The Upper Green River Basin Oil & Gas Emissions Inventory: Southwestern Wyoming, Wyoming Case Study

Brian Bohlmann, P.E

Wyoming Department of Environmental Quality, Air Quality Division

Tel: 307-777-6993; e-Mail: bbohlm@wyo.gov

Abstract: Over the past 10 years the Jonah Field and the Pinedale Anticline located in the Upper Green River Basin (UGRB) of southwestern Wyoming has seen a dramatic increase in the number of wells being drilled. Due to the technological advancements made by the oil & gas industry in drilling and completing these large volume gas/condensate wells, there has been a rapid development of the producing fields. Since 2004, the Wyoming Department of Environmental Quality (WDEQ), Air Quality Division (AQD) has been collecting inventories from all oil & gas operations located in the Jonah and Pinedale fields within Sublette County, Wyoming. There were 1,811 wells in the Jonah Field in 2008, an increase of 1,272 wells since 2004, while there were 1,153 wells in the Pinedale Anticline in 2008, an increase of 791 wells since 2004. This equates to the drilling of about 515 new wells each year. Since 1995, the AQD has had a rigorous Title V inventory program, so the aspects of this well-by-well inventory development program focused on all aspects of the exploration and production of oil and gas.

Production in the Jonah-Pinedale Area of Development (JPAD) based on the Annual 2008 UGRB emissions inventory was reported to be 843,284,082 mcf of gas and 7,091,145 bbls of condensate, more than double of that produced in 2004. With the increase in production comes a related increase in emissions. Due to the unique nature of the fields be located within a basin surrounded by mountain ranges on the west, north and east sides, and the development of wintertime inversion, emissions from the drilling and production activities can become trapped within the basin. As a result, in February of 2008, Wyoming exceeded the then ambient 8-hour ozone standard of 80 ppb. The highest 8-hour ozone reading recorded at the Boulder monitoring station was 122 ppb.

Detailed emissions inventories collected by the AQD have helped to understand the source of the emissions, and determine which hydrocarbons are more reactive with NO_x to form ozone. With the evolution of the inventories from 8 sources and 7 pollutants in 2004 to 14 sources and 30 different pollutants today, the AQD has the basis for well-by-well emissions to be used as the input to an ozone model. Wyoming is currently working with a contractor to develop an ozone model for the UGRB that will use the developed inventory to try and produce the ambient ozone levels as seen at the 3 monitors in the area. This is a unique situation in that all development occurs within a basin that is surrounded by high mountain ranges, and elevated ozone is produced during winter time inversions with stagnant conditions and plentiful snow cover.

More information can be found on the AQD emission inventory web page at the following link http://deq.state.wy.us/aqd/ei.asp or by visiting the AQD's oil & gas permitting web page at http://deq.state.wy.us/aqd/oilgas.asp .