

Health Consultation

VALLE VERDE WATER COMPANY

NOGALES, SANTA CRUZ COUNTY, ARIZONA

SEPTEMBER 28, 2007

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation 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.

You May Contact ATSDR Toll Free at
1-800-CDC-INFO

or

Visit our Home Page at: <http://www.atsdr.cdc.gov>

HEALTH CONSULTATION

VALLE VERDE WATER COMPANY
NOGALES, SANTA CRUZ COUNTY, ARIZONA

Prepared By:

Arizona Department of Health Services
Office of Environmental Health
Environmental Health Consultation Services
Under Cooperative Agreement with the
U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Purpose

The Arizona Department of Health Services (ADHS) received a request from the Arizona Department of Environmental Quality (ADEQ) to address questions regarding quality of Valle Verde public drinking water in the Nogales Wash area. Higher than Maximum Contaminant Level (MCL) tetrachloroethylene (PCE) concentrations have been detected in drinking water from Valle Verde water system. ADHS was requested by ADEQ to provide a health consultation to assess potential health risks associated with known PCE found in the drinking water wells.

Background and Statement of Issues

Nogales Wash site was identified as a potential health hazardous waste site and entered into the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) on July 1st, 1987. Volatile organic compounds (VOCs) such as PCE have been identified in groundwater monitoring and drinking water wells by Santa Cruz County Health Department, ADHS, and ADEQ since 1986.

The Valle Verde water system has a history of having detectable amounts (less than 0.005 milligrams per liter, mg/L) of PCE since 1995. Yet, the detected PCE has been above the regulatory threshold (i.e. EPA's MCL) from 2005 to 2007. Unfortunately, the water system was slow in providing required public notification, alternative water and/or shutting down the offending wells. Therefore, ADEQ and the City of Nogales requested ADHS to evaluate possible adverse health impacts for residents who consume, or otherwise use the water.

Discussion

Water Quality Monitoring Data

ADEQ provided ADHS water quality monitoring data¹ for seven drinking water supply wells collected from June 1993 to February 2007. Table 1 summarizes the monitoring results. ND means non-detect

Table 1. Valle Verde water quality monitoring data collected from 1993 to 2007

Chemical name	Well number	Number of samples	Ranges of detected concentration (mg/L)	Average concentration (mg/L)
Tetrachloroethylene (PCE)	EPDS001	47	Non-Detect (ND) – 0.031	0.004
	EPDS002	28	ND – 0.01	0.001
	EPDS003	7	ND	0
	EPDS004	10	ND – 0.0093	0.001
	EPDS005	4	ND – 0.0005	0.0001
	EPDS006	2	ND	0
	EPDS007	44	ND – 0.024	0.003

¹ No quality assurance or quality control (AQ/QC) information was accessible.

Exposure Pathway Evaluation

ADHS identified the exposure pathways to determine if and how residents might be exposed to chemicals in the water. There are five elements considered in the evaluation of exposure pathways:

- *A source of contamination*
- *Transport through an environmental medium*
- *A point of exposure*
- *Route of exposure*
- *A receptor population*

Exposure pathways are classified as completed, potential, or eliminated. Completed pathways exist when the five elements are present and indicate that exposure to a contaminant has occurred in the past and/or is occurring now. Potential pathways are those that may have occurred in the past, present, or could occur in the future. In eliminated pathways, at least one of the five elements is missing, and will never be present. Completed and potential pathways, however, may also be eliminated when the concentration of contaminants is not likely to cause harm.

Completed and potential exposure pathways may result from people using the water for domestic purposes. Typical domestic water exposures include dermal and inhalation exposures from bathing and showering, and ingestion exposures from drinking and using water for cooking. Table 2 shows the completed and potential exposure pathway elements.

Table 2. Complete and Potential Exposure Pathways

Exposure Pathway Elements					Time	Type of Exposure Pathway
Source	Media	Point of Exposure	Route of Exposure	Estimated Exposed Population		
Drinking Water Well	Water	Resident: Tap	Ingestion Skin contact Inhalation	2,394 Residents	Past	Completed
					Current	Completed
					Future	Potential

Selecting Chemicals of Interest

ADHS assesses a site by evaluating how people may be exposed to chemicals at levels of public health concern. A pathway defines how a chemical may enter a person's body and potentially

cause adverse health effects. This evaluation includes use of comparison values (CVs), which are screening tools used with environmental data relevant to the exposure pathways. CVs are conservatively developed and are based on the most current scientific data and give consideration the most sensitive groups (e.g. children).

If public exposure concentrations related to a site are below the corresponding CV, then the exposures are not considered to be of public health concern, and no further analysis is conducted. However, while concentrations below the CV are not expected to lead to any observable adverse health effect, it should not be inferred that a concentration greater than the CV will necessarily lead to adverse health effects. Depending on site-specific environmental exposure factors (e.g. duration and amount of exposure) and individual human factors (e.g. personal habits, occupation, and/or overall health), exposure to levels above the comparison value may or may not lead to a health effect. Therefore, the CVs should not be used to predict the occurrence of adverse health effects.

The CVs used in screening analyses include Maximum Contaminant Levels (MCL) and intermediate Reference Dose Media Evaluation Guide (RMEG). The Agency for Toxic Substances and Disease Registry (ATSDR) develops RMEGs which represent concentrations of substances in water, soil, or air to which daily human exposure is unlikely to result in adverse health effects. The EPA develops the MCLs which are enforceable standards for public drinking water supplies that are protective of human health, over a lifetime. MCLs are not health-based threshold levels. Therefore, people ingesting chemicals at or slightly above MCLs should not experience adverse health effects.

Intermediate Exposure (15-364 days)

In general, intermediate exposure means that people come into contact with a substance for a limited period of time, usually between 15 to 364 days. The intermediate CV for children established by ATSDR is 0.1 mg/L for PCE. As shown in Table 3 below, none of the average concentrations detected in the supply wells was above this CV. Therefore, adverse non-cancer effects are unlikely for exposure lasting less than one year.

Table 3. Valle Verde water quality monitoring data collected from March '06-February'07

Chemical name	Well number	Number of samples	Ranges of detected concentration (mg/L)	Average concentration (mg/L)
Tetrachloroethylene (PCE)	EPDS001	6	0.015 – 0.031	0.01937
	EPDS002	3	0.0076 – 0.01	0.0092
	EPDS003	1	ND	0.000
	EPDS004	3	0.0052 – 0.0093	0.00697
	EPDS007	6	0.013 – 0.024	0.0137

Chronic Exposure (365 days or longer)

In general, chronic exposure means that people come into contact with a substance over a long period of time, usually more than one year. As shown in Table 1, the average concentrations ranges from ND to 0.004 mg/L for all drinking water supply wells. None of the average concentrations were above the MCL of PCE (0.005 mg/L). Therefore, adverse non-cancer effects are unlikely and cancer risk is very low.

ATSDR Child Health Concern

ATSDR recognizes that the unique vulnerabilities of infants and children require special emphasis in those communities faced with contaminants in environmental media. A child's developing body systems can sustain permanent damage if toxic exposures occur during critical growth stages. Children ingest a larger amount of water relative to body weight, resulting in a higher burden of pollutants. Furthermore, children often engage in vigorous outdoor activities, making them more sensitive to pollution than healthy adults. All health analyses in this report take into consideration the unique vulnerability of children.

Conclusions

A chemical of concern (tetrachloroethylene) was identified. There is a completed pathway to a susceptible population, through an environmental media (drinking water). Water analyses from the wells belonging to the Valle Verde Water Company were averaged to calculate both intermediate and long term health effects. The Arizona Department of Health Services has determined that there is **no apparent public health hazard** from using this water for drinking, cooking and personal hygiene purposes based upon the information currently available. This applies to both intermediate and chronic exposures, meaning shorter-term and longer-term adverse health effects are not likely. However, if the concentration of PCE continues to increase with time, the situation will be reevaluated.

Recommendations

- The Valle Verde Water Company should continue regular monitoring of their wells
- Timely notice should be giving to the residents each time the detected, chemical concentration exceeds the EPA's MCL
- The Water Company should recommend that their customers reduce exposure to contaminants by using bottled water or filtering devices which are proven to remove VOC's from drinking water

Public Health Action Plan

- ADHS will provide community health education to customers of the Valle Verde Water System upon request
- ADHS will continue to monitor new water quality data as it is obtained by the Arizona Department of Environmental Quality (ADEQ)
- If future changes in the water quality indicate a need to vary from the current conclusion, another Health Consultation will be prepared, and all stakeholders will be informed

Prepared by

Hsin-I Lin, ScD
Jennifer Botsford, MS
Alan Croft, MPH

Office of Environmental Health
Bureau of Epidemiology and Disease Control
Arizona Department of Health Services

ATSDR Regional Representative

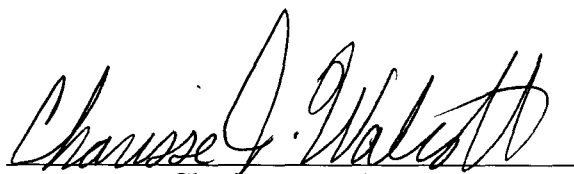
Gwen Eng
Office of Regional Operations, Region IX
Office of the Assistant Administrator

ATSDR Technical Project Officer

Charisse J. Walcott
Division of Health Assessment and Consultation
Cooperative Agreement Program Evaluation Branch
Cooperative Agreement Team

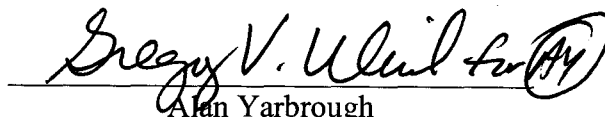
Certification

This Health Consultation entitled *Valle Verde Water Company, Nogales, Santa Cruz County, Arizona* was prepared by the Arizona Department of Health Services under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated. Editorial review was completed by the cooperative agreement partner.



Charisse J. Walcott
Technical Project Officer
Cooperative Agreement Program Evaluation Branch
Division of Health Assessment and Consultation

The Division of Health Assessment and Consultation, Agency for Toxic Substance and Disease Registry, has reviewed this health consultation and concurs with its findings.



Alan Yarbrough
Team Leader, Cooperative Agreement Team
Cooperative Agreement Program Evaluation Branch
Division of Health Assessment and Consultation
Agency for Toxic Substance and Disease Registry