



GARO AB 1500

Case Study

Vapor Recovery Systems for Storage Tank Based Applications

A Vapor Recovery Unit (VRU) is a specialized compression package that is used to help producers and refinery operators to lower emissions levels. Additionally VRUs allow operators to recover excess gas and vapor, which would otherwise be flared into the atmosphere, to be either sold or used as fuel onsite. A typical VRU package is capable of capturing approximately 95% of BTU-rich vapors, providing a tangible benefit to operators looking to improve the environmental credentials of their operation.

Specifically, VRU's provide operators with two key benefits:

- **Reduced Operating Costs:** Recovered vapors can be re-ejected into oil wells or used as fuel in various processes, reducing the operational costs. In some instances, recovered vapors can also be sold on, generating an additional stream of revenue.
- **Social and Environmental Responsibility:** Venting is virtually eliminated, reducing emissions of dangerous pollutants and chemicals by up to 95%; demonstrating a commitment to running a socially and environmentally responsible operation.

Overview

CLIENT

Undisclosed Canadian Petroleum Company

LOCATION

Athabasca Oil Sands, Canada

APPLICATION

Vapor Recovery

PRODUCTS

- Vapor Recovery Unit (VRU)
- Different Garo Liquid Ring Compressor Models

CUSTOMER BENEFITS

- Demonstrated Social and Environmental Responsibility
- Reduced operating costs
- Lower emissions



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Tank based VRUs also help ensure operational safety. When crude oil is stored in storage tanks, the vapor space above the crude is filled with Volatile Organic Compounds (VOCs) in order to reach a pressure equilibrium. Loading and unloading crude changes the amount of vapor space in the tank, meaning that vapor must either be added when liquid is drained, or removed when liquid is added in order to maintain the slightly positive pressure that prevents the tank from collapsing or rupturing.

Changes to ambient temperature can also have an impact on the vapor pressure inside the tank, which can lead to venting of the VOC saturated vapor or air to enter the tank, forming a potentially explosive environment inside the tank. VOCs containing vapor that are vented through either boil-off (e.g. hot ambient temperature) or through loading / unloading operations can be recovered, compressed by a VRU; instead of being released into the atmosphere.

Liquid Ring Compressors for Vapor Recovery

Liquid Ring Compressors (LRCs) are not only the preferred, but also the most ideally suited technology for vapor recovery. Intrinsically safe, LRCs are well suited to processing dirty, explosive, and corrosive gasses; in addition to gasses with a high H₂S content, variable composition, or gasses that have been saturated with water.

Liquid ring compressors also have a simple and rugged design that allows them to handle occasional carryover of salt or other organic materials without impacting process. LRCs also have much lower maintenance requirements than other compressor technologies, making them ideal for applications where reliability is a key consideration.

A Practical Application

The Athabasca oil sands are one of the largest known deposit of crude bitumen in the world. Located in the remote, north eastern part of the province of Alberta, Canada; the Athabasca oil sands not only play home to an abundant bitumen deposit, but also to over 140,000 km² of Boreal forest; ensuring that operators are under increasingly stringent environmental regulations.

The harsh, remote location combined with the requirements demanded by the delicate natural environment require a host of constantly running specialized equipment, to help operators minimize the environmental impact that mining bitumen can have on the surrounding area. As a result, reliability is often a key consideration for producers looking to extract crude oil from the bitumen, sand, silt, and clay that is mined in the region.

Our customer, a leading integrated energy company, required a total of 30 liquid ring compressors to power VRUs across a number of facilities located in and around the Athabasca oil sands. Stringent environmental regulations required that each VRU to be operational at all times; with machine failure resulting in high financial penalties for the customer. Coupled with the relatively remote location of each unit, which had the potential to delay repairs during unplanned maintenance or downtime, meant that machine reliability, high mean time between failure (MTBF), and low maintenance requirements were paramount for the customer. With this in mind they turned to the experts vapor recovery systems using liquid ring technology: Garo.

The Outcome

After evaluating the customers' requirements, the team at Garo proposed using a range of compressors from GARO's single stage AM and two stage AB series, as governed by the application requirements. Both the AM and AB series feature a single mechanical seal, a double eccentric casing for ideal rotor balance, and an overhung impeller with minimal moving parts; minimizing maintenance requirements and providing unrivalled reliability.

GARO's AM and AB series compressors deliver proven, efficient performance. The single stage AM series provides a discharge pressure up to 6 bar abs. (72 psig), and a suction capacity of up to 5,000 m³/h (2,900 CFM), and are ideal for the safe handling of wet, toxic, corrosive, flammable or explosive gases. The two stage AB series provide a discharge pressure up to 13 bar abs. (175 psig), and a suction capacity of up to 4,000 m³/h (2,350 CFM), and have been tailored for applications such as flare gas and vapor recovery.

The team at Garo successfully worked with the customer to provide the system design and engineering; package manufacturing, quality control, and acceptance testing; as well as the delivery, commissioning, start-up, and training, delivering each package over the course of a 10 year period, as determined by the customer's project schedule.

Trust the Experts in Vapor Recovery Systems

With over 70 vapor recovery systems and 130 compressors installed worldwide, Garo has the expertise and experience to help you optimize your refinery operations and minimize your environmental footprint.

Factory tested and pre-engineered for quick delivery and installation, all GARO vapor recovery systems are backed by a global technical service and support base, providing the ultimate peace of mind.

Contact our sales representatives for more information on Garo's range of vapor recovery systems today!





To find out more about GARO Vapor Recovery Systems visit:

<https://www.garocompressors.com/en-it/applications/vapor-recovery-units>




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