Utilization of Associated Petroleum Gases

LLC TyumenNIIgiprogaz puts a great emphasis on the utilization of associated petroleum gases (APG) when developing the process solutions for oil and gas fields infrastructure development. 100% of APG utilization is achieved in the delivered engineering projects.

By LLC TyumenNIIgiprogaz projects there were built and have been operated for more than five years utilization compressor stations CS-1 and CS-2 at the Central Gathering Facility-1 and Central Gathering Facility-2 of the Urengoy oil and gas condensate field with APG processing as a gas lifting in the required scopes and drying of the remaining gas at the low temperature separation unit and its feeding to the gas trunk pipeline. Petroleum gas utilization allowed refusing from the use of the Valangian gas as a gas lifting.

The key process and compressor equipment CS-1, CS-2 is produced by the factory of OJSC SMNPO named a

Sumy town, Ukraine. Centrifugal double hulled, three-stage compressor units ТКА-Ц-8БД/0.3-8.16 with a gas turbine drives of a unit capacity 8.0 MW are provided. The compressor units are placed in the hungars, where intermediate and gas boots for fluid catching after the inter-stage and end cooling of the compressed gas in the air-cooling units are provided.

The scope of petroleum gas utilization at the Compressor Stations CS-1 and CS-2 makes 1280 mln.m³/year.

Compressor Station CS-1 at the Central Gathering Facility-1

Reduction of gross emissions of pollutants into the atmospheric air will make 102 K tons per year for compressor station CS-1 and 86 K tons per year for CS-2 (188 K tons total per year) in case of commissioning of the utilization compressor stations and no flaring of the associated gas.

The Compressor Stations were included into the pilot project of a joint “Utilization of the associated petroleum gas in the Urengoy oil and gas condensate field” within the Kyoto protocol.

Development and implementation of a complex of the process solutions on modernization of oil production technology and efficient associated petroleum gas utilization in the Urengoy oil and gas condensate field received an award of OJSC Gazprom in 2011.

Utilization Gas Compressor Stations (GCS-1) at the Oil Treatment Facility in the Kazanian oil and gas condensate filed of OJSC Tomskgazprom was constructed as per the design of TyumenNIIgiprogaz and has been operated for more than two years. Second phase gas compressor station (GCS-2) on utilization of associated petroleum gas including gas from the terminal separation unit was delivered in 2013.

Gas Compressor Stations GCS-1

The first phase has been commissioned in August 2011.

Three Compressor Units are designed as a part of Gas Compressor Station GCS-1 on the basis of Ariel compressor with a gas reciprocating engine Caterpillar and four similar compressor units are designed as a part of Gas Compressor Station GCS-2.

Gas Compressor Stations GCS-2 (under construction)

Commissioning of the Gas Compressor Unit GCS-1 reduced emission of pollutants into the atmospheric air by 8.5 K tons per year. Commissioning of the Gas Compressor Station GCS-2 will allow to reduction of emissions by additional 12 K tons per year due to reduction of the associated petroleum gas flaring.

We are also designing an Integrated Gas and Condensate Processing Unit also in the Kazanian oil and gas condensate field with use of the compressed APG at the Gas Compressor Station of first and second construction phases. The peculiarity of the

Condensate Compressor Unit will be processing of the unstable condensate released while processing of dried gas by low temperature separation method with use of turbo expanding assemblies and obtaining of stable condensate and propane-butane at the mass-transfer apparatuses. The total scope of the associated petroleum gas utilization at the Gas Compressor Stations GCS-1 and GCS-2 will make 1000 M.m3/year in case of a full development of the field.

We are also delivering a Gas Compressor Station project on APG utilization, including gas from the Terminal Separation Unit in the Severo-Ostaninskoe oil and gas condensate field and its feeding to the Myldzhinskoe Integrated Gas Processing Unit. The scope of APG utilization will make 470 M m^3/year.

The developed process solutions and the experience of their implementation in the operating oil and gas production facilities will be used for designing of the analogue hydrocarbon fields in the East and West Siberia.