***possibility*** that PVL could have erroneously received the contaminants associated with the Site, but ultimately concludes that the release of hazardous substances to the aquifer is attributable to the PROTECO site:

> **Although it is possible** that PVL has inadvertently received hazardous substances, including halogenated solvents and mercury, given the association of the hazardous substances in the observed release with the site sources, the high volume of hazardous wastes deposited in unlined Waste Units at PROTECO and the position of the groundwater release nearer to and downgradient of site sources, and the admission by PROTECO that the contamination is site-related, the release of hazardous substances to the aquifer being evaluated is at least partially, if not wholly, **attributable to the PROTECO site**. [emphasis added]

The HRS documentation record at proposal does not conclude that PVL contributed to the Site contamination. Further, the language that the release is "at least partially, if not wholly, attributable" is not intended to indicate lingering suspicion that PVL may have contributed, but rather simply to recognize that 100% of the release cannot be attributed with absolute certainty to PROTECO at this stage in the Superfund process (such concrete certainty is not required by the HRS[3]).

Regarding the statement on page 3 of Reference 7 of the HRS documentation record at proposal that "[t]he PROTECO site is inside the Peñuelas Valley Landfill, where the company Waste Management, Inc. (WM) is also located and operates a non-hazardous industrial landfill," the EPA agrees this statement is inaccurate. The PROTECO site is not within the Peñuelas Valley Landfill. The HRS documentation record at proposal cites

[3] In direction on establishing an observed release by chemical analysis, HRS section 2.3, Likelihood of release, instructs that "some portion of the release must be attributable to the site"; HRS section 3.1.1, Observed release, specific to the ground water migration pathway, instructs that "[s]ome portion of the significant increase must be attributable to the site to establish the observed release.

Reference 7 to support other statements in the HRS documentation record at proposal, but the documentation record does not include the inaccurate statement on page 3 of Reference 7. Additionally, as noted in section 3.14, Requested Revisions to the HRS Documentation Record, of this support document, a new reference has been added to the HRS documentation record at promulgation (Reference 46) to clarify that page 3 of Reference 7 incorrectly states that the PROTECO site is within the Peñuelas Valley Landfill.

These comments result in no change to the HRS score and no change in the decision to place the Site on the NPL.

3.4 Economic Impact/Stigma of NPL Listing

Comment: PVL made numerous comments related to the negative stigma of being associated with the PROTECO site and potentially incurring negative economic impacts from the listing. PVL commented that inaccurate statements published by the EPA, such as statements that PVL may have inadvertently received hazardous substances and that there is a possibility of a release from the PVL landfill, could negatively affect its operations and business. PVL commented that those inaccurate statements have the potential to impact it and adjacent property owners and businesses, through the loss of business and through a perceived liability issue created by the inaccurate statements. PVL commented that many of its customers have strict environmental compliance programs that are able to rely on PVL because of PVL's commitment and record of excellence as a non-hazardous industrial landfill.

PVL commented that its proximity to the Site could create an erroneous perception of environmental and financial liability for the waste generators that dispose of waste in the PVL's fully compliant Subtitle D solid waste landfill. PVL commented that this perception could cause clients to question the liability protections offered by its landfill and result in significant lost revenues to PVL and other neighboring facilities. PVL commented that EPA should gather "valid data," such as installing additional monitoring wells, before making damaging conclusions that could economically disparage a fully compliant RCRA Subtitle D facility.

Response: As discussed in Sections 3.3, Definition of Site, and 3.14, Requested Revisions to the HRS Documentation Record, of this support document, PVL is not part of the Site as scored for HRS purposes; the HRS documentation record is revised at promulgation to clarify some of the points associated with PVL and correct related errors. The EPA acknowledges PVL's comments on errors in the HRS documentation record regarding the Site's relation to PVL, and the inaccurate statements in the HRS documentation record have been revised to alleviate any potential negative impact to PVL. The EPA also notes that NPL listing provides an opportunity for residents, business owners, and potential investors to express their concerns and ideas for final solutions in the public forums offered during other phases of the Superfund process.

Additionally, the EPA notes that economic factors discussed by the commenter (e.g., economic impacts due to proximity of other facilities to the Site) are generally not considered in the assessment of whether a site belongs on the NPL. To the extent that the comments are related to negative impacts associated with listing the PROTECO site and not the inaccurate statements, those impacts would be engendered by the contamination in the area, not by the action of placing the Site on the NPL. Inclusion of a site on the NPL does not in itself reflect a judgment on the activities of the owner(s) or operator(s), but rather reflects the EPA's judgment that a significant release or threat of release has occurred and that the site is a priority for further investigation under CERCLA. The EPA notes that there are both costs and benefits that can be associated with listing a site. Among the benefits of listing a site are increased health and environmental protection as a result of increased public awareness of potential hazards. In addition to the potential for Federally financed remedial actions, the addition of a site to the NPL could accelerate privately financed, voluntary cleanup efforts. As a result of the additional CERCLA remedies, there will be lower human exposure to high-risk chemicals, and higher quality groundwater and soil.

Regarding the request to gather "valid data" and install new monitoring wells, as further discussed in section 3.8, Adequacy of the Record/Data, of this support document, data relied upon in the HRS documentation record at

proposal are of sufficient quantity and type for the purposes of scoring the Site and placement on the NPL. Additional monitoring wells may be installed during later stages of the site assessment process as part of further investigation into the nature and extent of the contamination at the Site following its placement on the NPL.

These comments result in no change to the HRS score and no change in the decision to place the Site on the NPL.

3.5 Liability

Comment: PVL commented that the allegations in the HRS documentation record at proposal stating that the PVL landfill could be contributing to the contamination at the Site may be perceived as liability issues for PVL and its clients. PVL commented that its proximity to the Site could create an erroneous perception of environmental and financial liability for the waste generators that dispose of waste in the PVL's fully compliant Subtitle D solid waste landfill. PVL commented that this perception could cause clients to question the liability protections offered by its landfill

Response: Liability is not established by placing a site on the NPL. The NPL serves primarily informational purposes, identifying for the States and the public those sites or releases which appear to warrant remedial actions. Listing a site on the NPL does not reflect a judgment on the activities of any party, nor does it assign liability to any person. Subsequent government actions will be necessary to do so, and those actions will be attended by all appropriate procedural safeguards. See section 3.4, Economic Impact/Stigma of Listing, of this support document, for further discussion on related impacts of listing.

Further, as discussed in Sections 3.3, Definition of Site, and 3.14, Requested Revisions to the HRS Documentation Record, of this support document, PVL is not part of the Site as scored for HRS purposes. The HRS documentation record is revised at promulgation to clarify some of the points associated with PVL and correct errors. The EPA acknowledges that there are no indications that the operations at the PVL facility are out of compliance with the RCRA permits issued to the facility, and while the HRS documentation record at proposal mentions PVL as a ***possible*** source contributing to the contamination, it does not conclude that PVL contributed to Site contamination. EPA has clarified the HRS documentation record at proposal to avoid the possibility of the public mistakenly assuming PVL is liable for the Site contamination.

These comments result in no change to the HRS score and no change in the decision to place the Site on the NPL.

3.6 Alternatives to Listing

Comment: RMI opposes EPA's proposed placement of the Site on the NPL and asserts that the Site should be managed using "other tools and nonadversarial instruments." RMI offered that it is "willing to reestablish what are in essence housekeeping and control activities at the Site. RMI is also willing to engage in mutually agreed to examination of available EQB data supported by any necessary additional groundwater analysis." RMI asserted such a cost-effective alternative to NPL listing will show there is no risk posed by Site conditions to potable groundwater.

Response: Placing the Site on the NPL is appropriate because the decision is based on the HRS evaluation. Additionally, the past actions of PROTECO have been found insufficient and Puerto Rico supports listing the Site. However, the NPL listing process does not prevent parties from entering into agreements to carry out investigations or response actions.

Listing the Site on the NPL based on a HRS Site score above 28.50 represents EPA's determination that further investigation under CERCLA authority is warranted and that alternatives to listing are not sufficient at this stage in the process.

The past actions of PROTECO have been insufficient to address Site contamination. As discussed in Reference 30 of the HRS documentation record at proposal, the EPA RCRA program referred the Site to the Superfund program in November 2017 based on the Site's noncompliance history following closure of the landfill. PROTECO has been subject to an Amended Consent Decree (ACD) since 1997 under RCRA, which required PROTECO to file a Post-Closure Permit (PCP) application with the EPA, implement post-closure maintenance of the closed RCRA units, and establish a groundwater monitoring system. Initially, post-closure maintenance was implemented at the Site but ceased at some point between 2007 and 2009. Furthermore, PROTECO strongly opposed implementation of a groundwater monitoring system, and a dye tracer study was never performed by PROTECO despite being agreed to between the EPA and PROTECO as part of the PCP requirements. A groundwater monitoring system is still not in place at the Site. The Site's noncompliance has been exacerbated by a cattle-growing operation on the Site (which appears to have been allowed by PROTECO's owner) that is incompatible with a regulated closed hazardous waste facility under RCRA.

Further, the Commonwealth of Puerto Rico has provided support for placing the site on the NPL. In a January 25, 2018 letter from Tania Vázquez Rivera, Chairman of the Puerto Rico Environmental Quality Board (docket ID EPA-HQ-OLEM-2018-0253-0004) to the EPA, the Chairman stated:

> Based on our evaluation of the memorandum information on the site's non-compliance history and the current conditions of the site, our Agency concur with your Agency's assessment that the abandoned former hazardous waste facility poses a risk to public health and the environment, which requires an immediate action to mitigate the situation. For this reason, we request the designation of PROTECO as a Superfund Site and be included in the National Priorities List of the Superfund Program for further response action.

The EPA notes that throughout the Superfund process the EPA will be working closely with Puerto Rico and other interested stakeholders to determine appropriate remedy decisions for the Site. The EPA makes decisions during all stages of the Superfund Site Assessment process, and any member of the public can affect remedy selection through the public comment process. Potentially Responsible Parties (PRPs) may undertake the remedial investigation/feasibility study (RI/FS) and/or remedial design/remedial action stages under EPA supervision and pursuant to appropriate agreements with governmental authorities (under enforcement authorities of CERCLA or those of other statues). The listing process does not encumber or preclude PRPs from entering into these agreements. The EPA has entered into such agreements between proposal and promulgation at other sites, and such an alternative is available to the commenter.

This comment results in no change to the HRS score and no change in the decision to place the Site on the NPL.

3.7 Risk to Human Health and the Environment

Comment: RMI and PVL commented that the Site poses no risk to drinking water sources and individuals in the community around the Site. RMI stated that there is an absence of risk from the PROTECO site to any potable groundwater sources and no risk to any population using the groundwater. RMI asserted that the groundwater at the Site flows to the south, away from potable water supply wells, and asserted that this groundwater flow direction means there is no risk of potable groundwater contamination posed by the Site. PVL commented that the community in the Tallaboa valley is very attentive to environmental matters that could impact residents' health and stated that publishing incorrect allegations will only affect the emotional wellbeing of the residents.

Response: Regarding questions of the level of risk posed by the Site, placing a site on the NPL is not based on a site-specific risk assessment. The HRS documentation record at proposal establishes that the Site poses a sufficient relative risk to human health or the environment as compared to other candidate sites evaluated using the HRS to warrant inclusion on the NPL and further investigation. Consistent with CERCLA and the NCP, the Site has been placed on the NPL based on an HRS evaluation of the relative risk posed by uncontained hazardous

substances in Site sources, a release of mercury and chlorinated volatile organic compounds to groundwater, and the threat that this release poses to drinking water in the area. Further, the HRS does not consider flow direction in its evaluation of drinking water wells scored as targets.

The HRS is not a site-specific risk assessment. A site-specific risk assessment quantifies the risk to receptors actually posed by releases at a site. The HRS is a numerically based screening tool that the EPA uses to assess the relative degree of risk to human health and the environment posed by a site compared to other sites subject to review based on a screening-level knowledge of site conditions. The HRS score is used to determine whether a site is eligible for placement on the NPL. The NPL is intended primarily to guide EPA in determining which sites warrant further investigation to assess the nature and extent of public health and environmental risks associated with a release of hazardous substances, pollutants, or contaminants. See 83 FR 22918 (Proposed Rule, PROTECO site, May 17, 2018); see also 55 FR 51532 (Final Rule, Hazard Ranking System, December 14, 1990). CERCLA § 105(a)(8)(a) requires EPA to determine NPL priorities based on the "relative risk or danger to public health or welfare, or the environment." The criteria the EPA applies to determine this relative risk or danger is codified in the HRS, and is the EPA's primary tool for deriving a site score based on the factors identified in CERCLA. The HRS evaluation and score at or above 28.50 represents EPA's determination that the Site may pose a relative risk or danger to human health and the environment and warrants further investigation under CERCLA. Determination of site-specific risk posed to human health or the environment is made at a later stage of the Superfund process following listing. During this later stage, sufficient information will be collected to completely evaluate the site-specific risk associated with the Site. Based on this information, the EPA will determine if further response actions are warranted at the Site.

Regarding RMI's comment that groundwater flow at the Site is to the south and thus poses no risk to potable wells, the EPA followed the HRS in identifying eligible target wells for the Site. See section 3.13, Groundwater Flow Direction, of this support document, which further explains that the HRS does not consider groundwater flow direction when evaluating wells within the target distance limit (TDL) that are subject to potential contamination. However, site-specific investigations on subjects such as groundwater flow direction, may be undertaken and considered in later stages of the Superfund process (e.g., during a remedial investigation or feasibility study). This approach is consistent with the preamble to the 1990 HRS (Federal Register Volume 55, Number 241, page 51553) that discusses the consideration of groundwater flow direction in an HRS evaluation.

This comment results in no change to the HRS score and no change in the decision to place the Site on the NPL.

3.8 Adequacy of the Record/Data

Comment: PVL and RMI commented that the HRS documentation record at proposal fails to consider existing data for the Site. PVL commented that the HRS documentation record at proposal is based on assumptions and erroneous information, that "EPA must drill new monitoring wells at the site and gather valid data before jumping to damaging conclusions that may have adverse effect on adjacent active disposal facilities," and that "EPA must also collect and test water samples of the threatened wells and publish the information in order to bring peace of mind to the Tallaboa residents that use water from those wells.". RMI commented on a statement in the EPA Narrative Summary for the Site (docket ID EPA-HQ-OLEM-2018-0253-0003) that:

> [t]he uncontained waste sources and contaminated groundwater at the site threaten contamination of these supply wells. Runoff from the severe erosion at the site may also be contaminating the watershed. Waste had been disposed at the facility for approximately 25 years and the owner did not implement post-closure maintenance or monitoring, which has resulted in a continuing loss of integrity in the landfill cover.

RMI asserted that there is insufficient evidence (or even contradictory evidence) in the "HRS Record" to support a claim that uncontained waste sources threaten contamination of the supply wells or that runoff from erosion may be contaminating the watershed.

RMI commented that the Puerto Rico Environmental Quality Board (PREQB) has 20,000 pages of records documenting groundwater flow and aquifer conditions and interconnections in and around PROTECO, which RMI has not been able to examine during the comment period for the Site. RMI expects that the data will contradict EPA's assertion that groundwater flow at the Site is northwesterly and the related potential impact to groundwater wells. RMI cited several court cases[4] to support its assertion that EPA must examine all relevant data (i.e., the PREQB records) or articulate a rationale for its actions, and that the EPA must consider the whole record upon which its findings are based. RMI further asserted that the EPA cannot ignore or minimize evidence that refutes its judgment without adequate explanation. RMI concluded that EPA ignored the factual basis for assertions previously raised by RMI regarding prevalent groundwater conditions and aquifer interconnections. RMI stated that EPA instead relied on unsupported assertions in opposition to RMI's assertions, and that under such circumstances, the proposed listing is not supported by substantial evidence, is arbitrary and capricious, and should be set aside.

Response: The data relied upon in the HRS documentation record at proposal are of sufficient quantity and type for the purposes of scoring the Site and Site placement on the NPL. All of the data that were relied upon for the purposes of NPL listing were included in the HRS documentation record references at proposal, and the HRS docket for the Site at the time of proposal was appropriate and sufficient for the public to review the HRS evaluation of the Site and the proposed NPL listing. Commenters did not provide substantive reasons why the data used in the HRS evaluation of the Site is erroneous or that HRS factor values scored should be different based on other available data. As shown in other sections of this support document, lack of containment of the sources to groundwater and surface water was supported in the HRS documentation at proposal, the direction of groundwater flow does not impact HRS scoring, and collection of additional well data is not necessary at this step of the Superfund process and would not affect the HRS score. Finally, regarding the 20,000 pages of PREQB information pointed to by RMI, except for documents included in both the PREQB information and as references in the HRS documentation record at proposal[5], the EPA did not rely on the information pointed to by RMI for HRS scoring, and RMI has not explained how this information would invalidate data that was used for scoring or would affect HRS factor values assigned. RMI only superficially alleged that the "records in PREQB's custody will not support and, on the contrary, contradict, EPA's assertions of northwesterly groundwater flow and potential impact to groundwater wells as sustained in the HRS Record." As discussed in Section 3.13, Groundwater Flow Direction, groundwater flow direction is not directly considered by the HRS in determining impacts to target wells.

EPA used appropriate levels of data and investigation in determining the HRS score for the Site consistent with HRS regulation. As explained in the preamble in the Federal Register notice promulgating the 1990 HRS (55 FR 51533, December 14, 1990), Congress, in discussing the substantive standards against which HRS revisions could be assessed, states:

> This standard is to be applied within the context of the purpose for the National Priorities List; i.e., identifying for the States and the public those facilities and sites which appear to warrant

[4] RMI cited to the following court cases in support of assertion: Nat'l Gypsum Co. v. EPA; Genuine Parts Company v. EPA; CTS Corp. v. EPA; Carus Chem. Co. v. EPA; Universal Camera Corp. v. NLRB; Landry v. Fed. Deposit Ind. Corp.; Lakeland Bus Lines, Inc. v. NLRB; Bellagio, LLC v. NLRB; Bradley Mining Co. v. EPA; Regents of the Univ. of Wash. v. EPA; Morall v. DEA; and Int'l Union, United Mine Workers v. Mine Safety & Health Admin.

[5] EPA notes that, based on an index of contents provided by PREQB, HRS documentation record Reference 36, Phase IA Hydrogeologic Investigation, is among the 20,000 pages pointed to by RMI. EPA relies on data in this report but notes that this information was included as a cited reference document the HRS documentation record at proposal.

> remedial actions. . . .This standard does not require the Hazard Ranking System to be equivalent to detailed risk assessments, quantitative or qualitative, such as might be performed as part of remedial actions. This standard requires the Hazard Ranking System to rank sites as accurately as the Agency believes is feasible using information from preliminary assessments and site inspections. . . . Meeting this standard does not require long-term monitoring or an accurate determination of the full nature and extent of contamination at sites or the projected level of exposure such as might be done during remedial investigations and feasibility studies. This provision is intended to ensure that the Hazard Ranking System performs with a degree of accuracy appropriate to its role in expeditiously identifying candidates for response actions [H.R. Rep. No. 962, 99th Cong. 2nd Sess. at 199-200 [1986]].

The Courts have supported this position in stating:

> The HRS is intended to be a "rough list" of prioritized hazardous sites; a "first step in a process--nothing more, nothing less" Eagle Picher Indus. v. EPA, 759 F.2d 922, 932 (D.C. Cir. 1985) (Eagle Picher II). EPA would like to investigate each possible site completely and thoroughly prior to evaluating them for proposal for NPL, but it must reconcile the need for certainty before action with the need for inexpensive, expeditious procedures to identify potentially hazardous sites. The courts have found EPA's approach to solving this conundrum to be "reasonable and fully in accord with Congressional intent." Eagle Picher Industries, Inc. v. EPA, (759 F.2d 905 (D.C. Cir. 1985) Eagle Picher I).

As is shown throughout this support document, the commenters did not provide substantive reasons why the data used in the HRS evaluation of the Site is erroneous or that HRS factor values scored should be different based on available data. For specific discussion on relevant points, see the following sections of this support document:

- 3.11, Source Containment, which explains that the source containment for each source was appropriately documented and considered in the HRS documentation record at proposal, and that the lack of liners under the sources means that the hazardous substances in those sources are uncontained to groundwater for HRS purposes. That section also describes the evidence presented in the HRS documentation record at proposal showing that the landfills do not have maintained functioning covers and there is evidence of erosion that could threaten surface water (the surface water pathway is not scored for the Site, therefore this erosion into surface water has no effect on the HRS site score).
- 3.12, Aquifer interconnections, which explains the hydrological interconnections of the aquifers present at the Site. This section discusses relevant issues regarding the hydrogeological conditions within a 2-mile radius of the Site sources and describes the hydrological conditions present to establish aquifer interconnections according to the HRS.
- 3.13, Groundwater Flow Direction, which explains that groundwater flow direction is not considered by the HRS in determining impacts to target wells. Drinking water wells within the 4-mile target distance limit are considered subject to potential contamination regardless of their relationship to the sources and the flow of groundwater, consistent with the HRS.
- 3.9, Future Investigation, which explains that collecting additional data from drinking water wells that were scored as subject to potential contamination is not required at this time as it pertains to the listing process.

Regarding PVL's assertion that EPA should install more monitoring wells and collect additional data, this is not needed at this step of the Superfund process. The monitoring well data presented in the Observed Release section and discussed in the Attribution section of the HRS documentation record at proposal is sufficient to establish an observed release attributable to the Site, consistent with the HRS (the commenters have not challenged the

establishment of an observed release). Insomuch as commenters' request to have additional monitoring wells installed was to yield more information to determine groundwater flow direction, again, flow direction is not considered in the HRS evaluation.

Regarding the PREQB data, RMI has not identified what specific documents in PREQB's 20,000 pages of records are surmised to contradict the groundwater flow direction at the Site as identified in the HRS documentation record at proposal; therefore, the EPA is unable to provide a response to that claim. See section 3.13, Groundwater Flow direction, of this support document for more discussion on the direction of groundwater flow direction at the Site, and why it does not affect the HRS Site score.

Regarding the court cases cited by RMI, they are not applicable to this NPL listing because:

- RMI has not shown the data relied on in the HRS documentation record at proposal or its references, to be incorrect.
- RMI has not shown how the information in the PREQB records would contradict the data relied on in the HRS documentation record at proposal and the HRS score generated.

Courts have held that the "dialogue between administrative agencies and the public is a two-way street." Northside Sanitary Landfill, Inc. v. Thomas, 849 F.2d 1516, 1520 (D.C. Cir. 1988) (citing Home Box Office, Inc. v. FCC, 567 F.2d 9 (D.C. Cir. 1977)). A commenter "cannot merely state that a particular mistake was made," rather it must show "why the mistake was of possible significance in the result the agency reaches." See id. at 1519. RMI stated that "RMI sustains that records in PREQB's custody will not support and, on the contrary, contradict, EPA's assertions of northwesterly groundwater flow and potential impact to groundwater wells as sustained in the HRS Record." However, RMI does not specify exactly what information in the PREQB volume would accomplish this end, and, as shown further in section 3.13, Groundwater Flow Direction, of this support document, groundwater flow direction is not considered by the HRS in determining impacts to target wells.

EPA reasonably relied on the information in the HRS documentation record to place the Site on the NPL. In contrast, it is not reasonable for RMI to cite to 20,000 pages of documents without pointing out how those pages impact the HRS score or how those pages impact the information EPA relied on in the HRS documentation record. Therefore, the commenter is incorrect in assertions that the EPA has failed to consider relevant data or that the EPA has ignored or minimized evidence that would refute its judgement because no such evidence has been specifically pointed to by the commenter.

This comment results in no change to the HRS score and no change in the decision to place the Site on the NPL.

3.9 Future Investigation

Comment: PVL stated that the EPA must collect water samples of the threatened wells and publish the information to bring peace of mind to residents that use water from those wells.

Response: The investigative data in the HRS documentation record is sufficient to score the Site for HRS purposes, that is, for the purpose of qualifying the Site for the NPL and identifying the Site warrants further investigation. Therefore, collecting additional data from these wells is not required at this time as it pertains to the listing process.

Furthermore, possible future investigations may appropriately be carried out subsequent to NPL listing as a separate phase of the CERCLA process, during which time sampling of the target wells may occur. Consistent with CERCLA, the Agency has in place an orderly procedure for identifying sites where releases of substances addressed under CERCLA have occurred or may occur, placing such sites on the NPL, evaluating the nature and

extent of the threats at such sites, responding to those threats, and deleting sites from the NPL. The purpose of the initial two steps (which includes the HRS site score) is to develop the NPL, which identifies for the States and the public those sites that appear to warrant remedial action (56 FR 35842, July 29, 1991). The evaluation or RI/FS phase involves onsite testing to assess the nature and extent of the public health and environmental risks associated with the site (which may include sampling of these wells) and to determine what CERCLA-funded remedial actions, if any, may be appropriate.

The EPA notes that in April of 2018 EPA contractors collected water samples from several wells described in the HRS documentation record at proposal and scored as subject to potential contamination: PREPA wells 8, 9, 10, and 13; the PRASA Carlos Andinos well; and residential wells Tallaboa Saliente #8, Tallaboa Saliente #9, and Cuebas #1. The wells are all located within 2 miles of the Site (see Figure 3 of the HRS documentation record at proposal). The samples were analyzed for VOCs, SVOCs, pesticides, polychlorinated biphenyls (PCBs) and metals, and the compounds and analytes were either not detected in the samples or detected at concentrations well below the EPA maximum concentration level (MCL) or removal management level (RML)[6].

This comment results in no change to the HRS score and no change in the decision to place the Site on the NPL.

3.10 Pathways Not Evaluated

Comment: PVL commented that the Site is not located in the Tallaboa River watershed, contrary to the statement on page 35 of the HRS documentation record at proposal, and that water runoff from the Site actually flows along an ephemeral channel that discharges directly to the Caribbean Sea.

Response: Watersheds are not considered when evaluating a site using the groundwater migration pathway, which is the pathway scored for the Site. Watersheds are only considered in evaluations using the Surface Water Migration pathway, which was not scored for the Site.

The EPA notes that the purpose of indicating the location of the Site within the Rio Tallaboa watershed is to provide a geographical setting of the Site and has no impact on the HRS scoring. The Ground Water Migration Pathway Description on page 35 of the HRS documentation record at proposal provides a general introduction to the aquifers involved at the Site, identifies the various wells in these aquifers, and notes that "[t]he site is located within the watershed of the Río Tallaboa, and the general topographic and water-table profiles slope downward from the site west to the Río Tallaboa valley." The section continues to discuss groundwater flow direction.

This comment results in no change to the HRS score and no change in the decision to place the Site on the NPL.

3.11 Source Containment

Comment: RMI commented that the landfill contains an intact engineered cover and noted that the "HRS Record" lacks any specific information supporting the Site Narrative Summary conclusion that severe erosion and runoff have resulted in the loss of integrity of the landfill cover. Additionally, RMI commented that there is no evidence to support the EPA's Site Narrative Summary assertion that there is continuing loss of integrity to the landfill cover or that runoff from erosion may be contaminating the watershed. RMI cited a December 13, 2017, EPA reconnaissance report, quoting the following conclusions:

> A few small trees have been uprooted resulting in voids in the soil that could provide a pathway for precipitation to reach waste materials left on site; **no waste materials were visible within the voids**.

[6] See pages 1, 3, and 4 of the August 2018 EPA document Removal Assessment Sampling Report, Revision 3, PROTECO Site (Off-Site Wells), Peñuelas, Puerto Rico, available at http://semspub.epa.gov/src/document/02/562629.

> Evidence of a high volume of runoff was observed within the drainage ditch that runs along the western perimeter of the site; however, the reconnaissance team **did not observe exposure of waste materials within the ditch**.
>
> At 11:30 hours, the reconnaissance team moved to the northern portion of the site in the vicinity of the drum burial areas; similar conditions were observed in this area of the site. As noted in the southern portion, a few small trees were observed to be uprooted in this area, creating voids in the soil that could provide a pathway for precipitation to reach waste materials. **An overview of the site from an upslope access road did not reveal any obvious damage within other areas of the site and the scene appeared the same as observed during the June 2017 reconnaissance**. [emphasis added by RMI]

Response: Insomuch as these comments call into question the containment of the sources at the Site, the cover features discussed by the commenter involve containment of a source to the surface water migration pathway, which was not scored. The source containment for the scored groundwater migration pathway, based on the lack of liners beneath sources, is appropriately established in the HRS documentation record at proposal. Further, although not involved in scoring, the notes in the HRS documentation record at proposal (and Site Narrative Summary) regarding surficial erosion that may affect surface water are correctly supported.

The source containment features relevant to the ground water migration pathway for each source are appropriately documented and considered in the HRS documentation record at proposal when assigning the source containment factor value of 10 for each of Sources 1, 2, and 3 based on the directions of HRS Table 3-2. Sources 1 and 3 are landfills that did not have a liner present and are assigned source containment factor values of 10 from HRS Table 3-2 due to this deficiency. Source 2 is comprised of buried/backfilled surface impoundments that are unlined and are also assigned a source containment factor value of 10 from HRS Table 3-2 due to this deficiency. The commenter has not challenged the absence of a liner under the Site sources. The lack of adequate source containment features to prevent migration of hazardous substances to groundwater from the sources allow the sources to be assigned a source containment factor value of greater than zero (10 for each source in this case) making the source and its associated hazardous substances eligible for scoring.

HRS Section 2.2.3, *Identify hazardous substances available to a pathway*, presents the requirements for each pathway to evaluate hazardous substance migration from a source. It states:

> In evaluating each migration pathway, consider the following hazardous substances available to migrate from the sources at the site to the pathway:
>
> - Ground water migration.
>   - Hazardous substances that meet the criteria for an observed release (see section 2.3) to ground water.
>   - All hazardous substances associated with a source with a ground water containment factor value greater than 0 (see section 3.1.2.1).

HRS Section 3.1.2.1, *Containment*, of the ground water migration pathway directs assignment of a containment factor value to each source at a site, stating in relevant part:

> Assign a containment factor value from Table 3-2 to each source at the site. Select the highest containment factor value assigned to those sources with a source hazardous waste quantity value of 0.5 or more (see section 2.4.2.1.5). . . . Assign this highest value as the containment factor value for the aquifer being evaluated. . . . If no source at the site meets the minimum size

requirement, then select the highest value assigned to the sources at the site and assign it as the containment factor value for the aquifer being evaluated.

The source containment features for the landfills at the Site were evaluated under the "All Sources (Except Surface Impoundments, Land Treatment, Containers, and Tanks)" category and the surface impoundments were evaluated under the "Surface Impoundment" category in HRS Table 3-2. Based on this table, a source containment factor value of 10 is assigned if no liner exists for the source. HRS Table 3-2, in relevant part, is as follows:

TABLE 3—2.-CONTAINMENT FACTOR VALUES FOR GROUND WATER MIGRATION PATHWAY

Source	Assigned Value
All Sources (Except Surface Impoundments, Land Treatment, Containers, and Tanks)	
Evidence of hazardous substance migration from source area (i.e., source area includes source and any associated containment structures).	10
No liner ……..	10
No evidence of hazardous substance migration from source area, a liner, and	
(a) None of the following present: (1) maintained engineered cover, or (2) functioning and maintained run-on control system and runoff management system, or (3) functioning leachate collection and removal system immediately above liner. ……...	10
(b) Any one of the three items in (a) present ……	9
(c) Any two of the items in (a) …….	7
(d)All three items in (a) present plus a functioning ground water monitoring system. ……	5
(e) All items in (d) present, plus no bulk or non-containerized liquids nor materials containing free liquids deposited in source area. …….	3
No evidence of hazardous substance migration from source area, double liner with functioning leachate collection and removal system above and between liners, functioning ground water monitoring system, and	
(f) Only one of the following deficiencies present in containment: (1) bulk or noncontainerized liquids or materials containing free liquids deposited in source area, or (2) no or nonfunctioning or nonmaintained run-on control system and runoff management system, or (3) no or nonmaintained engineered cover. ……..	3
(g) None of the deficiencies in (f) present ……..……..	0
Source area inside or under maintained intact structure that provides protection from precipitation so that neither runoff nor leachate is generated, liquids or materials containing free liquids not deposited in source area, and functioning and maintained run-on control present. ……	0
Surface Impoundment	
Evidence of hazardous substance migration from surface impoundment …….	10
No liner……...	10
Free liquids present with either no diking, unsound diking, or diking that is not regularly inspected and maintained……...	10
No evidence of hazardous substance migration from surface impoundment, free liquids present, sound diking that is regularly inspected and maintained, adequate freeboard, and:	
(a) Liner……	9
(b) Liner with functioning leachate collection and removal system below liner, and functioning ground water monitoring system. ……..	5

Source	Assigned Value
(c) Double liner with functioning leachate collection and removal system between liners, and functioning ground water monitoring system. ……	3
No evidence of hazardous substance migration from surface impoundment and all free liquids eliminated at closure (either by removal of liquids or solidification of remaining wastes and waste residues). ……...	Evaluate using All sources criteria (with no bulk or free liquids deposited).

Page 18 of the HRS documentation record at proposal documents the assignment of a source containment factor value of 10 for Source 1 because it has no liner. It states:

> **Containment**
>
> Release to groundwater:
>
> Drums were buried directly above native soil in all four drum burial landfills (i.e., Waste Units 1, 2, 3, and 5), without installation of liners or leachate collection systems [Ref. 7, pp. 5, 7, 9, 10, 23, 38, 49, 50, 322, 540; 32, p. 64]. During its Phase III Soils Investigation in 1987, PROTECO observed leaking or damaged drums, soil contamination, and migration of hazardous substances in all four units; engineered liners were not present in any of the waste units [Ref. 33, pp. 35-46, 122–133, 141–145, 396]. The RCRA closure of Waste Units 1, 2, 3, and 5 consisted of capping only; there was no removal of drums or adjacent contaminated soil, nor was there installation of liners, prior to installation of the landfill caps [Ref. 7, pp. 662–664]. PROTECO stopped performing post-closure care at the site sometime between 2001 and 2009; since then, the site has been abandoned and the landfill covers for all the waste units at the site, including the drum burial areas, have not been maintained [Ref. 5, pp. 3–6, 12, 16–21; 30, pp. 1–2].
>
> Based on the lack of containment measures in all four drum burial areas, in particular no liners, a containment factor value of 10 is assigned to Source 1 in the ground water migration pathway [Ref. 1, Table 3-2].

Page 24 of the HRS documentation record at proposal documents the assignment of a source containment factor value of 10 for Source 2 because it has no liner. It states:

> **Containment**
>
> Release to groundwater:
>
> The surface impoundments at the site do not have liners [Ref. 7, p. 8]. During its Phase III Soils Investigation in 1987, PROTECO observed waste mixed with soil directly above native soil, as well as soil staining and contamination, in the surface impoundments, confirming that liners are not present in any of the waste units [Ref. 33, pp. 46–83]. RCRA closure of the unlined surface impoundments did not include installation of liners, with the exception of the CAMU lined landfill cell where the excavated wastes from Waste Units 4, 7, and 9 are encapsulated at the former

location of Waste Unit 9 [Ref. 7, pp. 662–669]. As described above, the Waste Unit 9 wastes were not fully excavated and hazardous substances remain beneath the CAMU liner [Ref. 32, pp. 329, 756–871, 872–883]. Due to the proximity of the CAMU to waste Units 9, 10, 11, 12, and 16, these waste units were closed together in conjunction with the CAMU under the same continuous cover system (i.e., the CAMU final cover) [Ref. 7, pp. 668, 669; 32, pp. 8, 1499, 1501]. Waste Units 13, and 17 were closed individually under separate cover systems [Ref. 32, pp. 8, 1499–1501]. Although closure activities did include improved run-on/runoff control and an enlarged and redesigned sediment basin to accommodate runoff from the surface of the closed units, information obtained and observations made during the June 2017 EPA reconnaissance indicate that site operators abandoned the site in 2001 and there has been no maintenance of the site surface or capped waste units since that time [Ref. 5, pp. 4, 16–18; 7, pp. 664, 665]. The entire site has become overgrown with secondary forest growth consisting of small and a few mature hardwood trees, making it difficult or impossible to distinguish site features and likely compromising the integrity of the caps put in place during the RCRA closure [Ref. 5, pp. 16–19]. Evidence of severe erosion was noted in the drainage ditch that runs along the western side of the site, showing that the run-on/runoff control measures put in place during the RCRA closure have been compromised due to lack of maintenance [Ref. 5, pp. 5, 20].

Historically, there have been observations that suggest waste migration from some of the waste units. Evidence of liquid migration from Waste Unit 13 was observed at depths of 12.5 to 16.5 feet in a downslope soil boring [Ref. 7, p. 542]. Evidence of vertical and horizontal seepage from Waste Unit 9 was also observed; soil borings advanced adjacent to Waste Unit 9 exhibited oily staining to depths up to 41 feet bgs, and liquid waste from Waste Unit 9 was observed to have migrated horizontally as far as 360 feet to the southwest [Ref. 7, p. 542].

Based on the lack of containment measures in all the surface impoundments, in particular no liners, a containment factor value of 10 is assigned to Source 2 in the ground water migration pathway [Ref. 1, Table 3-2].

Page 31 of the HRS documentation record at proposal documents the assignment of a source containment factor value of 10 for Source 3 because it has no liner. It states:

Containment

Release to groundwater:

Waste Unit 14 is an unlined landfill that accepted industrial and special wastes and was previously used as a landfarm for sludges [Ref. 7, pp. 146, 342; 32, p. 33]. During its Phase III Soils Investigation in 1987, PROTECO observed waste mixed with soil directly above native soil, as well as soil staining, in Waste Unit 14; there was no liner present [Ref. 33, pp. 84–86]. Results for waste samples collected during the Phase III Soils Investigation showed the presence of chlorobenzene, chloroform, ethylbenzene, PCE, and toluene [Ref. 33, pp. 84–86, 199, 203].

Because there is no liner in the landfill, a containment factor value of 10 is assigned to Source 3 in the ground water migration pathway [Ref. 1, Table 3-2].

The HRS documentation record at proposal correctly assigns source containment values of 10 for Sources 1, 2, and 3 because each does not have a liner. Note that the December 13, 2017, reconnaissance report referred to by

the commenter is included as Reference 31[7] of the HRS documentation record at proposal and the information quoted above by RMI is accurate as submitted but does not negate that Sources 1, 2, and 3 do not have liners, and thus, does not refute the source containment factor values assigned to Sources 1, 2, and 3 for the ground water migration pathway at proposal.

Regarding the Site Narrative Summary descriptions of the landfill cover and the December 13, 2017, EPA reconnaissance report, the information at listing supports that the sources do not have a maintained cover and that erosion may possibly be contaminating the watershed. The Site Narrative Summary (docket ID EPA-HQ-OLEM-2018-0253-0003) is correct in stating that

> [r]unoff from the severe erosion at the site may also be contaminating the watershed. Waste had been disposed at the facility for approximately 25 years and the owner did not implement post-closure maintenance or monitoring, which has resulted in a continuing loss of integrity in the landfill cover.

Information in the HRS documentation record at proposal and cited references support this. For example, page 10 of the HRS documentation record explains that:

> PROTECO conducted some post-closure maintenance, but stopped performing post-closure care altogether sometime between 2001 and 2009; since then, **the site has been abandoned**, it has become overgrown by secondary vegetation, and it has seen the establishment of a cattle growing operation on the premises [Ref. 5, p. 4; 30, pp. 1–2]. [emphasis added]

Page 15 of the HRS documentation record explains that:

> On June 13, 2017, representatives from EPA and PREQB conducted a reconnaissance of the site [Ref. 5, pp. 3–6, 12, 16–21]. A representative from the adjacent Peñuelas Valley Landfill (PVL), who was previously employed at PROTECO, was present to provide background information on former operations and site features [Ref. 5, p. 4]. **Information obtained and observations made during the reconnaissance indicate that operators abandoned the site circa 2001** [Ref. 5, p. 4]. **Since that time, there has been no maintenance of the landfill surfaces, capped waste units, or run-on/runoff controls; no post-closure groundwater monitoring; and no removal of leachate from the CAMU** [Ref. 5, pp. 4, 16–19]. The entire source area has become overgrown with secondary forest growth consisting of small and a few mature hardwood trees, making it difficult or impossible to distinguish site features and likely compromising the integrity of the caps put in place during the RCRA closure [Ref. 5, pp. 5, 16, 18]. The source areas are located on a hillside that slopes north to south [Figures 1 and 2]. **Evidence of severe erosion was noted in the drainage ditch** that runs along the western edge of the former landfill, **indicating that run-on/runoff control measures put in place during the RCRA closure have been compromised due to lack of maintenance since the operators abandoned the site in 2001** [Ref. 5, pp. 4, 5, 20]. [emphasis added]

- Page 15 of the HRS documentation record explains that.

> Follow-up reconnaissance activities by EPA in December 2017 indicate that Hurricane Maria (September 2017) affected site conditions, including **evidence of high volumes of runoff in the site drainage ditches from the massive amounts of rainfall and uprooted trees leaving voids in the cover soil** [Ref. 30, p. 2; 31, pp. 1–4]. [emphasis added]

[7] Reference 31 of the HRS documentation record at proposal: Snyder, Scott, WESTON. Project Note to Proteco HRS Site File, Subject: December 2017 Site Reconnaissance; with attached photo documentation. December 19, 2017. [5 pages]

Reference 5[8] of the HRS documentation record at proposal is a field logbook, which is cited on page 15 of the HRS documentation record at proposal to support observations made of the Site conditions during the June 2017 Site reconnaissance. Page 3 of Reference 5 of the HRS documentation record at proposal states, "Abandoned leachate sump for CAMU. Not used since 2001." Page 4 of Reference 5 of the HRS documentation record at proposal states, "Facility stopped being maintained in 2001." Page 5 of Reference 5 of the HRS documentation record at proposal states, "Observed severe erosion along ditch. … Observed 2nd well. Severely damaged totally unusable." Page 12 of Reference 5 of the HRS documentation record at proposal states, "There are no runoff/runon central measures currently in effect at the site. The site is overgrown with 2° forest growth and has not been maintained since 2001."

Reference 31 is cited on page 15 of the HRS documentation record at proposal to support observations made of the Site conditions during the December 2017 site reconnaissance. Page 1 of Reference 31 of the HRS documentation record at proposal states the following:

> On December 13, 2017, Scott Snyder, Weston Solutions, Inc. (WESTON®), along with Angel Salgado, U.S. Environmental Protection Agency (EPA) Caribbean Environmental Protection Division (CEPD), and Maria Figueroa, Puerto Rico Environmental Quality Board (PREQB), conducted a reconnaissance of the Proteco site to determine the effects of Hurricanes Irma and Maria on the site surface and waste capping materials. The reconnaissance team was accompanied by Rene Rodriguez of EC Waste, Inc.
>
> The reconnaissance commenced at 10:45 hours in the vicinity of Waste Unit 9 (Oil Lagoon), the Corrective Action Management Unit (CAMU), and the CAMU leachate sump. Observations indicated that the site surface was largely unaffected by the hurricanes. Herbaceous vegetation remained intact and large trees remained standing with only bent and broken limbs. **A few small trees have been uprooted resulting in voids in the soil that could provide a pathway for precipitation to reach waste materials left on site;** no waste materials were visible within the voids. **Evidence of a high volume of runoff was observed within the drainage ditch that runs along the western perimeter of the site**; however, the reconnaissance team did not observe exposure of waste materials within the ditch.
>
> At 11:30 hours, the reconnaissance team moved to the northern portion of the site in the vicinity of the drum burial areas; similar conditions were observed in this area of the site. As noted in the southern portion, **a few small trees were observed to be uprooted in this area, creating voids in the soil that could provide a pathway for precipitation to reach waste materials.** An overview of the site from an upslope access road did not reveal any obvious damage within other areas of the site and the scene appeared the same as observed during the June 2017 reconnaissance. The reconnaissance concluded at 12:15 hours. [emphasis added]

In sum, the source containment features as discussed in the HRS documentation record at proposal and in the Site Narrative Summary support that the source containment is inadequate, i.e., not present or not maintained and functioning. While the inadequacy of the landfill cover relative to migration of materials to the surface water pathway was not the factor used to assign the sources containment factor values at proposal, this information is accurate. Further, the lack of some surface containment features discussed above coincide with those evaluated in HRS Table 3-2 (such as maintained engineered cover, or functioning and maintained run-on control system and runoff management system, or functioning leachate collection and removal system immediately above liner) and

[8] Reference 5 of the HRS documentation record at proposal: Weston Solutions, Inc. (WESTON), Region 2 Site Assessment Team (SAT). Servicios Carbareon Site Logbook W0471.3B.01316; with attached photo documentation. June 13–19, 2017. [21 pages]

further support the source containment factor values of greater than zero assigned for Sources 1-3 for the scored ground water migration pathway in the HRS documentation record at proposal.

These comments result in no change to the HRS score and no change in the decision to place the Site on the NPL.

3.12 Aquifer Interconnection

Comment: PVL and RMI both submitted comments questioning the interconnection of the Juana-Díaz and the Tallaboa aquifers within two miles of the Site. PVL commented that wells found at the Site have perched water with high specific conductance and stated that if there is a connection between the wells at the Site and those wells in the Tallaboa alluvial aquifer, one would expect higher specific conductance in the potable wells in the Tallaboa Valley. PVL commented that there is no data to support the EPA's assertion that wells constructed across an aquifer boundary (i.e., across the Juana Díaz and the Tallaboa aquifer boundary) lead to an interconnection between the two aquifers as noted in the HRS documentation record at proposal.

In questioning potential Site impacts to groundwater wells, RMI stated that "[o]n numerous occasions, RMI supported its contention that post closure groundwater monitoring at the site was unnecessary precisely because of prevalent groundwater conditions and aquifer interconnection." In support of this, RMI cited an attachment to its comments, November 7, 2003, correspondence from Beveridge & Diamond, P.C. on behalf of PROTECO to EPA Region 2. This correspondence and attachments to it included assertions that aquifer interconnections are not present between the groundwater associated with the PROTECO facility and that of the groundwater in the Tallaboa Valley. These assertions include the following:

- The portion of the Juana-Díaz formation that consists of calcareous silty clay is not an aquifer and has very low permeability; where present at the PROTECO facility, this formation acts as a barrier to groundwater flow.
- Water levels between monitoring wells at the PROTECO facility vary more than 100 feet and the presence of dry deposits below some "wet" horizons suggest an aquiclude[9] to be present.
- This sequence of clayey sediments of the Juana-Díaz formation surrounding and underlying the PROTECO landfill acts as a discontinuity and prohibits flow to the reef limestone below.
- Contamination of VOCs in monitoring well MW-50D "may be attributed to cross-contamination during well construction."
- Fate and transport calculations of potential contaminants at the PROTECO facility in this calcareous silty clay layer of the Juana-Díaz formation to the Tallaboa valley concluded that contaminants would not reach the Tallaboa valley.
- There is an order of magnitude decrease in specific conductivity, total dissolved solids, chloride, sulfate and sodium in the water between the reef limestone and the calcareous silty clay of the Juana-Díaz formation, which indicates that the two layers are not hydraulically interconnected.
- The reef limestone dips toward the south and consists of water quality too poor to be considered an aquifer, and water would not flow toward the Tallaboa valley.

[9] An aquiclude for HRS purposes is a layer of geologic material with a hydraulic conductivity 2 or more orders of magnitude lower than the surrounding geologic material, sufficiently thick to impede all groundwater migration across the barrier, and not contain preferential pathways (e.g., cracks, fractures, veins) for groundwater migration across this barrier. The layer must be consistently present and consistently meet these specifications throughout the 2-mile radius portion of TDL to qualify as an HRS aquifer discontinuity.

- There is no flow path (i.e., interconnection) of groundwater between the facility and the Tallaboa River valley.
- Age dating of water within the Juana-Diaz Formation shows that the groundwater residence time in the formation below the Site is on the order of thousands of years; therefore, wells could not yield sufficient water for potable purposes and groundwater is not a likely release pathway.

Response: The hydrogeological conditions at the Site are appropriately evaluated as presented in the HRS documentation record at proposal; and the Juana-Díaz aquifer underlying the facility was properly determined to be hydraulically interconnected to the alluvial Tallaboa aquifer. The EPA established interconnections, consistent with the HRS, within the alluvial and Juana-Díaz aquifer layers by documenting preferential pathways in the calcareous silty clay layer that allow groundwater to travel from the surface to the reef limestone, and documenting that contamination has been observed to migrate into the reef limestone from the above aquifer units. The EPA then documented that the reef limestone underlying the facility exhibits hydraulic gradients toward the west and northwest to the Tallaboa valley with no HRS-qualifying aquifer discontinuities identified between the aquifer units (see Figure A-1 of this support document). Therefore, the hydrogeological conditions were appropriately evaluated at the Site and it was determined that the aquifer units are hydrologically interconnected for HRS purposes.

The HRS provides the general considerations to include when evaluating the groundwater migration pathway. HRS Section 3.0.1.1, *Ground water target distance limit*, first directs that a target distance limit (TDL) be defined. It states:

> The target distance limit defines the maximum distance from the sources at the site over which targets are evaluated. Use a target distance limit of 4 miles for the ground water migration pathway, except when aquifer discontinuities apply (see section 3.0.1.2.2). Furthermore, consider any well with an observed release from a source at the site (see section 3.1.1) to lie within the target distance limit of the site, regardless of the well's distance from the sources at the site.

HRS Section 3.0.1.2, *Aquifer boundaries*, directs to "[c]ombine multiple aquifers into a single hydrologic unit for scoring purposes if aquifer interconnections can be established for these aquifers. In contrast, restrict aquifer boundaries if aquifer discontinuities can be established."

HRS Section 3.0.1.2.1, *Aquifer interconnections*, directs how aquifers should be evaluated for interconnections. It states:

> Evaluate whether aquifer interconnections occur within 2 miles of the sources at the site. If they occur within this 2-mile distance, combine the aquifers having interconnections in scoring the site. In addition, if observed ground water contamination attributable to the sources at the site extends beyond 2 miles from the sources, use any locations within the limits of this observed ground water contamination in evaluating aquifer interconnections. If data are not adequate to establish aquifer interconnections, evaluate the aquifers as separate aquifers.

HRS Section 3.0.1.2.2, *Aquifer discontinuities*, directs how to evaluate potential discontinuities. It states:

> Evaluate whether aquifer discontinuities occur within the 4-mile target distance limit. An aquifer discontinuity occurs for scoring purposes only when a geologic, topographic, or other structure or feature entirely transects an aquifer within the 4-mile target distance limit, thereby creating a continuous boundary to ground water flow within this limit. If two or more aquifers can be combined into a single hydrologic unit for scoring purposes, an aquifer discontinuity occurs only when the structure or feature entirely transects the boundaries of this single hydrologic unit.

> When an aquifer discontinuity is established within the 4-mile target distance limit, exclude that portion of the aquifer beyond the discontinuity in evaluating the ground water migration pathway. **However, if hazardous substances have migrated across an apparent discontinuity within the 4-mile target distance limit, do not consider this to be a discontinuity in scoring the site.** [emphasis added]

In addition to these directions, the preamble to the 1990 HRS in the Federal Register (55 FR 51553, December 14, 1990) provides the following examples of information that can be used to identify aquifer interconnections for the purposes of scoring a site; page 51553 states:

> In practice, EPA has found that studies in the field to determine whether aquifers are interconnected in the vicinity of a site will generally require resources more consistent with remedial investigations than SIs, especially where installation of deep wells is necessary to conduct aquifer testing. Thus, EPA has in the past relied largely on existing information to make such determinations and the Agency finds it necessary to continue that approach. Examples of the types of information useful in identifying aquifer interconnections were given in the proposed rule. This information includes literature or well logs indicating that no lower relative hydraulic conductivity layer or confining layer separates the aquifers being assessed (e.g., presence of a layer with a hydraulic conductivity lower by two or more orders of magnitude); **literature or well logs indicating that a lower relative hydraulic conductivity layer or confining layer separating the aquifers is not continuous through the two-mile radius (i.e., hydrogeologic interconnections between the aquifers are identified)**; evidence that withdrawals-of water from one aquifer (e.g., pumping tests, aquifer tests, well tests) affect water levels in another aquifer; **and observed migration of any constituents from one aquifer to another within two miles. For this last type of information, the mechanism of vertical migration does not have to be defined, and the constituents do not have to be attributable to the site being evaluated.** Other mechanisms that can cause interconnection (e.g., boreholes, mining activities, faults, etc.) will also be considered. [emphasis added]

Page 16 of the HRS documentation record at proposal presents a map of the site with distance rings that establish the target distance limit for the Site (see HRS documentation record Figure 3).

Page 35 of the HRS documentation record at promulgation provides the general description of the ground water migration pathway and regional geological setting. It states:

> The site is located within the watershed of the Río Tallaboa, and the general topographic and water-table profiles slope downward from the site west to the Río Tallaboa valley [Ref. 7, pp. 75, 79, 413; 25, p. 17].

Additionally, the ground water migration pathway description includes general discussion of the aquifers being evaluated at the site. Page 35 of the HRS documentation record at promulgation states:

> The aquifers being evaluated are the Ponce-Juana Díaz aquifer, which consists of the Tertiary-age Juana Díaz Formation and Ponce Limestone, and the Tallaboa alluvial aquifer located west of the site [Ref. 7, pp. 1529–1534; 23, pp. 29–30; 24, p. 1] [note that only the Ponce-Juana Díaz aquifer is evaluated for the observed release in Section 3.1.1]. As shown on Geologic Map of the Peñuelas and Punta Cuchara Quadrangles, Puerto Rico (USGS, 1978), the alluvium abuts both the Juana Díaz Formation and the Ponce Limestone in the Río Tallaboa valley and in the tributary valleys west of the site [Ref. 24, p. 1]. The Tallaboa alluvial aquifer is recharged with

> groundwater from the Ponce-Juana Díaz aquifer (i.e., the aquifers are hydraulically connected) [Ref. 7, pp. 1529–1534; 22, p. 19; 23, pp. 29–30; 24, p. 1; 25, pp. 23, 35; 26, pp. 12, 21].

Page 36 of the HRS documentation record at promulgation discusses the general hydraulic gradients at the Site and that the predominant groundwater flow in the Juana-Díaz aquifer units is through cracks and veins. It states:

> Site-specific hydrogeologic information indicates that there is hydraulic connection between the calcareous silty clay and the underlying reef limestone, and that there is significant downward gradient from upper water-bearing zones to the limestone [Ref. 7, pp. 544, 634, 640–641, 1530]. The presence of groundwater in the calcareous silty clay deposits is associated with gypsum veins, which act as preferential pathways for groundwater to flow to the adjacent or underlying strata [Ref. 7, pp. 86, 499, 634, 639; 43, p. 8]. Groundwater might also flow preferentially through the alluvium, which has a hydraulic conductivity of 10-3 centimeter per second (cm/s) [Ref. 1, Section 3.1.2.4, Table 3-6; 7, pp. 86, 508, 527, 541].

On page 37, the HRS documentation record at promulgation outlines the aquifer strata present at the site and provides a description of the layers with site-specific information. It states:

> **Stratum 1** (shallowest)
> Stratum/Aquifer Name: Alluvial deposits
>
> Description: Small deposits of alluvium occur sporadically as surface or near-surface deposits at the site; the alluvial deposits consist of sand-to gravel-size, subangular limestone clasts within a clay matrix [Ref. 7, pp. 491, 497, 503, 506]. The alluvium is only a few feet thick where it occurs on the site, however, in the Río Tallaboa valley it ranges in thickness from 12 to 60 meters (about 40 to 200 feet) [Ref. 7, pp. 65, 497; 24, p. 1]. Groundwater at the site occurs in the alluvial deposits at depths of 10 to 20 feet bgs [Ref. 7, pp. 491, 497, 503–504, 537–539]. Groundwater in on-site limestone flows toward the alluvium in the Río Tallaboa valley via a westerly to northwesterly flow component [Ref. 7, pp. 277, 283, 299, 596, 640; 25, p. 19].
>
> **Stratum 2** (intervening layer)
> Stratum/Aquifer Name: Juana Díaz Formation – calcareous silty clay (a.k.a. mudstone or claystone)
>
> Description: The uppermost geologic stratum that has been encountered during investigations at the site predominantly consists of brown and gray, calcareous silty clay, which is mudstone or claystone of the Juana Díaz Formation that has undergone a facies change; this unit contains varying amounts of clay, silt, sand, limestone clasts, fractures, gypsum veins, and calcareous deposits [Ref. 7, pp. 3, 493–495, 499, 503; 36, pp. 122–353]. The total thickness of the calcareous silty clay at the site ranges up to 220 feet, but it is relatively thin beneath the drum burial areas (Waste Units 1, 2, and 3) and it pinches out against reef limestone outcrops north of the waste units at the site [Ref. 7, pp. 500, 506, 524, 537–538, 541, 544, 549–550]. Groundwater at the site occurs discontinuously in the calcareous silty clay at depths ranging from 30 to 70 feet bgs [Ref. 7, pp. 76, 491, 497, 499, 503–504, 537–539]. The presence of groundwater in the calcareous silty clay deposits is associated with gypsum veins that act as preferential pathways for groundwater flow into adjacent or underlying strata [Ref. 7, pp. 86, 499, 634, 639].
>
> **Stratum 3** (deepest)
> Stratum/Aquifer Name: Juana Díaz Formation – reef limestone

> Description: The reef limestone component of the Juana Díaz Formation consists of coralline and algal limestone formed as fringing reefs; the water-bearing zone is highly fossiliferous, very weathered, and fractured [Ref. 7, pp. 3, 493–495, 500, 503]. The reef limestone lies at a depth of approximately 9.5 to 250 feet bgs at the site, directly beneath the calcareous silty clay; the on-site thickness is reported to be 60 feet [Ref. 7, pp. 491, 524–527; 33, p. 84; 36, pp. 364, 372, 373, 376, 378, 379]. Regionally, the total thickness of Juana Díaz Formation limestone facies ranges from approximately 150 to 600 meters (about 490 to 1,970 feet) [Ref. 23, p. 18]. Groundwater at the site occurs continuously in the reef limestone at depths of approximately 100 to 200 feet bgs [Ref. 7, pp. 76, 491, 497, 499, 503–504, 537–539].

Page 36 of the HRS documentation record at promulgation provides additional information relating to the documentation of aquifer interconnections at the PROTECO facility and within 2 miles of the Site sources. It states:

> Aquifer Interconnections/Distance from Source
>
> The calcareous silty clay is relatively thin (10–15 feet) beneath the drum burial areas (Waste Units 1, 2, and 3); and it pinches out against limestone outcrops north of the waste units at the site [Ref. 7, pp. 299, 500, 524, 537–538, 541, 544, 549–550; 33, p. 84; 36, p. 376]. Additionally, gypsum veins in the calcareous silty clay at the site act as preferential pathways for groundwater to flow to the adjacent or underlying strata, including the limestone and alluvium [Ref. 7, pp. 86, 499, 634, 639]. The boreholes and screen/gravel-pack intervals for some on-site monitoring wells straddle the boundaries between the calcareous deposits and underlying limestone, providing man-made conduits between the units [Ref. 45, pp. 7, 11].
>
> Man-made conduits (i.e., wells) across the aquifer boundaries lead to aquifer interconnection between the Ponce-Juana Díaz aquifer and the Tallaboa alluvial aquifer, where present—the most productive wells in the Río Tallaboa valley straddle the formation interface and withdraw water from both the alluvium and the carbonaceous rocks [Ref. 23, p. 30; 25, pp. 20, 23]. For example, the Carlos Andinos public supply well is screened from 50 to 80 feet bgs in the alluvium and from 80 to 110 feet bgs in the limestone [Ref. 17, pp. 2–3, 5; 27, pp. 1, 3, 5]. Other active drinking-water supply wells, irrigation wells, and industrial wells located in the Río Tallaboa valley have finished depths ranging up to 200 feet [Ref. 5, pp. 7–10; 6, pp. 4–41]. Groundwater in the on-site limestone aquifer also has a westerly to northwesterly flow component along the strike of the rock and a northwesterly component toward an outcrop that discharges into a Río Tallaboa tributary valley, where it reaches the alluvial aquifer [Ref. 7, pp. 277, 283, 299, 596, 640; 25, p. 19].

Finally, the 4-mile TDL was evaluated for HRS-qualifying discontinuities. Page 36 of the HRS documentation record at proposal states:

> Aquifer Discontinuities within Target Distance Limit
>
> The areal extent of the aquifer being evaluated is continuous between the site and the wells being scored as targets, but it is limited south of the site near the coast, where groundwater is present as a freshwater lens overlying saltwater; the interface creates an aquifer boundary beyond which there are no drinking water wells, as shown in Figure 3 [Ref. 7, pp. 1529–1534; 17, pp. 1–4; 24, p. 1; 26, p. 20].

Therefore, the HRS documentation record at proposal properly evaluated the hydrogeological conditions at the Site and determined that the Tallaboa aquifer and the Juana-Díaz aquifer are hydraulically interconnected. As

quoted above, the HRS documentation record establishes that Site-related contamination migrates from the surface soils, predominantly through preferential pathways (e.g., fractures and veins) in the upper portion of the Juana-Díaz formation (described as calcareous silty clay), into the deeper reef limestone portion of the Juana-Díaz formation. Groundwater flows from higher gradients to lower gradients, and the reef limestone unit of the Juana-Díaz formation underlying the PROTECO facility is elevationally upgradient (i.e., hydraulically upgradient) of the Tallaboa aquifer with no known aquifer discontinuities separating these two aquifer units. Therefore, it is expected that groundwater flows downgradient from the reef limestone to the Tallaboa aquifer. Channelized flow through fractures in the reef limestone aquifer beneath the facility flows along the hydraulic gradient to the west/northwest and interconnects the Juana-Díaz formation with the Tallaboa aquifer west of the PROTECO facility. The following two subsections provide additional detail on the specific migration pathways and aquifer interconnections.

Migration from the Sources at the facility to the reef limestone

At the PROTECO facility, the HRS documentation record at promulgation describes mechanisms for contaminant migration from the Site sources to the reef limestone beneath the facility. The EPA documented that preferential pathways exist in the calcareous silty clay that facilitate groundwater migration throughout the calcareous silty clay formation. The HRS documentation record at proposal identified that the calcareous silty clay formation contains limestone clasts, fractures, and gypsum veins that act as conduits for groundwater to flow throughout the formation and into the reef limestone[10]. These features are sufficient to facilitate groundwater migration through the calcareous silty clay formation, however, in addition to these features the calcareous silty clay layer is also documented to be thin (approximately 20 feet thick) beneath the north drum burial areas (Waste Units 1, 2, and 3; see HRS documentation record Reference 7, p. 7) and pinch out completely north of the PROTECO facility. Notably, in the north drum burial areas, where the calcareous silty clay layer is only approximately 20 feet thick, the drums are documented to be buried up to 18 feet below ground[11]. Thus, in some areas at the Site, the reef limestone exists only a few feet below documented source areas, and in these areas the groundwater migration to the reef limestone may not use these documented preferential pathways to reach the underlying limestone aquifer.

In addition to analyzing the geological strata at the Site and documenting interconnections between the aquifers beneath the PROTECO facility, the EPA also identified Site-related contamination migrating directly into the reef limestone aquifer beneath the Site. This migration of Site-related contamination is sufficient by itself to document that the calcareous silty clay and reef limestone aquifers are interconnected, as contamination from the Site sources would not be detected in the reef limestone if the calcareous silty clay were a competent confining unit. Pages 41 and 42 of the HRS documentation record at proposal identify an observed release of mercury and VOCs in well 50WD-86 (screened entirely in the reef limestone) located less than 100 feet from Waste Unit #9 (See Figure 2 of the HRS documentation record at proposal). As shown on pages 41 and 42 of the HRS documentation record at proposal, in two different sampling events as part of a RCRA Facility Assessment, 15 months apart, sample results for this well detected contamination to be present directly in the reef limestone aquifer beneath the Site. These detections constitute observed migration of contamination from one aquifer to another within two miles and separately establish aquifer interconnection for HRS purposes.

Regarding RMI's assertion that this contamination in well 50WD-86 may be due to cross-contamination during well construction, first, in its Phase IA Hydrogeologic Investigation (HRS documentation record Reference 36), PROTECO did not report any unusual water chemistry/water level data, or any evidence of cross-contamination during drilling, well construction, development, or sampling of the well in 1986 (see pages 56-105 of HRS documentation record Reference 36). Second, as this well is only screened in the reef limestone aquifer, after well completion there would be no cross-contamination from well construction after one volume of the well was pumped. As part of well construction, it was determined that the well produced up to 10 gallons per minute and

[10] See HRS documentation record Reference 7, pp. 3, 493–495, 499, 503; and Reference 36, pp. 122–353
[11] HRS documentation record Reference 7, p. 7

this process would have purged the well of any cross-contamination during future sampling events; a subsequent sampling event 18 months later in 1988 contained observed releases of Site-related contamination, long after construction and purging, indicating that cross-contamination during well construction is not the source of contamination in the well (See page 42 of HRS documentation record at promulgation and HRS documentation record Reference 7, p. 538). Finally, as quoted above, the HRS states that the mechanism of vertical migration does not have to be defined and constituents do not have to be attributable to the site. Therefore, this observed migration of contamination independently confirms that aquifer interconnections have been appropriately established according to the HRS.

Migration in the reef limestone to the Tallaboa aquifer

As described in the HRS documentation record at proposal and quoted above, the reef limestone consists of coralline and algal limestone that is highly fossiliferous, weathered, and fractured. These characteristics are consistent with limestone aquifers that transmit groundwater flow in the aquifer through channelized flow in the weathered and fractured bedrock and are consistent with the pump rates observed in the wells screened in the reef limestone at the Site[12]. The EPA notes that neither of the commenters challenged that fractured, channelized flow exists in the limestone formations underlying the Site. However, RMI questioned the direction of groundwater flow beneath the facility by noting that the reef limestone dips to the south and not directly toward the Tallaboa aquifer that is located west/southwest of the PROTECO facility. The EPA notes that, in general terms, "strike" refers to the orientation of a geological feature and "dip" refers to the angle and direction of the tilted geological feature.

Regarding this flow direction as it impacts the aquifer interconnection at the Site, the EPA does not challenge that the reef limestone has an overall dip toward the south or that the groundwater can flow to the south in the limestone; rather, the EPA notes that the fractured nature of the limestone allows for groundwater flow in many directions including toward the west/northwest as it was measured at the Site. Fractures in limestone provide a path of least resistance for groundwater to flow within a geological layer (i.e., fractures act as channels for groundwater flow in the subsurface). The EPA considers the overall orientation (the dip) of the geological layers, but the orientation is not the only consideration; at this site, fractures in the limestone must also be considered in the evaluation of the groundwater flow direction as fractures in limestone can have a greater influence on groundwater flow than the overall orientation of the geological layer. While the groundwater flow direction is discussed in greater detail below in section 3.13, Groundwater Flow Direction, of this support document, for purposes of interconnecting the reef limestone with the Tallaboa aquifer the EPA identified hydraulic gradients under the PROTECO facility flowing to the west/northwest along strike[13] in the reef limestone toward the Tallaboa aquifer (see the quoted aquifer interconnection section of the HRS documentation record at proposal shown above in this response).

Additionally, the EPA notes that the reef limestone is present beneath the Site at an elevation of 110 feet above mean sea level and the Tallaboa valley is approximately 30 feet above mean sea level[14]; this difference in elevation (Tallaboa valley being a minimum of 80 feet below the reef limestone) provides further demonstration that a hydraulic gradient toward the Tallaboa aquifer exists beneath the Site. In addition to the flow data, no aquifer discontinuities were identified between the Tallaboa aquifer and the reef limestone underlying the PROTECO facility. Finally, the EPA notes that the Carlos Andinos public supply well located in the Tallaboa alluvial aquifer draws water from multiple aquifer layers including the reef limestone of the Juana-Díaz aquifer. As indicated in the Carlos Andinos well borehole log (HRS documentation record Reference 27, page 5), the well

[12] HRS documentation record Reference 7, p. 538 describes wells screened in the reef limestone underlying the site as yielding up to 10 gallons per minute.
[13] Strike, as defined by the USGS is the trend or bearing, relative to north, of the line defined by the intersection of a planar geologic surface (for example, a fault or a bed) and a horizontal surface such as the ground.
[14] See HRS documentation record 7, pp. 75, 527

is screened across two aquifer layers and is finished as an open borehole in a third aquifer layer: the well screen begins in the alluvial aquifer and extends down to the Ponce limestone formation and is an open borehole in the reef limestone. As the Carlos Andinos well draws water from all three aquifer layers, for HRS purposes, these aquifer layers are considered interconnected in the Tallaboa Valley. Therefore, groundwater flow through the fractured, channelized conduits completes the aquifer interconnection from the PROTECO facility to the downgradient Tallaboa valley aquifer.

Summary

The information in the HRS documentation record at proposal documents that the aquifer units underlying the Site are interconnected and correctly considered one hydrological unit for HRS purposes. Interconnections from the surficial deposits/site sources to the reef limestone beneath the PROTECO facility are established by showing:

- Preferential pathways exist in the calcareous silty clay layer.
- Observed migration of contamination into the reef limestone has been documented.

The HRS documentation record at proposal then documented that:

- The fractured reef limestone underlying the facility transmits water via channelized flow through fractured limestone.
- The reef limestone underlying the PROTECO facility contains hydraulic gradients toward the west and northwest along the strike of the underlying limestone formations.
- These limestone formations extend to, and are beneath, the Tallaboa valley[15] and that no HRS qualifying aquifer discontinuities are present between the PROTECO facility and the Tallaboa valley.

Therefore, the hydrogeological conditions were appropriately evaluated at the Site and it was determined that the aquifer units are interconnected as one hydrological unit for HRS purposes in the HRS documentation record at proposal.

Further, the assertions included in the Beveridge & Diamond, P.C. document cited by RMI and summarized above also do not refute the aquifer interconnection:

- Regarding the assertion that the portion of the Juana-Díaz formation that consists of calcareous silty clay is not an aquifer and has very low permeability and would act as a barrier to groundwater flow, this is incorrect because, as discussed above, the EPA documented that preferential pathways exist in the calcareous silty clay, which facilitate groundwater migration throughout the calcareous silty clay formation. These preferential pathways are identified in the HRS documentation record at promulgation and document that the calcareous silty clay formation contains limestone clasts, fractures, and gypsum veins that act as conduits for groundwater to flow throughout the formation and into the reef limestone and is thus not a barrier to groundwater flow.
- Regarding the statement that water levels between monitoring wells at the PROTECO facility vary more than 100 feet and the presence of dry deposits below some “wet” horizons suggest an aquiclude to be present, the EPA acknowledges that discrete portions of the calcareous silty clay layer may act as a local aquiclude on the scale of tens or hundreds of horizontal feet, but this does not refute aquifer interconnection. As described above, the calcareous silty clay layer is documented to contain fractures and veins that allow for groundwater migration. The EPA agrees areas of clay lenses may be present on

[15] See HRS documentation record Reference 27, pp. 1-5

the PROTECO facility where the calcareous silty clay layer contains a relatively low number of fractures/veins that will result in local water table elevation differences. However, the EPA notes that the calcareous silty clay layer was appropriately evaluated as discontinuous within 2 miles of the Site sources (i.e., on the PROTECO facility) and these areas do not qualify as HRS discontinuities. In other words, the clay lenses are intermittent or sporadic lenses that are not continuous or "solid" throughout the 2-mile area. Therefore, these comments do not impact the aquifer interconnection evaluation at this site.

- Regarding the assertion that the calcareous silty clay sediments of the Juana-Díaz formation surrounding and underlying the PROTECO landfill act as a discontinuity and prohibit flow to the reef limestone below, this is incorrect because, as discussed above, the EPA documented that preferential pathways exist in the calcareous silty clay that facilitate groundwater migration throughout the calcareous silty clay formation. These preferential pathways are identified in the HRS documentation record at promulgation and document that the calcareous silty clay formation contains limestone clasts, fractures, and gypsum veins that act as conduits for groundwater to flow throughout the formation and into the reef limestone; thus, the calcareous silty clay layer does not qualify as an HRS discontinuity at the Site.
- Regarding the assertion that contamination of VOCs in monitoring well 50WD-86 "may be attributed to cross-contamination during well construction," this does not affect aquifer interconnection because, as discussed above, well 50WD-86 is completed and screened only in the reef limestone aquifer where sampling, 18-months after the well was installed and effectively purged, indicates that cross-contamination from well construction cannot be the source of contamination and instead indicates that the aquifers are interconnected. Additionally, in its Phase IA Hydrogeologic Investigation, PROTECO did not report any unusual water chemistry/water level data, or any evidence of cross-contamination during drilling, well construction, development, or sampling of the well in 1986.
- Regarding fate and transport calculations at the PROTECO facility of contaminants in the calcareous silty clay aquifer to the Tallaboa valley aquifer and resulting RMI assertions that contaminants would not reach the Tallaboa valley, the underlying assumptions for the fate and transport calculations provided by the commenter rely on the transport being through porous media and not through fractured/channelized flow documented to be present at this site. As the prominent transport mechanism for groundwater at the Site (and discussed in the HRS documentation record at proposal) of fractured/channelized flow has not been considered, these calculations are not accurate or sufficient to characterize the flow of groundwater at the Site. Thus, these comments do not impact the interconnection of aquifers for HRS purposes at the Site.
- Regarding the commenters' discussion of an order of magnitude decrease in specific conductivity, total dissolved solids, chloride, sulfate, and sodium in the water between the reef limestone and the calcareous silty clay of the Juana-Díaz formation, and their conclusion that this indicates that the two layers are not hydraulically interconnected, this is not correct; these differences only imply that there is a greater quantity of conductive ions in the calcareous silty clay formation than in the limestone aquifer (or the downgradient Tallaboa alluvial aquifer). In general, specific conductivity refers to the amount of dissolved minerals/ions in the water. The assertion that the reef limestone formation has less dissolved minerals/ions than the upper calcareous silty clay layer is not an indication that the two layers cannot be interconnected; rather, it only indicates that the two layers have different chemical compositions and that the reef limestone layer may also be receiving additional input from other upgradient aquifers in addition to the calcareous silty clay aquifer. Additionally, as the calcareous silty clay layer contains gypsum veins (note that gypsum is a water-soluble mineral), it is expected that the water in this upper layer would have a higher specific conductance compared to the reef limestone layer.

  More specifically, this difference in specific conductance does not show that groundwater cannot migrate down into the reef aquifer, it only indicates that calcareous silty clay formation groundwater might migrate down into the aquifer at a slower gradient (lower *hydraulic* conductivity) than that of other recharge points into the reef limestone. Even if preferential pathways were ignored as a conduit of vertical

migration, a lower hydraulic conductivity in the calcareous silty clay formation does not restrict groundwater migration between the aquifer units because **lower** hydraulic conductivity layers can flow into the **higher** hydraulic conductivity layers of the limestone below. As discussed in the preamble to the 1990 HRS[16], when water encounters a geological unit with a hydraulic conductivity **lower** by two or more orders of magnitude (i.e., not higher in hydraulic conductivity as is present at the Site) an aquifer discontinuity may be present. However, a downward hydraulic gradient in the aquifer units from high to low hydraulic conductivity is not observed at this site; therefore, even if preferential pathways were ignored at the Site, a hydraulic gradient of low to high hydraulic conductivity would not qualify as an HRS discontinuity. Thus, this difference in specific conductance only provides evidence to suggest that the reef limestone and Tallaboa aquifers are receiving additional groundwater recharge from additional locations with groundwater containing lower specific conductance. This difference in specific conductance does not indicate that the aquifers are not interconnected; it only indicates that the rate of the groundwater travelling from the calcareous silty clay unit to the reef aquifer may be lower compared to other groundwater inputs in the reef limestone aquifer.

- Regarding the statements that the reef limestone dips toward the south, the reef limestone consists of water quality too poor to be considered an aquifer, and that water would not flow toward the Tallaboa valley, none of these impact the aquifer interconnection established at the Site. The EPA does not challenge that the reef limestone has an overall dip toward the south or that the groundwater can flow to the south in the limestone; rather, as discussed above, the EPA notes that the fractured nature of the limestone allows for groundwater flow in many directions including toward the west/northwest as it was measured at the Site. As the EPA identified hydraulic gradients under the PROTECO facility flowing to the west/northwest along strike in the reef limestone toward the Tallaboa aquifer, this flow gradient completes the interconnection to the Tallaboa aquifer. Finally, on the quality of the water in the reef limestone, it is noted that the Carlos Andinos well—used for drinking water—is finished as an open borehole in the reef limestone in the Tallaboa Valley (i.e., the Carlos Andinos well draws water from the reef limestone); and, more importantly, the quality of the water in the reef limestone below the Site does not negate the connection between groundwater underlying the site and that of the groundwater in the reef limestone as discussed above, or the connection between groundwater in the reef limestone and groundwater downgradient in the Tallaboa Valley.
- Regarding the assertion that there is no flow path (i.e., interconnection) of groundwater between the facility and the Tallaboa River valley, this is incorrect; as discussed above, the EPA has identified that fractured, channelized flow exists in the limestone formations underlying the Site and that flow beneath the facility has been measured to be flowing in these fractures to the west/northwest along strike in the reef limestone toward the Tallaboa aquifer.
- Regarding the age dating of water within the Juana-Diaz Formation indicating groundwater residence time in the calcareous silty clay layer below the Site is too long to be an effective aquifer and yield sufficient water for potable purposes, this does not impact the determination that the aquifers are documented to be interconnected at the Site. As noted in the Beveridge & Diamond comment, this comment is in regard to the effectiveness of groundwater yield for potable purposes from wells screened in the calcareous silty clay aquifer and the comment does not assert that the calcareous silty clay aquifer cannot be hydrologically interconnected with the reef limestone at the Site. As noted above, the primary method of groundwater migration and interconnection is via clasts, fractures, and gypsum veins that act as conduits for groundwater to flow throughout the calcareous silty clay layer and into the reef limestone and this comment on the aquifer yield does not impact the determination that the aquifers are interconnected for HRS purposes at the Site.

[16] December 14, 1990, Federal Register Volume 55, Number 241, page 51553. Accessed at https://semspub.epa.gov/src/document/HQ/174028.pdf

These comments result in no change to the HRS score and no change in the decision to place the Site on the NPL.

3.13 Groundwater Flow Direction

Comment: PVL and RMI both submitted comments questioning the direction of groundwater flow at the Site. Both PVL and RMI commented that the groundwater flow direction at the Site is to the south and not toward the west as stated in the HRS documentation record at proposal. Additionally, RMI asserted that additional information in the records it has requested from PREQB will contradict the EPA's assertion of a northwesterly groundwater flow direction. PVL commented that EPA needs to verify the groundwater flow direction by installing new wells before stating that there is a potential of contamination of potable wells in the Tallaboa valley.

Response: The EPA appropriately evaluated the groundwater flow direction at the Site to interconnect the aquifer units and to document observed releases of contamination in monitoring wells at the PROTECO facility. The HRS does not contain any specific requirements for establishing the groundwater flow direction at a site and groundwater flow direction is not directly considered by the HRS in determining impacts to target wells subject to potential contamination. The groundwater flow direction was evaluated, consistent with the hydrogeological conditions present at the Site, to establish that preferential pathways, or channelized groundwater in the aquifer units at the Site allow for hydraulic interconnection between the units and to establish a background level and an observed release of contamination at the Site.

The HRS does not contain any specific requirements for establishing the groundwater flow direction at a site, however, the preamble to the HRS (December 14, 1990, Federal Register Volume 55, Number 241, page 51553) discusses the consideration of evaluating groundwater flow direction. The preamble states that accounting for groundwater flow direction is an increased level of complexity that is not required for a screening tool such as the HRS, and that determining the level of remedial action warrants a more accurate understanding of the groundwater; therefore it is more appropriate to evaluate the groundwater flow direction during a remedial investigation (RI). The preamble further states that the HRS does consider groundwater flow indirectly by distance weighting populations not subject to actual contamination. The EPA notes that this method of distance weighting populations not subject to actual contamination was recently upheld in the *Genuine Parts Company v. EPA No. 16-1416 (D.C. Cir. 2018)*, where the court held:

> [t]he HRS regulation does not foreclose EPA from evaluating ground water flow direction at future stages of the administrative process, when the evidence may be firmer. For now, however, EPA's decision to distance weight the wells without consideration of ground water flow direction was rational under the APA and a reasonable interpretation of CERCLA.

As stated in the preamble to the HRS, determining the direction of groundwater flow throughout the TDL is not consistent with a screening level evaluation such as the HRS, and the groundwater flow direction is more accurately determined during a later stage of the superfund listing process (during the RI). Therefore, the EPA is unable to determine the groundwater flow direction throughout the 4-mile TDL at this stage in the Superfund process and has appropriately distance weighted all populations apportioned to wells subject to potential contamination, consistent with the HRS.

Regarding comments that EPA needs to verify the groundwater flow direction by installing new wells before stating that there is a potential of contamination of potable wells in the Tallaboa valley, insomuch as this comment involves the target wells scored as subject to potential contamination, those targets wells within the TDL were scored consistent with the HRS, which does not consider groundwater flow direction in evaluating this factor. (See HRS sections 3.3.2, *Populations* and 3.3.2.4, *Potential contamination*, which generally explain the criteria used to evaluate targets at a site that are subject to potential contamination.)

While the EPA is unable to determine the groundwater flow direction throughout the 4-mile TDL, the EPA did identify hydraulic gradients influencing groundwater direction at the PROTECO facility that are sufficient to establish that the aquifer units underlying the Site are interconnected (see section 3.12, Aquifer Interconnection, of this support document). Similarly, groundwater flow direction was evaluated in the area of the PROTECO facility property in considering selection of background levels in the establishment of an observed release for the Site (the commenters have not challenged the observed releases of contamination at the Site).

Regarding RMI's comment that additional data might contradict a northwesterly groundwater flow direction, as explained above in section 3.8, Adequacy of the Record/Data, of this support document, the data used in the HRS evaluation of the Site includes the relevant site-specific information that is necessary to evaluate the Site properly for an HRS evaluation and the commenters have not provided any relevant site-specific evidence/data to show that is information is incorrect. The additional information requested may provide further information on facilities and geological conditions at locations outside of the PROTECO facility or in other locations in the 4-mile TDL not specifically evaluated in this HRS evaluation; however, the EPA relied upon site-specific information that was determined to be the most recent and most relevant data available. Specific to the groundwater flow, the EPA notes that groundwater flow direction is expected to be variable throughout the 4-mile TDL for reasons of complexity as noted above in this section and in section 3.12, Aquifer Interconnection, of this support document. Even if different groundwater flow patterns are identified at distance (e.g., one to four miles from the sources) or at different aquifer depths beneath the PROTECO facility, the EPA does not consider this data to be contradictory to the HRS evaluation of groundwater flow presented in the HRS documentation record at proposal.

These comments result in no change to the HRS score and no change in the decision to place the Site on the NPL.

3.14 Revisions to the HRS Documentation Record

Comment: PVL requested that the EPA correct errors in the HRS documentation record at proposal, including that:

- The PVL started operations in 1975, as stated on page 43 of the HRS documentation record at proposal. PVL asserted that its operations instead began in 1999, submitting a copy of a landfill construction permit and an operating permit[17] to support this.
- The implication that the PVL may have inadvertently received hazardous substances and the possibility of a release from PVL to groundwater based on statements on page 43 of the HRS documentation record at proposal. PVL noted that it is a Subtitle D compliant landfill, that its wastes are subject to RCRA characterization prior to acceptance, that further inspection and sampling are carried out before disposal, and that its landfill has a composite liner system with leachate collection consistent with RCRA requirements.
- PROTECO is located within the PVL stated on page 3 of Reference 7 of the HRS documentation record at proposal. PVL asserted that "Peñuelas Valley Landfill, LLC. is a separate operation that is on land adjacent to the PROTECO site."

Response: The EPA acknowledges that the HRS documentation record at proposal contains inaccurate statements on page 43 regarding the PVL landfill and, therefore, has revised the HRS documentation record at promulgation to correct these statements. The EPA also acknowledges that page 3 of Reference 7 has an inaccurate description

[17] See Exhibit 3 of Peñuelas Valley Landfill, LLC. comment document available at: https://www.regulations.gov/document?D=EPA-HQ-OLEM-2018-0253-0007

of PROTECO's location relative to PVL. These revisions do not impact the site characterization or the NPL listing decision. See also section 3.3, Definition of Site, of this support document for related explanations.

The HRS documentation record at proposal contains following inaccurate statements on page 43 regarding PVL [see bolded text]:

> Two separate, active RCRA Subtitle D nonhazardous industrial waste landfills border the site to the east (Ecosystems, Inc.[Ecosystems]) and west (Peñuelas Valley Landfill [PVL]) [Figure 2; Ref. 9, pp. 1, 2; 10, pp. 1–6; 11, pp. 6, 7, 6769; 12, pp. 1–12; 13, pp. 11, 12]. As opposed to RCRA Subtitle C landfills which accept hazardous waste, RCRA Subtitle D landfills (e.g., PVL and Ecosystems) are authorized to accept only nonhazardous solid waste, such as municipal solid waste (i.e., household waste), organic waste, construction and demolition debris, and coal combustion residue [Ref. 9, pp. 1, 2; 10, pp. 1–5; 11, pp. 6, 7, 67-69; 13, pp. 10–16]. Ecosystems is a relatively new facility having been granted a construction permit in 2012 [Ref. 12, pp. 1–12], long after the observed release from PROTECO was documented. **However, PVL began operations around the same time as the PROTECO landfill (i.e., circa 1975) [Ref. 7, p. 4]. Although it is possible that PVL has inadvertently received hazardous substances, including halogenated solvents and mercury,** given the association of the hazardous substances in the observed release with the site sources, the high volume of hazardous wastes deposited in unlined Waste Units at PROTECO and the position of the groundwater release nearer to and downgradient of site sources, and the admission by PROTECO that the contamination is site-related, the release of hazardous substances to the aquifer being evaluated is at least partially, if not wholly, attributable to the PROTECO site.

Reference 7, page 3 also makes the following inaccurate statement regarding the location of PROTECO relative to the PVL:

> The PROTECO site is inside the Peñuelas Valley Landfill, where the company Waste Management, Inc. (WM) is also located and operates a non-hazardous industrial landfill. The eastern and northern portions of the property are occupied by PROTECO, while WM occupies the western portion (Figure 2 and 3). The perimeter around both PROTECO and WM is completely bordered by a cyclone fence; in addition, the areas formerly occupied by PROTECO are completely bordered by barbed wire fence.

The HRS documentation record at promulgation has been revised to:

- Correctly state that PVL began operations in 1999.
- Remove statements that PVL may have inadvertently received hazardous waste.
- Add a reference containing a memorandum that clarifies that page 3 of Reference 7 incorrectly states that the PROTECO site is within the Peñuelas Valley Landfill. (The HRS documentation record at proposal itself did not state that the PROTECO site is in the Peñuelas Valley Landfill; this error was only in Reference 7, a document not created by EPA.)

The revised text on page 43 of the HRS documentation record at promulgation reads as follows:

> Two separate, active RCRA Subtitle D nonhazardous industrial waste landfills border the site to the east (Ecosystems, Inc.[Ecosystems]) and west (Peñuelas Valley Landfill [PVL]) [Figure 2; Ref. 9, pp. 1, 2; 10, pp. 1–6; 11, pp. 6, 7, 6769; 12, pp. 1–12; 13, pp. 11, 12]. As opposed to RCRA Subtitle C landfills which accept hazardous waste, RCRA Subtitle D landfills (e.g., PVL and Ecosystems) are authorized to accept only nonhazardous solid waste, such as municipal solid

> waste (i.e., household waste), organic waste, construction and demolition debris, and coal combustion residue [Ref. 9, pp. 1, 2; 10, pp. 1–5; 11, pp. 6, 7, 67-69; 13, pp. 10–16]. Ecosystems is a relatively new facility having been granted a construction permit in 2012 [Ref. 12, pp. 1–12], long after the observed release from PROTECO was documented. *PVL began operations in 1999. There are no indications that the operations at the PVL facility are out of compliance with the RCRA permits issued to the facility or that PVL has received hazardous waste.* Given the association of the hazardous substances in the observed release with the site sources, the high volume of hazardous wastes deposited in unlined Waste Units at PROTECO and the position of the groundwater release nearer to and downgradient of site sources, and the admission by PROTECO that the contamination is site-related, the release of hazardous substances to the aquifer being evaluated is at least partially, if not wholly, attributable to the PROTECO site. [*italics identify language modified at promulgation*]

In addition to these revisions included in the HRS documentation record at promulgation, in response to public comments, the EPA identified an error in a cited reference (HRS documentation record Reference 7) and revised the HRS documentation record at promulgation to accurately describe the subsurface conditions at the Site. The EPA notes that while no public comments were received on the accuracy of the cited material, the changes to the HRS documentation record at promulgation are implemented to more accurately reflect the Site conditions. Page 527 of HRS documentation record Reference 7 contains a cross-section diagram that characterizes well 50WD-86 as containing “fractured calcareous rock” from the surface down approximately 150 feet to the reef limestone. Upon further investigation, this cross-section appears to be inconsistent with data in the Phase IA Hydrologic Investigation (HRS documentation record Reference 36) that indicates brown calcareous silty clay is likely present in the upper portions of the aquifer. As such, the EPA is revising the HRS documentation record at promulgation to reflect data in HRS documentation record Reference 36 and is removing references to “fractured calcareous rock” and associated statements that indicate the calcareous silty clay layer to be absent near Waste Unit 9. While the EPA is revising these statements in the HRS documentation record at promulgation, the EPA notes that these changes do not impact the HRS Site score or the established aquifer interconnections at the Site (see section 3.12, Aquifer Interconnections, of this support document).

These comments result in the HRS documentation record being revised at promulgation to correct the statements identified in this response. However, these comments result in no change to the HRS score and no change in the decision to place the Site on the NPL.

4. Conclusion

The original HRS score for this site was 36.33. Based on the above responses to public comments, the score remains unchanged. The final scores for the PROTECO site are:

Ground Water:	72.67
Surface Water:	NS
Soil Exposure:	NS
Air Pathway:	NS
HRS Score:	36.33