Prudhoe Bay Field
Fact Sheet Gas Handling Facilities

Central Gas Facility (CGF) and Central Compression Plant (CCP)

Oil extracted from the North Slope reservoirs contains water and gas. The water and gas are separated from the oil at separation facilities (gathering centers or flow stations), after which the gas is routed to the Central Gas Facility (CGF). The CGF is operated by BP and is located in the eastern end of the Prudhoe Bay oil field. The facility started up in 1986 and was expanded in 1990, 1993, and 1994. It was constructed in Japan, and Tacoma, Washington, and New Iberia, Louisiana and has the world's largest capacity smokeless flare and, at 76,000 horsepower, the world's biggest refrigeration system.

The CGF can handle 9 billion cubic feet of gas daily and can produce up to 100,000 barrels of natural gas liquids (NGLs) daily, making it the largest gas plant in the world. The main facility is 1,310 feet long, 10 feet short of a quarter mile. It consists of 36 modules, the largest being a 10-story compressor module weighing 5,400 tons.

The gas-fired turbines that drive the booster and miscible injectant (MI) compressors at the CGF generate more than 30,000 horsepower each. They are the same engines found on large-body jumbo jets. The total power of CGF's turbines is over 470,000 horsepower.

Gas Handling Facilities Fast Facts

- CGF has the capacity to handle 9 billion cubic feet of gas daily.
- CGF is the largest gas-handling facility of its kind in the world.
- CGF was constructed in 1985 and began operating in 1986.
- Average gas injected daily from the CCP is 4.5 billion cubic feet.
- Combined horsepower of CGF & CCP is more than 1 million horsepower.

At the CGF, the gas is compressed, cooled to –40 degrees Fahrenheit, and sent to low-temperature separators. NGLs are the heavier components of gas, which liquefy during the cooling and separation process. Most of the NGLs are blended with the crude oil and shipped down the Trans Alaska Pipeline. A portion of the NGLs is mixed with dry gas (methane) to create miscible injectant for enhanced oil recovery. Some of the NGL stream is routed to Kuparuk where it is converted to MI, as well. CGF is the chief provider of fuel gas for other North Slope processing facility equipment consumption. The remaining dry gas is sent to the Central Compression Plant (CCP).

The MI is injected back into selected areas of the oil reservoir. The MI acts as a solvent, allowing more oil to move through the reservoir to the producing wells. MI and water are injected into the reservoir alternately in repeated cycles to push the oil through the formation. The use of MI has increased daily oil recovery by approximately 90,000 barrels.

At the CCP, dry gas is compressed, as a conditioned by-product, so it can be re-injected into the gas-cap formation of the Prudhoe Bay reservoir to help maintain reservoir pressure. A small portion of the gas is used to supply field fuel needs, rather than being re-injected. This highlighted sentence is true, only on a back-up basis, when CGF isn't providing the field's need (as added above). Approximately 5 billion cubic feet of gas are routed to the CCP each day, enough gas to heat a typical U.S. home continuously for more than 20,000 years.

The gas is compressed in stages by industrial turbines until it reaches 4,000 pounds per square inch. Compressing the gas causes it to heat up, so periodically during the compression process, the gas is cooled with fans. After the final compression, the gas is cooled to about 150 degrees Fahrenheit and distributed through pipes to gas injection wells, to inject the gas into the ground. The total power of the turbines at the CCP is over 600,000 horsepower.

Central Gas Facility

Central Gas Compressor