**Questions and Answers Regarding Hot Mix Asphalt Plants and Environmental and Public Health Considerations**

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**Q. Are hot mix asphalt plants *relatively common* in the United States?**

A. Yes. There are some 3,600 hot mix asphalt plants in the U.S. (U.S. EPA, 2000, available at http://www.epa.gov/ttn/chief/ap42/ch11/related/ea-report.pdf). Hot-mix asphalt is usually produced at temperatures of about 300 degrees Fahrenheit, and needs to be applied at no less than about 250 degrees. It therefore needs to be produced relatively close to where it is needed. This is why hot-mix asphalt is produced at thousands of small facilities near residential centers and roadways, rather than at a few large facilities at distant locations.

**Q. Have hot mix asphalt plants been *tested* with regard to airborne emissions?**

A. Yes. The U.S. Environmental Protection Agency (EPA) has extensively tested, or overseen the testing of, hot mix asphalt production. (See http://www.epa.gov/ttn/chief/ap42/ch11/related/c11s01.html and associated links, especially the Emission Assessment Report at http://www.epa.gov/ttn/chief/ap42/ch11/related/ea-report.pdf).

**Q. On the basis of testing, what has the U.S. EPA concluded?**

A. U.S. EPA has concluded that even the largest hot mix asphalt plants, provided they are equipped with standard air pollution control equipment, are not major sources of pollution. This is in contrast to almost 200 other types of manufacturing facilities, which are considered, *per* the federal Clean Air Act, to be major sources of potentially hazardous air pollutants. (See *Federal Register*: February 12, 2002, Volume 67, Number 29, Pages 6521-6536, "National Emission Standards for Hazardous Air Pollutants: Revision of Source Category List Under Section 112 of the Clean Air Act," available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2002_register&docid=02-3348-filed.pdf).

**Q. Have various state environmental agencies studied hot mix asphalt plants?**

A. Yes. The North Carolina Department of Environment and Natural Resources (NCDENR), for example, has studied ambient air impacts from asphalt plants in the state, including in the very hilly terrain of western North Carolina. In 1998, NCDENR issued a temporary moratorium on the construction of new asphalt plants due to some citizens' concerns about air pollutant emissions. After extensive testing and modeling, NCDENR resumed

permitting of asphalt plants, finding that properly controlled facilities do not degrade air quality or otherwise endanger public health. NCDENR has studied asphalt plants more than any other state agency, and assesses their impacts using methods similar to those used by South Carolina DEHC.

**Q. What *compounds* are emitted to the air from hot mix asphalt plant exhaust stacks?**

A. The gases expected to exit the exhaust stack of the proposed facility are listed below in the table. As shown, more than 99% of the exhaust gases are made up of four chemicals — nitrogen, water vapor, oxygen, and carbon dioxide. Emissions of these four chemicals, at these rates, are not expected to affect public health.

**Table. Typical concentrations of compounds in gases emitted by hot-mix asphalt facilities.**

| Compound | Concentration in stack gas |
|---|---|
| Nitrogen | 67.7 % |
| Water | 20.0 % |
| Oxygen | 9.5 % |
| Carbon dioxide | 2.8 % |
| Carbon monoxide | 0.02 % |
| Sulfur dioxide | 0.004 % |
| Nitrogen oxides | 0.005 % |
| Volatile organic compounds (VOCs) | 0.004 % |
| Total | 100 % |

**Q. Can the *other* emitted materials listed above *harm health*?**

A. Yes, but only *at sufficiently large concentrations*, and not at small concentrations emitted by asphalt plants. Very large concentrations of substances such as carbon monoxide, sulfur dioxide, nitrogen oxides, and some members of a group of chemicals known as "volatile organic compounds" (VOCs, such as formaldehyde and benzene) can harm health. These pollutants, which are products of incomplete combustion, are emitted by cars and trucks, electric power plants, cigarettes, and many other sources.

**Q. Will children or others at the New Heights Middle School in Jefferson be endangered if the proposed hot mix asphalt plant is built?**

A. No. The proposed asphalt plant will, of course, emit pollutants, but not at dangerous levels. For example, the proposed plant would emit benzene, but this benzene will represent only 0.2% of the benzene already in outdoor air at the School (and throughout the County) due to cars, trucks, and other ordinary sources of this pollutant. Similarly, the proposed plant would add some formaldehyde to local outdoor air, but this increment would represent less than 2% of the formaldehyde already present.

Because of its rural location, air quality in Jefferson is quite good, and is expected to remain so regardless of whether or not the plant is built and operated.

**Q. Do "*fugitive emissions*" – emissions not captured by air pollution control devices – significantly adversely affect air quality and public health?**

A. No. Fugitive emission sources from hot mix asphalt production include:

- aggregate material handling and traffic;
- vapors released from equipment vents and from hot-mix asphalt placed into trucks; and
- truck exhaust.

Public concerns in the late 1990's prompted U.S. EPA to conduct a comprehensive study in which two hot mix asphalt plants (one in California and one in Massachusetts) were tested extensively for fugitive emissions and stack emissions. The EPA found that fugitive emissions of volatile substances were small, relative to exhaust stack emissions. (See EPA's 2000 Hot Mix Asphalt Plants Emission Assessment Report at http://www.epa.gov/ttn/chief/ap42/ch11/related/ea-report.pdf).

**Q. Are emissions from hot mix asphalt plants harmful to *worker* health?**

A. With regard to worker health and safety, although *roofers* who work with roofing asphalts (which are quite different, chemically and physically, from paving asphalts) and who remove coal-tar based products *may* be at some excess risk of some respiratory disease, **people working with paving asphalt do not seem to be at excess risk**. Watkins and colleagues (*J. Occup. Environ. Med*. 2002:*44*:551-558) found no excess risk of lung cancer or of non-malignant lung disease due to asphalt exposure in workers exposed occupationally to asphalt fumes.

**Q. Do asphalt plants or asphalt concrete otherwise threaten water quality?**

A. No. Many hot mix asphalt plants operate near drinking water aquifers and other potentially sensitive areas without incident. Asphalt concrete (the finished product) is solid and inert at all ambient temperatures. Asphalt concrete does not dissolve in water. Asphalt has been used for more than 50 years to line drinking water reservoirs and fish rearing ponds. Water in these settings must meet rigorous, health-based, drinking water standards. For example, for more than 40 years, the Metropolitan Water District of Southern California has used hot mix asphalt to line its drinking water reservoirs. Many fish hatchery ponds in Oregon and Washington are lined with hot mix asphalt.

**Q. Overall, then, are emissions from modern hot mix asphalt plants hazardous to public health?**

A. **No**: although some of the chemical compounds emitted by asphalt plants can be hazardous if people are exposed to high enough levels, **the amounts of these compounds emitted from these plants (and from associated operations, such as loading the product onto trucks) are too small to affect public health**. Hot mix asphalt production facilities are not major sources of air pollution *per* U.S. EPA. Air quality modeling of emissions from modern hot mix asphalt facilities almost always shows that impacts are very small, even for the nearest neighbors to a site, let alone for those farther afield.

Odors can and should be controlled to acceptable levels, as should dust and traffic from such operations.

Experience with thousands of currently operating hot mix asphalt plants in the nation indicates that they can be designed and operated in manners consistent with maintenance of environmental quality and public health.

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