

Letter Health Consultation

BALD FRIAR QUARRY NOA SITE

CONOWINGO, MARYLAND

DECEMBER 14, 2012

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
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

BALD FRIAR QUARRY NOA SITE

CONOWINGO, MARYLAND

Prepared By

Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
Eastern Branch



Agency for Toxic Substances
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Atlanta GA 30333

December 14, 2012

Mr. Jack Kelly
On Scene Coordinator
Removal Response Program (Mail Code 3HS31)
USEPA - Region 3
1650 Arch Street
Philadelphia, PA 19103-2029

RE: Evaluation of Activity-based Sampling Results from Bald Friar Naturally Occurring
Asbestos (NOA) Site in Maryland

Dear Mr. Kelly:

Thank you for consulting with the Agency for Toxic Substances and Disease Registry (ATSDR) regarding public health aspects of the U.S. Environmental Protection Agency's (EPA's) sampling activities at the Bald Friar Naturally Occurring Asbestos (NOA) site, near Conowingo, Maryland. I am writing to provide ATSDR's public health conclusions of EPA's September 2012 on-site activity-based sampling (ABS) and soil sampling results for asbestos at a youth camp.

Asbestos exposures at the camp are below levels of health concern. No special precautions are needed during any camp activities. Because the general area may contain natural deposits of asbestos, we recommend that any future construction or development planners recognize this potential and plan accordingly.

Background

The U.S. Geological Survey identified the Bald Friar Quarry site as one of 22 natural asbestos occurrences, former mines, or former prospects in Maryland.¹ The approximately 100-acre site was used for quarrying of soda spar, talc, and feldspar between 1928 and 1954 (the exact years of operation within this period are not known). Quarrying had ceased by 1954, and a youth camp has operated there since 1955.² The former open pit mine is now filled with water to form a pond in the central portion of the mostly wooded site. The site also includes campsites, a dining hall, outdoor amphitheater, and other camp facilities.

¹ Van Gosen BS. Reported historic asbestos mines, historic asbestos prospects, and natural asbestos occurrences in the eastern United States. U.S. Geological Survey Open-File Report 2005-1189. Version, 2.0, posted March 2006. Available at: <http://pubs.usgs.gov/of/2005/1189/>.

² Weston Solutions Inc. Final field sampling plan, removal site evaluation, Bald Friar Quarry Site, Conowingo, Cecil County, Maryland. West Chester: Weston Solutions. Prepared for the U.S. Environmental Protection Agency, Region 3. September 2012.

The Bald Friar NOA site was prioritized for investigation by the Maryland Department of the Environment (MDE) as part of a 2009 NOA Initiative. In 2011 MDE collected 22 surface soil, 6 surface water, and 7 sediment samples in several areas, including camp use areas, and analyzed them for metals and asbestos.³ Asbestos was quantified at 0.50% and 0.25% in two surface soil samples next to the pond and near the camp entrance, respectively. Trace levels (<0.25%) of asbestos were reported in 7 of the remaining 20 samples.⁴ Sediment samples also showed low (0.25%) or trace (<0.25%) levels of asbestos; no asbestos was detected in surface water samples. Not reported in the MDE investigation, the 2012 Weston Field Sampling Plan reported that in 2010, the camp operator had arranged for the collection of 7 soil and 2 surface water samples from the site for asbestos analysis. Soil samples from various areas showed trace levels (<0.25%) of asbestos; surface water samples detected no asbestos.

Activities that disturb soil containing low or trace levels of asbestos can sometimes result in airborne asbestos concentrations of health concern.⁵ ATSDR typically recommends ABS to characterize actual exposures for representative activities taking place in locations where trace levels of asbestos in soil exist. To better characterize the potential risk to campers, ATSDR recommended ABS be conducted in high-use areas of the camp. ATSDR worked with the EPA Region 3 Removal Program as they planned this sampling effort.

Summary of EPA Sampling and Results

EPA conducted sampling at the site on September 25, 2012. For ABS, contractors wearing personal air monitors conducted activities in defined areas of the camp. The personal air monitor collects a volume of air through a filter; asbestos structures, if present, are trapped by the filter for later counting. The monitor collects air from the breathing zone of the person doing the activity, so it closely represents actual exposures. Three 120-minute long activities were conducted for the ABS. For each ABS activity, two contractors performed activities in the same location and at the same time, so two samples were collected.

- ABS #1 gardening or weeding in the nature center area of the camp
- ABS #2 represented running, walking, or raking in one of the campsite areas
- ABS #3 represented hiking with vehicle traffic on a nearby road

While these activities were conducted, a stationary monitor collected air from a perimeter location removed from the immediate activity to represent “background” or “bystander”

³ Maryland Department of the Environment. Site inspection of the Bald Friar Quarry NOA site (MD-592). Baltimore: Maryland Department of the Environment. October 2011.

⁴ The method used to quantify asbestos was polarized light microscopy using point counting and CARB 435 preparation.

⁵ *See, for example*, U.S. Environmental Protection Agency. El Dorado Hills naturally occurring asbestos multimedia exposure assessment final preliminary assessment and site inspection report. San Francisco: U.S. Environmental Protection Agency, Region 9; 2006 or Weis CP. Memo to P. Peronard of U.S. Environmental Protection Agency RE: Amphibole mineral fibers in source materials in residential and commercial areas of Libby pose an imminent and substantial endangerment to public health. Denver: U.S. Environmental Protection Agency, Region 8, December 20, 2001.

exposures. This type of monitor collects a greater volume of air than do personal air monitors, so it achieves a greater sensitivity for asbestos detection. Table 1 summarizes air sample results for phase contrast microscopy equivalent (PCMe) asbestos structures per cubic centimeter of air (s/cc). PCMe refers to a size fraction of asbestos structures that has been historically used as an index of asbestos exposure. Most asbestos health and risk assessment information is based on PCMe.

Table 1. Summary of Activity-Based and Perimeter Air Sample Results from EPA Sampling at Bald Friar Quarry NOA Site, September 25, 2012

Sample	Result*		Average [†] Concentration Used in Risk Calculations
	Duplicate #1	Duplicate #2	
ABS #1 Gardening or Weeding in Nature Center Area	Not Detected (<0.0048 s/cc)	0.0097 s/cc	0.00485 s/cc
ABS #2 Running, Walking, or Raking in Campsite Area	0.0046	Not Detected (<0.0045 s/cc)	0.0023 s/cc
ABS #3 Hiking Near Vehicle Traffic	Not Detected (<0.0047 s/cc)	Not Detected (<0.0047 s/cc)	0 s/cc
Perimeter – Nature Center	Not Detected (<0.000489 s/cc)		0.0001225 s/cc
Perimeter – Cottage	0.00049		
Perimeter – Pond	Not Detected (<0.000481 s/cc)		
Perimeter - Campsite	Not Detected (<0.00047 s/cc)		
<p>*Results are given in units of phase contrast microscopy equivalent (PCMe) asbestos structures per cubic centimeter (s/cc) as measured with the ISO 10312 method. PCMe structures include asbestos individual fibers, clusters of fibers, and fibers associated with matrices of other minerals longer than 5 microns, between 0.25 and 3 microns in width, and with a length:width ratio of 3 or greater.</p> <p>†The average of duplicates or of multiple perimeter samples was used in risk calculations. Results of “not detected” count as zero in the average.</p>			

Evaluation of Potential Risk

To estimate potential risk from activities at the camp, ATSDR assumed that the “worst case” would apply to a camper who attended three one-week sessions of the camp every year from ages 8 to 18 and worked at the camp for 12 weeks a year from ages 21 to 28. Based on general information about the camp, we conservatively assumed 2 hours of exposure every day to each of the 3 activities represented by ABS. We assumed the average “perimeter” asbestos concentration would represent exposure for the remaining 18 hours per day. (ABS scenario #3 does not contribute to risk, because no asbestos structures were detected.)

To estimate potential risk posed by this exposure, ATSDR followed EPA’s Framework for Investigating Asbestos-contaminated Superfund Sites.⁶ This document specifies unit risk values

⁶ U.S. Environmental Protection Agency. Framework for investigating asbestos-contaminated Superfund sites.

for given ages at onset and exposure durations to asbestos. As will be illustrated in example calculations below, the estimated increased cancer risk is given by this unit risk multiplied by the asbestos concentration for a given activity (given in PCMe s/cc) multiplied by a time-weighting factor that describes the fraction of time over the exposure duration that the particular activity is performed.

For ATSDR's analysis, we combined the activity asbestos concentration and time-weighting factor terms to calculate an average asbestos exposure concentration (over the exposure duration of interest), which is then multiplied by the appropriate unit risk to determine the increased risk of cancer. The calculations are detailed below for the two general age ranges considered:

Ages 8 through 18 (Camper Scenario):

Age at onset: 8 Exposure Duration: 11 years Unit Risk: $0.0665 (s/cc)^{-1}$

Average Exposure Concentration:

$$\begin{aligned} & \left(0.00485 \frac{s}{cc} \times \frac{2 \text{ hr}}{24 \text{ hr}} \times \frac{3 \text{ weeks}}{52 \text{ weeks}} \right) + \left(0.0023 \frac{s}{cc} \times \frac{2 \text{ hr}}{24 \text{ hr}} \times \frac{3 \text{ weeks}}{52 \text{ weeks}} \right) \\ & + \left(0.0001225 \frac{s}{cc} \times \frac{18 \text{ hr}}{24 \text{ hr}} \times \frac{3 \text{ weeks}}{52 \text{ weeks}} \right) \\ & = 0.0000397 \text{ s/cc} \end{aligned}$$

Ages 21 through 28 (Camp Worker Scenario):

Age at onset: 21 Exposure Duration: 8 years Unit Risk: $0.031 (s/cc)^{-1}$

Average Exposure Concentration:

$$\begin{aligned} & \left(0.00485 \frac{s}{cc} \times \frac{2 \text{ hr}}{24 \text{ hr}} \times \frac{12 \text{ weeks}}{52 \text{ weeks}} \right) + \left(0.0023 \frac{s}{cc} \times \frac{2 \text{ hr}}{24 \text{ hr}} \times \frac{12 \text{ weeks}}{52 \text{ weeks}} \right) \\ & + \left(0.0001225 \frac{s}{cc} \times \frac{18 \text{ hr}}{24 \text{ hr}} \times \frac{12 \text{ weeks}}{52 \text{ weeks}} \right) \\ & = 0.000159 \text{ s/cc} \end{aligned}$$

The total excess lifetime cancer risk associated with this exposure is given by the sum of the unit risk for each time period multiplied by the average exposure concentration for the time period:

$$\begin{aligned} \text{Total Risk} &= (0.0665(s/cc)^{-1} \times 0.0000397 \text{ s/cc}) + (0.031(s/cc)^{-1} \times 0.000159 \text{ s/cc}) \\ &= 0.0000076 = 7.6 \times 10^{-6}, \text{ or about 8 in one million.} \end{aligned}$$

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In other words, out of one million people exposed to asbestos under this scenario, 8 cases of cancer might occur above normal cancer rates (which can be as high as 1 in 3). This estimated risk is well within EPA's target risk range for Superfund of 1 in one million to 1 in 10,000 (1×10^{-6} to 1×10^{-4}). These calculations indicate that activities at the camp do not contribute an appreciable excess lifetime risk of cancer from asbestos exposure to children or adults at the Bald Friar Quarry NOA site.

Conclusions and Recommendations

- Activity-based and perimeter air sampling results indicate that asbestos exposures at the camp are below levels of health concern. No special precautions are needed during any camp activities.
- Because the general area may contain deposits of asbestos, we recommend that any future construction or development planners recognize this potential and plan accordingly.

Thank you for including ATSDR in your site work. If you have any questions or concerns, or if you or your stakeholders would like further advice on dealing with NOA in communities, please feel free to contact me. I can be reached at (770) 488-0768 or by email at JDyken@cdc.gov.

Sincerely,

[signed]

Jill J. Dyken, PhD, PE
Environmental Health Scientist
Eastern Branch
Division of Community Health Investigations

cc:

Lora Werner, ATSDR Region 3