

GOPELC Internship Report

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CHAPTER 1

INTRODUCTION

Romgaz is the largest natural gas producer and the main supplier in Romania. The company has a vast experience in the field of gas exploration and production and a history that began in 1909 with the discovery of the first commercial gas reservoir in the Transylvanian Basin by drilling well Sarmasel.

Romgaz undertakes geologic research in order to discover new gas reserves, produces methane by exploiting the reservoirs, stores natural gas in the underground deposits known as depogas, interventions, workover and special operations on wells and technological transport. Romgaz is composed of four main subsystems:

- Production and extraction
- Maintenance
- Transportation
- Gas storage: Depogas

The main responsibility of romgaz is oil extraction, dehydration, and separation. After extraction and treatment, romgaz supply the gas to Transgas national system. The conditions of the transported gas should be 99.7% methane and -15 °C dew point.

CHAPTER 2

SITE VISIT

Two different processes are applied whether in summer or in winter.

2.1 Winter

In winter, September to May, gas is extracted from the ground through Christmas tree eruption head presented below.



Figure 1: Christmas tree

The first process after gas extraction is heating. The inlet gas enters at a pressure of 40 bars and temperature of 10-12 °C. The outlet gas exits at a pressure of 130 bars and a temperature of 55°C. Two types of heater are present in the plant: old and new heaters.



Figure 2: Old heater



Figure 3: New heater

The difference between them is that in the new heater, we can specify the required outlet gas temperature. In the heater, the gas, water, and sand pass through the orifice resented below



Figure 4: Gas orifice

After heating the gas, all the gas from open wells goes into underground separators to separate water and sand from gas, and then enter through surface separators. Large quantities of water or other liquid impurities are separated and small leftovers impurities are still present in the gas.



Figure 5: Surface separators

After leaving the surface separators, small quantities of water remains in the gas upon which they need further treatment. The dehydration treatment stage is called absorption and is done in an absorption column using dry polyethylene glycol (PEG) since it is the most used hydrophobic liquid to absorb water from gas.



Figure 6: Dry polyethylene glycol



Figure 7: Absorption column

After the absorption column, a PEG regeneration process is applied in order to account of minimal losses benefit from 99.7 % PEG. Here it should be noted that only 10 L of PEG are lost per year.



Figure 8: Polyethylene glycol regeneration

After dehydration, the treated gas is sent 8km to fiscal measurement unit in which chromatography test is done in order to test the present components in the gas. The treated gas should contain 99.7% methane and have a dew point of $-15\text{ }^{\circ}\text{C}$. If the gas meet these requirements, it is selled to national transport system transgas.

2.2 Summer

In summer, April to October, gas is injected underground in order to provide supply in winter because higher gas consumption are noticed in winter.

After the gas arrives from the national transport system, it enters a horizontal three-phase separator device in (oil, gas, and water separation). The gas then enters two phases compression stages. In the first stage, the pressure is increased from 20 bars to 50 bars. In the second stage separation, the pressure is increased from 50 bars to 125 bars. Here is should be noted that the compression occurs in two stages in order to increase the pressure gradually and not immediately. From the ideal gas law $PV=nRT$: increasing the pressure will lead to volume reduction and that is the purpose of the compression stage. If the gas volume is reduced, the injection well will sustain high gases volumes. After the compression stage, the gas enters a two phase separation unit in order to separate the gas from certain leftover oil. After, the gas is sent to measurement line in order to measure the pressure by ultrasonic devices. After, the gas goes to three groups, and the gas in each group is injected into ten wells through a Christmas tree.



Figure 9: Groups and lines

CHAPTER 3

CONCLUSION

The experience at Romgas was very beneficial since in Lebanon a huge amount of natural gas is present. Romgaz is focused on extending its operations outside Romania by acquiring petroleum rights and obligations for petroleum exploration, development and production operations, with an aim to record the first gas and oil reserves outside Romania.

REFERENCES

<https://www.romgaz.ro/>