SO WHY ARE ALL THESE GAS FLARES BURNING IN THE OIL FIELDS? By Dave Hvinden

There is a common misconception as to why so many oil wells have flares burning night and day (fig. 1). First of all, it must be understood that unlike oil, natural gas cannot be trucked to the nearest gas plant for processing. A gas-gathering pipeline and processing plant infrastructure must be in place to condition the natural gas for retail use. An economic analysis must be done to determine if it is even feasible to connect a well to an existing pipeline or perhaps to build a new pipeline into an area of ongoing development (fig. 2). Even after the oil and gas well has been connected to a gas-gathering pipeline and processing facility, there are still times when the well may flare intermittently, this is generally due to excessive line pressures or mechanical problems.

In North Dakota, more than three-quarters of the natural gas is produced as associated gas from an oil well (figs. 3 & 4). In an effort to conserve this resource and protect against waste, the Industrial Commission Oil and Gas Division, under the authority granted in section 38-08-04 of the North Dakota Century Code, implements and enforces rules and regulations to limit the production of oil produced from wells that are not yet connected to a gas-gathering system. Typically, wells are allowed to produce at a maximum efficient rate or MER for a period of time (generally 30-60 days) in order to evaluate the potential of the well and stabilize the production. After such time, the well production is then restricted to 200 bopd (barrels of oil per day) for another 30-60 days, then 150 bopd for an additional 30-60 days, and finally 100 bopd until the well is connected to a gas-gathering system (fig. 5). Further extensions may be granted provided certain conditions are met. But whatever the reason, until that connection is made, the only alternative is to burn the gas.

If an oil company determines that it is not economically feasible for them to build a new pipeline or connect to an existing gathering system, the company may make application to the Industrial Commission Oil and Gas Division seeking relief from paying taxes and royalties on flared gas. Currently, state law, under section 38-08-06.4 of the North Dakota Century Code, grants an exemption from payment of taxes and royalties to all new wells for one year from the date of completion. After one year the well must be connected to a gas-gathering system, granted an exemption from the Industrial Commission Oil and Gas Division, or pay taxes and royalties on the flared gas.

In 1999, North Dakota flared only 3% of its gas production. Since then, flaring has continued to increase, primarily due to the influence of the Bakken Play. Prior to the Bakken Play, most of North Dakota's gasgathering and processing was concentrated in historical oil-producing areas in the extreme western parts of the state. However, as the Bakken Play continues to expand, companies are drilling wells further east and into areas that lack natural gas-gathering and processing facilities. In 2007 the state produced over 70 bcf (billion cubic feet) of natural gas and nearly 20% of that production was flared.

As stated earlier, in order to reduce the amount of gas being flared



Figure 1. An example of a flare from an oil and gas well producing at its maximum efficient rate.



Figure 2. Prior to permanent connection to a gas gathering pipeline and processing facility, a test meter assembly is used to measure the rate at which the well is producing gas for future market feasibility.



Figure 3. An example of an oil and gas well connected to a gas pipeline. This particular connection also enables the pipeline company to launch a pipeline inspection gauge or what is affectionately known as a "pig" to clean and inspect specific lengths of the pipeline.

the infrastructure must be built to gather the produced gas, process it, and get the processed gas to a pipeline. Now that the size of the natural gas resource is proven, operators in the state are rapidly planning and building the gathering pipelines and processing plants as well as access pipelines to the large interstate pipelines that cross the state.

Some suggestions to facilitate this process have been introduced:

- 1. Extend the sales tax exemptions to gathering systems that collect oil wells producing associated gas.
- 2. Allow construction of pipelines in existing road right-of-ways.
- 3. Perform in-depth studies of gas production and potential to aid in planning future infrastructure needs.
- 4. Streamline pipeline facility permitting and regulatory processes.
- 5. Maintaining and not tightening EPA air quality standards for natural gas gathering and processing.
- 6. Educate the public as to the value and necessity of pipelines.

Oil always has, and continues to be, the primary source of income for most wells in the Williston Basin. With natural gas prices now hovering in the \$6-8 per thousand cubic feet range, natural gas is no longer just a "by-product' of an oil well. So next time you are driving through oil country and see those flares, you will be aware of all that is being done to conserve this vital resource while providing you with a safe and secure supply of energy.



Figure 4. Once the oil and gas well is connected, temperatures, pressures, and rates of gas production can be read onsite or accessed remotely through a solar powered remote terminal unit.



| | | | 2006 Gas Processing | 227 MIMCED |
|------------------------|---------|-------------------------------------|--------------------------------------|------------|
| Pipelines | <u></u> | Gas Plant | | |
| | | New Gas Plant Expanded Gas Plant | New Gas Processing Plants | 73 MMCFD |
| Proposed Pipelines | | | Gas Processing Expansion Projects | 213 MMCFD |
| | | | Total Planned Capacity | 513 MMCFD |
| Bakken Expansion Link* | | | New Additional Pipeline Capacity | 122 MMCED |
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| | | | Proposed Pipeline Expansion Capacity | 228 MMCFD |
| | | | Total New and Proposed Capacity | 350 MMCFD |
| | | | | |

Figure 5. Map of major natural gas pipelines in North Dakota.