Letter Health Consultation

Sparta Aquifer Vulnerability Study/Health Implications of Heavy Metals Contamination in Locust Bayou Private Wells (Phase II)

LOCUST BAYOU, CALHOUN COUNTY, ARKANSAS

EPA CONTRACT #: 68-W-02-019

JUNE 17, 2008

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.

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LETTER HEALTH CONSULTATION

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Prepared By:

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

Arkansas Department of Health

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Governor Mike Beebe
Paul K. Halverson, DrPH, FACHE, Director and State Health Officer

June 6, 2008

Dianna Kilburn
Hazardous Waste Division
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317

Dear Mrs. Kilburn:

On the basis of a review of the U.S. Environmental Protection Agency (EPA) groundwater monitoring data and Locust Bayou private residential tap water data we received by mail from your office on April 25, 2008, the Arkansas Department of Health (ADH), in a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), has prepared this health consultation letter to address potential public health issues related to the data evaluation.

Background and Statement of Issues

Federal and state agencies have collaborated in an effort to serve the request of the community surrounding the former Shumaker Naval Ammunition Depot property (Shumaker) and/or Highland Industrial Park (HIP) area near East Camden and Locust Bayou, AR, regarding groundwater and drinking water quality within the alluvial and Sparta aquifers. The Arkansas Department of Environmental Quality (ADEQ), EPA, ATSDR and ADH have been working in collaboration on the Sparta Aquifer Vulnerability Study since Spring 2007 in order to ensure that residents who still use private drinking water wells drawn from the aquifer as their only source for tap water are not exposed to any compounds or contaminants detected in water sampled from their homes that could lead to adverse public health effects [1].

With the first phase of sampling and evaluation finalized in the Summer of 2007 [1], the second phase of sampling both from the groundwater (by EPA) and the tap water of private residential wells (by ADEQ) was conducted in the Spring of 2008. The results of this sampling event have been reviewed by our office and are summarized herein.

Discussion

Exposure to contaminants of concern is determined by examining human exposure pathways. An exposure pathway has five parts:

1. A source of contamination (e.g., industrial facilities utilizing hazardous materials),
2. An environmental medium such as water, soil, or air that can hold or move the contamination,
3. A point at which people come in contact with a contaminated medium (e.g., private residential well water),
4. An exposure route, such as drinking well water from the same aquifer that is close to the industrial facility, and
5. A population who could come in contact with the contaminants.

An exposure pathway is eliminated if at least one of the five parts is missing and will not occur in the future. For a completed pathway, all five parts must exist and exposure to a contaminant must have occurred, is occurring, or will occur. For this evaluation, a complete pathway has been identified. Because the private residential wells draw from the same shallow aquifer that is being monitored by the EPA for potential contamination surrounding the former Shumaker property, the source exists for the same compounds found in the EPA groundwater monitoring study to be detected in the private residential well water, and therefore consumed by an individual on a daily basis.

Past contaminants of concern that were identified in the first phase of sampling and evaluated in the Summer of 2007 were arsenic, copper, and lead [1]. In this review, these compounds along with anions, metals, and volatile organic compounds (VOCs) were evaluated. The reported laboratory concentration was compared to the ATSDR Health Comparison Value or the EPA Maximum Contaminant Level (MCL), where appropriate.

EPA Groundwater Monitoring Data for the Sparta Aquifer Vulnerability Study

The EPA groundwater monitoring data was reviewed first. It was determined that arsenic and lead were the only two compounds exceeding their MCL of 10 microgram per liter (μg/L) and 15 μg/L, respectively. Refer to Table 1 for all samples and corresponding concentrations that exceeded these comparison values [2].

Because the groundwater monitoring study only draws water for monitoring purposes, and is not intended for human consumption or household use (i.e., cooking, bathing, clothes washing), this data was not calculated on the basis of potential risk to human exposure. The EPA groundwater monitoring data is intended as a guide when reviewing the private residential well water, as both

well types draw upon the same aquifer as their source. Since there are still residents in the Locust Bayou vicinity that obtain their water source exclusively from private residential wells, and these private wells draw the same aquifer water that is being evaluated by the EPA study, agency officials deemed it necessary to sample private residential water wells on a voluntary basis due to the elevated levels of contaminants in the EPA groundwater monitoring well samples. In this round of EPA monitor sampling, arsenic and lead were the two detected compounds exceeding screening values; therefore, private residential well water samples were also collected and analyzed for these and other contaminants.

Table 1. US EPA Groundwater Monitoring Data
(January 2008)

Sample	Compound	MCL µg/L	Concentration µg/L
GW-S02	Arsenic	10	16
	Lead	15	29
GW-S04	Lead	15	21
GW-S07	Arsenic	10	29
	Lead	15	41
GW-S08	Arsenic	10	21
	Lead	15	37
GW-S09	Lead	15	22
GW-D02L	Lead	15	18
GW-D21	Lead	15	20
GW-D03L	Arsenic	10	17
SW-10	Arsenic	10	13

MCL = Maximum Contaminant Level; µg/L = microgram per liter; GW = Groundwater; SW = Shallow Well

ADEQ Private Residential Well Water Data

The next review involved four tap water samples taken from private residential well water within the Locust Bayou community. Of the four samples identified by ADEQ as Drinking Well (DW) 15, DW 16, DW 17, and DW 18, only sample DW 15 had an exceedance of the compound copper above the ATSDR Health Comparison Value. After further public health risk calculations to determine a daily exposure dose and hazard quotient (HQ) from ingestion of private well water using ATSDR TopHat Modeling Software, there was found to be no potential risks of adverse health effects from sample DW 15.

An HQ is a comparison of the average daily intake with a reference dose level below any likelihood that adverse health effects would occur. If the HQ for a chemical is equal to or less than one, it is believed that there is no significant risk that non-cancer health effects will occur.

If the HQ exceeds one, there is some possibility that non-cancer effects may occur, although an HQ above one does not indicate an effect will definitely occur. In this review, all HQ values fell below one, and it was concluded that no significant potential risks exist for any individual (infant, child, or adult) that is drinking water from the Sample DW 15 source. See Table 2 for all values [3].

Table 2. Private Well Water Data from ADEQ
(March 2008)

Sample	Compound	Concentration µg/L	Receptor	Intake Rate	Hazard Quotient
DW 15	Copper	186	Infant	36 ounces/day	0.51
			Child	1 liter/day	0.32
			Adult	2 liters/day	0.14

DW = Drinking Well

Conclusions

Based on the data review, there is minimal potential risk for adverse health effects from the concentration of copper in private residential well water sample DW 15, since the hazard quotient falls below a value of one. Copper is an essential element required for normal growth and development for a variety of metabolic functions [4]. Therefore, there is ***no apparent public health hazard*** associated with private residential well water sample DW 15.

Since the other three private residential water well samples detected no compounds over health comparison values, there is minimal potential risk for adverse health effects from the well water in samples DW 16, DW 17, and DW 18; thus, there is ***no apparent public health hazard*** associated with these three private residential well water samples. As defined by ATSDR, this public health hazard category applies to sites where exposure to site-related compounds might have occurred in the past or is still occurring, but *the exposures are not at levels likely to cause adverse health effects*.

Recommendations

- ADH/ATSDR recommends public health education and/or further testing of private residential water wells, as needed or upon request.
- When testing private residential water well supplies in the future, it may be appropriate to take a sample both from the well head source and the inside tap water source, in order to rule out possible contamination due to corrosion or similar plumbing issues.
- Data results should continue to be shared with all agencies involved (EPA, ATSDR, ADEQ, and ADH) in order to gain the most beneficial and collaborative efforts to

provide the public and interested parties with a thorough evaluation of the groundwater surrounding the Shumaker and/or HIP property.

References

1. Agency for Toxic Substances and Disease Registry (ATSDR) Health Consultation, "Sparta Aquifer Vulnerability Study: Health Implications of Heavy Metals Contamination in Locust Bayou Private Wells," Locust Bayou, Calhoun County, Arkansas 71701. September 28, 2007.
2. U.S. Environmental Protection Agency (USEPA) Sparta Aquifer Validation Data. "Analytical Report for Lot# D8A090200 (1/23/08); Lot# D8A100295 (1/23/08); Lot# D8A110236 (1/24/08); Lot# D8A120180 (1/25/08)" by TestAmerica for Techlaw.
3. Arkansas Department for Environmental Quality. "Certificate of Analysis" Laboratory Reporting Data. March 3, 2008
4. Agency for Toxic Substances and Disease Registry (ATSDR) ToxProfiles for Copper, pages 21 through 103. 2005.

Thank you for allowing ADH/ATSDR the opportunity to work with your agency once again on this site. Please feel free to contact me at 501-280-4041 or by email at ashley.whitlow@arkansas.gov, if you have any questions regarding this letter health consultation.

Sincerely,

Ashley Whitlow, M.S.
ADH Sr. Epidemiologist
ATSDR Health Assessor
Environmental Epidemiology

cc: Lori Simmons, M.S., Section Chief for Environmental Epidemiology, ATSDR Program Manager, ADH
Carrie Poston, B.S., CHES, ATSDR Public Health Education Supervisor, ADH
Jeff Kellam, M.S., Division of Health Assessment and Consultation, Technical Project Officer, ATSDR

Certification

The Arkansas Division of Health prepared this health consultation for the Sparta Aquifer Vulnerability Study under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with approved methodology and procedure existing at the time the health consultation was initiated. Editorial review was completed by the cooperative agreement partner.

Jeff Kellam
Technical Project Officer
Division of Health Assessment and Consultation (DHAC)
ATSDR

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

Alan W. Yarbrough
Cooperative Agreement Team Leader, DHAC, ATSDR