



SUMMARY OF THE HALEY & ALDRICH GROUNDWATER RISK EVALUATION FOR AES PUERTO RICO IN GUAYAMA

March 13, 2019

What you need to know:

Haley & Aldrich is an environmental consulting and engineering firm that has extensive experience with coal combustion residuals, or CCR. Haley & Aldrich has completed a study evaluating potential impacts of groundwater monitoring results adjacent to the AES Puerto Rico (AES-PR) temporary AGREMAX™ Storage Area.

The study confirms that there is no impact on drinking water and there is no evidence of impact to human health or the environment.

AES-PR LOCATION

AES-PR is located in the municipality of Guayama, Puerto Rico. The former Chevron Phillips Chemical Puerto Rico Core, LLC (CPCPRC) facility borders the site to the east, open land and the inactive former pharmaceutical plant TAPI border the site to the north, open land and the AES Illumina, LLC solar energy farm border the site to the west, and open land borders the site to the south. The site is 1870 feet north of the Caribbean Sea at Las Mareas Harbor (approximately 1/3 mile). See **Figure 1**.

AES-PR is in an industrial area of Guayama. The neighboring inactive CPCPRC facility to the east of the AES-PR site is a source of organic and potentially other constituents in groundwater at AES-PR. Sulfolane and benzene, toluene, ethylbenzene, and xylene (BTEX) plumes in the upper and lower aquifers at CPCPRC¹ have migrated to the southeastern portion of the AES-PR property. The inactive former pharmaceutical plant TAPI² to the north of the site has also released organics to the groundwater upgradient (similar to upstream) of AES-PR. AES-PR is not

¹ <https://www.epa.gov/hwcorrectiveactionsites/hazardous-waste-cleanup-chevron-phillips-chemical-puerto-rico-core-guayama>

² <https://www.epa.gov/hwcorrectiveactionsites/hazardous-waste-cleanup-tapi-puerto-rico-incorporated-guayama-puerto-rico>

the source of plumes or releases from neighboring sites. In addition, a USEPA Superfund site (Fibers Public Supply Wells³) is located approximately one mile to the northeast.

STUDY DESCRIPTION – TEMPORARY AGREMAX™ STORAGE AREA

Haley & Aldrich used groundwater monitoring data, including data collected in compliance with the USEPA Coal Combustion Residuals (CCR) Rule⁴, from wells adjacent to and near the temporary AGREMAX™ Storage Area at the AES-PR facility in its evaluation. Sample results are also available for seawater in the near-by Las Mareas Harbor. These data were used to conduct an evaluation that follows current USEPA guidance for risk assessment⁵ and includes consideration of Puerto Rico water quality regulations.

Information on the location of the facility, surrounding land use, groundwater flow directions, groundwater and surface water data, and the potential for groundwater and surface water use in the immediate vicinity of the facility were used to identify potential exposure pathways. As defined by USEPA⁶, a potential exposure pathway is complete only if four conditions are met:

1. A source and mechanism of chemical release to the environment;
2. An environmental transport medium (e.g., air, water, soil);
3. A point of potential contact with the receiving medium by a receptor; and
4. A receptor exposure route at the contact point (e.g., inhalation, ingestion, dermal contact).

A diagram of the potential exposure pathways is shown in **Figure 2**. The diagram identifies exposure to groundwater, surface water in Las Mareas Harbor, and marine organisms in the harbor as potential exposure pathways. The figure identifies recreational users of Las Mareas Harbor and marine organisms in the harbor as potentially exposed populations. The figure also indicates that groundwater in this specific area is not used as a source of drinking water.

To evaluate these potential exposures, the data in the report were evaluated using human health risk-based and ecological risk-based screening levels drawn from Federal and Puerto Rico sources. The screening levels were used to determine if the detected concentrations of constituents in groundwater and in surface water could pose a risk to human health or the environment. The evaluation below demonstrates there is no evidence of risk to human health or the environment.

³ <https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0202559>

⁴ <https://www.epa.gov/coalash/coal-ash-rule>

⁵ <https://www.epa.gov/risk>

⁶ <https://www.epa.gov/risk/risk-assessment-guidance-superfund-rags-part>

GROUNDWATER IS LOCALIZED AND NOT USED AS A SOURCE OF DRINKING WATER IN THE IMMEDIATE VICINITY OF AES-PR

AES-PR is located in what is defined by the US Geological Survey (USGS) as the south coast alluvial aquifer. The USGS has identified separate hydrologic units in the area of the south coast alluvial aquifer according to the surface topography and hydrologic data. Each hydrologic unit is, therefore, an area of surface water and groundwater flow and each is associated with a code; AES-PR is located in the hydrologic unit: 210100040146.

Within these hydrologic units, surface water flows from areas of high elevation to areas of low elevations; surface water in this hydrologic unit is expected to generally move southward and discharge to the sea. At AES-PR, groundwater flows generally southwest and towards Las Mareas Harbor. This means that if there is a release of constituents to groundwater from the AES-PR facility, it will be confined to the area of groundwater at the plant and downgradient (south). As the plant is very close to the ocean (1870 feet), the area of groundwater that could be affected by facility operations is also very small and limited.

There are no users of groundwater as drinking water downgradient of the AES-PR facility. The closest residential area is Las Mareas along the coast south of the facility and this area is serviced by public water from PRASA.

CCR MANAGEMENT AND GROUNDWATER MONITORING RESULTS

The temporary AGREMAX™ Storage Area is located on the ground surface at the southern border of the facility. The groundwater monitoring data for the well network associated with the temporary AGREMAX™ Storage Area at the AES-PR facility has been collected and evaluated using the methods and procedures outlined in the USEPA CCR Rule.

Five (5) groundwater monitoring wells and four (4) temporary wells were installed to evaluate groundwater. The wells are summarized below and shown on **Figure 1**.

- MW-1 and MW-2 – Upgradient. These wells were installed to represent background groundwater.
- MW-3 through MW-5 – Downgradient. These wells were installed downgradient of and immediately adjacent to the temporary AGREMAX™ Storage Area to evaluate the potential impacts to groundwater.
- TW-A, TW-B, TW-C, and TW-D. These four temporary monitoring wells are not part of the CCR Rule groundwater monitoring, but data from these wells were included in this evaluation.

The CCR Rule identifies the constituents that are included for groundwater testing. Of the 15 assessment monitoring constituents under the CCR Rule, the groundwater monitoring results for AES-PR show levels above human health risk-based screening levels for only three constituents: selenium (downgradient well MW-3), lithium (downgradient well MW-4), and molybdenum (downgradient wells MW-3 and MW-4). Selenium is the only constituent present in groundwater at concentrations above the ecological screening level for seawater (downgradient well MW-3). As noted above, there are no direct exposures to groundwater in this area by humans or ecological populations.

SEAWATER

A surface seawater sample was collected in Las Mareas Harbor and evaluated for the constituents identified in the CCR Rule. All of the seawater results are below human health recreational and ecological screening levels and are comparable to seawater concentrations worldwide.

CONCLUSION





This investigation demonstrates that the impacts of the temporary AGREMAX™ Storage Area are limited. There is no impact on drinking water and there is no evidence of impact to human health or the environment. There are no downgradient users of groundwater as drinking water – thus, there is no impact on drinking water. Las Mareas Harbor does not show impacts. There is no exposure to CCR-derived constituents detected in groundwater at the AES-PR facility – either via groundwater use or surface water. Where there is no exposure, there is no risk.

AES-PR is continuing with further evaluation and actions at the facility, consistent with the requirements of the CCR Rule.

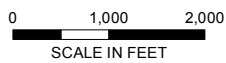


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LEGEND

-  SEA WATER SAMPLING LOCATION
-  MONITORING WELL
-  APPROXIMATE PREDOMINANT GROUNDWATER FLOW DIRECTION
-  SITE BOUNDARY

NOTE
AERIAL IMAGERY SOURCE: ESRI



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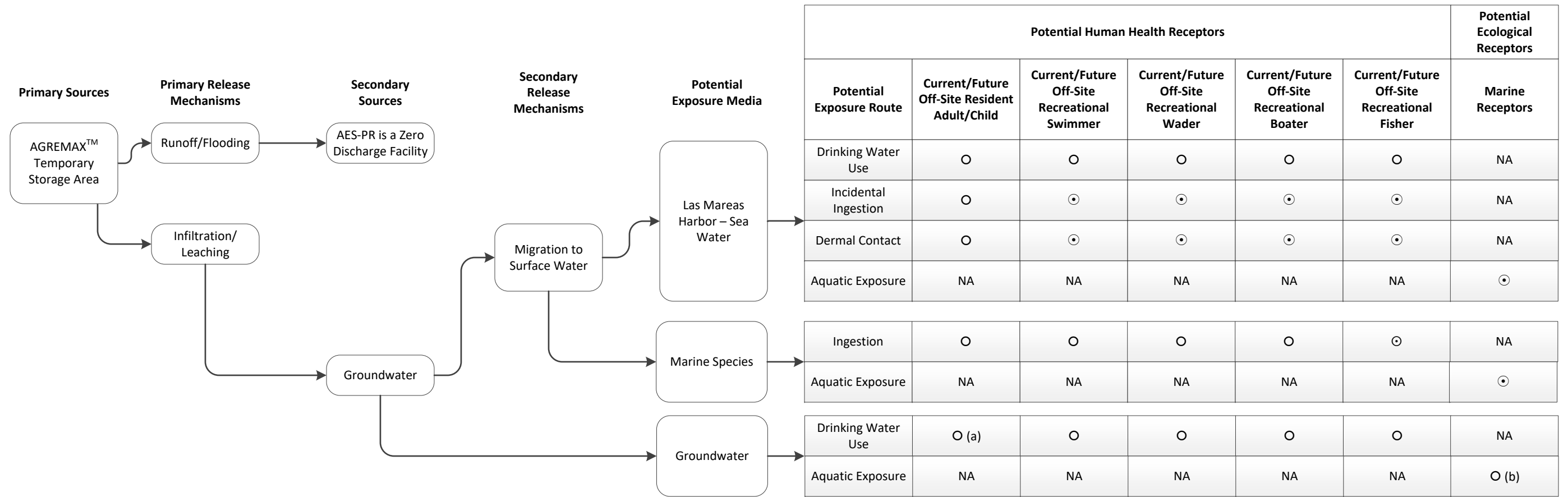
AES PUERTO RICO
GUYAMA, PUERTO RICO

SITE FEATURES

MARCH 2019

FIGURE 1

**FIGURE 2
CONCEPTUAL SITE MODEL
AES PUERTO RICO LP, GUAYAMA, PUERTO RICO**



- Notes:
- ⊙ Pathway potentially complete – pathway evaluated in this risk assessment; results indicate no risk to human health or the environment.
 - Pathway evaluated and found incomplete; results indicate no risk to human health or the environment.
 - (a) The groundwater in the vicinity of AES-PR is not used for drinking water purposes.
 - (b) Ecological Receptors are not exposed to groundwater.
 - NA – Not Applicable.