DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA725)
Current Human Exposures Under Control

Facility Name: *Thermo King de Puerto Rico, Inc.*

Facility Address: B Street, Zeno Gandía Industrial Park, Hato Abajo, Arecibo, Puerto Rico

Facility EPA ID #: PRD090497959

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) (1) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in 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).

Facility Information

Thermo King produces solenoids, wire harnesses, control boxes, plastic in-lays, and evaporators for transport refrigeration units. Activities performed on-site by Thermo King included metal shearing, refrigerant copper coil forming and assembly, metal punching, bending, welding, painting, and electrical wire harness and metal finishing. The current land use of the facility is industrial. The manufacturing buildings shown the maps provided in Attachment A are all occupied.

Periodic ground water monitoring for volatile organic compounds (VOCs) has been conducted at the Thermo King facility from December 1999 through November 2012. Several VOCs in excess of the EPA Maximum Contaminant Levels (MCLs) have been detected in the shallow and deep aquifers, as well as in three identified perched water zones. 1,1-Dichloroethene (1,1 – DCE) is the primary contaminant of concern at the site based on its concentration in ground water relative to other detected contaminants.

AVAILABLE AND RELEVANT INFORMATION

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

   ☒ YES, continue with #2 below.

   ☐ NO, re-evaluate existing data or, if data are not available, skip to #6 and enter "IN" (more information needed) status code.

Rationale

Additional site work was conducted in 2012, including the installation of downgradient extent monitor well MW-15S and a soil vapor extraction (SVE) well SVE-1. A SVE pilot test was also conducted and ground water quality is monitored annually. The results of the August 2012 SVE pilot test confirm that there is recoverable contaminant mass within the unsaturated zone beneath the former 1,1,1-TCA tank area. Results of annual ground water monitoring show that the lateral extent of ground water contamination has been defined. The information collected in 2012 along with existing site information provides an effective Site Conceptual Model that can be applied to site remediation efforts.

MEDIA

2. Are groundwater, soil, surface water, sediments, or air media known or reasonably suspected to be "contaminated"[1] above appropriately protective risk-based levels (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

Media	Yes	Rationale/Key Contaminants
Groundwater	YES	VOCs in ground water in source area. Several VOCs have been detected in excess of the EPA Maximum Contaminant Levels (MCLs) in the shallow and deep aquifers, as well as in perched water zones. 1,1-DCE is the primary contaminant of concern at the site based on its concentration in ground water relative to other detected contaminants. 1,1-DCE is a degradation product of 1,1,1-TCA which was stored in tanks and dispensed at the source area. Information summarizing site investigation work is presented in Attachment A.
Air (indoors)[2]	NO	Air monitoring data not available. Vapor intrusion has been eliminated as a potential exposure based on the distance from contaminated media to potential receptors, the concentrations of contaminants, and the depth to ground water (see following section).
Surface Soil (e.g., <2 ft)	NO	Six shallow soil samples were collected from the former 1,1,1-TCA tank area as part of the waste characterization for the new wastewater treatment plant foundation excavation. VOCs were not detected in any of the soil samples. The results indicate that there is not a potential exposure pathway associated with shallow soil in this area.
Surface Water	NO	No surface water bodies have been identified within the footprint of the ground water contaminant plume. Ground water is not expected to discharge to nearby downgradient surface water bodies due to the depth to ground water (>120 feet). The nearest surface water body is the Atlantic Ocean 1 mile north (downgradient) of the facility. Surface water bodies are shown in the maps provided in Attachment A.
Sediment	NO	No sediments identified within the footprint of the ground water contaminant plume.
Subsurface Soil (e.g., >2 ft)	YES	The available soil analytical data, along with additional soil vapor data collected during the August 2012 SVE pilot test, indicate that residual VOCs remain in unsaturated soil within the source area. Information summarizing site investigation work is presented in Attachment A.
Air (Outdoor)	NO	Outdoor air sampling data not available, but preliminary modeling of indoor air vapor intrusion shows that this exposure pathway is not complete. It is reasonable then to assume the outdoor air exposure pathway is also not complete.

UNK = Unknown

[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 appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggests that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

☐ NO (for all media) – skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

☒ YES (for any media) – continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

☐ UNKNOWN (for any media) – skip to #6 and enter "IN" status code.

Rationale

See Attachment A for soil and ground water quality data

PATHWAYS

3. Are there complete pathways between "contamination" and human receptors such that exposures can be reasonably expected under the current (land and groundwater-use) conditions?

Table 1 – Summary Exposure Pathway Evaluation Table for Potential Human Receptors (Under Current Conditions)

Contaminated Media	Potential Human Receptors (Under Current Conditions)						
	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food[3]
Groundwater	NO	NO	NO	NO	NA	NA	NA
Air (indoors)	NO	NO	NO	NA	NA	NA	NA
Surface Soil (<2 ft)	NO	NO	NO	NO	NO	NO	NA
Surface Water	NA	NA	NA	NA	NA	NA	NA
Sediment	NA	NA	NA	NA	NA	NA	NA
Subsurface Soil (>2 ft)	NO	NO	NO	YES	NA	NA	NA
Air (Outdoor)	NO	NO	NO	NO	NO	NO	NA

Instructions for Summary Exposure Pathway Evaluation Table:

- Select "NA" for specific Media (including Human Receptors' spaces for Media which are not "contaminated") as identified in #2 above.
- Enter "yes" or "no" for potential "completeness" under each "Contaminated" Media – Human Receptor combination (Pathway).
- Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media – Human Receptor combinations (Pathways) are defaulted to

[3] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

"NA". While these combinations may not be probable in most situations they may be possible in some settings and should be changed as necessary.

☐ NO (pathways are not complete for any contaminated media-receptor combination) – skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional Pathway Evaluation Work Sheet to analyze major pathways).

☒ YES (pathways are complete for any "Contaminated" Media – Human Receptor combination) – continue after providing supporting explanation.

☐ UNKNOWN (for any "Contaminated" Media – Human Receptor combination) – skip to #6 and enter "IN" status code

Rationale

Air (Indoor) – No indoor air monitoring data has been collected. However, There are no occupied buildings within 100 feet of the area of identified contaminated soil. The ground water to indoor air vapor intrusion pathway is also incomplete because the depth to ground water is over 120 feet below ground surface. Contaminated perched water lenses do not extend beneath occupied buildings, and are over 75 feet deep which makes the indoor air vapor intrusion pathway very improvable to be complete. However, it should be noted that per U.S. EPA Environmental Indicator guidance on vapor intrusion (http://www.epa.gov/epawaste/hazard/correctiveaction/eis/faqs.htm#vapor), U.S. EPA yields to the authority of the Occupational Safety and Health Administration (OSHA) when enforcing worker exposure to hazardous concentrations of chemicals in workplaces such as Thermo King where workers are handling hazardous chemicals. Under the OSHA General Duty clause, workers present inside the Thermo King structures known to contain hazardous indoor air vapor concentrations of 1,1-DCE are to be provided adequate monitoring, engineering controls, and/or personal protective equipment (PPE) to prevent unnecessary occupational exposure.

Ground water - The potential exists for a complete exposure pathway for workers during ground water monitoring and other site assessment activities. A survey was conducted in the area surrounding the site to assess the presence of existing ground water supply wells. The results of the survey showed that there were no existing wells within the survey area that would be impacted by the site contaminant plume. Results of the survey are presented in Attachment B.

Subsurface soil - The potential exists for a complete exposure pathway for workers during subsurface activities such as excavation. There is no potential for construction worker exposure to contaminated ground water due to the depth to water (ground water >120 feet, perched water >75 feet).

Air (Outdoor) – No outdoor air monitoring data has been collected. However, the source area soils are capped by the wastewater treatment plant cement slab. In addition, the depth to ground water and perched water, along with the concentrations of contaminants in ground water, effectively eliminate this exposure pathway.

SIGNIFICANT EXPOSURES

4. Can the exposures from any of the complete pathways identified in #3 be reasonably expected to be "significant"[4] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

☒ NO (exposures cannot be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

☐ YES (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

☐ UNKNOWN (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale

Exposure to both contaminated soil and ground water as indicated in Section 4 will be limited to experienced personnel with the appropriate HAZWOPER training and using the appropriate personal protective equipment and monitoring tools. The results of a well survey completed in April 2013 of the surrounding area showed that no water supply wells are present in the study area. Vapor intrusion has been eliminated as a potential exposure based on the distance from contaminated media to potential receptors, the concentrations of contaminants, and the depth to ground water as detailed in previous sections.

ACCEPTABLE LIMITS

5. Can the "significant" exposures (identified in #4) be shown to be within acceptable limits?

☐ YES (all "significant" exposures have been shown to be within acceptable limits) – continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

[4] If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

☐ NO (there are current exposures that can be reasonably expected to be "unacceptable") – continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

☐ UNKNOWN (for any potentially "unacceptable" exposure) – continue and enter "IN" status code

Rationale

Section is not applicable because no significant exposures have been identified.

DETERMINATION

6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

☒ YE – Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the *Thermo King de Puerto Rico, Inc.* facility, EPA ID #EPA ID: 110000580390, located at B Street, Zeno Gandía Industrial Park, Hato Abajo, Arecibo, Puerto Rico under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

☐ NO – "Current Human Exposures" are NOT "Under Control."

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

Completed by	(signature)	Luis A. Negrón	Date	10/23/13
	(print)	Luis Negron		
	(title)	Env. Engineer		
Reviewed by	(signature)		Date	2013-10-31
	(print)	Jesse Aviles		
	(title)	Env. Scientist		
Supervisor	(signature)		Date	12/4/13
	(print)	Ramon Torres		
	(title)	CEPD RRB Branch Chief		
EPA Region or State		2		

Contact telephone and email:

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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.

FINAL NOTE: the human exposures EI is a qualitative screening of exposures and the determinations within this document should not be used as the sole basis for restricting the scope of more detailed (e.g., site-specific) assessments of risk.

Attachment A
Soil and Ground Water Quality Data

ERM

SITE PLAN
THERMO KING DE PUERTO RICO
ZENO GANDIA INDUSTRIAL PARK
HATO ABAJO, ARECIBO, PUERTO RICO

FIGURE
2

LEGEND

- MONITOR WELL
- SOIL BORING
- CONE PENETROMETER BORING
- D FORMER DEGREASER
- >1 mg/kg 1,1-DCE IN SOIL
- ESTIMATED EXTENT OF VOC-AFFECTED SOIL

N

50 FEET

TK-2
COIL BUILDING

TK-1

TK-3

B STREET

SIDEWALK

SIDEWALK

W

W

SS

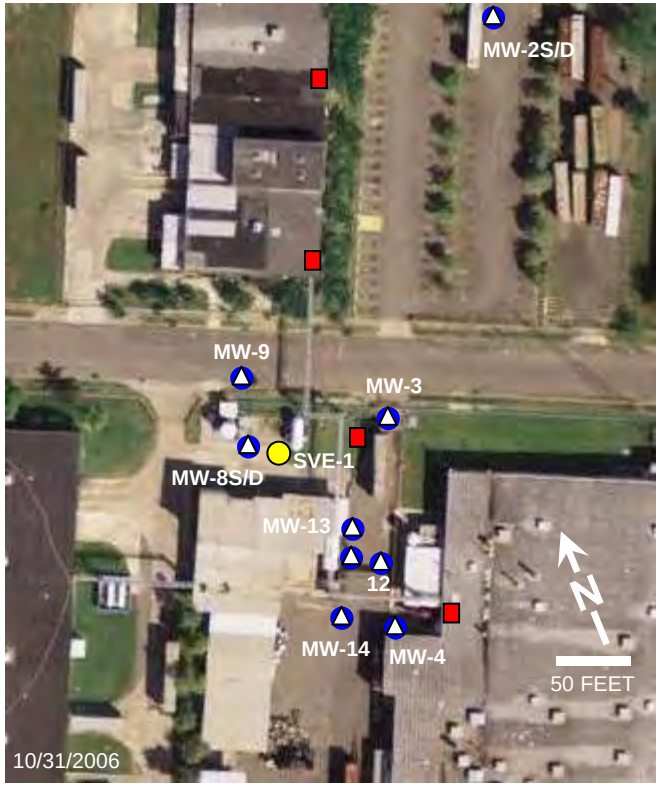
WASTEWATER TREATMENT PLANT

HAZARDOUS MATERIALS STORAGE AREA

LOADING DOCK

FORMER WASTE 1,1,1-TCA ASTs

MW-2S/D
SB-2
SB-1
SB-3
SB-4
CPT-14
CPT-10
CPT-18
SB-13
MW-9
SB-17
MW-3
SS-8
SS-7
SS-6
SB-9
SS-4
SS-5
SB-7
CPT-15
CPT-6
SB-5
SB-12
SB-6
SB-8
SS-3
SB-11
MW-8S/D
SS-1
SS-2
SB-10
SB-22
MW-13
CPT-13
SB-19
INJ-S/D
MW-12
SB-14
MW-4
SB-16
SB-15
MW-14
SB-20
CPT-5
SB-21



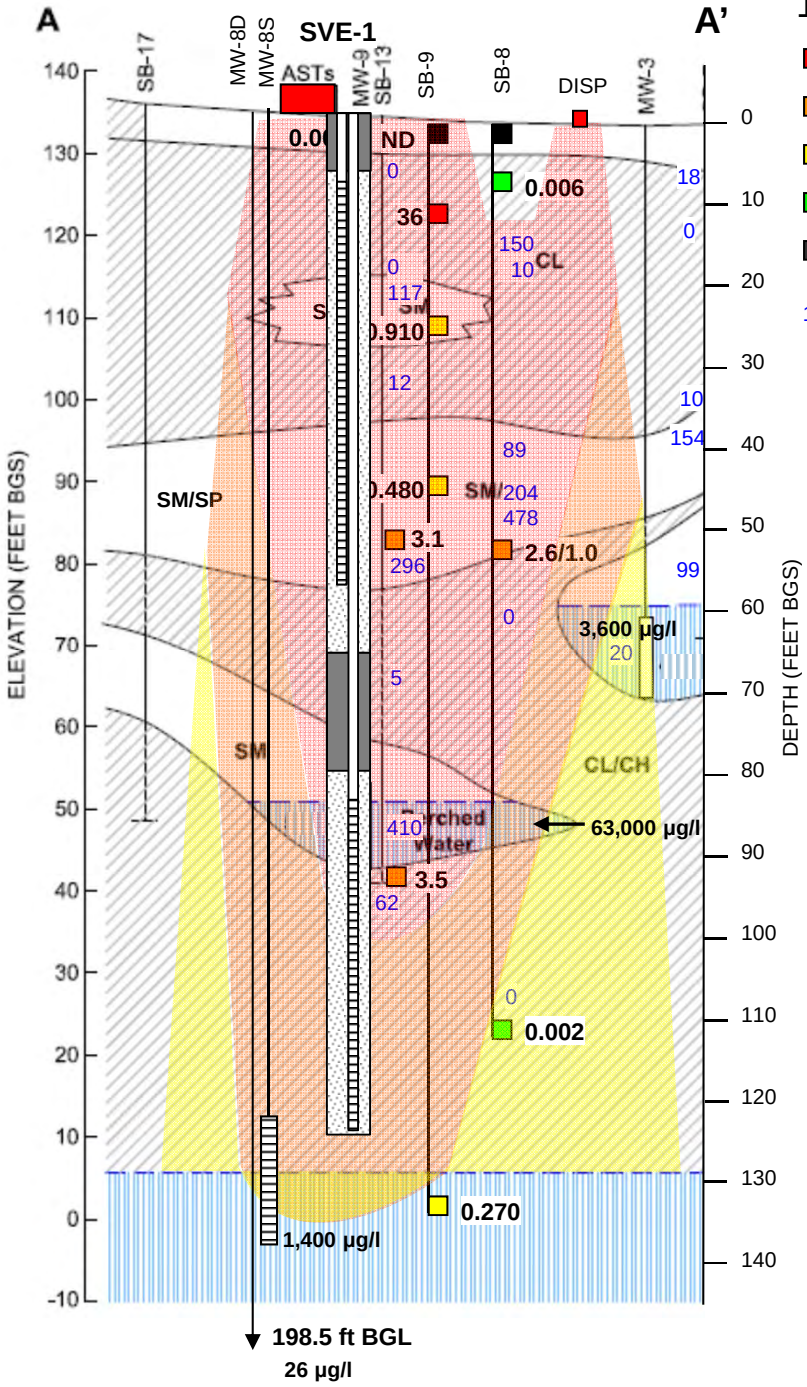
DEPTH TO GROUND WATER ~129 ft BGS

Environmental Resources Management

SOIL BORING MAP - SITEWIDE
THERMO KING DE PUERTO RICO
ZENO GANDIA INDUSTRIAL PARK
HATO ABAJO, ARECIBO, PUERTO RICO

FIGURE
6A

CROSS SECTION



1,1-DCE

- >10 mg/kg
- >1 mg/kg
- >0.1 mg/kg
- >0.001 mg/kg
- Not detected
- 18 PID READING (ppmV)

ESTIMATED EXTENT OF SECONDARY SOURCE OF 1,1-DCE

>1 mg/kg 1,1-DCE IN SOIL

MONITOR WELL

SVE WELL

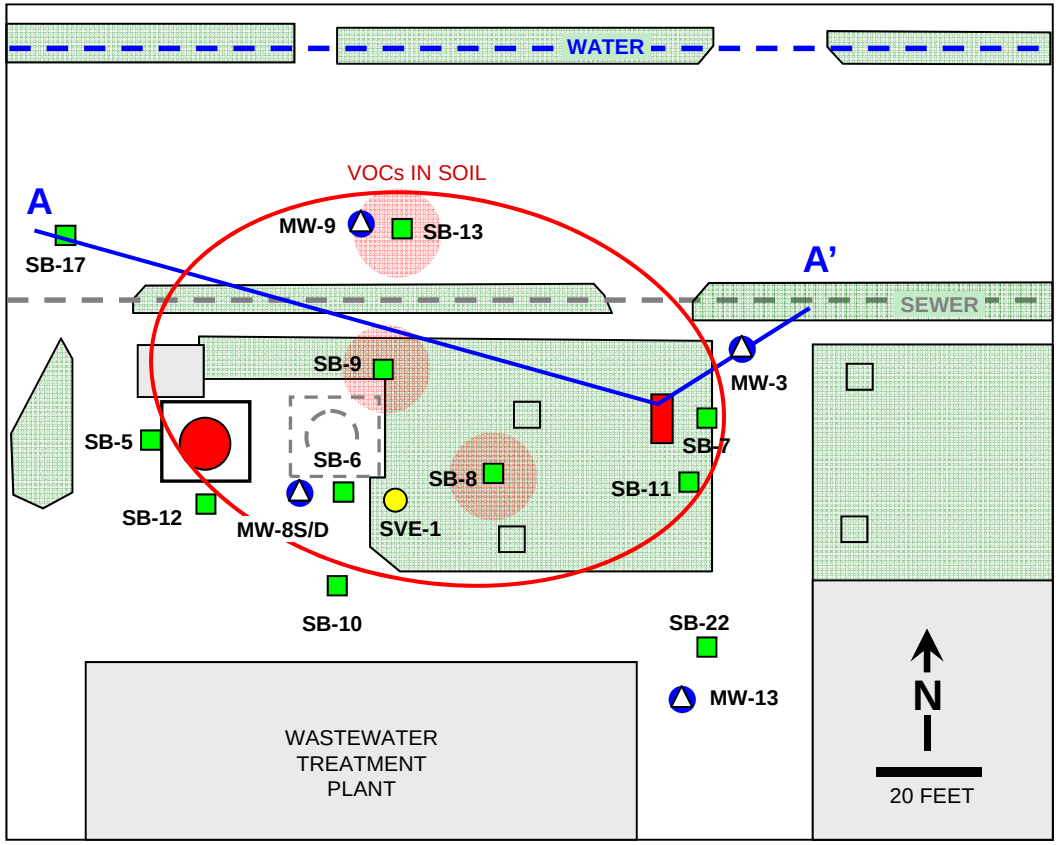
SOIL BORING

SOIL VAPOR & GROUND WATER DATA

WELL	AQUIFER	SOIL VAPOR (ppmV)	GW 1,1-DCE (µg/l)
MW-3	PERCHED	519	2,800
MW-8S	SHALLOW	510	1,200
MW-9	PERCHED	1,166	52,000
MW-13	PERCHED	78	260

SOURCE: 2010 SOIL VAPOR EXTRACTION PILOT TEST REPORT (ERM)

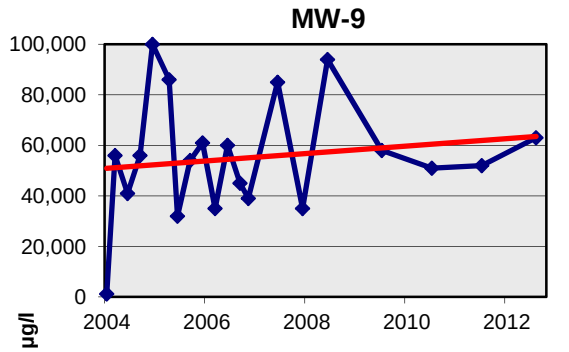
PLAN VIEW

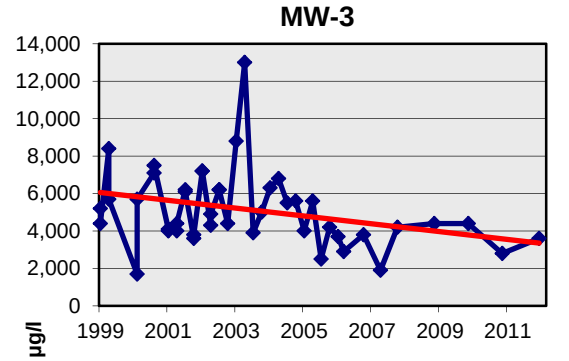


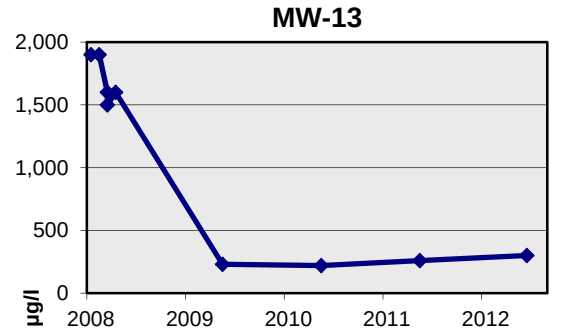
Environmental Resources Management

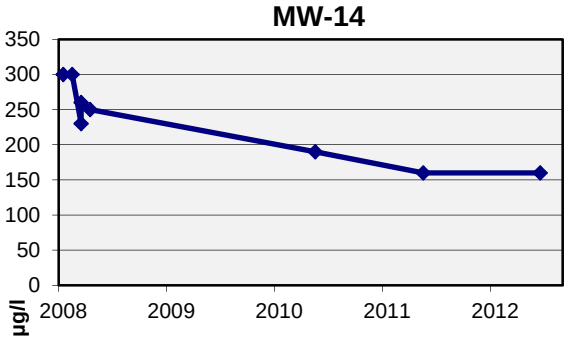
SOIL BORING MAP – SOURCE AREA
THERMO KING DE PUERTO RICO
ZENO GANDIA INDUSTRIAL PARK
HATO ABAJO, ARECIBO, PUERTO RICO

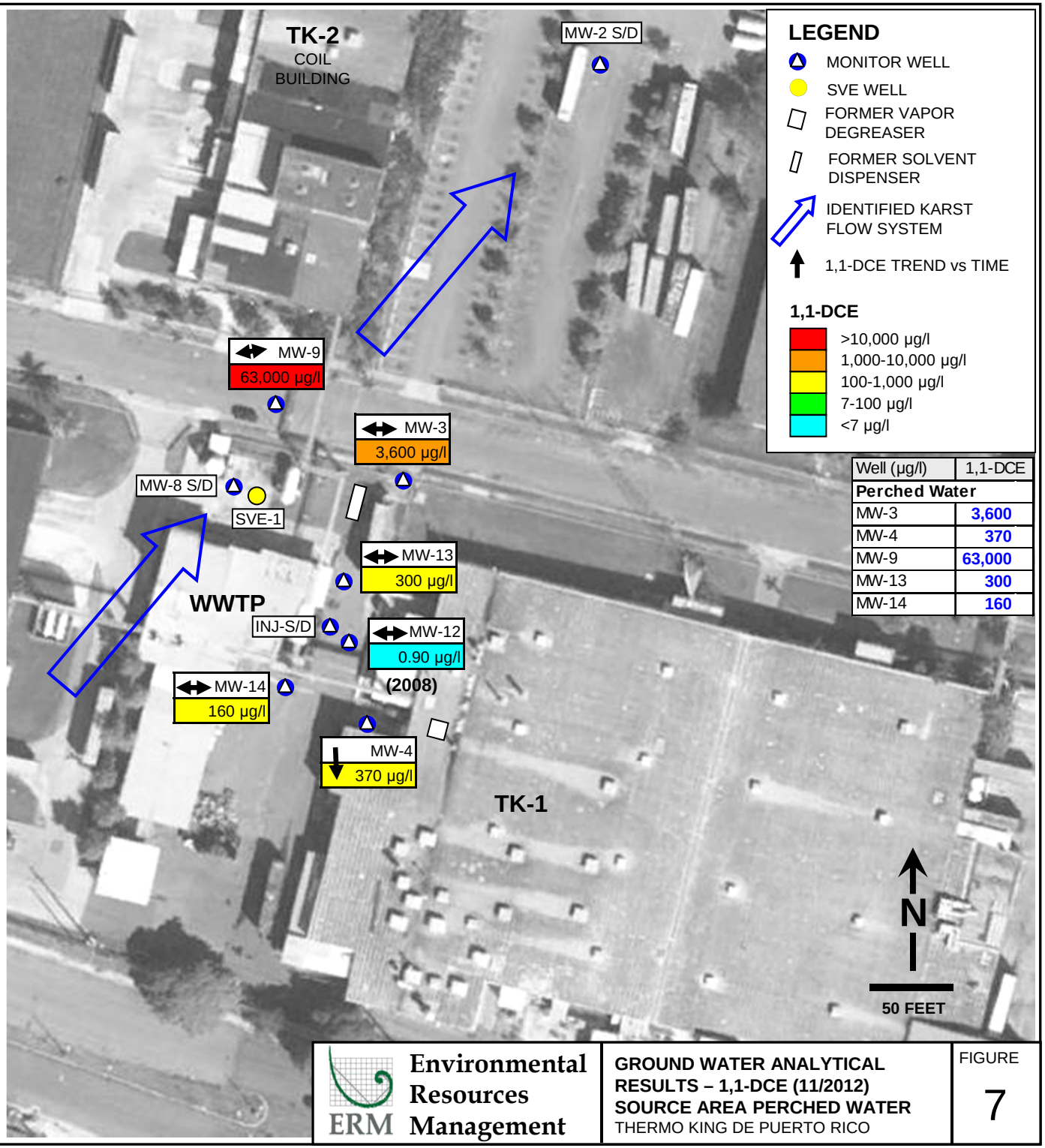
FIGURE
6B











LEGEND

- MONITOR WELL
- SVE WELL
- FORMER VAPOR DEGREASER
- FORMER SOLVENT DISPENSER
- IDENTIFIED KARST FLOW SYSTEM
- 1,1-DCE TREND vs TIME

1,1-DCE

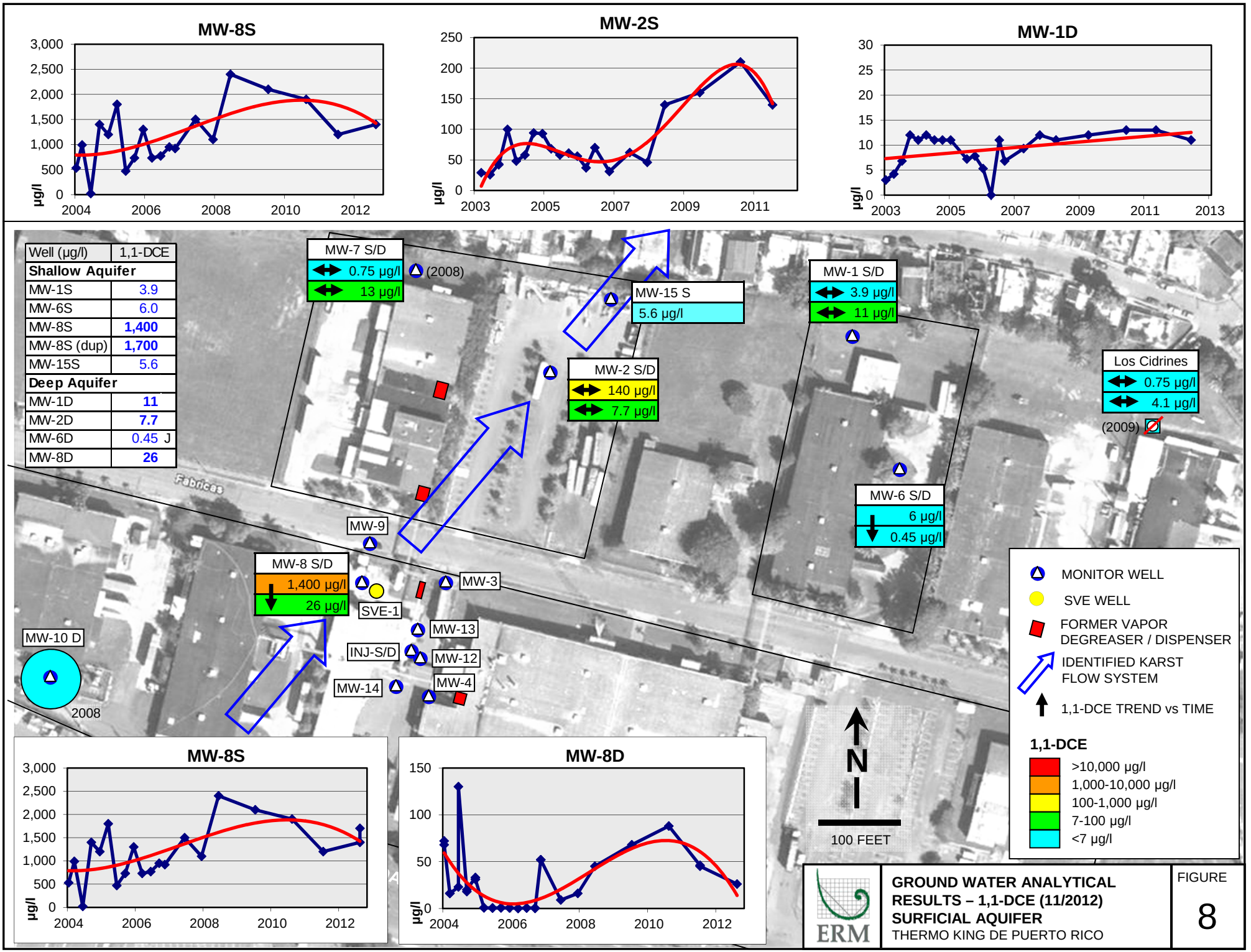
- >10,000 µg/l
- 1,000-10,000 µg/l
- 100-1,000 µg/l
- 7-100 µg/l
- <7 µg/l

Well (µg/l)	1,1-DCE
Perched Water	
MW-3	**3,600**
MW-4	**370**
MW-9	**63,000**
MW-13	**300**
MW-14	**160**

Environmental Resources Management

GROUND WATER ANALYTICAL RESULTS – 1,1-DCE (11/2012)
SOURCE AREA PERCHED WATER
THERMO KING DE PUERTO RICO

FIGURE
7



ERM

GROUND WATER ANALYTICAL RESULTS – 1,1-DCE (11/2012)
SURFICIAL AQUIFER
THERMO KING DE PUERTO RICO

FIGURE
8

TABLE 5. SOIL ANALYTICAL RESULTS - PRIMARY VOCs, THERMO KING DE PUERTO RICO, ARECIBO, PR

Results in mg/kg	Depth (ft BGS)	Date	Vinyl Chloride	1,1-DCE	1,1-DCA	1,1,1-TCA	Benzene	1,2-DCA	TCE	1,4-Dioxane	Toluene	Ethyl benzene	Total Xylenes
SB-1	7-8	12/03/02	ND	0.014	0.022	ND	ND	ND	ND	ND	0.018	ND	0.007 J
SB-1	11-12	12/03/02	0.034	0.003 J	0.012	ND	ND	ND	ND	ND	0.003 J	ND	ND
SB-1	117-118	12/05/02	ND	0.015	0.002 J	ND	ND	ND	ND	ND	0.002 J	ND	ND
SB-2	8-8.5	12/05/02	ND	0.005	0.013	ND	ND	ND	ND	ND	0.002 J	ND	ND
SB-2	11-12	12/05/02	ND	0.004	0.010	ND	ND	ND	ND	ND	0.002 J	ND	ND
SB-2	120-121	12/07/02	ND	0.310 D	0.098	ND	ND	ND	ND	ND	0.002 J	ND	0.001 J
SB-3	11-12	12/09/02	ND	0.002 J	ND	ND	ND	ND	ND	ND	0.005 B	ND	ND
SB-3	121-122	12/10/02	ND	0.310 D	0.098	ND	ND	ND	ND	ND	0.002 J	ND	0.001 J
SB-4	8-9	12/10/02	ND	ND	ND	ND	ND	ND	ND	ND	0.004 JB	ND	ND
SB-4	8-9	12/10/02	ND	ND	ND	ND	ND	ND	ND	ND	0.004 JB	ND	ND
SB-4	11-12	12/10/02	ND	ND	ND	ND	ND	ND	ND	ND	0.005 B	ND	ND
SB-4	58-59	12/11/02	ND	0.025	0.007	ND	ND	ND	ND	ND	0.003 JB	ND	ND
SB-4	122-123	12/11/02	ND	0.004 J	ND	ND	ND	ND	ND	ND	0.003 JB	ND	ND
SB-5	3-4	12/13/02	ND	0.004 J	0.002 J	ND	ND	ND	ND	ND	0.003 J	ND	ND
SB-5	7-8	12/13/02	ND	0.001 J	0.002 J	ND	ND	ND	ND	ND	0.005 J	ND	ND
SB-5	107-108	12/16/02	ND	0.001 J	ND	ND	ND	ND	ND	ND	0.002 J	ND	ND
SB-6	3-4	12/16/02	0.002 J	0.004 J	0.002 J	ND	ND	ND	ND	ND	0.003 J	ND	ND
SB-6	5-6	12/16/02	ND	0.270	0.048	2.6	ND	ND	0.0007 J	ND	0.005	ND	ND
SB-6	15-16	12/16/02	0.006	0.510 D	0.140	0.160	ND	ND	ND	0.058 J	0.004	ND	ND
SB-6	96-97	12/17/02	ND	0.002 J	ND	ND	ND	ND	ND	ND	0.002 J	ND	ND
SB-7	3-4	12/18/02	ND	0.002	0.016	ND	ND	ND	ND	ND	0.003	ND	ND
SB-7	44-45	12/18/02	ND	0.010	0.005	ND	ND	ND	ND	0.180 J	0.001 J	ND	ND
SB-8	3-4	12/19/02	ND	ND	ND	ND	ND	ND	ND	ND	0.008	ND	ND
SB-8	5-6	12/19/02	0.022	0.006	0.005	ND	0.001 J	ND	ND	ND	0.007	ND	0.001 J
SB-8	44-45	12/19/02	0.0006 J	2.6 D	0.270	ND	0.010	ND	0.001 J	ND	0.007	0.0004 J	0.004 J
SB-8	44-45	12/19/02	0.0007 J	1.0	0.100 J	ND	0.110	0.0002 J	ND	ND	0.012	0.0003 J	0.004 J
SB-8	93-94	12/19/02	ND	0.002 J	ND	ND	ND	ND	ND	ND	0.004 J	ND	ND
SB-9	2-3	12/20/02	ND	ND	ND	ND	ND	ND	ND	ND	0.005	ND	ND
SB-9	9-10	12/20/02	ND	36	1.3 J	0.007	ND	0.071	0.011	42 J	0.004 J	0.0005 J	ND
SB-9	21-22	12/20/02	ND	0.910	0.033	0.047	ND	0.011	0.0006 J	3.7 J	ND	ND	ND
SB-9	37-38	12/20/02	ND	0.480	0.030	0.230	ND	0.036	0.002 J	7.1	ND	ND	ND
SB-9	114-115	12/21/02	ND	0.270	0.003 J	ND	ND	ND	ND	0.290	0.0006 J	ND	ND
SB-10	3-4	01/07/03	0.007	0.006	0.003 J	ND	ND	ND	ND	ND	0.0008 J	ND	ND
SB-10	30-31	01/07/03	ND	0.009	0.004 J	ND	0.003 J	ND	ND	0.230	0.003 J	0.001 J	0.009 J
SB-10	93-94	01/08/03	ND	0.004 J	ND	ND	ND	ND	ND	ND	0.001 J	0.0005 J	ND
SB-11	3-4	01/08/03	ND	ND	ND	ND	ND	ND	ND	ND	0.0008 J	ND	ND
SB-11	58-59	01/08/03	ND	0.440 D	0.034	ND	0.007	ND	0.0003 J	0.053 J	0.003 J	0.0006 J	0.004 J
SB-12	4-5	01/09/03	ND	0.003 J	0.001 J	ND	ND	ND	ND	ND	0.001 J	ND	ND
SB-12	37-38	01/09/03	ND	0.540 D	0.017	ND	ND	0.0005 J	0.0009 J	ND	0.001 J	ND	ND
SB-12	79-80	01/09/03	ND	0.002 J	0.001 J	ND	ND	ND	ND	ND	0.0008 JB	0.0004 J	ND
SB-13	4-5	01/13/03	0.002 J	0.007	0.001 J	ND	ND	ND	ND	ND	0.0005 JB	ND	ND
SB-13	51-52	01/13/03	ND	3.1 D	0.045	ND	ND	0.004 J	0.001 J	0.040 J	0.0006 JB	ND	ND
SB-13	93-94	01/13/03	ND	3.5 D	ND	ND	0.0004 J	0.002 J	0.001 J	0.550	0.0009 JB	ND	ND
SB-14	12-13	03/11/03	0.066	0.070 JD	0.043	ND	ND	ND	0.0007 J	0.026	0.010	0.001 J	0.004 J
SB-14	26-27	03/11/03	ND	0.002 J	0.001 J	ND	ND	ND	ND	0.120 JB	0.010	ND	0.002 J
SB-14	41-42	03/11/03	0.0008 J	0.270 D	0.140	ND	ND	ND	0.0004 J	0.150 JB	0.009	0.0004 J	0.003 J
SB-15	10-11	03/12/03	0.061	2.0 D	0.610 D	0.012	ND	0.011	0.003 J	3.5 B	0.012	0.0009 J	0.004 J
SB-15	26-27	03/12/03	ND	0.003 J	0.007	0.001 J	ND	ND	ND	0.480	0.008 B	ND	0.002 JB
SB-15	41-42	03/12/03	ND	ND	0.000 J	ND	ND	ND	ND	0.032 J	0.005 B	0.0005 J	0.002 JB
SB-16	9-10	03/13/03	0.033	0.082	0.029	ND	ND	ND	ND	0.033 J	0.007	0.001 J	0.003 JB
SB-16	26-27	03/13/03	ND	0.010	0.009	ND	ND	ND	ND	0.250	0.007 B	ND	0.002 JB
SB-16	41-42	03/13/03	0.7 J	0.075	0.020	ND	ND	ND	ND	0.015 J	0.007 B	ND	0.002 JB
New wastewater treatment plant footprint - soil excavation waste characterization													
SS-1	1.5-3	12/03/02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SS-2	1.5-3	06/26/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SS-3	1.5-3	06/26/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SS-4	1.5-3	06/26/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SS-5	1.5-3	06/26/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SS-6	1.5-3	06/26/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SS-7	1.5-3	06/26/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SS-8	1.5-3	06/26/12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 6. GROUNDWATER ANALYTICAL RESULTS - THERMO KING, ARECIBO FACILITY, PUERTO RICO

Monitor Well	Vinyl Chloride	1,1-DCE	1,1-DCA	Benzene	TCE	Toluene	PCE	Ethyl-benzene	m-, p-Xylene	o-Xylene	Total Xylenes	MTBE	cis-1,2-DCE	Carbon disulfide	Isopropylbenzene	Bromoform	Cyclo-hexane	Styrene	trans-1,2-DCE
EPA MCLs	2.0	7.0	--	5.0	5.0	1,000	5.0	700	10,000	10,000	10,000	--	70	--		80	--	100	100
Perched Water																			
MW-3	**83**	**3,600**	**410**	**34**	4.1	2.0	1.2	2.3	2.9	3.8	6.6	11	1.6	0.19 J	0.66	2.5	0.75	0.12 J	0.39 J
MW-4	**180**	**370**	**160**	ND	1.6 J	ND	ND	ND	ND	ND	ND	ND	3.5 J	ND	ND	ND	ND	ND	ND
MW-9	**31**	**63,000**	**2,800**	ND	81	ND	ND	ND	14 J	ND	14 J	ND	32	ND	ND	ND	ND	ND	ND
MW-12	0.32	0.90	0.66	ND	ND	0.34	ND	ND	ND	--	ND	ND	--	--	ND	--	--	--	--
MW-13	**6.9**	**300**	**41**	**21**	ND	ND	ND	ND	2.3 J	2.4 J	4.6 J	6.2	ND	ND	ND	ND	ND	ND	ND
MW-14	**2.5**	**160**	**34**	2.4	0.8	ND	0.45 J	ND	0.23 J	ND	0.23 J	ND	0.27 J	ND	ND	ND	ND	ND	ND
Shallow Aquifer																			
MW-1S	ND	3.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2S	0.41 **J**	140.0	12.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	--
MW-6S	ND	6.0	0.55	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7S	ND	0.75	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	--
MW-8S	**43**	**1,400**	**120**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-8S (dup)	**48**	**1,700**	**150**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-15S	ND	5.6	ND	ND	ND	ND	ND	ND	0.41 J	0.21 J	0.62	ND	ND	ND	ND	ND	ND	ND	ND
Deep Aquifer																			
MW-1D	ND	**11**	0.41 J	0.1 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-2D	ND	**7.7**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-6D	ND	0.45 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-7D	ND	**13**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	--
MW-8D	ND	**26**	**18**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-10D	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--	--	ND	--	--	--	--
Los Cidrines	Not sampled due to malfunctioning dedicated pump						--	--	--	--	--	--	--	--	--	--	--	--	--

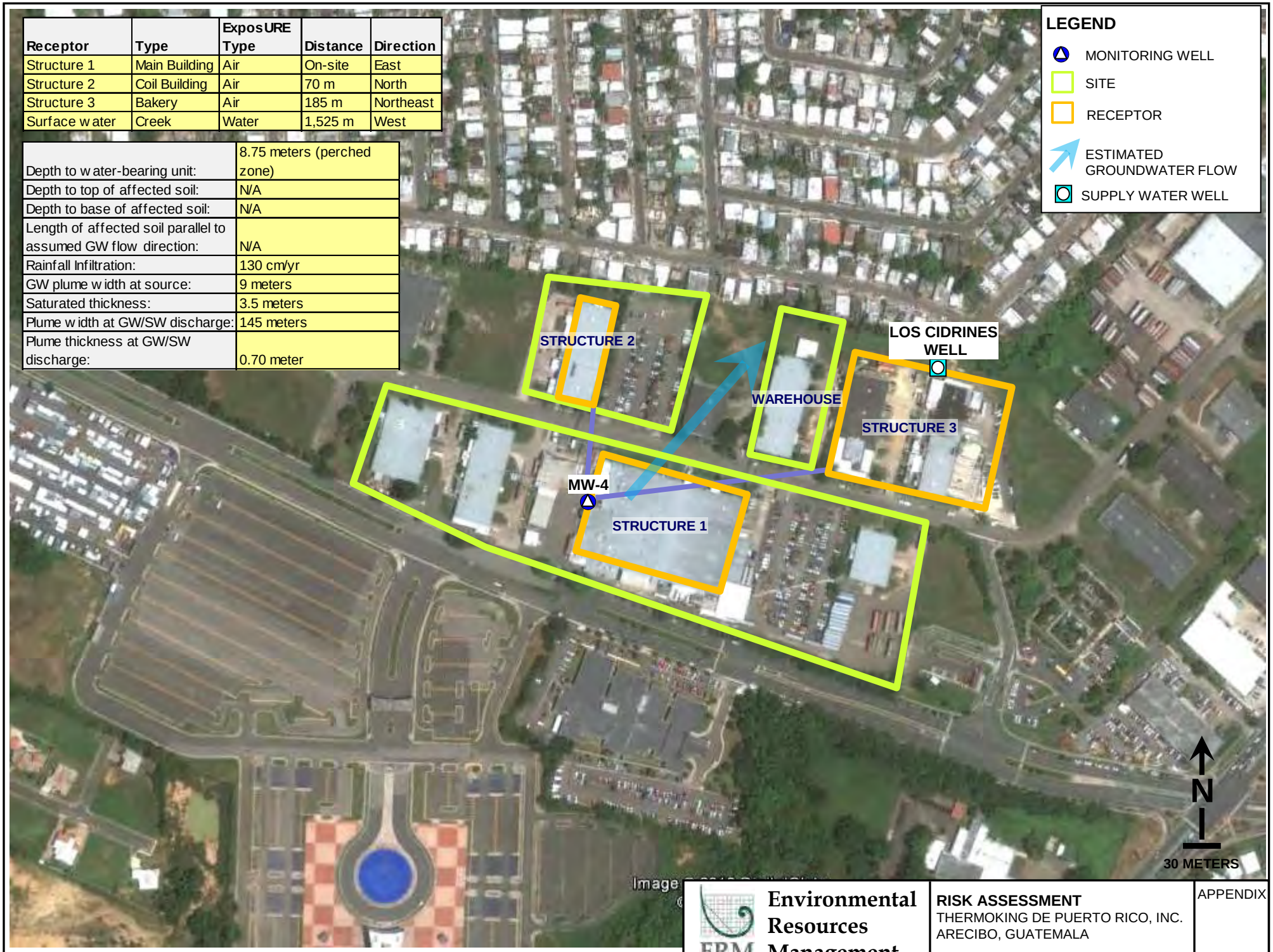
MCLs = Maximum Contaminant Level TCA = Trichloroethane B = analyte found in laboratory blank associated with the sample MTBE= Methyl -tert Butyl Ether

DCE = Dichloroethene TCE = Trichloroethene E = analyte concentration exceeded instrument calibration range and was reanalyzed J = estimated value

Attachment B
Screening Level Risk Assessment

Receptor	Type	Exposure Type	Distance	Direction
Structure 1	Main Building	Air	On-site	East
Structure 2	Coil Building	Air	70 m	North
Structure 3	Bakery	Air	185 m	Northeast
Surface water	Creek	Water	1,525 m	West

Depth to water-bearing unit:	8.75 meters (perched zone)
Depth to top of affected soil:	N/A
Depth to base of affected soil:	N/A
Length of affected soil parallel to assumed GW flow direction:	N/A
Rainfall Infiltration:	130 cm/yr
GW plume width at source:	9 meters
Saturated thickness:	3.5 meters
Plume width at GW/SW discharge:	145 meters
Plume thickness at GW/SW discharge:	0.70 meter



Environmental Resources Management

RISK ASSESSMENT
THERMOKING DE PUERTO RICO, INC.
ARECIBO, GUATEMALA

APPENDIX

Attachment B

Water Supply Well Survey

TABLE 2. WELL SURVEY FIELD CONFIRMATION RESULTS

Search Date: 9/1/2010

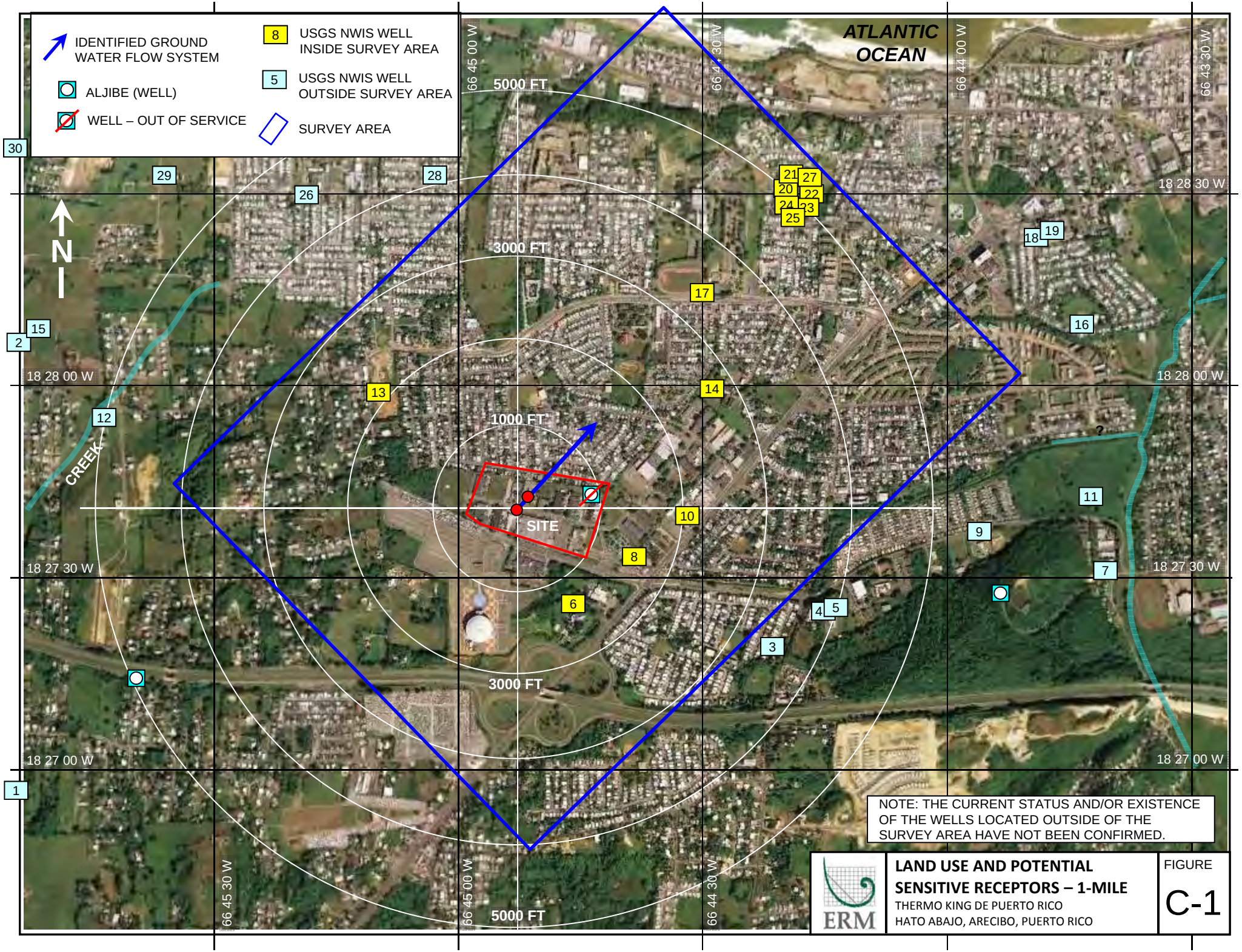
Arecibo Municipio, Puerto Rico, Hydrologic Unit 21010002

Field Confirmation Date: 5/6/2013

MAP ID	Site Number	Site Name	Lat	Long	Notes
6	182726066444600	PENIZA WELL, ARECIBO, PR	18°27'26"	66°44'46"	No evidence of well.
8	182733066443800	LOCK HUDSON WELL, ARECIBO, PR	18°27'33"	66°44'38"	No evidence of well. Site occupied by a driver training area (since 2003). Prior use - vacant land.
10	182739066443200	CARIBE GE WELL, ARECIBO, PR	18°27'38.6"	66°44'32.5"	No evidence of well. Site occupied by GE Puerto rico (earliest reference - 1993)
13	182758066451000	BARRANCA WELL, ARECIBO, PR	18°27'58"	66°45'10"	No evidence of well. Vacant property, former use as construction yard
14	182801066442900	HERMANOS COLON WELL, ARECIBO, PR	18°28'01"	66°44'29"	No evidence of well. Site occupied by large building (earliest reference - 1993).
17	182814066443000	HATO ABAJO 3 WELL, ARECIBO, PR	18°28'14"	66°44'30"	No evidence of well. Site occupied by a University athletic field (earliest ref - 1993)
20	182829066441900	McGUINESS 114 (P.R. DISTILLING) WELL, ARECIBO, PR	18°28'29"	66°44'19"	No evidence of well. Site occupied by a basketball court/baseball field (earliest ref - 1993)
21	182830066441500	P.R. DISTILLING 1 WELL, ARECIBO, PR	18°28'30"	66°44'15"	No evidence of well. Site occupied by a basketball court/baseball field (earliest ref - 1993)
22	182830066441501	P.R. DISTILLING 2 WELL, ARECIBO, PR	18°28'30"	66°44'15"	No evidence of well. Site occupied by a basketball court/baseball field (earliest ref - 1993)
23	182830066441502	P.R. DISTILLING 3 WELL, ARECIBO, PR	18°28'30"	66°44'15"	No evidence of well. Site occupied by a basketball court/baseball field (earliest ref - 1993)
24	182830066441503	McGUINESS 115 (P.R. DISTILLING) WELL, ARECIBO, PR	18°28'30"	66°44'15"	No evidence of well. Site occupied by a basketball court/baseball field (earliest ref - 1993)
25	182830066441504	McGUINESS 116 (P.R. DISTILLING) WELL, ARECIBO, PR	18°28'30"	66°44'15"	No evidence of well. Site occupied by a basketball court/baseball field (earliest ref - 1993)
27	182832066441700	McGUINESS AR-110 WELL, ARECIBO, PR	18°28'32"	66°44'17"	No evidence of well. Site occupied by a basketball court/baseball field (earliest ref - 1993)
Not Included in USGS NWIS Survey					
31	NA	LOS CIDRINES WELL	18°27'33.7"	66°44'41.9"	Out of service. Data from 2001-09.

NOTES:

See Figure C-1 for survey area and well locations.


IDENTIFIED GROUND WATER FLOW SYSTEM
ALJIBE (WELL)
WELL – OUT OF SERVICE
8 USGS NWIS WELL INSIDE SURVEY AREA
5 USGS NWIS WELL OUTSIDE SURVEY AREA
SURVEY AREA
ATLANTIC OCEAN
5000 FT
3000 FT
1000 FT
SITE
CREEK
N
66 45 00 W
66 44 30 W
66 44 00 W
66 43 30 W
66 45 30 W
18 28 30 W
18 28 00 W
18 27 30 W
18 27 00 W
NOTE: THE CURRENT STATUS AND/OR EXISTENCE OF THE WELLS LOCATED OUTSIDE OF THE SURVEY AREA HAVE NOT BEEN CONFIRMED.
ERM
LAND USE AND POTENTIAL SENSITIVE RECEPTORS – 1-MILE
THERMO KING DE PUERTO RICO
HATO ABAJO, ARECIBO, PUERTO RICO
FIGURE
C-1

	
Well #13 area – Looking southeast. Lat: 18º27’46.2”N Long: 66º45’09.3”W	Well #13 area – Looking east. Lat: 18º27’46.2”N Long: 66º45’09.3”W
	
Well #13 area – Looking northeast. Lat: 18º27’46.2”N Long: 66º45’09.3”W	Well #13 area – Looking north. Lat: 18º27’46.2”N Long: 66º45’09.3”W

	
Well #17 area – Looking south. Lat: 18º28’00.9”N Long: 66º44’27.5”W. University athletic track.	Well #17 area – Looking south. Lat: 18º28’00.9”N Long: 66º44’27.5”W. University athletic track.
	
Well #17 area – Looking south. Lat: 18º28’00.9”N Long: 66º44’27.5”W. University athletic track.	Well #17 area – Looking south. Lat: 18º28’00.9”N Long: 66º44’27.5”W. University athletic track.

	
Wells #20-25 and 27 area – Looking north, Lat: 18º28'11.1"N Long: 66º43'57.3"W Basketball court	Wells #20-25 and 27 area – Looking northeast, Lat: 18º28'11.1"N Long: 66º43'57.3"W. Basketball court
	
Wells #20-25 and 27 area – Looking east, Lat: 18º28'11.1"N Long: 66º43'57.3"W Former baseball field beyond trees.	Wells #20-25 and 27 area – Looking south, Lat: 18º28'11.1"N Long: 66º43'57.3"W Former baseball field beyond trees.

	
Well #10 area – Looking north, Lat: 18º27’29.7”N Long: 66º44’29.6”W	Well #8 area – Looking south, Lat: 18º27’25.5”N Long: 66º44’36.5”W
	
Well #8 area – Looking north, Lat: 18º27’25.5”N Long: 66º44’36.5”W	Well #8 area – Looking north, Lat: 18º27’25.5”N Long: 66º44’36.5”W

	
Well #6 area – Looking west, Lat: 18º27’19.1”N Long: 66º44’40.3”W	Well #6 area – Looking south, Lat: 18º27’19.1”N Long: 66º44’40.3”W

Note: The area where well #14 is located was not accessible, it is a gated and secure property.

Historical Aerial Photos are Provided on the Following Pages

Environmental Resources Management

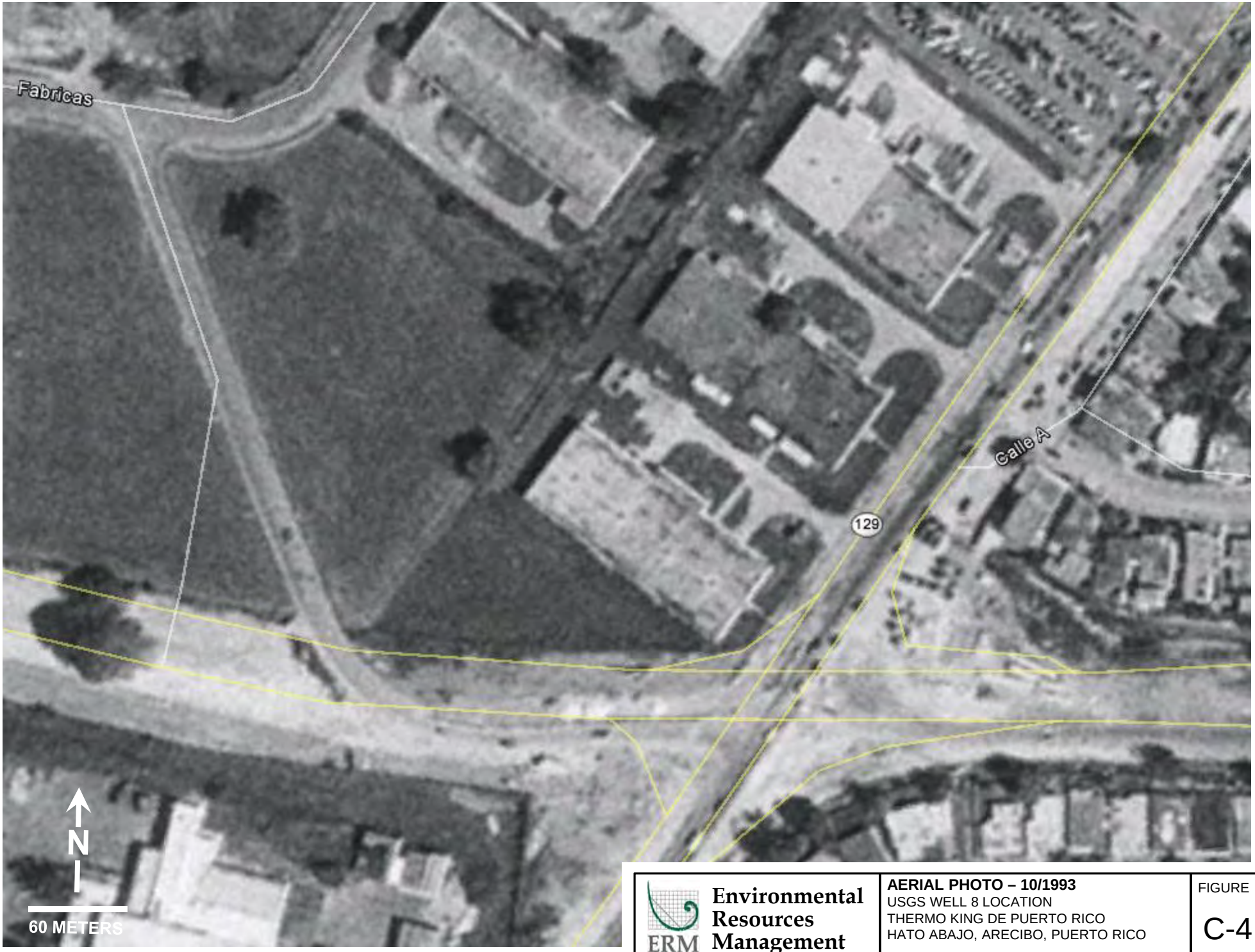
AERIAL PHOTO – 10/1993
USGS WELL 6 LOCATION
THERMO KING DE PUERTO RICO
HATO ABAJO, ARECIBO, PUERTO RICO

FIGURE
C-2

Environmental Resources Management

AERIAL PHOTO – 06/2009
USGS WELL 6 LOCATION
THERMO KING DE PUERTO RICO
HATO ABAJO, ARECIBO, PUERTO RICO

FIGURE
C-3



Environmental Resources Management

AERIAL PHOTO – 10/1993
USGS WELL 8 LOCATION
THERMO KING DE PUERTO RICO
HATO ABAJO, ARECIBO, PUERTO RICO

FIGURE
C-4

Environmental Resources Management

AERIAL PHOTO – 06/2009
USGS WELL 8 LOCATION
THERMO KING DE PUERTO RICO
HATO ABAJO, ARECIBO, PUERTO RICO

FIGURE
C-5

Environmental Resources Management

AERIAL PHOTO – 10/1993
USGS WELL 10 LOCATION
THERMO KING DE PUERTO RICO
HATO ABAJO, ARECIBO, PUERTO RICO

FIGURE
C-6

Environmental Resources Management

AERIAL PHOTO – 06/2009
USGS WELL 10 LOCATION
THERMO KING DE PUERTO RICO
HATO ABAJO, ARECIBO, PUERTO RICO

FIGURE
C-7

Environmental Resources Management

AERIAL PHOTO – 10/1993
USGS WELL 13 LOCATION
THERMO KING DE PUERTO RICO
HATO ABAJO, ARECIBO, PUERTO RICO

FIGURE
C-8

Environmental Resources Management

AERIAL PHOTO – 06/2009
USGS WELL 13 LOCATION
THERMO KING DE PUERTO RICO
HATO ABAJO, ARECIBO, PUERTO RICO

FIGURE
C-9

Environmental Resources Management

AERIAL PHOTO – 10/1993
USGS WELL 14 LOCATION
THERMO KING DE PUERTO RICO
HATO ABAJO, ARECIBO, PUERTO RICO

FIGURE
C-10

Environmental Resources Management

AERIAL PHOTO – 6/2009
USGS WELL 14 LOCATION
THERMO KING DE PUERTO RICO
HATO ABAJO, ARECIBO, PUERTO RICO

FIGURE
C-11

Environmental Resources Management

AERIAL PHOTO – 10/1993
USGS WELL 17 LOCATION
THERMO KING DE PUERTO RICO
HATO ABAJO, ARECIBO, PUERTO RICO

FIGURE
C-12

Environmental Resources Management

AERIAL PHOTO – 06/2009
USGS WELL 17 LOCATION
THERMO KING DE PUERTO RICO
HATO ABAJO, ARECIBO, PUERTO RICO

FIGURE
C-13

Environmental Resources Management

AERIAL PHOTO – 10/1993
USGS WELLS 21-27 LOCATION
THERMO KING DE PUERTO RICO
HATO ABAJO, ARECIBO, PUERTO RICO

FIGURE
C-14

Environmental Resources Management

AERIAL PHOTO – 11/2006 Close-up
USGS WELLS 21-27 LOCATION
THERMO KING DE PUERTO RICO
HATO ABAJO, ARECIBO, PUERTO RICO

FIGURE
C-15

Environmental Resources Management

AERIAL PHOTO – 6/2009
USGS WELLS 21-27 LOCATION
THERMO KING DE PUERTO RICO
HATO ABAJO, ARECIBO, PUERTO RICO

FIGURE
C-16