

Dresser-Rand

RESPONDS TO AIR PRODUCTS

For Grass Roots Hydrogen Plant in Canada's Oil Sands Region

THE REMOTE LOCATION of Canada's oil sands and the relatively short construction window created by severe winter weather produce unique challenges for the operators and the companies who provide equipment and services necessary to extract and upgrade the sizeable bitumen deposits that exist in the region.

Located in Edmonton, Alberta, Air Products Canada Limited, a subsidiary of Air Products and Chemicals, Inc. (APCI) is a key player serving the rapidly expanding industry tapping into the oil-rich region. The company provides a long-term supply of hydrogen used by refiners to upgrade petroleum-based products from the oil sands deposits. The Alberta Energy and Utilities Board estimates that approximately 1.6 trillion barrels of crude oil are contained in Canadian oil sands. This resource is expected to be a major solution to the increasing demand for refinery feedstock needs of North American markets, and Canadian producers are predicted to refine up to 2.1 million barrels per day (bpd) by 2010, and 3.5 million bpd by 2015 (source: CAPP).

In 2006, APCI commenced operation of its first hydrogen production facility to serve Canada's refining industry in the region. Located adjacent to the Petro-Canada Edmonton Refinery, the state-of-the-art grass roots plant produces 71 million standard cubic feet per day (MMSCFD) of hydrogen to serve the production needs of the Petro-Canada and Imperial Oil refineries, as well as other refineries in the

area. The plant operates as a natural gas-based steam methane reformer, creating hydrogen to be used to produce clean transportation fuels and other petroleum products.

In April 2004, APCI contracted with Dresser-Rand to provide reciprocating compressors for hydrogen service at the facility. "To help ensure the scheduled plant start-up and substantially reduce installation costs, Dresser-Rand was required to have everything completely assembled and skid-mounted before arriving at the client's site," said Eric Zahradka, project manager at Dresser-Rand. "The project would require a team effort from our facility in Painted Post, New York, as well as our service center located in Edmonton." The proximity of Dresser-Rand's Edmonton facility to the client operation played a key role in project execution, according to Zahradka. "Having a capable and experienced service center right in Edmonton helped reduce both installation and transportation costs."

In February 2005, Dresser-Rand provided APCI with two skid-mounted, HHE-VL compressors (see photos below), each including a frame lube oil console attached to the skid. The packages were completely assembled before arriving at the Edmonton jobsite, including the compressor and cylinders, complete with the pulsation vessels. Upon delivery of the equipment, APCI was able to set and level the fully assembled compressors in one day — a process that normally takes several weeks.



Dresser-Rand met the demanding requirements because of expert planning, the coordinated efforts of experienced engineers and technicians at company facilities in Painted Post and Edmonton, and key suppliers who assisted with the project. “For this type of equipment, Dresser-Rand provides superior pre- and post-order service,” Zahradka stated. “Additionally, we’ve developed the modular design concept for units of more than 100,000-pound maximum allowable continuous combined rod load, which perfectly suited the requirements for this client’s application.” Dresser-Rand’s HHE slow-speed process compressors have four compressor cylinders and are driven by 7500 hp motors. The HHE compressor’s variable crank design with a bearing between each crank throw is capable of both odd and even crank throw options. This reduces operational costs and parasitic horsepower as balancing cylinders with connecting rod and crosshead are not required for odd throw applications.

The compressor frames and cylinders were manufactured and tested at the Dresser-Rand facility in Painted Post. Additionally, the cylinder water and auxiliary piping systems were fabricated and assembled at the plant. Subsequently, the compressors were disassembled and the compressor frames shipped to Cobey, Inc., an equipment packager located near the Dresser-Rand facility. “Cobey is an experienced packager that can handle this

class of equipment,” said Zahradka. “We’ve successfully executed several projects together in the past.”

Meanwhile, the compressor cylinders, distance piece and crosshead guide assemblies were shipped to the Dresser-Rand service center in Edmonton.

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—Eric Zahradka,
Project Manager, Dresser-Rand

Dresser-Rand designed the compressor skids, which were fabricated by Cobey. Finite Element Analysis was performed to ensure that the skids were suitable for the vibration forces. A honeycomb skid design did not require concrete filling, and the compressor frames were grouted to the skid base. Cobey fabricated a single mezzanine deck measuring approxi-

mately 100 feet (30.48 m) by 37 feet (11.28 m), to be shared by both compressors. Auxiliary manifold piping was fabricated and pre-fit to the skid by Cobey. The skidded compressor frames were shipped from Cobey, while pulsation vessels were shipped from the supplier in Texas, directly to Dresser-Rand’s service center.

Once at the facility in Edmonton, Dresser-Rand installed the cylinders on the frame and mounted the suction and discharge vessels. The service center fabricated and installed the remaining auxiliary piping and tubing from the cylinders to the manifolds on the compressor skid, and all wiring was completed before delivery to the APCI site. Finally, the compressors were shipped from the service center to the client facility in one piece and installed at the facility.

“The entire project went smoothly and efficiently,” Zahradka said. “It really demonstrated how our Edmonton service center was a vital link in responding to the needs of our client.”

The APCI hydrogen plant went on line in June 2006 as the first of several plants the company expects to have in operation in the Edmonton area. In late 2006, Dresser-Rand provided APCI with two additional HHE-VL compressors as part of an expansion at the original facility to increase production capacity by 105 MMSCFD. The expanded plant is expected to be on line by mid-2008. ■

