Benefits are questionable, but not the potential for harm

With the promise of compounding troubles, the specter of oil shale and tar sands development looms large in three Western states. Colorado, Utah, and Wyoming are already dealing with some of the worst air pollution in the country — in the very same areas where oil shale and tar sands development is centered.

Air pollution, specifically high levels of ozone and fine particulate matter pollution, has been a well-documented problem in the areas of Utah, Colorado, and Wyoming that surround or are near potential oil shale and tar sands developments. Regardless of the technology employed, the problems are many: significant energy needed to extract, separate, and upgrade operations; large-scale open pit mining; disposal of great amounts of waste material; long-haul trucking of the products for refining; and emissions from the “in-situ” heating process. These issues increase air pollutants with long links to a host of environmental and public health problems.

Such problems are already prevalent along the Wasatch Front, the most populated area of Utah, where oil shale and tar sands crude would ultimately be shipped for refining. In 2013, the American Lung Association (ALA) named the Wasatch Front the 6th most polluted area in the U.S. for PM2.5, one of the more dangerous types of air pollution; in the winter of 2012-13, concentrations of this fine particulate matter exceeded the national health standard on at least 22 days. This would be problematic enough, but the same area received an air quality grade of “F” from the ALA for its high concentrations of ozone.
Q&A: Air Pollution, Oil Shale & Tar Sands

Q: What part of the oil shale process contributes to air pollution?

A: All of it. From mining the rock to refining the material, from transportation to waste disposal, all phases of oil shale and tar sands development would generate a suite of contaminants and particulates that are harmful to human health and the environment. Emissions from the development of these dirty fuels will also adversely impact ecosystem health and visibility in National Parks, Monuments and Wilderness Areas in the 3-state region.

Q: What particular contaminants are released into the air from oil shale and tar sands development?

A: There are many, but primary contaminants include Sulfur Dioxide (SO₂); Nitrogen Oxides (NOₓ); Carbon Dioxide (CO₂); Carbon Monoxide (CO); Fine particulate matter (both PM₁₀ and PM₂.₅); and Volatile Organic Compounds (VOC). Other hazardous pollutants include benzene, toluene, ethylbenzene, xylene, and formaldehyde.

Q. What is “fine particulate matter” pollution?

A: Fine particulate matter (PM) pollution consists of airborne particles, including dust, dirt, soot, smoke, and liquid droplets. Particles less than 10 micrometers in diameter (PM₁₀) can be inhaled into and accumulate in the respiratory system. The greatest health risk comes from particles less than 2.5 micrometers in diameter (PM₂.₅). Because of their small size (approximately 1/30th the average width of a human hair), fine particles can lodge deeply into the lungs.

Q. What are some of the health impacts associated with this kind of air pollution?

A: Air pollution has been directly connected to problems with:

- **Cardiovascular System**: Arterial inflammation, narrowing of the vessels, higher blood pressure, increased rates of heart attack and stroke.
- **Lungs**: Respiratory disease resulting in increased hospitalizations and deaths, exacerbated pulmonary diseases, and development of lung cancer.
- **Fetal Development & Related Issues**: Higher rates of babies born with significantly more chromosomal aberrations, premature or low-weight babies, and miscarriages. Also leads to increase in male infertility.
- **Other Diseases**: Higher rates of breast cancer, childhood leukemia, diabetes, immune suppression, bacterial infections, lupus, juvenile arthritis, infant mortality, sleep apnea, obesity, and suicide have all been connected to increased levels of air pollution.

Q: What recent studies have been done to link pollution with health problems?

A: In April 2013, the Centers for Disease Control and Prevention (CDC) and the Wyoming Department of Health released a study showing that increases in ground-level ozone concentrations in a heavily drilled county in Wyoming were directly related to more people visiting doctor’s offices with respiratory complaints. Conducted from 2008–2011, the study found that for every 10 parts per billion (ppb) increase in ozone, health clinic visits rose by 3% (the federal health-based standard for ozone concentrations is 75 ppb).
**Oil Shale**

Oil Shale is neither oil nor gas, though it is often confused with “shale oil” and “shale gas.” Scientists have spent more than 100 years trying to develop a commercial process for extracting kerogen from shale rock, which could in theory be developed as a fuel source for vehicles.

**Tar Sands**

Also called “Oil Sands,” Tar Sands is the name for a combination of clay, sand, water, and bitumen (a heavy, black, viscous oil). Current technologies involve strip mining and the use of solvents in order to separate the bitumen from surrounding clay, sand, and water. About 2 tons of Tar Sands will produce 1 barrel of oil.

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**Significant Public Health Risks**

The U.S. Environmental Protection Agency (EPA) recently stated that “oil shale and tar sands development processes may have significant, adverse impacts to air quality, in particular by increasing levels of ozone and nitrogen deposition.” For families living near regions facing potential oil shale and tar sands development, their concern is obvious — particularly given the already poor air quality in parts of Colorado, Utah, and Wyoming.

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Doctors and other health officials continue to voice concerns regarding the dangers of poor air quality in the region. “The volume of pollutants like sulfur dioxide, nitrogen oxides, and mercury added to the regional atmosphere will certainly result in many premature deaths, respiratory illnesses, non-fatal strokes, heart attacks, and childhood neurotoxicity,” says Dr. Brian Moench, president of the Utah Physicians for a Healthy Environment. “It would be far better for the public health if we invested in clean, renewable energy sources instead.”

Concerns over poor air quality have not just emerged recently. In the winter of 2011, the Uintah Basin (Duchesne and Uintah counties, Utah) saw ozone levels reach an 8-hour average value of 139 parts per billion — nearly twice as high as the federal health standard. In the first 2 months of 2013, the Uintah Basin experienced 24 days above federal standards. In the winter of 2013, concentrations of PM$_{2.5}$ were repeatedly at or above the national standard, which is more commonly seen along the heavily populated Wasatch Front.
Harming Iconic Landscapes

The economies of Colorado, Utah, and Wyoming are inextricably linked to clean air and clear vistas. Vast public lands sit within 50 miles of oil shale and tar sands country (and in some cases, right next door to areas most likely to be developed).

In addition to the health problems associated with increased emissions, oil shale and tar sands development produces SO₂, NOₓ, dust, and other pollutants that contribute to regional haze — leading to reduced visibility in National Parks, Monuments, and Wilderness Areas. Many cherished landscapes would be affected by oil shale and tar sands development, including:

**Colorado**
- Rocky Mountain National Park (sidebar)
- Flat Tops Wilderness Area
- Maroon Bells-Snowmass Wilderness Area
- Colorado National Monument
- Dinosaur National Monument (Colorado & Utah)

**Utah**
- Arches National Park
- Bryce Canyon National Park
- Canyonlands National Park
- Capitol Reef National Park

**Wyoming**
- Bridger Wilderness Area
- Fitzpatrick Wilderness Area

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**By the Numbers...**

**75%**
Depending on the extraction process, Oil Shale is estimated to emit as much as 75% more greenhouse gases than conventional liquid fuels produced from crude oil.

**40%**
Strip mining techniques to produce oil from Tar Sands results in as much as 40% more greenhouse gases than conventional means. Methods to access deeper deposits would greatly increase that percentage.

**2,000**
Up to 2,000 premature deaths in Utah each year can be directly attributed to air pollution.

**2**
It takes approximately 2 tons of Tar Sands material in order to produce just 1 barrel of oil.

**3%**
Increase in health clinic visits for every 10 ppb increase in ozone levels in Sublette County, WY, according to a recent 4-year study by CDC & the Wyoming Department of Health.