DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

Resource Conservation and Recovery Act Corrective Action Environmental Indicator
RCRA Information System Code (CA750):
Migration of Contaminated Groundwater Under Control

Facility Name: TAPI Puerto Rico, Inc.

Facility Address: PR-3, km 143, Guayama PR, 00785

Facility EPA ID #: PRD090613357

DEFINITIONS

Definition of Environmental Indicators

Environmental Indicators (EIs) (1) are measures being used by the Resource Conservation and Recovery Act (RCRA) Corrective Action (CA) program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The developed EI CA750 indicates the quality of the environment in relation to the migration of contaminated groundwater associated with the facility. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of *Migration of Contaminated Groundwater Under Control* (EI CA750)

A positive EI determination for *Migration of Contaminated Groundwater Under Control* ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original *area of contaminated groundwater* (for all groundwater *contamination* subject to RCRA corrective action at or from the identified facility (i.e., site-wide).

Relationship of EIs to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EIs are near term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993. The EI CA750: *Migration of Contaminated Groundwater Under Control* pertains ONLY to the physical migration (i.e., further spread) of contaminated groundwater and contaminants within groundwater (e.g., non-aqueous phase liquids). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore,

wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI determinations status codes should remain in RCRA Information System (RCRIS) national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

AVAILABLE, RELEVANT AND SIGNIFICANT INFORMATION

1. Has all available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units, and Areas of Concern), been considered in this EI determination?

☒ If yes - check here and continue with #2 below.

☐ If no - re-evaluate existing data, or

☐ If data are not available, skip to #8 and enter "IN" (more information needed) status code.

GROUND WATER KNOWN OR REASONABLY SUSPECTED TO BE CONTAMINATED

2. Is groundwater known or reasonably suspected to be "contaminated"[1] above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

☒ If yes – continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.

☐ If no – skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

☐ If unknown – skip to #8 and enter "IN" status code.

[1] *Contamination* and *contaminated* describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate *levels* (appropriate for the protection of the groundwater resource and its beneficial uses).

Rationale

The facility performed a SWMU assessment as per the approved Assessment Work Plan (June 2004). The SWMU assessment included a groundwater component. Phase 1 of the assessment was completed in July 2005. Groundwater contamination with di-isopropyl ether (IPE) was confirmed, and warranted further corrective action investigation to be carried out. Phase 2 of the assessment was completed in June 2007. The sampling results of Phase 2 investigation indicated that further groundwater investigation (a Phase 3) was necessary to complete the delineation of potentially impacted groundwater at the facility (2). A Phase 3 investigation was conducted in June 2009 (3). To perform the recommendation of the Phase 2, two additional wells, MW-8A and MW-9A, were installed on the southeast corner of the lot just outside of the facility. The results from the samples collected from these wells showed that the IPE concentrations were below the comparison criteria. At the time, the criterion was obtained from Texas Natural Resources Conservation Commission and was established at 2400 µg/L. The results from the wells sample were 557 µg/L at well MW-8A and 129 µg/L at well MW-9A. None of these concentrations were above the comparison criteria thus delineating the extent of IPE in groundwater.

MIGRATION STABILIZED

3. Has the migration of contaminated groundwater stabilized (such that contaminated groundwater is expected to remain within *existing area of contaminated groundwater*[2] as defined by the monitoring locations designated at the time of this determination)?

   ☒ If yes – continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the *existing area of groundwater contamination*).

   ☐ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the *existing area of groundwater contamination*) – skip to #8 and enter "NO" status code, after providing an explanation.

   ☐ If unknown – skip to #8 and enter "IN" status code.

[2] *existing area of contaminated groundwater* is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of *contamination* that can and will be sampled/tested in the future to physically verify that all *contaminated* groundwater remains within this area, and that the further migration of *contaminated* groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

Rationale

On November 22, 2010 (4), EPA required the facility to implement a quarterly groundwater monitoring plan at wells MW-8A and MW-9A to observe the migration of IPE. These two wells are located at the southeast boundary of the facility. The quarterly groundwater monitoring started on March 30, 2011 (5). On October 2, 2012 (6) EPA required the facility to include wells MW-1B, MW-2A, MW-3A, MW-4A, MW-5A, MW-6A and MW-7A in the quarterly groundwater monitoring plan.

The last groundwater sampling event was held on September 23, 2013 (7). The comparison criterion used during the groundwater monitoring was the EPA's *Regional Screening Levels for Chemical Contaminants at Superfund Sites* (8). The threshold value used for IPE was 1,500 µg/L. Figure 1 shows a layout of the facility and the location of the wells.

Table 1 – Comparison of IPE Concentrations in April 2007 and December 2012

Well	April 2007 (µg/L)	September 2013 (µg/l)
MW-1B	1450	539
MW-2A	802	101
MW-3A	1650	88.6
MW-4A	44.1	15.6
MW-5A	128	30.2
MW-6A	31.9	62.3
MW-7A	2880	558

Table 2 – Comparison of IPE Concentrations in June 2009 and December 2012

Well	June 2009 (µg/L)	September 2013 (µg/L)
MW-8A	557	172
MW-9A/R	129	9.9

Well MW-9A was destroyed and substituted with well MW-9R.

As the tables above show, concentrations of IPE have reduced over time to the point that all concentrations are now below the comparison criterion of 1,500 µg/L. Samples collected from the wells at the boundary of the facility, MW-8A and MW-9A/R, were never above the comparison criterion.

DISCHARGE INTO SURFACE WATER BODIES

4. Does *contaminated* groundwater discharge into surface water bodies?

☐ If yes – continue after identifying potentially affected surface water bodies.

☒ If no – skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater *contamination* does not enter surface water bodies.

☐ If unknown – skip to #8 and enter "IN" status code.

Rationale

As shown above, the data collected from 2007 until 2012 shows that IPE is not migrating outside the facility. There are no surface water bodies within the boundaries of the facility.

DISCHARGE LIKELY INSIGNIFICANT

5. Is the discharge of *contaminated* groundwater into surface water likely to be *insignificant* (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater *level*, and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

☐ If yes – skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater *level*, the value of the appropriate *level(s)*, and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgment/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

☐ If no – (the discharge of *contaminated* groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration of each contaminant discharged above its groundwater *level*, the value of the appropriate *level(s)*, and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations greater than 100 times their appropriate groundwater *levels*, the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

☐ If unknown – enter "IN" status code in #8.

[3] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

Rationale

N/A

DISCHARGE CURRENTLY ACCEPTABLE

6. Can the discharge of *contaminated* groundwater into surface water be shown to be *currently acceptable* (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

☐ If yes – continue after either:

1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater;

OR

2) providing or referencing an interim-assessment[5], appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment *levels*, as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[5] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

☐ If no – (the discharge of *contaminated* groundwater can not be shown to be *currently acceptable*) - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

☐ If unknown – skip to 8 and enter "IN" status code.

Rationale

N/A

FUTURE MONITORING

7. Will groundwater monitoring / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the *existing area of contaminated groundwater*?

☒ If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

☐ If no - enter "NO" status code in #8.

☐ If unknown - enter "IN" status code in #8.

Rationale

As mentioned above, the facility was required to perform groundwater monitoring (4) at wells MW-8 and MW-9. In October 2, 2012 EPA required the facility to expand their groundwater monitoring program to include wells MW-1B, MW-2A, MW-3A, MW-4A, MW-5A, MW-6A and MW-7A (9). The ground water monitoring of these wells started in December 2012 (10). The wells continue to be monitored.

DETERMINATION

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

☒ YE – Yes, *Migration of Contaminated Groundwater Under Control* has been verified. Based on a review of the information contained in this EI determination, it has been determined that the *Migration of Contaminated Groundwater* is *Under Control* at the facility, EPA ID # PRD090613357, located at PR-3, km 143, Guayama PR, 00785. Specifically, this determination indicates that the migration of *contaminated* groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the *existing area of contaminated groundwater.* This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

☐ NO – Unacceptable migration of contaminated groundwater is observed or expected.

☐ IN – More information is needed to make a determination.

Completed by (signature) Jesse Avi **Date** 2014-03-17

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Supervisor (signature) [signature] Date 3/17/14

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REFERENCES

1. **U. S. Environmental Protection Agency.** Environmental Indicators. [Online] September 4, 2012. http://www.epa.gov/osw/hazard/correctiveaction/eis/index.htm.

2. —. TAPI Puerto Rico, Inc. Environmental Indicator (EI) RCRIS code (CA725) Current Human Exposures Under Control. *Documentation of Environmental Indicator Determination.* New York, NY : U. S. Environmental Protection Agency, September 18, 2007.

3. **Anderson, Mulholland & Associates.** *Phase 3 Groundwater Investigation.* White Plains : Anderson, Mulholland & Associates, 2009. Technical Memorandum. August 10, 2009.

4. **U.S. Environmental Protection Agency.** Technical Memorandum 3 Approval. San Juan, PR : s.n., November 22, 2010. letter.

5. **Anderson, Mulholland & Associates.** 1st Quarter 2011 Groundwater Sampling Results. White Plains, NY : s.n., May 11, 2011.

6. **U.S. Environmental Protection Agency.** Response to TAPI's July 30, 2012 letter. Guaynabo, PR : s.n., October 2, 2012. letter.

7. **Anderson, Mulholland & Associates.** Quarterly Progress Report No. 23. White Plains, NY : s.n., November 15, 2013.

8. **U.S. Environmental Protection Agency.** Regional Screening Levels for Chemical Contaminants at Superfund Sites. [Online] November 2012. http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm.

9. **U. S. Environmental Protection Agency.** Response to your July 30, 2012 letter. Guaynabo, PR : s.n., October 2, 2012.

10. **Anderson, Mulholland & Associates.** 4th Quarter 2012 Groundwater Sampling Results. White Plains, NY : s.n., February 15, 2013.

Source: U.S. Geological Survey. ***Central Aguirre Quadrangle, Puerto Rico.*** 1:24,000. 7.5 Minute Series. Reston, VA: United States Department of the Interior, USGS, 1970.

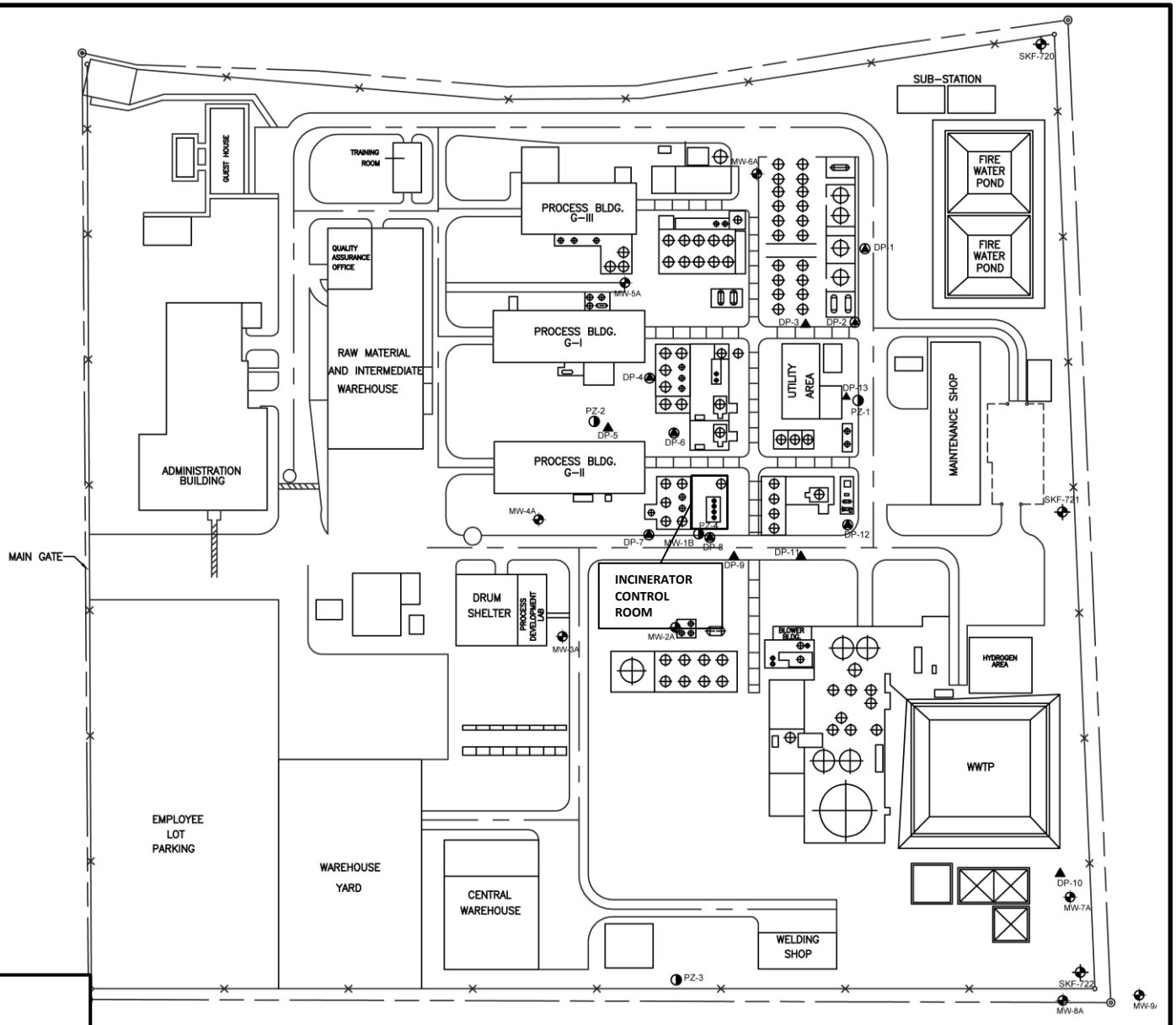
North

Figure 1

Site Location Map

TAPI Puerto Rico
Guayama, Puerto Rico

Prepared By: Anderson - Mulholland & Assoc, Inc.



North

Figure 2

Facility Layout

TAPI Puerto Rico
Guayama, Puerto Rico

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