



# Public Health Assessment for

**CIDRA GROUNDWATER  
CIDRA, PUERTO RICO  
EPA FACILITY ID: PRN000204538**

**SEPTEMBER 9, 2005**

**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
PUBLIC HEALTH SERVICE**

Agency for Toxic Substances and Disease Registry

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6)), and in accordance with our implementing regulations (42 C.F.R. Part 90). In preparing this document, ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. The revised document was released for a 30-day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment process for this site, unless additional information is obtained by ATSDR which, in the agency's opinion, indicates a need to revise or append the conclusions previously issued.

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**PUBLIC HEALTH ASSESSMENT**

CIDRA GROUNDWATER SITE

CIDRA, PUERTO RICO

EPA FACILITY ID: PRN000204538

Prepared by:

Puerto Rico Department of Health  
Under a Cooperative Agreement with the  
U.S. Department of Health and Human Services  
Agency for Toxic Substances and Disease Registry

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## List of Abbreviations

ATSDR	Agency for Toxic Substances and Disease Registry
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CLP	Contract Laboratory Program
CREG	Cancer Risk Evaluation Guide
CV's	comparison values
EMEG	environmental media evaluation guide
EPA	U.S. Environmental Protection Agency
IARC	International Agency for Research on Cancer
EQB	Environmental Quality Board
MCL	maximum contaminant level
NPL	National Priorities List
PHA	public health assessment
ppb	parts per billion
PRASA	Puerto Rico Aqueduct and Sewer Authority
PRCAP	Puerto Rico Cooperative Agreement Project
PRDOH	Puerto Rico Department of Health
RMEG	reference media evaluation guide
SAT	Site Assessment Team
SVOC	semi-volatile organic compound
TAL	Target Analyte List
TCL	Target Compound List
USA	United States of America
VOC	volatile organic compound

## **Executive Summary**

Cidra Groundwater Plume is located in Cidra, Puerto Rico, just south of the village of Cidra and west of the northern end of Road 171. The site consists of a groundwater plume. Four public supply wells in Cidra were closed due to contamination by tetrachloroethylene: well Cidra 4 (Calle Padilla Final) in March 1996; well Cidra 8 (Cementerio) in October 1996; well Cidra 3 (Planta Alcantarillado) in February 1999; and well Cidra 6 (Calle Baldorioty) in August 2000. These wells are currently inactive.

Estimates of the populations served at the time of closure are 113 persons for well Cidra 3; 0 persons for well Cidra 8; 177 persons for well Cidra 4 and 207 persons for well Cidra 6. In addition, there are 15 active drinking water supply wells located within 4 miles of the site that draw from the aquifer of concern, serving a total 8,838 people who are subject to potential contamination (Weston, 2003).

From June 10 -17, 2002, the Weston Solutions, Inc. (Weston) Site Assessment Team (SAT) collected groundwater samples from 24 public (active and closed), community, industrial/potable and industrial supply wells in the Municipio of Cidra, Puerto Rico. The data available included levels of volatile organic compounds, semi volatile organic compounds, pesticides and metals. The Puerto Rico Cooperative Agreement Project (PRCAP) evaluated the data and found that none of the contaminants exceeded the Agency for Toxic Substances and Disease Registry (ATSDR) comparison values. The health based comparison values are used as screening values to determine whether a contaminant should be further evaluated. Comparison values are quite conservative and include ample safety factors that account for most sensitive populations.

Region II Site Assessment Team collected surface and subsurface soil samples from several commercial and industrial sites in and around the Municipio of Cidra, Puerto Rico, from January 28 to February 12, 2003. The samples were analyzed for volatile organic compounds only. The data was evaluated and none of the contaminants exceeded the comparison values.

At the time of the development of this document no community concerns about suspected exposures and health effects were reported to any of the agencies that were contacted as part of the community involvement plan.

It was concluded that adverse health effects are not expected from exposure to the concentrations of the chemicals evaluated in the groundwater and soil. These exposures pose no apparent public health hazard.

## **Background Information**

### **Purpose and Health Issues**

The Agency for Toxic Substances and Disease Registry (ATSDR) is a federal agency with the U.S. Department of Health and Human Services. ATSDR is authorized and required by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) to conduct public health activities at hazardous waste sites proposed or included on the National Priorities List (NPL). The Cidra Groundwater Plume site was proposed for inclusion to the NPL on March, 2004. The Puerto Rico Department of Health (PRDOH) has a cooperative agreement with ATSDR to conduct public health assessments (PHA) and consultations for sites in Puerto Rico. The PRDOH completed this public health assessment under the cooperative agreement. The purpose of the public health assessment is to identify completed exposure pathways, to determine whether and what health effects might occur as a result of the site-specific exposure and to evaluate specific community health concerns about the site.

### **Site Description and History**

Cidra Groundwater Plume is located in Cidra, Puerto Rico, just south of the village of Cidra and west of the northern end of Road 171. The site consists of a groundwater plume with no identified source(s) of contamination. PRDOH ordered the following four public supply wells in Cidra to be closed due to contamination by tetrachloroethylene: well Cidra 4 (Calle Padilla Final) in March 1996; well Cidra 8 (Cementerio) in October 1996; well Cidra 3 (Planta Alcantarillado) in February 1999; and well Cidra 6 (Calle Baldorioty) in August 2000.

Well Cidra 4 (Calle Padilla Final) exceeded the maximum contaminant level (MCL) of 5 parts per billion (ppb) for tetrachloroethylene in March, 1996. Concentrations detected during that month were 7.8 ppb, 7.7 ppb and 10.9 ppb. The annual mean concentration (7.7 ppb) for well Cidra 8 (Cementerio) exceeded the MCL (5 ppb) for tetrachloroethylene for the period from October, 1995 through September, 1996.

Well Cidra 3 exceeded the MCL (5 ppb) for tetrachloroethylene during the months of January, 1998 through March, 1998 (7.3 ppb) and April, 1998 through June, 1998 (11 ppb). There were no detections for that contaminant for the months of July, 1998 through September, 1998. From October, 1998 through December, 1998 and January, 1999 through March, 1999 the concentrations exceeded the MCL for tetrachloroethylene (17.8 ppb and 7.0 ppb, respectively). The annual mean concentration (9 ppb) also exceeded the MCL.

The mean annual (October, 1999 through September, 2000) concentration of tetrachloroethylene (8.9 ppb) for well Cidra 6 exceeded the MCL (5 ppb). Puerto Rico Aqueduct and Sewer Authority (PRASA) reported to the PRDOH on September, 1998, that an investigation performed by PRASA and the Environmental Quality Board (EQB)



did not find any information about nearby facilities that linked them with the contamination of Cidra well 3 and 6.

In June 2002, the U.S. Environmental Protection Agency (EPA) Region 2 Site Assessment Team (SAT) sampled the closed wells and 20 other active and inactive wells in Cidra. In January and February 2003, Region 2 SAT investigated 12 industrial sites in Cidra as potential sources of contamination to the groundwater plume. Eleven of the sites are listed in EPA's Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Hazardous Waste Sites database and one site is listed in the Archived Sites database (Weston, 2003).

### **Demographics, Natural Resources and Land Use**

To identify and define the size, characteristics, location, and possible unique vulnerabilities of populations near the Cidra Groundwater Plume site, the Puerto Rico Cooperative Agreement Project (PRCAP) studied available demographics and land use information. Demographics information helps the PRCAP understand the number and makeup of the population. Land use information helps identify possible exposure situations in the area (that is, what activities are occurring, have occurred, or might occur in the future). This information helps determine whether and how people might come in contact with site-related contamination.

#### ***Demographics and land use***

The municipality of Cidra is located in the central eastern portion of the island of Puerto Rico. The territorial extension is approximately 36.66 square miles. According to the 2,000 US Census Bureau, the municipality of Cidra has a population of 42,753 inhabitants. There is a residential population of approximately 52,774 persons within 4 miles of the Cidra Groundwater Plume site (Weston, 2003).

Estimates of the populations served at the time of closure are 113 persons for well Cidra 3; 0 persons for well Cidra 8; 177 persons for well Cidra 4 and 207 persons for well Cidra 6. In addition, there are 15 active drinking water supply wells located within 4 miles of the site that draw from the aquifer of concern, serving a total 8,838 people who are subject to potential contamination (Weston, 2003), that are not currently contaminated.

Surface water runoff from the Cidra Groundwater Plume site location flows to the Lago de Cidra watershed via the municipality's storm water management system. The distance to surface water via this overland migration pathway is 0.5 mile and the probable point of entry is at an unnamed tributary to the lake. The in-water segment includes the tributaries, Lago de Cidra and Río de Bayamón. An intake located about 2.2 miles downstream of the point of entry in Lago de Cidra serves approximately 30,148 people.

The surface water withdrawal is also used for watering of commercial livestock. The lake is also a popular fishing destination.

## *Natural Resources*

### Groundwater

The aquifer of concern in the Cidra area is in the saturated portion of the Pre-Robles Sequence that underlies the region. Well data and logs obtained from the Puerto Rico Aqueduct and Sewer Authority (PRASA), the U.S. Geological Survey (USGS) and well owners/operators indicate that active and inactive wells in Cidra are finished in the rock formation, described in well logs mainly as blue, brown or black volcanic rock. The pre-Robles sequence is described as sparsely fossiliferous, massive rock including pyroxene andesite, pyroclastic rock and lava. Closed and active wells throughout Cidra all are finished in the bedrock aquifer at total depths ranging from 110 to 705 feet below ground surface.

## **Discussion**

### **Environmental Contamination**

In this section, the PRCAP staff reviewed the available environmental data collected for the Cidra Groundwater Plume site. The Program staff evaluated the adequacy of the sampling conducted, identified the maximum concentration and frequency of detection of the contaminants found in the various media, and compared the detected concentrations with environmental and health-based screening values or comparison values (CVs).

Program staff selected contaminants based on the following:

- An understanding of contaminant concentrations detected on and off-site.
- A determination of overall data quality (field data quality, laboratory data quality, and sample design).
- Comparison of on- and off-site contaminant concentrations with the CVs.
- Community health concerns.

The health based CVs are used as screening values to determine whether a contaminant should be further evaluated. CVs are quite conservative and include ample safety factors that account for most sensitive populations. Because comparison values are based on extremely conservative assumptions, the presence of a contaminant at concentrations greater than comparison values does not necessarily suggest that exposure to the contaminant will result in adverse health effects. Identification of contaminants of concern narrows the focus of the health assessment to those contaminants requiring additional evaluation.

## ***Groundwater***

Program staff obtained all available environmental data related to the site. From June 10 through June 17, 2002, the Weston Solutions, Inc. (Weston) Site Assessment Team (SAT) collected groundwater samples from 24 public (active and closed), community, industrial/potable and industrial supply wells in the Municipio of Cidra, Puerto Rico. Four background wells were sampled: the active public supply well Villa del Carmen, the closed public supply well Zaperera 1, the closed public supply well Zaperera 2 and the community supply well Carrasquillo. See Figure in Appendix A, for a sample location map. Weston also collected two field duplicate groundwater samples, a rinsate blank and six daily trip blanks for quality assurance and control (QA/QC) purposes. The groundwater and rinsate blank samples were analyzed for Target Compound List (TCL) and Target Analyte List (TAL) parameters through the EPA Contract Laboratory Program (CLP). The trip blanks were designated for TLC Volatile Organics analysis only. All TCL volatile organics sample fractions were designated for analysis using the low-concentrations methodology.

The data obtained for the 24 wells in Cidra was analyzed for volatile organic compounds (VOC), semivolatile organic compounds (SVOC), pesticides and inorganics. Although tetrachloroethylene exceeded the MCL of 5 ppb in the closed Cidra 3 public supply well, the detected value of 10 ppb did not exceed ATSDR's reference media evaluation guides (RMEGs). The RMEGs for tetrachloroethylene are 100 ppb for children and 400 ppb for adults. ATSDR derives RMEGs from EPA's oral reference doses, which are developed based on EPA evaluations. RMEGs represent the concentration in water or soil at which daily human exposure is unlikely to result in adverse noncarcinogenic effects. Tetrachloroethylene was not detected in the background well samples. Health effects related to tetrachloroethylene are not expected since the concentration did not exceed the comparison value and since the PRDOH ordered PRASA to close the well as soon as they found levels exceeding the MCL.

Only carbon tetrachloride exceeded the comparison value, the cancer risk evaluation guide (CREG) in the closed public supply well Cidra 3 but it did not exceed the MCL (5 ppb) nor the ATSDR noncancer comparison values (Table 1). At the time of the sampling of June, 2002, the well Cidra 3 was closed so nobody was exposed to this concentration. Also, PRCAP evaluated the data for carbon tetrachloride for the period from March, 1998 through August, 1998 and the period from January, 1999 through March, 1999. For that period the PRDOH detected unusual concentrations for tetrachloroethylene and found that the levels of carbon tetrachloride were not above the detection limit. Since only one sample for Cidra well 3 exceeded the CREG and since the well was closed at that time, it does not represent a health hazard.

Contaminant migration could represent a health risk in the future if other supply wells in the area were affected.

Table 1. Contaminant with concentration detected above the comparison value.

Contaminant	*Comparison value	Detected concentration	†Sampling location
Carbon tetrachloride	0.3 ppb (CREG) 200 ppb (child intermediate EMEG) 700 ppb (adult intermediate EMEG) 7 ppb (child RMEG) 20 ppb (adult RMEG) 5 ppb (MCL)	0.55 ppb	BOJ34
Tetrachloroethylene	100 ppb (child RMEG) 400 ppb (adult RMEG) 5 ppb (MCL)	10 ppb	BOJ34

\*Comparison values

CREG-cancer risk evaluation guide

EMEG-Environmental media evaluation guide

RMEG-Reference media evaluation guide

MCL-Maximum Contaminant Level

†BOJ34-closed public supply well Cidra 3

From January 28 to February 12, 2003, Region II SAT collected surface and subsurface soil samples from several commercial and industrial sites in and around the Municipio of Cidra, Puerto Rico. See sample location map in Appendix B. All samples were collected according to the EPA Contract Laboratory Program. The Field Sampling Plan was amended to include sediment sampling from two locations in Cidra Industrial Park. Surface water and sediment samples were added to the sampling plan as well, which were collected from the Cidra Lake. The samples obtained during 2003 were analyzed for VOC only. The data was evaluated and none of the contaminants exceeded the comparison values.

### Exposure Pathway Analyses

This section summarizes the exposure pathways associated with the Cidra Groundwater site. Exposure pathways are studied to understand the different ways that people might come in contact with the contaminants of concern. An exposure pathway consists of five elements: a source of contamination, transport through an environmental medium, a point of exposure, a route of human exposure and a receptor population. Program staff analyze the exposure pathways environmental data to determine whether health effects could result from exposures to the contaminant concentrations identified.

An exposure pathway can be eliminated if at least one of the five elements is missing and will never be present. The PRCAP categorizes exposure pathways that are not eliminated as either completed or potential. For completed pathways, all five

elements exist and exposure to a contaminant has occurred, is occurring, or will occur. For potential pathways, at least one of the five elements is missing, but could exist. Pathways are considered for the past, current and future.

### ***Completed Exposure Pathways***

#### Drinking water

The population served by the closed wells could have been exposed to tetrachloroethylene, during the period since the contaminants were detected until they were closed. However, the contaminants concentrations do not represent a health hazard and the period of exposure was relatively short, for example, tetrachloroethylene was first detected in the well Cidra 3 on March, 1998 and on February, 1999 it was closed. During that time, the highest level detected was 17.8 ppb. The annual mean concentration was 9 ppb. During the quarter of July through September, 1998 there were no detections for tetrachloroethylene. The levels detected on the four contaminated wells that were closed were below ATSDR comparison values. The RMEGs for tetrachloroethylene are 100 ppb for children and 400 ppb for adults. Comparison values are concentrations or doses that are conservatively derived and are below the levels associated with adverse health effects. According to the International Agency for Research on Cancer (IARC) there is limited human evidence on the carcinogenicity of tetrachloroethylene to humans. The contaminated wells were a source of water of the Urban Cidra System which then serves the population of the urban area of Cidra. This System has other components: Cidra filter plant (principal water source of the system), well Bayamón, well Ceiba, well Rabanal, well Villa del Carmen, well Zaperera I, well Zaperera II and Well Zaperera III. Exposures to the contaminants concentrations detected do not warrant further evaluation for cancer and non cancer health effects.

### **Children's Health Considerations**

Children are at greater risk of health effects from exposures to hazardous substances than adults because: 1) children are smaller than adults and their exposures would result in higher doses of chemical per body weight; and 2) children's developing body systems can sustain damage if toxic exposures occur during certain growth stages.

The children of the population which received drinking water from the wells closed were not exposed to contaminant's concentrations that pose a health threat (see discussion section).

### **Community Health Concerns**

As part of the community involvement plan to collect community health concerns, the PRCAP met with the EPA remedial project manager on June, 2004, to share information about the site. Also, during the months of June and August, 2004, phone conversations took place with personnel from PRASA, the office of the mayor of Cidra,

the municipal Environmental Resources Office, the Community Relationships Office and the Drinking Water Program of the PRDOH. According to the information provided by the personnel of the different offices and agencies contacted they have not received any concerns or complaints about suspected exposures and health effects related to the wells closed by the community members. Also, the PHA was released for public comment (see Appendix D). The public comment period was announced through the major newspapers in Puerto Rico.

### **Conclusions**

This PHA evaluated the exposure to contaminants from the Cidra Groundwater site in Cidra, Puerto Rico. With the available data PRCAP makes the following conclusion:

- Adverse health effects are not expected from exposure to the concentrations of the chemicals evaluated (volatile organic compounds, semi volatile organic compounds, pesticides and metals) in the groundwater. The exposures pose no apparent public health hazard.
- Contaminants in groundwater could impact additional wells in the future unless remediated.

### **Recommendations**

- Continue monitoring the active public supply wells around the site-PRDOH and PRASA and notify the EPA, EQB and PRCAP of any well around the site with contaminants levels above the MCL.

### **Public Health Action Plan**

#### Actions Completed

- Phone conversations with representatives from state and federal agencies to identify community concerns-PRCAP:
  - EPA
  - Office of the major of Cidra
  - Municipal Environmental Resources Office
  - Municipal Community Relationships Office
  - Drinking Water Program of the PRDOH
- A Site repository was identified by PRCAP
- A Site mailing list has been developed by PRCAP
- A Needs Assessment and a Health Education Plan were developed by PRCAP
- Development of a Spanish fact sheet summarizing the PHA-PRCAP

- Development of a Spanish evaluation form to collect concerns related to the PHA-PRCAP
- A public comment period (June 23 – July 22, 2005) for the brown cover of the PHA to collect concerns.

#### Future Actions

- Spanish fact sheet summarizing the PHA will be distributed to the community.
- Information on the EPA's process for the site investigation will also be shared with the community.
- EPA will continue with the Site investigation.
- PRCAP will evaluate new data as it become available.
- Copies of the PHA, the fact sheet, the evaluation form and educational material on tetrachloroethylene (hard copy and electronic) will be placed in the site repository.

## **Preparers of Report**

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Cooperative Agreement



## **Bibliography**

Agency for Toxic Substances and Disease Registry. 2003. Toxicological profile for carbon tetrachloride. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry. 1997. Toxicological profile for tetrachloroethylene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

WESTON Inc. (2003). Expanded Site Inspection/Remedial Investigation Report, Cidra Groundwater Plume. Document Control No.: SAT.20103.1047.521.

WESTON Inc. (2003). Hazard Ranking System Documentation Package, Cidra Groundwater Contamination Cidra, PR. Document Control No.: SAT.20103.047.598.

Appendix A: Sample location map and description of the groundwater samples collected from June 10 - 17, 2002

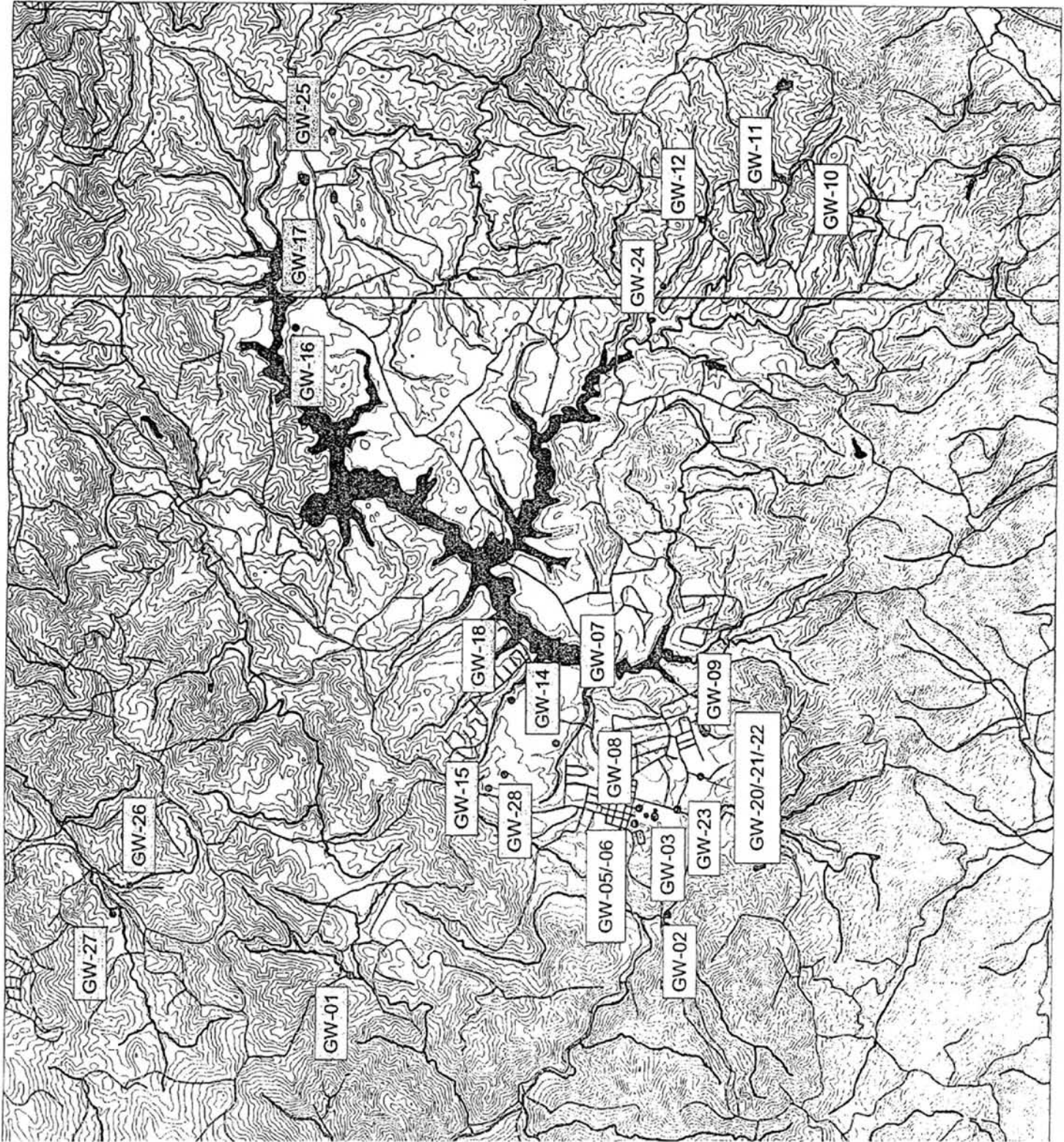
Figure 1  
 Sample Location Map  
 Cidra Groundwater Plume  
 Cidra, Puerto Rico

**Legend**

- Public Supply Wells
- Industrial Wells
- Community Wells
- Roads
- Streams
- Topography
- Water Bodies



SOURCE: USGS 7.5 Minute Series  
 (Topographic) Coverages:  
 Comerio and Caguas  
 DATE: 6/24/02



Sample description: Groundwater samples collected from June 10 through June 17, 2002.

- Active public supply well Ceiba
- Active public supply well Rabanal
- Closed public supply well Pozo #3/Planta Alcantarillado
- Closed public supply well Pozo #6/Calle Baldorioty
- Active public supply well Pozo #7
- Closed public supply well Pozo #4/Calle Padilla
- Active public supply well Villa del Carmen
- Closed public supply well Zapera 1
- Closed public supply well Zapera 2
- Closed public supply well Zapera 3
- Industrial/potable supply well Mylan Inc.
- Potable supply well Ciba-Vision building #1 (formerly Wesley-Jessen)
- Industrial/potable supply well Glaxo Smith Kline #1
- Industrial/potable supply well Glaxo Smith Kline #2
- Industrial/potable supply well Caribbean Refrescos Inc.
- Community supply well Almirante
- Industrial well IVAX (formerly Zenith Labs) #1
- Industrial well IVAX (formerly Zenith Labs) #2
- Closed public supply well Pozo #8 (Frente cementerio)
- Community supply well Campamento Ebenezer
- Industrial well Millipore Cidra
- Community supply well Carrasquillo
- Community supply well Pelegrin Santos
- Industrial well Ciba-Vision lot #2 (formerly Mentor Caribe)

Appendix B: Sample location map and description of the samples collected  
from January 28 to February 12, 2003



Sample description: Samples collected from January 28 to February 12, 2003:

- Groundwater sample collected at Tech Group de Puerto Rico
- Two subsurface soil samples collected from Tech Group de Puerto Rico
- Surface soil sample collected from Tech Group de Puerto Rico
- Surface soil sample collected from Creative Medical
- Two subsurface soil samples collected from Creative Medical
- Surface soil sample collected from SmithKline Beecham
- Four subsurface soil sample collected from SmithKline Beecham
- Two surface soil samples collected from CCL Label
- Two subsurface soil samples collected from CCL Label
- Two surface soil sample collected from Zenith Labs
- Two subsurface soil sample collected from Zenith Labs
- Two subsurface soil sample collected from Shelfoam
- Surface soil sample collected from Shelfoam
- Three subsurface soil sample collected from Cidra Convention Center
- Surface soil sample collected from Cidra Convention Center
- Two subsurface soil samples collected from a background location adjacent to the Cidra Baseball Field
- Surface soil sample collected from a background location adjacent to the Cidra Baseball Field
- Surface soil sample collected from CMM Laundry
- Three subsurface soil samples collected from CMM Laundry
- Surface soil sample collected from Excellent Laundry
- Subsurface soil sample collected from Excellent Laundry
- Four subsurface soil samples collected from International Dry Cleaners
- Surface soil sample collected from International Dry Cleaners
- Two subsurface soil samples collected from Caribbean Manufacturing
- Surface soil samples collected from Caribbean Manufacturing
- Two subsurface soil samples collected from Cidra Metallic Caskets
- Surface soil sample collected from Cidra Metallic Caskets
- Sediment sample collected on CCL Label property where the drainage channels head towards the street
- Sediment sample collected from beneath a storm sewer grating on Calle A in Cidra Industrial Park, located near the municipal cemetery and police station
- Surface water and sediment sample collected from Cidra Lake near the Cidra Fishing Club boat launch. The sample was collected at a depth of 10 inches below the water's surface.
- Surface water and sediment sample collected from Cidra Lake at the drinking water intake. The sample was collected at a depth of 6.2 inches below the water's surface.
- Surface water and sediment sample and sediment sample collected from the east-central branch of Cidra Lake, approximately 0.75 mile east-southeast of the

- dam/intake. The sample was collected at a depth of 10 inches below the water's surface.
- Surface water sample collected near the northeast end of Cidra Lake, approximately 0.85 mile east-northeast of the dam/intake. The sample was collected at a depth of 6.1 inches below the water's surface.
  - Surface water and sediment sample collected from the southeast branch of Cidra Lake. The sample was collected at a depth of 21 inches below the water's surface.



## Appendix C: ATSDR Glossary of Terms

# ATSDR Glossary of Terms

The Agency for Toxic Substances and Disease Registry (ATSDR) is a federal public health agency with headquarters in Atlanta, Georgia, and 10 regional offices in the United States. ATSDR's mission is to serve the public by using the best science, taking responsive public health actions, and providing trusted health information to prevent harmful exposures and diseases related to toxic substances. ATSDR is not a regulatory agency, unlike the U.S. Environmental Protection Agency (EPA), which is the federal agency that develops and enforces environmental laws to protect the environment and human health. This glossary defines words used by ATSDR in communications with the public. It is not a complete dictionary of environmental health terms. If you have questions or comments, call ATSDR's toll-free telephone number, 1-888-42-ATSDR (1-888-422-8737).

## General Terms

### **Adverse health effect**

A change in body function or cell structure that might lead to disease or health problems

### **Ambient**

Surrounding (for example, ambient air).

### **Background level**

An average or expected amount of a substance or radioactive material in a specific environment, or typical amounts of substances that occur naturally in an environment.

**CERCLA** [see Comprehensive Environmental Response, Compensation, and Liability Act of 1980]

### **Chronic**

Occurring over a long time [compare with acute].

### **Chronic exposure**

Contact with a substance that occurs over a long time (more than 1 year) [compare with acute exposure and intermediate duration exposure]

### **Comparison value (CV)**

Calculated concentration of a substance in air, water, food, or soil that is unlikely to cause harmful (adverse) health effects in exposed people. The CV is used as a screening level during the public health assessment process. Substances found in amounts greater than their CVs might be selected for further evaluation in the public health assessment process.

**Completed exposure pathway** [see exposure pathway].

### **Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)**

CERCLA, also known as Superfund, is the federal law that concerns the removal or cleanup of hazardous substances in the environment and at hazardous waste sites. ATSDR, which was created by CERCLA, is

responsible for assessing health issues and supporting public health activities related to hazardous waste sites or other environmental releases of hazardous substances. This law was later amended by the Superfund Amendments and Reauthorization Act (SARA).

### **Concentration**

The amount of a substance present in a certain amount of soil, water, air, food, blood, hair, urine, breath, or any other media.

### **Contaminant**

A substance that is either present in an environment where it does not belong or is present at levels that might cause harmful (adverse) health effects.

### **Detection limit**

The lowest concentration of a chemical that can reliably be distinguished from a zero concentration.

### **Environmental media**

Soil, water, air, biota (plants and animals), or any other parts of the environment that can contain contaminants.

### **EPA**

United States Environmental Protection Agency.

### **Exposure**

Contact with a substance by swallowing, breathing, or touching the skin or eyes. Exposure may be short-term [acute exposure], of intermediate duration, or long-term [chronic exposure].

### **Exposure pathway**

The route a substance takes from its source (where it began) to its end point (where it ends), and how people can come into contact with (or get exposed to) it. An exposure pathway has five parts: a source of contamination (such as an abandoned business); an environmental media and transport mechanism (such as movement through groundwater); a point of exposure (such as a private well); a route of exposure (eating, drinking, breathing, or touching), and a receptor population (people potentially or actually exposed). When all five parts are present, the exposure pathway is termed a completed exposure pathway.

### **Groundwater**

Water beneath the earth's surface in the spaces between soil particles and between rock surfaces [compare with surface water].

### **Hazard**

A source of potential harm from past, current, or future exposures.

**Hazardous waste**

Potentially harmful substances that have been released or discarded into the environment.

**Health education**

Programs designed with a community to help it know about health risks and how to reduce these risks.

**National Priorities List for Uncontrolled Hazardous Waste Sites (National Priorities List or NPL)**

EPA's list of the most serious uncontrolled or abandoned hazardous waste sites in the United States. The NPL is updated on a regular basis.

**No apparent public health hazard**

A category used in ATSDR's public health assessments for sites where human exposure to contaminated media might be occurring, might have occurred in the past, or might occur in the future, but where the exposure is not expected to cause any harmful health effects.

**NPL** [see National Priorities List for Uncontrolled Hazardous Waste Sites]

**Plume**

A volume of a substance that moves from its source to places farther away from the source. Plumes can be described by the volume of air or water they occupy and the direction they move. For example, a plume can be a column of smoke from a chimney or a substance moving with groundwater.

**Point of exposure**

The place where someone can come into contact with a substance present in the environment [see exposure pathway].

**Population**

A group or number of people living within a specified area or sharing similar characteristics (such as occupation or age).

**ppm**

Parts per million.

**Public health action**

A list of steps to protect public health.

**Public health assessment (PHA)**

An ATSDR document that examines hazardous substances, health outcomes, and community concerns at a hazardous waste site to determine whether people could be harmed from coming into contact with those substances. The PHA also lists actions that need to be taken to protect public health [compare with health consultation].

### **Public health hazard categories**

Public health hazard categories are statements about whether people could be harmed by conditions present at the site in the past, present, or future. One or more hazard categories might be appropriate for each site. The five public health hazard categories are no public health hazard, no apparent public health hazard, indeterminate public health hazard, public health hazard, and urgent public health hazard.

### **Route of exposure**

The way people come into contact with a hazardous substance. Three routes of exposure are breathing [inhalation], eating or drinking [ingestion], or contact with the skin [dermal contact].

### **Sample**

A portion or piece of a whole. A selected subset of a population or subset of whatever is being studied. For example, in a study of people the sample is a number of people chosen from a larger population [see population]. An environmental sample (for example, a small amount of soil or water) might be collected to measure contamination in the environment at a specific location.

### **Source of contamination**

The place where a hazardous substance comes from, such as a landfill, waste pond, incinerator, storage tank, or drum. A source of contamination is the first part of an exposure pathway.

### **Substance**

A chemical.

**Superfund** [see Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and Superfund Amendments and Reauthorization Act (SARA)]

### **Superfund Amendments and Reauthorization Act (SARA)**

In 1986, SARA amended the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and expanded the health-related responsibilities of ATSDR. CERCLA and SARA direct ATSDR to look into the health effects from substance exposures at hazardous waste sites and to perform activities including health education, health studies, surveillance, health consultations, and toxicological profiles.

### **Surface water**

Water on the surface of the earth, such as in lakes, rivers, streams, ponds, and springs [compare with groundwater].

### **Volatile organic compounds (VOCs)**

Organic compounds that evaporate readily into the air. VOCs include substances such as benzene, toluene, methylene chloride, and methyl chloroform.

Other glossaries and dictionaries:

Environmental Protection Agency (<http://www.epa.gov/OCEPAterms/>)

National Center for Environmental Health (CDC) (<http://www.cdc.gov/nceh/dls/report/glossary.htm>)

National Library of Medicine (NIH) (<http://www.nlm.nih.gov/medlineplus/mplusdictionary.html>)

## Appendix D: Response to public comments

## **Response to public comments**

The Puerto Rico Cooperative Agreement Project received the following comments during the public comment period (June 23, 2005 – July 22, 2005) for the Public Health Assessment for Cidra Groundwater, Cidra, P.R. (April, 2005).

1. Comment: Community Health Concerns, this section mentions several interviews with Federal and State agencies but does not mention any interviews with the community members. We believe that the community members input may provide more information and may bring attention to other unknown environmental health issues.

Response: The PRCAP have not received any community member input regarding the Cidra site and for that reason tried to investigate if any concern was mentioned to any of the agencies contacted. Also, through the public comment period, which was announced through the major newspapers in P.R., the PRCAP gave the opportunity to the community members to provide any issue or concern related to the site.

2. Comment: The health effects, symptoms and exposure routes for the contaminants should be incorporated in the fact sheet to be distributed to the community.

Response: Site repositories:

Biblioteca Electrónica Municipal de Cidra  
Apartado 729  
Cidra, P.R. 00739  
(787)714-0535

Autoridad de Acueductos y Alcantarillados  
Biblioteca  
Piso 1  
P.O. Box 7066  
San Juan, P.R. 00916-7066  
(787) 620-2277  
Ext. 2042/2043

Copies of the PHA, a Spanish fact sheet summarizing the PHA and educational materials on tetrachloroethylene (hard copy and electronic) are available in the site repositories.



Also, the community members can contact:

Puerto Rico Department of Health  
Epidemiology Program  
Puerto Rico Cooperative Agreement Project  
Bo. Monacillos, Calle Casia #2  
San Juan P.R. 00921-3200  
Phone numbers: (787) 774-8247, 774-8288, 773-0600

3. Comment: Recommend to be more specific on the frequency of the monitoring of the wells around the site.

Response: The Drinking Water Program of the P.R. Department of Health establishes the frequency of the monitoring of the wells around the site according to the Safe Drinking Water Act's regulations.

4. Comment: The conclusions are not clear.

Response: ATSDR has established five conclusion categories. The five categories are:

- Category 1 Urgent public health hazard
- Category 2 Public health hazard
- Category 3 Indeterminate public health hazard
- Category 4 No apparent public health hazard
- Category 5 No public health hazard

The conclusions on this public health assessment were determined based on the results of the exposure and health effects evaluations. The degree of public health hazard at the site was characterized based on the following factors:

- The existence of past, current or potential future exposures to site-specific contaminants or physical or safety hazards.
- The susceptibility of the potentially exposed population.
- The likelihood of exposures resulting in adverse health effects.

A Spanish fact Sheet on ATSDR conclusions categories and its definitions is available in the site repositories.

5. Comment: The document helps to understand the health risks related to the site.


Response: Thanks for your comment.

6. Comment: The document clarifies doubts related to the magnitude of the situation of the site.


Response: Thanks for your comment.

## Certification

This Cidra Groundwater, Cidra, Puerto Rico Public Health Assessment was prepared by the Puerto Rico Department of Health under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with approved methodologies and procedures existing at the time health assessment was initiated. Editorial review was completed by the Cooperative Agreement partner.

  
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Technical Project Officer, CAT, SPAB, DHAC

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health assessment and concurs with its findings.

  
\_\_\_\_\_  
Team Lead, CAT, SPAB, DHAC, ATSDR

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