Letter Health Consultation

Review of Groundwater Sampling Data

ARKANSAS FLY SERVICE WATER WELL

BRADY, ARKANSAS

MARCH 3, 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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BRADY, ARKANSAS

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

4815 West Markham Street • Little Rock, Arkansas 72205-3867 • Telephone (501) 661-2000
Governor Mike Beebe
Paul K. Halverson, DrPH, FACHE, Director and State Health Officer

December 21, 2007

Micheal J. Thompson
Director, Pesticide Division
Arkansas State Plant Board
P.O. Box 1069
Little Rock, AR 72203

Dear. Mr. Thompson:

On the basis of a review of the groundwater sampling data collected on 08/07/07 and 11/14/07, by the Arkansas State Plant Board (ASPB) for commercial well Laffayette-06 in Bradley, AR, 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 public health issues related to detected levels of dinoseb from the data submitted to our offices on 12/5/07.

Background and Statement of Issues

In accordance with the "Arkansas Agricultural Chemical Ground Water Management Plan Memorandum of Understanding" (MOU) between the ASPB and ADH, water sample results taken from a commercial well in Bradley, AR, were sent to our offices for evaluation of detected herbicides. The Laffayette-06 well is owned by Arkansas Flying Service, and it is used in the process of commercial pesticide application. The Laffayette-06 well was first sampled on 08/07/07 and tested positive for the presence of herbicides in the pre-purge and post-purge water. Therefore, the well was resampled on 11/14/07, and again tested positive for the presence of specific herbicides.

Discussion

The herbicides detected in the water samples included: 2,4-dichlorophenoxyacetic acid (2,4 D), acifluoren, atrazine, bentazon, clomazone, dinoseb, fluometuron, metolachlor, molinate, norflurazon, quinclorac, and triclopyr. These compounds were screened using ATSDR Health Comparison values. Comparison values are doses or substance concentrations set well below levels that are known or anticipated to result in adverse health effects. These values help health assessors make consistent decisions about what substance concentrations or dose levels require a closer look. It was determined that the concentration of dinoseb in all samples submitted

exceeded the health comparison value, and was further evaluated as a compound of potential concern for human exposure. All other detected herbicides were below health comparison values, and no further action was required.

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., herbicide spill),
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., commercial well),
4. An exposure route, such as drinking or skin contact with water from a well, 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 potentially complete pathway was identified. Because dinoseb exceeded the ATSDR health comparison values found in Lafayette-06 well that may have the potential to be intentionally or accidentally ingested or absorbed by workers or visitors, further screening was performed.

To characterize potential adverse health effects from ingestion (swallowing) or dermal (skin) contact of dinoseb directly from Lafayette-06 well, the ATSDR's Toxicological Profile and Health Assessment Toolkit (TopHat) was used [1]. TopHat is a software program that provides the health assessor a means by which one can take site-specific chemical levels and estimate a theoretical excess risk expressed as the proportion of a population that may be affected by a compound during a lifetime of exposure.

The "ingestion of drinking water pathway" was calculated for four separate scenarios: an adult drinking two liters of well water per day, an adult drinking one-half of a liter of well water per day, a child drinking one liter of well water per day, and a child drinking one-fourth of a liter of well water per day. The "dermal exposure pathway" considers all possible skin contact as a result of bathing, showering, and general washing for ten minutes per day every day. Refer to Table 1 for results.

Table 1. ATSDR Health Values for ASPB Data Results 11/14/07

Well ID	Compound	Max Concentration (µg/L)	Ingestion HQ*		Dermal HQ**	
			Child	Adult	Child	Adult
Laffayette-06	Dinoseb	53.65	**3.4** (1L/day)	**1.5** (2L/day)	0.00041	0.001
			0.84 (0.25L/day)	0.38 (0.5L/day)		

*Note different daily exposure dose amount. Bold values indicate exceedance of the target range.
**Dermal HQ based on 10 minutes skin contact/day, 365 days/year.
ATSDR = Agency for Toxic Substances and Disease Registry; ASPB = Arkansas State Plant Board; HQ = Hazard Quotient (Environmental Protection Agency target risk range HQ <1); ID = identification; µg/L = micrograms per liter; L/day = liters per day

To put the calculated exposure doses into a meaningful context for non-cancer, acute effects [meaning a rapid onset of an illness, or an illness that happens in less than a year (short duration)] the Hazard Quotient (HQ) was calculated for each potentially exposed adult and child. An HQ is the average daily intake divided by a chemical specific reference dose (RfD) set by the Environmental Protection Agency (EPA). If the HQ for a chemical is equal to or less than one, it is believed that there is no appreciable 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. This is because of the margin of safety inherent in the derivation of all RfD values. The larger the HQ value, the more likely it is that an adverse effect may possibly occur.

Conclusions

The HQ for ingestion of well water with the concentration of dinoseb at 53.65 micrograms per liter was exceeded in the daily maximum drinking water scenario (i.e., two liters per day for an adult or one liter per day for a child). However, because this is a commercial well not intended for domestic drinking water use, this scenario is highly unlikely.

During a phone conversation on 12/10/07, you stated that this well was not labeled as restricted for drinking, and it may occasionally be used by employees for drinking or pouring on their skin to cool off, particularly in the warmer summer months. A second scenario, although still a conservative estimate of human exposure, was also calculated (i.e., one-half of a liter per day for an adult or one-fourth of a liter per day for a child). The HQ using this scenario was less than one for both the adult and child, and it is probable that, presently, there is no appreciable risk that non-cancer health effects could occur from either drinking water or skin contact of the water with these concentrations of dinoseb.

Therefore, it has been determined that there is ***no apparent public health hazard*** from ingestion and dermal exposure to the groundwater taken from Lafayette-06 well at this time.

Recommendations

ADH/ATSDR recommends periodic sampling for commercial well Lafayette-06 to ensure that levels of dinoseb or other detected herbicides are not increasing. Should future tests detect levels of herbicides at higher concentrations for this or surrounding wells, please do not hesitate to contact us again with the new data information.

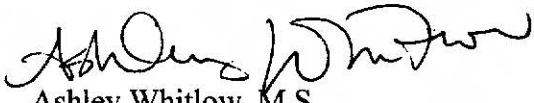
Additionally, to further reduce the possibility of potential exposures, ADH/ATSDR suggest that the ASPB or the well owner could post a sign indicating that ingestion of the well water should be limited.

References

1. Agency for Toxic Substances and Disease Registry (ATSDR) *TopHat Tool*. Exposure Dose Calculator. Accessed December 10, 2007.

Thank you for allowing ADH/ATSDR the opportunity to work with your agency on this site. Please feel free to contact me at 501-280-4041, if you have any questions.

Sincerely,



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

cc: Shirley Louie, M.S., CIH, Associate Epidemiology Branch Chief, ADH
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Certification

The Arkansas Division of Health prepared this health consultation for Lafayette-06 well at Arkansas Flying Service 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