# **Letter Health Consultation**

Soil Data Evaluation

# ROSS PARK TAR SITE

ST. BERNARD, HAMILTON COUNTY, OHIO

EPA FACILITY ID: OHN000510412

Prepared by the Ohio Department of Health

JUNE 30, 2010

Prepared under a Cooperative Agreement with the U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES Agency for Toxic Substances and Disease Registry Division of Health Assessment and Consultation Atlanta, Georgia 30333

#### Health Consultation: A Note of Explanation

A health consultation is a verbal or written response from ATSDR or ATSDR's Cooperative Agreement Partners 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 or ATSDR's Cooperative Agreement Partner 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:

Ohio Department of Health Health Assessment Section Under Cooperative Agreement with the Agency for Toxic Substances and Disease Registry May 4, 2010

Steven Renninger, On-Scene Coordinator U.S. Environmental Protection Agency Emergency Response Branch 26 West Martin Luther King Drive (G41) Cincinnati, OH 45268

Dear Mr. Renninger:

This letter is in response to your request to evaluate the public health threat posed by potential exposures to seeps of petroleum hydrocarbons at the Ross Park Tar Site in St. Bernard, Ohio. The Ohio Department of Health's Health Assessment Section (HAS) evaluated the U.S. EPA soil sample results for this site in order to make recommendations for further actions at this site to the U.S. EPA On-Scene Coordinator.

#### **Background and Statement of Issues**

The Ross Park Tar site currently is a city park that includes baseball fields, playground, and picnic areas. Residents indicate that an oily, tar-like fluid occasionally migrates to the surface of the park. The tarry material appears to be left over from a former road paving operation where asphalt was used and stored during the construction of Interstate 75. The health concern is that residents who use the park might be exposed to hazardous substances during the times when the tarry material seeps to the surface. Limited U.S. EPA sampling data suggest that polycyclic aromatic hydrocarbons (PAHs) are the primary contaminants of concern.

## Discussion

The tarry material is buried about a foot beneath the surface and may extend down to a depth of 12 feet in the vicinity of the baseball diamond on the west end of the park. According to residents and the city service administrator, the tarry material seeps onto the surface (mainly in this area) in the summer months. The city response in recent years is to dig up the visibly stained soils at the surface and fill in the area with clean topsoil. However, there is some opportunity for incidental exposure to the contaminated surface soils and to volatile organic chemicals when one of these seep events occurs.

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides. Others are contained in asphalt used in road construction. They are commonly found throughout the environment at low levels in the air, water, and soil. Diesel exhaust contains significant amounts of PAHs. They can occur in the air, attached to dust particles, or as solids in soil or sediment (ATSDR 1995).

Urban soils contain measurable amounts of PAHs, primarily from airborne fallout from car and truck exhaust, residential burning of wood, and industrial sources. Documented levels of PAHs in soil near oil refineries have been as high as 200 parts per million (ppm). Levels in soil samples obtained near cities and areas with heavy traffic were typically less than 2 ppm (ATSDR 2009, IARC 1973).

PAHs generally have a low degree of acute toxicity to humans. The carcinogenicity of certain PAHs is well established in laboratory animals. Researchers have reported increased incidences of skin, lung, bladder, liver, and stomach cancers, as well as injection-site sarcomas, in exposed lab animals. Increased incidences of lung, skin, and bladder cancer are associated with occupational exposure to PAHs in humans (ATSDR 2009). Because of the complexity of PAH mixtures, the most active compound, benzo(a)pyrene [B(a)P], is used as the indicator compound. While not all PAHs are considered carcinogenic (e.g., pyrene), the EPA has determined that benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene are probable human carcinogens (ATSDR 1995). The National Toxicology Program (NTP) at the U.S. Public Health Service considers 15 PAH compounds to be "reasonably anticipated to be human carcinogens" (NTP 2005). Recently, the International Agency for Research on Cancer (IARC) has upgraded its overall evaluation of benzo(a)pyrene from 2B to Group 1 (carcinogenic to humans) [IARC 2010].

U.S. EPA collected soil samples from over 40 locations around the park for a variety of different compounds, including a limited number of volatile organic compounds, metals, and semi-volatile organic compounds, but this document will focus primarily on the PAHs. U.S. EPA collected four samples from various depths (from 3 to 8 feet) which were analyzed for individual PAHs (Table 1). HAS compared seven PAHs that are known or suspected to be human carcinogens to the ATSDR cancer risk evaluation guide of 0.1 parts per million (ppm), which was established for benzo(a)pyrene. In addition, HAS used EPA's Regional Screening Levels (RSLs) for the individual PAHs (U.S. EPA 2009) for further evaluation for carcinogenic and noncarcinogenic health effects. Ohio EPA has established a risk-based generic cleanup number of 0.512 ppm for the direct contact of soil based on cancer effects for B(a)P (Ohio EPA 2009). Soil quality guidelines for benzo(a)pyrene total potency equivalents in soil for specific land use were proposed by Canadian Council of Ministers of the Environment for protection against cancer risks in humans. Guideline values of 0.6 ppm and 5.3 ppm were established for all land uses, based on an incremental lifetime cancer risk of one in a million ( $10^{-6}$ ) and 1 in 100,000 ( $10^{-5}$ ), respectively (CCME 2008).

B(a)P was used as a surrogate to assess the relative toxicity of the seven carcinogenic PAHs (cPAHs) classified by EPA as probable human carcinogens. To determine the toxicity of the mixture of PAHs, the concentration of each cPAH was multiplied by a Toxic Equivalency Factor (TEF) which relates its toxicity to that of B(a)P. The sum of the weighted concentrations can be used to evaluate the PAH mixture (U.S. EPA 1993).

For this site, the calculated total B(a)P equivalent concentrations (Table 1) for three out of four samples were in the 1 to 2 ppm range, which is close to the typical average background levels found in urban soils but above the Ohio EPA's direct contact soil level of 0.512 ppm. However, the contaminated soils are currently between three and five feet below the ground, and no one would have direct access to the soil contamination at that depth. Sample 3, at a depth of eight feet, had a B(a)P toxic equivalent concentration of 5.6 ppm, which exceeds the Canadian guideline value of 5.3 ppm for a cancer risk of  $10^{-5}$ . This sample was taken on the western side of the park near the edge of the baseball diamond. The tarry substance occasionally comes to the surface in this area during the hot summer months, but was not detected at the surface in the past year (City of St. Bernard city service administrator personal communication 2010).

Besides direct contact with the tarry material seeping onto the ground surface in the vicinity of the west ball diamond, U.S. EPA and Ohio EPA field sampling crews detected a distinct hydrocarbon smell at the drill sites. This suggests a potential inhalation hazard from volatile chemicals associated with the seeps. Unfortunately, we have no extensive chemical-specific VOC data either for soils or the ambient air. Current data is inadequate to determine if this inhalation pathway is a public health threat as well.

A public health concern was raised because children could be potentially exposed to PAHs at this site due to its heavy use as a recreational area park. Children can be at a greater risk of developing illness due to exposure to hazardous chemicals because of their smaller stature and developing body systems. Children are also likely to have more opportunity to come into contact with environmental pollutants due to being closer to the ground surface and taking part in activities on the ground such as, crawling, sitting, and lying down on the ground.

## Conclusions

ODH concludes that exposure to site-related PAHs may pose a public health hazard if the tarry material reaches the surface and the public comes into direct contact with PAH-contaminated soil in the vicinity of the west ball diamond of Ross Park. This conclusion is based on the distinct possibility of exposure during a "seep event" during the summer months when use of the park by children is heaviest and not necessarily on the concentrations of chemicals of concern in surface soils. Specific information regarding levels of the chemicals of concern present in surface soils and in ambient air during the summer seep events is not available, limiting the HAS staff's ability to determine if exposure to these seeps pose a risk to the health of people using the park.

#### Recommendations

- The oily tar found at depth near the southwest baseball diamond should be isolated and contained or removed and the area covered with clean soil to protect the public from direct exposure to polycyclic aromatic hydrocarbons.
- Interim measures adopted by the city to identify and remove the tar substance that reaches the surface in that area of Ross Park should continue.

#### **Public Health Action Plan**

• If U.S. EPA becomes aware that the tarry substance has seeped to the surface (most likely during the hot summer months), U.S. EPA plans to collect a sample of the oily material in order to identify its composition, including an analysis for PAH content. In addition, U.S. EPA plans to sample for volatile and semi-volatile organic compounds in the ambient air during a seep event, which will aid in the evaluation of exposure via the inhalation route.

Sincerely,

Robert C. Frey, Ph.D. Chief, Health Assessment Section Ohio Department of Health

RF/jk

#### References

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U.S. EPA. 2009. Regional Screening Level (RSL) Master Table. December 2009. Available at: <u>http://www.epa.gov/reg3hwmd/risk/human/rb-concentration\_table/index.htm</u>.

#### Certification

The Ross Park Tar Site Letter Health Consultation was prepared by the Ohio Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun. Editorial review was completed by the Cooperative Agreement Partner.

Technical Project Officer, CAT, CAPEB, DHAC, ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.

Cn Team Lead, Cooperative Agreement Team, CAPEB, DHAC, ATSDR

DAII	Sample Number (Depth in feet)				Screening	EPA Cancer
ΓΑΠ	3 (8ft)	16 (5ft)	15 (4ft)	35 (3ft)	Level	Class
Acenaphthene	0.705	ND	0.554	0.665	3,400	
Anthracene	1.76	0.561	0.738	0.92	17,000	D
Benz(a)anthracene	4.18	0.933	1.25	1.37	0.15	B2
Benzo(b)fluoranthene	4.38	0.826	0.994	1.33	0.15	B2
Benzo(g,h,i)perylene	2.54	0.807	0.774	0.765		
Benzo(k)fluoranthene	2.18	0.714	0.802	0.903	1.5	B2
Benzo(a)pyrene	3.67	0.872	1.06	1.19	0.015	B2
Chrysene	4.42	0.854	1.23	1.41	15	B2
Dibenz(a,h)anthracene	0.775	ND	ND	0.301	0.015	B2
Fluoranthene	15.8	1.57	1.88	1.63	2,300	D
Fluorene	1.37	ND	0.702	0.791	2,300	D
Indeno(1,2,3-cd)pyrene	2.49	0.677	ND	0.789	0.15	B2
2-Methylnaphthalene	ND	ND	0.648	0.882	310	IN
Naphthalene	ND	20	2.33	1.17	3.6	С
Phenanthrene	5.27	1.54	2.22	2.07		
Pyrene	27.6	2.22	2.85	2.84	1,700	D
Total B(a)P Equivalents	5.58	1.12	1.29	1.85	5.3 (CCME 2008)	B2

#### Table1. Summary of PAH Results - Ross Park Tar Site

Source: U.S. EPA February 2010

Screening levels taken from the U.S. EPA Regional Screening Level (RSL) Master Table (December 2009) Results reported in parts per million

ND = Not detected at laboratory reporting limit

B2 = Probable human carcinogen (EPA 1986 guidelines)

C = Possible human carcinogen (EPA 1986 guidelines)

D = Not classifiable as to human carcinogenicity (EPA 1986 guidelines)

IN = Inadequate information to assess carcinogenic potential (EPA 2005 guidelines)



Figure 1. Ross Park Tar Site Location Map