

Enerproject supplied five associated gas recovery modules to this station in West Siberia.

ASSOCIATED GAS RECOVERY MODULES

Global Environmental Protection Issues Bring Growth in Enerproject's Associated Gas Recovery Module Business

By Roberto Chellini

Recent environmental protection directives prohibit flaring of associated natural gas coming out of oil wells. This practice is still widely used, but in many nations national legislation makes it illegal and controls are getting progressively stricter.

The problem, especially in remotely located oil fields, is what do we do with associated gas? It must be collected, treated and then used in the most convenient way.

Enerproject of Switzerland is engineering and manufacturing associated gas recovery modules.

For years the company has specialized in fuel skids supplying natural gas for gas turbine operation. Designing of an associate gas module is substantially different from a turbine fuel gas module because of the type of gas to be handled. While the fuel gas is practically pure methane — well over 80% — clean and dry, the associated gas coming out of an oil well is dirty and unstable. Its composition can vary from well to well and also vary over time from the same well.

It is important to separate all components that could be absorbed by the compressor lube oil, which could be diluted and thereby lose its lubrication characteristics. All the materials of piping, valves, etc., have to be selected so as to avoid the corrosive effect of the gas.

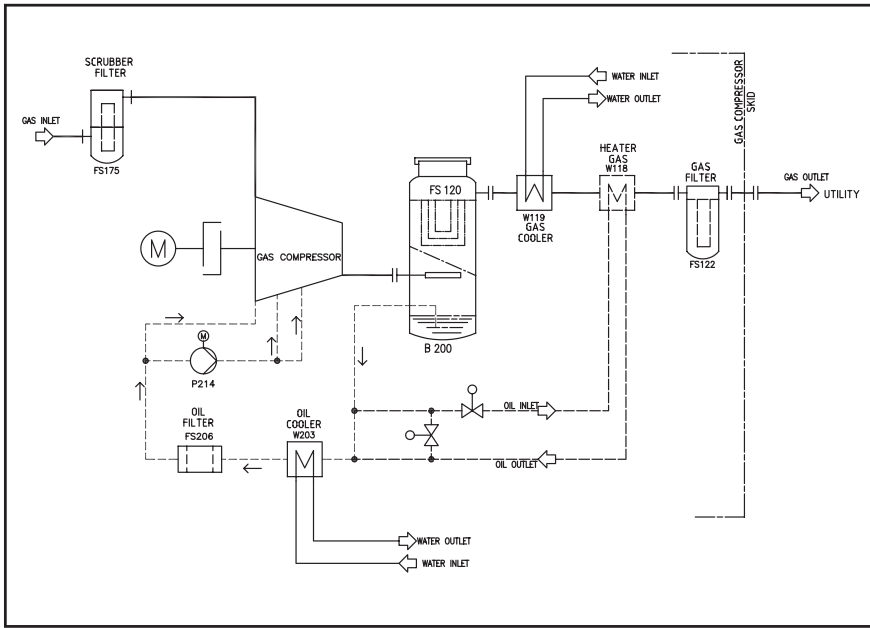
Usually the gas is received after a first separation stage at 29 to 43 psi (2 to 3 bar) pressure, or after the second separation stage at atmospheric pressure (or even slightly below). At the module inlet, high-performance filters and separators are placed before the compressor to avoid entraining of sand, as well as to reduce water and other impurities. After compression, the gas

is cooled down in a heat exchanger to separate residual condensate and then heated up again using the heat recovered from the compressor lube oil to go away from the dewpoint in order to avoid condensation. It is delivered in stable condition of pressure and temperature so that its state is 36° to 54°F (20° to 30°C) away from its dewpoint.

The types of compressors more



The West Siberia station was constructed in 2008. Gas delivery pressure is 232 psi (16 bar). Gas flow for each of the five Enerproject-supplied units is 247,202 cfh (7000 Nm³/hr).



Flow diagram of an associated gas recovery unit.

suitable for this kind of service are oil-injected screw compressors. Being volumetric compressors, they are not affected by gas composition (variation in molecular weight) and are able to maintain a constant delivery pressure.

These compressors are usually driven by electric motors, but the tendency is to use gas engines as drivers since the gas is always

available. Enerproject has also manufactured modules with diesel engines, but this solution has to be considered an exception.

These associated gas skids have a capacity of up to 529,720 cfh (15,000 Nm³/hr), which is half the capacity of fuel gas skids. This is due to the size of the equipment, filters and separators needed to handle this type of gas.

It is important to maintain the skid size in standard container dimensions for transport into remote areas. The modules are positioned on a concrete foundation near the wellhead. Usually three or four modules are placed in parallel. The number of modules in operation is selected according to the associated gas flow, which is continuously variable.

The delivery pressure of the associated gas recovery module is set according to the use. If the gas is used as turbine fuel gas, the delivery pressure can be in the range of 435 to 580 psi (30 to 40 bar). The gas needs to be very clean after compression to comply with the strict gas turbine manufacturer specifications.

More often the module supplies the gas to a low-pressure local gathering line at 87 psi (6 bar) or 290 to 362 psi (20 to 25 bar) depending on the gathering system. The gas collected from several wells in the neighborhood is then piped to a refinery or other uses.

According to Enerproject, this type of production now accounts for 40% of its total order volume. Due to the environmental protection issues, associated gas orders are increasing more than the orders for fuel gas skids. ©

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