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Proj 115

To: COGCC Commissioners

From: Rich Griebeling

Date: May 30, 2000

Subject: 3M Project Status Relative to the June 5&6 Public Issues Hearing on the 160-Acre Well Density Ignacio Blanco Fruitland Formation Application (Amoco et. al., Cause No. 112, Docket Nos. 0004-AW-05,-06)

As you will recall, the 3M Project **3 M's** stand for **Mapping, Modelling, and Monitoring**. The 3M Project has been designed as a continuous, decades-long project to provide tools that will develop a more comprehensive understanding of gas and water production from the Fruitland Formation and potential impacts at the Fruitland Formation outcrop in the Colorado portion of the San Juan Basin. These tools have progressed to adequately support COGCC's regulatory implementation of the referenced 160-acre well density application if it is approved. An update by each of the 3M's follows:

Mapping

Geologic surface mapping of the Fruitland Formation outcrop has been completed. Prior to the initiation of the 3M Project approximately 22 miles of the Fruitland Formation outcrop was mapped from the New Mexico state border northeastward to the northern boundary of the Southern Ute Indian Tribe (SUIT) Reservation. The 3M Project extended outcrop mapping approximately 26 more miles northeastward to the eastern edge of the developed portion of the basin near the La Plata County – Archuleta County line. The Colorado Geologic Survey performed the outcrop geologic surface mapping and will be publishing the maps, measured sections, and stratigraphic cross sections in an open-file report in July.

The mapping portion of the 3M project has not turned up any new public health, safety and welfare or significant adverse environmental impacts along the outcrop. Rather, it has documented detailed geologic relationships within the Fruitland Formation as they are expressed over a large portion of the outcrop. This geologic mapping work should be useful in reviewing and conditioning applications for permits to drill in near-outcrop areas, investigating outcrop impacts, and evaluating potential mitigation alternatives.

Modelling

Computer ground water and reservoir models have been developed. The ground water model is a public domain single-phase (water only) computer model that was applied to simulate pre-coal-gas-development head pressures over the entire San Juan Basin (both Colorado and New Mexico portions). These heads established initial pressure and ground water flow conditions for the reservoir

model which was custom- developed as a public domain model for the Fruitland Formation in the Colorado portion of the San Juan Basin.

The reservoir model is a two-phase (gas and water) computer model that handles methane desorption and adsorption as well as matrix shrinkage enhancement of permeability. It is unprecedented in scale and capability as a public-domain, regional, coalbed methane reservoir model. The reservoir model is currently based on up to 20 years of production data from 1060 wells, 4870 pressures from 591 wells, thickness measurements from 742 wells, and water chemistry data from 572 wells.

The reservoir model can serve as a predictive tool for new well development. The reservoir model has been run for both the current status quo level of well development and with future development assuming existing approved open drilling windows are developed and new drilling windows applied for under the referenced application are developed. These runs showed no significant change in outcrop seepage due to future coal gas well development.

Portions of the regional reservoir model could also be expanded to investigate potential site-specific outcrop impacts from existing or proposed wells and to evaluate mitigation alternatives. Future data from new coal gas wells and the 3M monitoring wells will be incorporated into the reservoir model as appropriate. I view the reservoir model as a dynamic tool that will continue to be refined over the next several years and decades as new information becomes available and new concepts are developed.

Monitoring

Later this summer several clusters of monitoring wells will be installed north of the SUI Reservation to gather data in the area between the producing coal gas wells (which have provided a great deal of data) and the outcrop (which has been mapped extensively) north of the SUI Reservation. These wells will compliment existing monitoring wells at various near-outcrop locations both north and south of the SUI Reservation boundary in addition to new monitoring wells that SUI is installing within the Reservation. Each monitoring well will be completed and isolated in a separate package of coals within the Fruitland Formation to monitor pressures and coal gas (if present). Many of the coals will be cored, and the cores will be analyzed to provide gas content data. These monitoring wells can be observed over the decades of future coal gas production in the Colorado portion of the San Juan Basin. Information from the monitoring wells may be used to refine the reservoir model in the future.