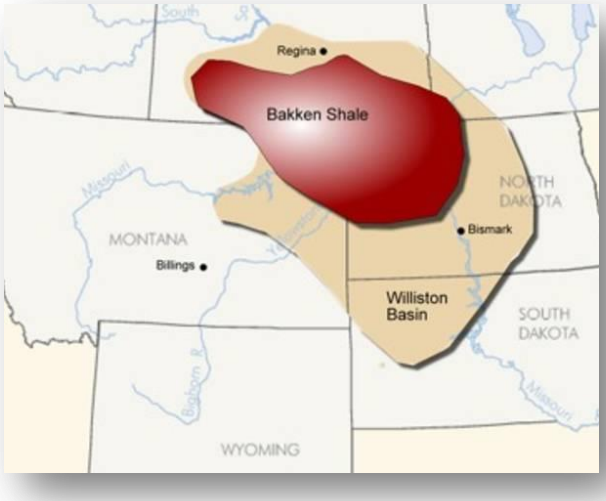
Recognizing Excellence in Gas Flaring Reduction

The 2015 GGFR Excellence Awards

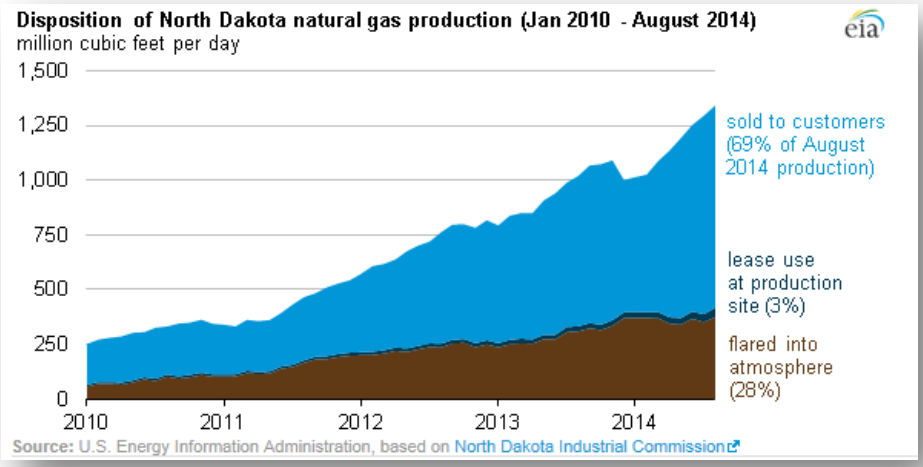
FLARE REDUCTION IN THE BAKKEN, USA

Background

The Bakken/Three Forks petroleum system is a large oil and gas resource play in the Williston Basin that covers the western part of the state of North Dakota, USA, northeastern Montana and extends into southern Saskatchewan, Canada. Although conventional vertical wells previously produced minor amounts of oil from the system, it was extended through lateral horizontal drilling combined with multistage hydraulic fracturing that has driven the Bakken/Three Forks to over 12,000 wells producing more than 1 million barrels of oil per day. The midstream pipeline infrastructure that collects and takes the oil and gas to market has not kept up, leaving much of the oil to be transported by truck and as much as 350 million cubic feet per day of associated well head gas to be flared at the well.



Hess Corporation first commenced operations in North Dakota in 1951 and currently holds one of the largest acreage positions in the Bakken. Hess's net Bakken production averaged over 105,000 barrels of oil equivalent (BOE) per day for the first three months of 2015. Hess also operates a large midstream gathering system.



The company values sustainability and as a result was ranked first among U.S. energy companies on the 2015 *Newsweek* Green Rankings – U.S. 500. In January 2015, the company was the only U.S. oil and gas producer named to the 2015 Global 100 Most Sustainable Corporations list. Even with the large commitment to developing their midstream system, the company was still flaring associated gas.

In 2013, Hess partnered with GTUIT, a designer, manufacturer and operator of well site gas capture and natural gas liquid extraction equipment to provide mobile and modular flare gas processing equipment.

Partnership Roles

Hess has funded the project and receives revenue from the sale of the natural gas liquids (NGLs). GTUIT provides all design, manufacturing and operation of the units. GTUIT staff is responsible for setting-up the equipment, monitoring (site visits and remote telemetry), consumables and maintenance and repairs.

Challenges, Barriers and Lessons Learned

There were two categories of challenges the partners faced:

- developing equipment that adapted to the every changing flow conditions of the well and the changing chemistry (BTU content, water content) of the associated gas, and
- developing unmanned, mobile and modular equipment that was reliable in oil field conditions as well as dusty and extreme environmental conditions that range from -40°F to +105°F.

The resulting equipment consists of patent-pending flow control with gas compression and refrigeration that lowers the gas stream to -40°F resulting in creation of a stream of NGLs and conditioned field gas. The equipment has been tested and improvements made over several long cold winters and hot summers resulting in the equipment being operational over 90% of the time in 2015.

Environmental Results

Currently GTUIT is operating 16 units for Hess at seven well site locations processing 10.5 MMCFD of associated gas per day. Hess' investment in flare capture and commitment to the environment has:

- recovered over 6 million gallons of NGLs since the start of the relationship which represent a significant economic benefit. The project is currently recovering approximately 40,000 gallons of NGLs per day,
- saved 45,000 tons of carbon dioxide (CO_2) from entering the atmosphere, and
- saved 13,500 tons of volatile organic compounds (VOC) from entering the atmosphere

To put these savings into perspective, the average tree in North America sequesters 911 pounds of CO_2 over its life (Source: U.S. EPA). Hess and GTUIT efforts resulted in saving 45,000 tons of CO_2 from entering the atmosphere which is the equivalent of planting nearly 100,000 trees. VOCs are precursors to photochemical smog and a contributor to global warming. Hess' commitment to the environment with this project diverted over 13,500 tons of VOCs from escaping with the flare gases into the atmosphere.

Future

The other by-product of the GTUIT system is conditioned field gas. The gas is a high-quality, dehydrated natural gas product with reduced BTU and increased methane rating that is delivered at steady flow and pressure. The conditioned field gas is currently being used for fuel for onsite power generation equipment replacing costly and less environmentally friendly diesel fuel.

In the very near future this conditioned field gas will be used for feedstock for mobile compressed natural gas and liquefied natural gas production units. Field production of compressed natural gas and liquefied natural gas produces a more cost-effective, efficient, and cleaner fuel that is used to power drilling rigs or well completion equipment.

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