Understanding and Solving a Pollution Problem
2010 - 2011

Environmental Public Health Leadership Institute Fellow:

Timothy P. Ryan; MS, PhD
State Occupational Epidemiologist
Office of Governor Matt Mead
124 State Capitol
Cheyenne, WY 82002
307-777-8514
Tryan@wyo.gov

Mentor:

Pieter A. Sheehan; REHS
Director, Division of Environmental Health and Protection
Department of Community Health and the Environment
St. Charles County Government
1650 Boone’s Lick Road
St. Charles, MO 63301
636- 949-7406.
EXECUTIVE SUMMARY:

Sublette County, Wyoming has experienced significant growth in the exploration and extraction of natural gas in recent years. With the increase in exploration and extraction the level of air pollution has also significantly increased. Once the level of pollution was quantified, two questions arose. 1) Why has the level of pollution increased so much and, 2) who is responsible for regulating it? DEQ sought to answer both of these questions.

Through discourse, policy implementation, and best practices the level of air pollution has gradually declined over the last two years. DEQ now believes it has an understanding of the source of the pollution and how to regulate it.

INTRODUCTION/BACKGROUND:

Sublette County, Wyoming has experienced tremendous growth in recent years in the exploration and drilling for, and extraction of, natural gas from the Jonah and Pinedale Anticline Fields (see Figure 1). The number of wells drilled in Sublette County increased from 1,900 in 2000 to 10,000 in 2006; the number of gas production rigs in Sublette County increased from 2 in 1996 to 49 in 2006; and the statewide number of natural gas and gas condensate wells increased from 5,000 in 1999 to 28,969 by the end of 2008. This level of development has lead to increases in the amount of pollutants released into the air.

Ozone is a criteria pollutant created by reactions between the nitrogen oxides (NOx) emitted by various combustion sources and the VOCs emitted by both combustion and non-combustion sources. In 2005, the Wyoming Department of Environmental Quality (DEQ), Air Quality Division placed ambient air quality monitoring at three sites in the Upper Green River valley. Since the placement of those monitors, winter ozone levels in the Upper Green River valley have been observed at elevated levels of concern (e.g., 140 parts per billion during February 2008). It has been postulated that the largest change in ozone precursor emissions in Sublette County is due to increased oil and gas extraction activities, and that the increase in ozone has been attributed to this industry.

The elevated ozone levels began to raise concern in the State and so began the conversation on the cause and the possible solutions. The U.S. Bureau of Land Management (BLM) is the agency responsible for issuing leases on the land as well as the permit to drill on the land. The Wyoming DEQ is the agency that then issues the permit to extract the resources from the ground. Because the State is unable to control the rate at which BLM issues permits it felt as though it could not properly address the pollution problem.

Problem Statement: Why has the State of Wyoming been unable to control the level of air pollution in Sublette County?
Figure 1
**Behavior Over Time Graph:**

Figure 2

This graphic illustrates some of the air quality issues that have developed in Sublette County over the last 10 years. The increasing gas well development has lead to significant air quality issues.
Shifting the Burden archetype is used to illustrate that the current system attempting to address the level of air pollution in Sublette County is not working as effectively as it could.
**10 Essential Environmental Health Services:**
This project focuses on the Develop Policies category of the 10 Essential Environmental Health Services. The project goal is to facilitate dialogue between the natural resource development industry and the State and Federal regulatory authorities. This project was also done in parallel with a health risk assessment.

![Figure 4: The 10 Essential Environmental Health Services](image)

**National Goals Supported**
This project supports the following goals:

- The Healthy People 2010 objective to improve outdoor air quality by reducing the proportion of persons exposed to air that does not meet the U.S. Environmental Protection Agency’s health-based standards for harmful air pollutants.
- Reducing toxic air emissions and in turn reducing the risk of adverse health effects caused by airborne toxics.
- CDC Health Protection Goal for Healthy Communities by promoting safe and high-quality air in communities.
Goal: To reduce the level of air pollution in Sublette County, Wyoming

- **Resources/Inputs**: State Staff, Best available Technology
- **Activities**
  - Environmental Health Risk Assessment
    - Determine the type and quantity of air toxics.
    - Determine the level of risk that the air toxics pose on human health.
  - Determine Non-Attainment
    - EPA will determine the level of non-attainment in Wyoming
- **Outputs**
  - TIER I
    - Knowledge of the level and significance of the air pollution problem
  - This will determine how long the State and industry have to "fix" the problem.
  - Will reduce pollution in the short-term as well as the long-term.

- **Short & Long Term Outcomes, Impacts**
  - Learning
    - Understanding of the potential impact the air pollution is having on human health
    - State will learn the extent of non-attainment and how long they have to address the issue.
    - Which technologies reduce pollution and which do not.

- **Behavior**
  - Change in behavior of industry when it comes to development of natural resources in an environmentally friendly way.

- **Results**
  - Improved environment and reduction in the impact to the health of the citizens.
PROJECT OBJECTIVES/DESCRIPTION/DELIVERABLES:

Program Goal: The primary goal is to facilitate communication between the State and Federal agencies with the goal of reducing the level of pollution in Sublette County.

Health Problem: Sublette County has been declared in non-attainment of the federal ozone standard by the State and is under consideration by the USEPA, which can have a significant impact on the residents in the area.

Outcome Objective: A sustainable plan to systematically reduce the level of air pollution in Sublette County.

Determinant: Sustainability could be measured as a continual reduction in the level of air contaminants and ozone.

Impact Objective: To reduce the level of pollution in Sublette County.

Contributing Factors: The primary factor is the competing interests of the different parties involved. Industry wants to drill as many wells as possible; for the lowest cost possible. BLM has been issuing permits as quickly as they are requested. The Wyoming DEQ has been unable to slow the process down and properly monitor and enforce air quality standards.

Process Objectives:
1. By March 2010, meet with DEQ to discuss options to reduce pollution.
2. By April 2010, meet with Industry to discuss best technologies.
4. By March 2011, complete risk assessment of Sublette County.

METHODOLOGY:

The Wyoming Department of Environmental Quality in undertaking an effort to reduce the level of air pollution in Sublette County. Beginning in 2000, the number of drilling permits issued by the U.S. BLM rose rapidly. The resulting level of pollution has left DEQ wondering how it can both reduce the current level of pollution, and limit the number of new permits.

DEQ began the process by temporarily halting all new permits. This was not received well by the oil/gas industry. DEQ then formulated new rules stating that each new permit had to be off-set with reductions in emissions on an existing permit. This policy was also coupled with efforts by the industry to self-regulate and reduce their total emissions.

DEQ then implemented additional rules requiring further reductions with each new permit. DEQ, along with Sublette County and the Wyoming Department of Health commissioned a health risk assessment for the populated areas within Sublette County.
The health risk assessment has not been completed, but some of the preliminary findings suggest that the level of air pollution has decline from previous levels.

**Outcomes:**
This process has given all stakeholders a better understanding of the balance that is required in natural resource development. It has created more realistic expectations on each of the stakeholder’s parts. It has also given the Wyoming DEQ a better understanding of how it can control the level of air pollution.

**LEADERSHIP DEVELOPMENT OPPORTUNITIES:**

*Timothy P. Ryan, PhD*

The last year in the Environmental Public Health Leadership Institute has been an excellent learning opportunity. I have really enjoyed the many opportunities to further my leadership skills and identify those areas that are in need of further development. Hats off to the coaches and mentors, a job well done.

**ABOUT THE EPHLI FELLOW**

Timothy Ryan is an epidemiologist for the State of Wyoming. He is currently working in the Governor’s Office as the State Occupational Epidemiologist. His primary responsibilities are to provide surveillance, analysis, and policy advice on worker safety.

Timothy received his PhD in Epidemiology from the University of Rochester School of Medicine, with a focus on chronic kidney disease and the risk of cardiovascular mortality. He also has a Masters degree in Public Policy from Duquesne University, and a BA from Loyola University of Chicago.

Timothy also served three years in the U.S. Peace Corps in Albania and Nepal.