

Upper Green River Valley Coalition

The Upper Green's Declining Air Quality: A primer on pollution gathering over the valley

Wyoming's Upper Green River Valley has historically enjoyed some of the finest air in the United States thanks to its isolation from industrial development and large cities. With the rapid, widespread development of energy resources, however, the valley's air quality has visibly declined in recent years. This fact sheet summarizes how the natural gas boom has degraded this invaluable natural asset, affecting everyone who lives, works and visits the valley. More than 3,100 gas wells have been drilled in recent years, and 8,000 to 10,000 more are anticipated over the next decade or two. Each new well brings a host of impacts. Drill rigs spew exhaust, while traffic, pipelines, disturbed land, compressors and dehydrators pollute the air over the production life of the well. The potential for energy development to ruin our air is huge, highlighting the need for phased development and firm emission caps.

Airborne pollution obscures our vistas and may put our health at risk. Prevailing winds transport nitrous oxides and other industrial pollutants over the Wind River and Gros Ventre ranges, where they may be contributing to the documented acidification of alpine streams and lakes and harming prized fisheries. Eutrophication—a process where nitrate deposition depletes the oxygen content of water by spurring harmful plant growth—is already under way in wilderness lakes. Recent government projections indicate “infill” development in the Jonah gas field, when analyzed cumulatively with other energy projects, could lead to violations of visibility standards in nearby national parks and Wilderness areas and haze the sky over parts of the valley for as much as one-third of the year. The air in the Jonah, south of Pinedale, is expected to become so choked with particulates and ozone that human health standards could be violated.

Despite a glut of agencies monitoring our air, the Upper Green's air quality is falling through the bureaucratic cracks. Industry's use of best emission control practices is largely voluntary, air-quality monitoring is piecemeal and un-coordinated, and agencies look to each other for leadership. There is much to be done to protect the public's vital interest in air quality. The good news is that there are reasonable steps to lessen the drilling boom's impacts. The State of Wyoming, Bureau of Land Management (BLM), and U.S. Forest Service have the ability to require these steps through plan revisions, permits and other mechanisms. Here are answers to some common questions.

How does the energy industry affect our air?

Every aspect of the natural gas industry—from exploration and drilling to production and transmission—discharges pollution into the air. The largest source is the powerful diesel rigs used to drill wells two to three miles under the valley. “Fugitive” gas escapes from wells, compressors and pipelines. While drill rigs have the biggest impact in the short term, compressors operate for the production life of a well and may therefore result in the greatest quantities of emissions over the long haul. Excess gas is burned, or “flared,” in the completion process of most wells. Flaring and venting of waste gases also occurs during well testing and cavitation, from compressors and

during pipeline maintenance. Fumes also escape from dehydrators, drilling-waste ponds, and even pipelines. Truck traffic produces diesel exhaust and kicks up dust.

Finally, many consider the lighting, odors and noise associated with drilling and flaring to be serious impacts on air quality. While impossible to quantify, the diminished ability to see the stars on a crisp, quiet night erodes the valley's sense of place and quality of life. Values like this rarely show up in cost-benefit analyses for oil and gas development.

What pollutants do drilling and other industrial activities emit?

Nitrous oxides (NO_x), produced as engine exhaust and flared waste gases, are a leading culprit in the Upper Green's declining air quality. Emissions of **carbon monoxide** and **sulfur oxides** (SO_x) also result from combustion. When these gases react with sunlight and other emissions, ground-level **ozone** is produced. **Hydrocarbon gases** escape as "fugitive" emissions from countless sources, such as wellheads, compressors, pipelines, waste ponds and tanker trucks.

Industrial activity also releases two other classes of harmful emissions, known as **volatile organic compounds** (VOCs) and **hazardous air pollutants** (HAPs), which include carcinogens such as benzene, toluene, ethylbenzene and xylene (collectively known as BTEX), n-hexane and formaldehyde. **Particulates** are released as road dust and wind erosion of disturbed areas.

How much pollution does industry release over the Upper Green?

Under current monitoring programs, it will remain impossible to know for certain. Agencies can estimate emission volumes, but these have proved unreliable in the past because of faulty assumptions. A major source of emissions is the Jonah, the rich gas field south of Pinedale and slated for major "infilling." The BLM's preferred alternative in the Jonah's next phase of development, which calls for up to 3,100 new wells, estimates an annual release of up to 56,226 tons of VOCs and 16,362 tons of HAPs (see the Air Quality Technical Support Document, Jonah Infill Drilling Project). Under the most aggressive development scenario, in which industry drills 250 new wells a year, annual sulfur dioxide emissions would be about 26 tons a year; 1,115 tons of NO_x; 2,225 tons of carbon monoxide; and nearly 2,000 tons of particulates. According to a supplemental review, particulates in the Jonah will reach 99 percent and ozone 98 percent of the thresholds established to protect human health.

The Pinedale Anticline, another busy gas field in the Upper Green, produces four times the NO_x emissions predicted when this field was permitted in 2000. Then, officials estimated 694 tons would be emitted a year. Because the pace of drilling is much faster and the rigs used are more powerful than anticipated, actual NO_x emissions have increased to 2,700 tons. Because these releases are not expected to violate formally defined Clean Air Act thresholds, responsible agencies have declined to require further analysis and emission-control measures. Given BLM's history of underestimating impacts, it is hard to put much faith in its latest analysis, which still predicts a grim future for our air, stemming from the Jonah infill.

What are some of the harmful effects of these pollutants?

Visibility: The obscured mountain skylines are the most noticeable air-quality impacts associated with energy development. Beginning in late winter and running through summer into fall, the Wind River Range is often hard to see because of increasing industrial emissions gathering in the

sky and absorbing light. NO_x emissions from drill rigs are a leading culprit. The latest review on the Jonah infill anticipates visibility in Pinedale will be degraded for 113 days a year. Amateur astronomer Perry Walker, a retired Air Force physicist living in Daniel, has documented declines in both night-time air transparency and daytime solar ultraviolet radiation reaching the surface. These declines have coincided with the rapid expansion of development on the Jonah. Environmental reviews indicate that development will lead to violations of visibility standards in nearby Wilderness areas, as well as Yellowstone and Grand Teton national parks. For the first time in 20 years of monitoring, the Forest Service has acknowledged haze over the Wind River Range is reaching unacceptable levels. The BLM predicts the Bridger Wilderness will see up to 61 days of degraded visibility a year.

Human health: Exposure to hazardous air pollutants, many of which are carcinogenic, makes you sick. Benzene, for example, can cause leukemia, while moderate short-term exposure can cause a variety of unpleasant symptoms, like dizziness, headaches and vomiting. Ground-level ozone and its precursor gases impair respiratory function and are linked to asthma. A recent condensate spill in downtown Pinedale shows the potential for industry to inadvertently expose the public to harmful chemicals.

Environmental: Road dust degrades forage available to wildlife. Contaminants can be blown into our cleanest air sheds over national parks and Wilderness areas, where they can be deposited and washed into lakes and streams. Water samples collected in Bridger Wilderness lakes have documented a downward trend in the lakes' acid-neutralizing ability, although Forest Service officials do not attribute this to solely energy development, but to regional trends in air quality.

How are air-quality impacts monitored?

Currently, only three monitoring stations measure pollutants suspended in the air. Encana installed one on the western edge of the Jonah, poorly sited upwind from most of the activity. Shell operates one in the Anticline, just west of the town of Boulder. These devices measure NO_x, large particulates, carbon monoxide and ozone, but not small particulates and sulfur dioxide. The state Department of Environmental Quality installed third ambient air-quality monitoring station south of Daniel in the spring of 2005. Critics say this network is inadequate, arguing there should be more stations to assess local conditions and to test for a wider array of pollutants.

For years, the U.S. Forest Service has sampled water from alpine lakes in Wilderness areas, so-called Class 1 air sheds that have the highest air-quality standards under the Clean Air Act. Three times a year, water is sampled from five high-elevation lakes in the Wind River Range, home of Bridger, Popo Agie and Fitzpatrick Wilderness areas. These samples have shown a decline in the ability of these waters to neutralize acid, according to the Forest Service, which says a combination of factors may be involved.

State and federal agencies monitor "air-quality related values" at other valley locations. However, there are not enough secure funding sources to underwrite an effective monitoring system. Perry Walker performs independent spectroscopic analyses of emissions, but regulators have yet to take his findings into account. The annual cost of this entire monitoring system is \$527,000, or 0.013 percent of the \$4 billion in gas extracted from the Upper Green in 2004.

How can we improve our air quality?

It is time for firm **caps on emissions** and a plan for **phasing development** in stages. These measures would spread impacts over time, prolong the economic benefits of energy extraction and provide a fail-safe against irrevocable harm to the air. Industry can adopt many practices to minimize emissions. Here are some examples.

- Operators can install equipment to capture gases that are otherwise vented or flared.
- **Clustered development** leads to fewer acres of disturbed surfaces, such as roads, well pads and paths for pipeline and transmission lines, thus reducing airborne dust.
- To reduce road traffic, rig crews should be bussed to drill sites, production wells should be monitored remotely and pipelines should transport condensate and water.
- Drill with **low-emission rigs** that burn alternative or low-sulfur fuels.
- Disturbed areas should be reclaimed quickly to minimize wind-borne dust.
- Industry should install **control devices** on production facilities, such as dehydrators, condensate tanks, glycol heaters and compressors, sooner than required.

Which agencies are responsible for safeguarding Upper Green air?

Under the Clean Air Act, the federal Environmental Protection Agency (EPA) is required to maintain “National Ambient Air Quality Standards,” designed to protect human health and preserve the air quality in this rural region. The agency is also charged with ensuring “Prevention of Significant Deterioration,” known as PSD increments, in pristine areas classified as Class I and Class II air sheds. This responsibility has been delegated to the state of Wyoming, which administers what is known as a State Implementation Plan (SIP) to meet the requirements of the Clean Air Act. The state Department of Environmental Quality regulates the emission of pollutants and operates a state-wide network of air-quality monitoring stations. Federal land-management agencies also play a key role in Upper Green air quality. The Bureau of Land Management, the Forest Service and the National Park Service administer large holdings affected by Upper Green energy development. The National Environmental Policy Act requires BLM to analyze and mitigate air impacts in its reviews of energy projects on its lands. This agency has an important role to ensure industry compliance with Wyoming’s SIP and ambient air quality standards. While they have no regulatory authority, the Forest Service and National Park officials are mandated to ensure air-quality related values on the protected landscapes they administer.

What can I do to help protect the Upper Green’s air?

- Join the Upper Green River Valley Coalition and endorse its **Responsible Energy Development** proposal for the BLM’s resource management plan revision.
- Write letters to Gov. Dave Freudenthal and Wyoming’s Congressional delegation.
- Publish letters to the editor in local newspapers.
- Attend public meetings and comment on energy project reviews.

FOR MORE INFORMATION: visit www.uppergreen.org.

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