

Letter Health Consultation

J&J CORNER STORE
BERRYVILLE, VIRGINIA
Groundwater Contamination

Prepared by:
VIRGINIA DEPARTMENT OF HEALTH

March 3, 2012

Virginia Department of Health
109 Governor Street
Richmond, VA 23218

Letter Health Consultation: A Note of Explanation

A letter health consultation is a verbal or written response from VDH 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 letter health consultation process for J&J Corner Store, unless additional information is obtained by VDH which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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March 3, 2012

Charles J Devine, III, M.D.
Health Director
Lord Fairfax Health District

Dear Dr. Devine:

This letter is in response to your request for the Virginia Department of Health (VDH) to examine the environmental data obtained from private drinking wells near J&J Corner Store in Berryville, Virginia, where a petroleum underground storage tank (UST) leak occurred. Thank you for providing VDH with the private well sampling results. Through a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), we completed an evaluation of the water sampling information you forwarded to VDH on November 10, 2011, and assessed the potential risks to human health from drinking water in private wells impacted by a gasoline leak.

SITE BACKGROUND AND HISTORY

J&J Corner Store is a local country store located on 2.75 acres of land at 4192 Harry Byrd Hwy, Berryville, VA 22611, on the northeast corner of Harry Byrd Highway and Shepherds Mill Road. J&J Corner Store operates as a gas station and convenience store that sells diesel fuel, gasoline, and take-out meals. The store provides minimal restaurant seating and does not have a drinking water fountain. An apartment above the store and an adjacent home directly north of the store share the same supply well as the store. The store is in a rural region of Virginia and is about three miles east of the Town of Berryville which has a population of 4,185. The closest homes are located to the north of the store along Shepherds Mill Road.

Approximately 20 homes are located within a quarter mile radius of the store on the north side of Harry Byrd Highway. Directly south of the store, across from Harry Byrd Highway, are a rock quarry and a vineyard (Employee at Stuart M Perry Inc., personal communication, February 15, 2012). A map of the area is included as an attachment. In addition, three rows of rental storage units are located to the east of the store. There are no fences or barriers that limit access to the store's surrounding property. J&J Corner Store and the surrounding residences have individual private wells. The closest waterworks is a mile and a half west of the store at Grafton School, which is a private school with a single drilled well (R. LePrell, personal communication, October 19, 2011).

J&J Corner Store reported an UST tightness test failure to the Virginia Department of Environmental Quality (DEQ) in October 2010. The tank was subsequently emptied and two monitoring wells were installed next to the UST. Gasoline was detected in the monitoring wells on November 4, 2010. The store's private well and the nearest neighboring private well was found to have trace levels of gasoline constituents in late November and early December 2010. Two other private wells were found to have trace levels of gasoline constituents in June and September of 2011. A whole house carbon filtration unit (CFU) was installed to treat the well water at each location (1).

Gasoline constituents detected in private supply wells above the laboratory reporting limit include benzene, diisopropyl ether (DIPE), methyl *tert*-butyl ether (MTBE), toluene, xylenes, and *tert*-amyl methyl ether (TAME) (2). The concentrations of gasoline constituents reported in the four affected private supply wells are provided as an attachment along with dates when gasoline constituents were first detected and when CFUs were installed (R. LePrell, personal communication, November 14, 2011).

Environmental Activities Timeline

October 12 2010 – petroleum UST release reported to DEQ

October 27, 2010 – monitoring wells installed

November 4, 2010 – gasoline discovered in groundwater

November 5, 2010 – contractor removed gasoline from groundwater through monitoring wells

November 8, 2010 – J&J Corner Store and attached rental home private supply well impacted by plume

December 2, 2010 – neighboring private supply well impacted; product removal system installed which began pumping gasoline and contaminated water from the monitoring/recovery wells; over 300 gallons of gasoline removed during first week of pumping

January 3, 2011 – site characterization report submitted to DEQ identified groundwater flow beneath the site is to the northeast

January 2011 – 12 monitoring/recovery wells installed to delineate the plume and recover gasoline and contaminated groundwater

February 3, 2011 – USTs removed at J&J Corner Store

June 17, 2011 – third private supply well impacted by plume

September 13, 2011 – fourth private supply well impacted by plume

December 2011 – nine additional private wells tested and were negative for gasoline constituents (3)

December 17, 2012 – private well adjacent to the store on the east tested negative for gasoline constituents

February 2012 – DEQ requested four new groundwater monitoring wells, plus two vapor monitoring wells next to the store be installed; concentration of gasoline constituents in the four affected private wells “dropped significantly” in January 2012; DEQ plans to continue

maintaining CFUs until four consecutive quarterly raw water sampling events are negative for gasoline compounds (D. Forrer, personal communication, February 8, 2012).

DISCUSSION

The first step in determining if a community is exposed to a contaminant at a site is to evaluate if a completed exposure pathway exists. A completed exposure pathway identifies the source of the contaminant and how individuals come into contact with them. An exposure pathway is considered complete if the following five elements are present:

- a **source** of contamination (e.g., UST, landfill, incinerator)
- an **environmental transport medium** (e.g., air, water and soil),
- a **point of exposure** (e.g., drinking water, swimming pool, indoor air),
- a **route of exposure** (e.g., ingestion, dermal, inhalation), and
- a **receptor population** (e.g., workers, community members and individual household members).

VDH has determined that a completed pathway *did exist* in the *past* between the UST and individuals at the J&J Corner Store/rental property and at three surrounding homes. Each of the five elements of the completed exposure pathway is displayed in Table 1.

Table 1. Site Specific Exposure Pathway Elements

Pathway Name	Exposure Pathway Elements					Time Frame
	Source	Environmental Transport Medium	Exposure Point	Exposure Route	Exposed Population	
Private Wells	Underground Storage Tank Leak	Groundwater	Private Wells	Ingestion, Dermal, Inhalation	J&J Corner Store Employees and Customers, and surrounding residents	Past

Chemicals of Concern

Completed exposure pathways require further evaluation to determine whether exposures to environmental contaminants are sufficient to result in adverse health effects. VDH first identifies chemical of concerns by comparing environmental contaminants sample results to comparison values (CV) available from ATSDR, or the U.S. Environmental Protection Agency (EPA) (See Attachment). This allows VDH to determine if the amount of contaminant found in the environment is sufficient enough to result in adverse health effects. CVs are derived from human and animal studies. Uncertainty factors are applied to ensure that they are adequately protective of public health. Therefore, contaminants present in concentrations less than CVs are unlikely to pose a health threat.

Comparison values used to screen contaminants in private drinking wells at this site included:

- EPA's Maximum Contaminant Level (MCL)
- ATSDR's Environmental Media Evaluation Guideline (EMEG) for children
- EPA's Regional Screening Level (RSL)

The MCL is an appropriate CV to use because it is the maximum concentration of a chemical that is allowed in public drinking water systems and is established by the EPA. If an MCL was not available for a gasoline constituent then the EMEG was used if available. EMEGs are derived from ATSDR using conservative assumptions about exposure, such as intake rate, exposure frequency and duration, and body weight. VDH used the more health protective EMEG derived for children. Many of the fuel oxygenate additives such as DIPE and TAME do not have an MCL or EMEG. A RSL does exist for DIPE. RSL is a risk-based screening levels, calculated using the latest toxicity values, default exposure assumptions and physical and chemical properties.

Gasoline constituents detected in private wells were all below their corresponding CV. Therefore, further analysis of individual chemicals is not warranted at this time. The exposure to chemicals detected in private wells was also eliminated once CFUs were installed.

CONCLUSIONS

VDH concludes that gasoline constituents detected in private wells at J&J Corner Store and nearby homes prior to installation of CFUs are not expected to harm people's health because the levels of chemicals detected in private wells were below health-based screening levels established by ATSDR and EPA. In addition, the installation of CFUs further limited the duration of exposure to approximately one month.

RECOMMENDATIONS

VDH supports DEQ's plan to maintain and monitor CFUs installed on private wells until four consecutive quarterly raw water results are negative for gasoline constituents.

PUBLIC HEALTH ACTION PLANS

Actions undertaken

CFUs were installed approximately a month after gasoline constituents were detected in private supply wells. VDH provided educational and technical material to the Local Health Department in support of their attendance at the community meeting held by DEQ on November 16, 2011.

Actions planned

VDH will review new groundwater and other monitoring data as they become available.

I trust that the above information will be of help to you. Should you have any additional questions please contact the VDH Division of Environmental Epidemiology at (804)-864-8182 or at 109 Governor Street, Richmond, VA 23219.

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REFERENCES

1. Forrer, D. Community meeting presentation. Presented November 16, 2011, Berryville, VA. Accessed on line February 2012
<http://www.deq.virginia.gov/export/sites/default/tanks/pdf/jnjcstore11-16-11.pdf>
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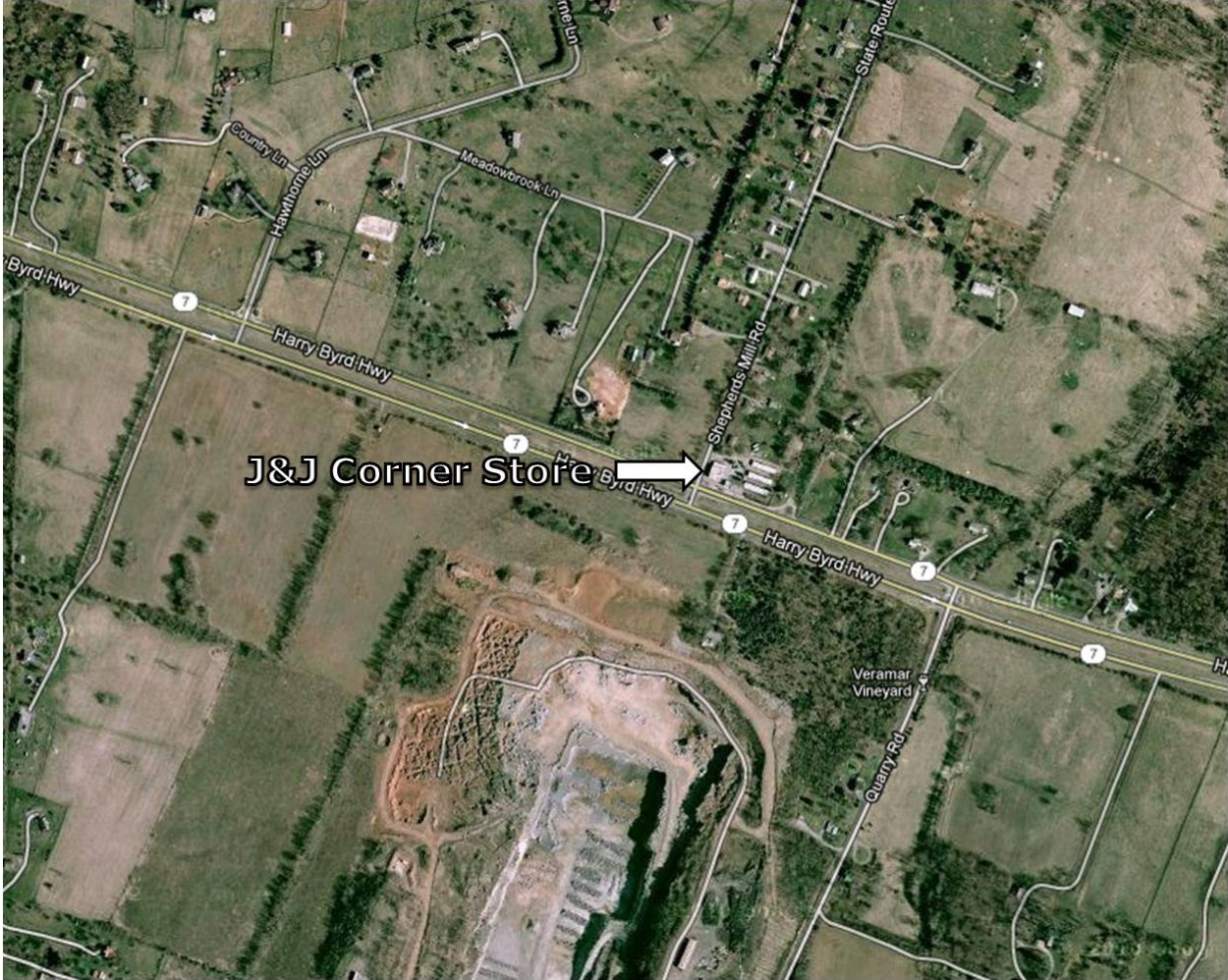
Attachments

Private well raw water results, CFU installation dates, and Comparison Values

		Gasoline compounds detected in private wells (µg/L)							
Well	Date*	Benzene	Ethylbenzene	DIPE	MTBE	Naphthalene	Toluene	Xylenes (total)	TAME
Well 1	8-Nov-2010				3				
	19-Nov-2010	<2.0	<2.0	23	3.5	<2.0	<2.0	<2.0	<2.0
	2-Dec-2010	Carbon Filtration Unit Installed							
Well 2	22-Nov-2010	1.9		3.6				4	
	7-Dec-2010	3	<2.0	6	.88	<2.0	1.3	6.92	.6
	20-Dec-2010	Carbon Filtration Unit Installed							
Well 3	17-Jun-2011	<1	<1	13.8	1.2	<1	<1	<2.0	0.4
	1-Jul-2011	Carbon Filtration Unit Installed							
	13-Sep-2011	No gasoline compounds detected in raw water							
Well 4	13-Sep-2011	No Data							
	28-Sep-2011	<1	<1	4.2	<5	<1	<1	<2.0	<1
	7-Oct-2011	Carbon Filtration Unit Installed							
	7-Dec-2011	No gasoline compounds detected in raw water							
	Comparison Value	5	700	1,200	3,000	6,000	1,000	10,000	N/A [†]
	Comparison Value Source	MCL	MCL	RSL	EMEG	EMEG	MCL	MCL	
	Number of times Comparison Value Exceeded	0	0	0	0	0	0	0	

*Dates in bold face are when gasoline compounds were first detected in private wells. [†]There are no federal health-based standards available for TAME in drinking water. DIPE (diisopropyl ether) MTBE (methyl *tert*-butyl ether) TAME (*tert*-amyl methyl ether) CFU (carbon filtration unit)

Map of J&J Corner Store and surrounding community



Approximate location of private supply wells that tested positive for gasoline constituents.

