



Arkansas Department of Health

4815 West Markham Street • Little Rock, Arkansas 72205-3867 • Telephone (501) 661-2000

Governor Asa Hutchinson

Nathaniel Smith, MD, MPH, Director and State Health Officer

February 13, 2019

Caleb Osborne
Office of Water Quality Associate Director
Arkansas Department of Environmental Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317
RE: Trafalgar Road Fire, Bella Vista, AR

Dear Mr. Osbourne,

The Arkansas Department of Environmental Quality (ADEQ) requested that the Arkansas Department of Health (ADH) evaluate surface water sampling data results collected at the northern site perimeter of an ongoing underground fire on Trafalgar Road in Bella Vista, AR. ADH prepared this health consultation to address potential public health issues of exposure related to chemicals in the surface water taken from the toe of the property at the northern perimeter of the Trafalgar Road Fire site. ADH has completed this document under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Department of Health and Human Services*.

Background and History

The Trafalgar Road Fire site is located on the 8000 block of Trafalgar Road, Bella Vista in Benton County, Arkansas. The property was purchased for use by Browns Tree Care in 2018. The site is listed as 4.74 acres, Parcel number 16-77998-007. The approximate geographic coordinates are Latitude 36.461346° North and Longitude 94.209098° West. The Trafalgar Road Fire site is surrounded by residential properties to the north, east, south, and west amongst trees and rolling topography. A commercial storage facility, Blue Mountain Storage, is located directly south of the property [1].

The site was leased by the property owners association (POA) from December 2003 to December 2016 to allow local residents to dispose of yard debris, tree limbs, and tree stumps. The last several years of that lease, the POA did not monitor what materials were being dumped at the site, but historically it was monitored and any non-organic material was removed and taken to the transfer station [2].

On August 1, 2018, ADEQ began to receive smoke and odor complaints from residents living in the area [1]. ADEQ and ADH communicated regarding the Trafalgar Road Fire on August 27, 2018 about potential health concerns regarding the smoke. ADH continues to support ADEQ regarding review of air monitoring data results for the site for potential public health impacts. This includes ongoing public health evaluations statements for fine particulate matter (PM2.5) data as it becomes available, as well as, a letter health

consultation to the Environmental Protection Agency (EPA), published on December 12, 2018 evaluating previous volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) air results.

On January 2, 2019, Governor Asa Hutchinson signed a proclamation declaring a state of emergency regarding the Trafalgar Road site.

ADEQ mobilized their contractor, EnSafe, to do site preparation work in January 2019 (Map in Attachment A). EnSafe contractors collected surface water samples at the northern perimeter of the site on January 23, 2019. Samples were analyzed in a laboratory using a gas chromatography–mass spectrometry (GC-MS) method. Surface water samples were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), anions, metals, and dissolved metals [3].

Discussion

Exposure to a chemical of concern (COC) is determined by examining human exposure pathways. An exposure pathway has five parts:

1. A source of contamination (e.g., surface water),
2. An environmental medium, such as water, that can hold or move the contamination,
3. A point at which people come in contact with a contaminated medium (e.g., wading in water),
4. An exposure route, such as dermal contact,
5. A population who could come in contact with the chemical (i.e., workers, trespassers or general public).

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 chemical must have occurred, is occurring, or will occur. For this evaluation, a potential dermal (skin) exposure pathway could exist for workers, trespassers, and/or any individuals near the perimeter of the site, if they make contact with this surface water source.

The surface water data results from January 23, 2019 included seventeen (17) chemicals that were detected [3]. While these samples were not from a public drinking water source, and it is not considered a possible human drinking water source, the data were screened using ATSDR's drinking water Comparison Values (CV) to determine which chemicals warranted further evaluation for potential dermal (skin) exposure. Comparison values are doses (termed health guidelines) or substance concentrations (termed environmental guidelines) set well below levels that are known or anticipated to result in adverse health effects. Comparison values are derived from scientific studies and modified by safety factors to be more protective of human health. ATSDR's CVs are developed for a specific chemical in each of three environmental media: air, soil, and drinking water. To determine which chemicals to examine further for potential dermal exposure, ADH conservatively used the drinking water chemical-specific screening levels to be the most protective of public health.

Of the seventeen (17) chemicals detected, three exceeded the ATSDR screening CV (arsenic, benzene, and manganese). These three (3) chemicals were further evaluated using public health risk assessment calculations for dermal (skin) exposure to determine potential risk to human health. Table 1 lists the chemical concentrations in the January 23, 2019 surface water samples.

Arsenic and manganese are elements that occur naturally in rocks, soils, and waters that come in contact with these rocks and soils. Elevated levels of arsenic and manganese in water can be naturally occurring and/or due to human actions. Benzene can occur naturally and small amounts are released by volcano eruptions, forest fires, and underground oil and gas reservoirs; however, it is more typically released by human actions [4].

The conservative scenario for potential exposure to the surface water at the toe of the dump location at the northern perimeter of the Trafalgar Road Fire site was based on a prolonged surface water contact by a full-time worker being exposed for eight (8) hours a day, seven (7) days a week for fifty-two (52) weeks a year. The scenario was based on total body surface area and 100% gastrointestinal (GI) absorption. Only arsenic has a water CV for acute exposure (1-14 days), so the potential exposure scenarios for chronic exposures are based on 365+ continuous days of contact with the surface water source for eight (8) hours a day, seven (7) days a week for at least a full year. This scenario was used for non-workers as well.

Dermal exposure to surface water is defined as exposure to chemicals found in surface water that enters the body through the skin. The amount of chemical that enters the body is dependent on certain properties of the chemical, such as how efficiently it may go through the skin and enter the bloodstream [5].

The dermal dose is the amount of chemical absorbed through the skin and is derived using the dermal exposure equations into an absorbed dose and is calculated in milligrams of chemical per kilograms of body weight per day (mg/kg/day). ATSDR converts the dermal absorbed dose to an administered dermal dose by using a GI absorption factor to estimate the amount of chemical absorbed through the GI tract. This dose can then be compared with the ATSDR minimum risk level (MRL) or the Environmental Protection Agency's (EPA) oral reference dose (RfD) [5]. Table 1 lists these MRL and RfD values for the COCs. Doses were calculated for all child age groups and for adults. These doses can be found in Tables 2a, 2b, and 2c.

Table 1: Water Concentrations for Potential Chemicals of Concern

Chemical Name	Concentration	Chronic ATSDR Oral MRL^a or EPA RfD^b mg/kg/day	Acute Oral MRL mg/kg/day
Arsenic	0.0207 mg/L	0.0003 ^{a,b}	0.005
Benzene	0.0045 mg/L	0.0005 ^a	NA
Manganese	3.69 mg/L	0.05 ^b	NA

ATSDR: Agency for Toxic Substances and Disease Registry

MRL: Minimum Risk Level

EPA: Environmental Protection Agency

RfD: Reference Dose

mg/kg/day: milligrams per kilogram per day

mg/L: milligram per liter

NA: Not Applicable

A hazard quotient (HQ) is the average daily intake divided by a chemical specific MRL or RfD. If the HQ for a chemical is equal to or less than one (1), it is believed that there is no appreciable risk that non-cancer health effects will occur. If the HQ exceeds one (1), 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. None of the HQ values exceeded one (1).

Table 2a: Arsenic Water Dermal Exposure for Hazard Quotients

Age Group	Chronic, Oral, Admin Dose mg/kg/day	Chronic HQ	Acute, Oral Admin Dose mg/kg/day	Acute HQ
Child (birth to < 1 yr)	0.000090	0.30	0.00009	0.02
Child (1 to < 2 yr)	0.000082	0.27	0.00008	0.02
Child (2 to < 6 yr)	0.000073	0.24	0.00007	0.01
Child (6 to < 11 yr)	0.000060	0.20	0.00006	0.01
Child (11 to < 16 yr)	0.000049	0.16	0.00005	0.01
Child (16 to < 21 yr)	0.000045	0.15	0.00005	0.01
Adult	0.000044	0.15	0.00004	0.01

mg/kg/day: milligrams per kilogram per day

HQ: hazard quotient

Table 2b: Benzene Water Dermal Exposure for Hazard Quotients

Age Group	Chronic, Oral, Admin Dose mg/kg/day	Chronic HQ
Child (birth to < 1 yr)	0.000281	0.56
Child (1 to < 2 yr)	0.000256	0.51
Child (2 to < 6 yr)	0.000228	0.46
Child (6 to < 11 yr)	0.000187	0.37
Child (11 to < 16 yr)	0.000154	0.31
Child (16 to < 21 yr)	0.000141	0.28
Adult	0.000136	0.27

mg/kg/day: milligrams per kilogram per day

HQ: hazard quotient

Table 2c: Manganese Water Dermal Exposure for Hazard Quotients

Age Group	Chronic, Oral, Admin Dose mg/kg/day	Chronic HQ
Child (birth to < 1 yr)	0.015832	0.32
Child (1 to < 2 yr)	0.014381	0.29
Child (2 to < 6 yr)	0.012845	0.26
Child (6 to < 11 yr)	0.010506	0.21
Child (11 to < 16 yr)	0.008659	0.17
Child (16 to < 21 yr)	0.007949	0.16
Adult	0.007660	0.15

mg/kg/day: milligrams per kilogram per day

HQ: hazard quotient

Conclusions

A potential dermal (skin) exposure pathway exists for on-site workers, trespassers, and/or any individuals near the perimeter of the Trafalgar Road Fire site. The conservative scenario of exposure to the surface water source for eight (8) hours a day, seven (7) days a week for at least a full year is much greater than would be expected for any real-life exposure. This was chosen in order to ensure the potential risk scenario would identify any increased risk to the workers or public who might come in contact with the water source. The HQ was below one (1) for all age categories.

Based on this review of the surface water samples collected on January 23, 2019, ADH has determined that potential exposure, such as from accidental splashing or wading, to surface water by dermal (skin) contact with any of the chemicals detected in the surface water at the perimeter of the Trafalgar Road Fire site poses no apparent public health hazard. ADH concludes that dermal contact with surface water from the perimeter of the Trafalgar Road Fire site is not expected to harm people's health because all levels of arsenic, manganese, and benzene were found to be below calculated risk levels related to public health.

Recommendations

For prudent public health safety, ADH recommends the following:

- If additional surface water samples are warranted due to changing conditions at the site, please provide these results to ADH for evaluation of public health exposures.

Please feel free to contact me at 501-614-5227 or chris.hemann@arkansas.gov, if you have any questions.

Sincerely,



Chris C. Hemann, M.S.
ADH Environmental Epidemiologist
ATSDR Cooperative Agreement Health Assessor

cc: Shirley Louie, M.S., CIH, ADH Center for Public Health Practice Director
Lori Simmons, M.S., ADH Epidemiology Branch Chief
Ashley Whitlow, M.S., ADH ATSDR Principal Investigator/ Environmental Epidemiology Supervisor
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References

1. Weston Solutions, Inc. September 2018. *Quality Assurance Sampling Plan for Browns Tree Care Dump Trafalgar Road Bella Vista, Benton County, Arkansas*. Prepared for the Environmental Protection Agency.
2. Lewis, Stacey. December 1, 2018. *Meeting Minutes- Trafalgar Road Fire*. Community Public Meeting Metfield Clubhouse, Bella Vista, AR. Provided by Amber Goin via electronic mail December 2, 2018.
3. Test America. January 31, 2019. *Analytical Report, Job ID: 490-167298-1, Job Description: ADEQ Trafalgar Road*. Prepared for EnSafe, Inc.
4. Environmental Protection Agency Website. *Ground Water and Drinking Water*. Retrieved from: <https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations>
5. Agency for Toxic Substances and Disease Registry. Sept 25, 2018. *Exposure Dose Guidance for Dermal and Ingestion Exposure to Surface Water*. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Attachment A

Sampling Location



ARKANSAS DEPARTMENT OF ENVIRONMENTAL QUALITY
 OFFICE OF LAND RESOURCES
 TRAFALGAR ROAD
 BELLA VISTA, ARKANSAS – AFIN# 04-02528
 SURFACE WATER SAMPLE EVENT - 01/23/2019

LEGEND

- SURFACE WATER SAMPLE LOCATION
- STREAM
- SUBJECT PROPERTY BOUNDARY
- PARCEL BOUNDARY

NAD 1983 STATE PLANE
 ARKANSAS NORTH FEET

0 100 200
 SCALE IN FEET

REQUESTED BY: EB
 DRAWN BY: NR
 DATE: 2/4/2019
 PROJECT: 0888824307

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Source: Google Earth Pro Imagery - 03/13/2018; Parcels - <https://bentoncountyar.gov/gis/>; U.S. Geological Survey. Bentonville North Quadrangle, Arkansas [Map]. Photorevised 2017. 1:24,000. 7.5 Minute Series.