

The Alberta Taciuk Process (ATP) Technology - The FMG Project in China - UMATAC Industrial Processes



(Above) The ATP Processor for the FMG Project is similar in size to the Processor for the Stuart Oil Shale Research and Development Project, built in Gladstone, Australia in 1999.

2) Project Development

UMATAC, in cooperation with Polysius AG, a ThyssenKrupp company based in Germany, began discussions with FMG in 2002 to explore use of the ATP Technology with Fushun oil shale. UMATAC obtained small oil shale samples from FMG in 2003 for testing at UMATAC's pilot plant facility.

Based on the test results, the parties held technical discussions and review meetings in China in 2003, 2004, and 2005. In 2004, FMG shipped 100 tonnes of oil shale to Calgary. This material was tested in 2005 in UMATAC's 5 tonne/hour pilot plant. Following the test program, the parties held further technical discussions and negotiations culminating in the contract for design and construction of the first ATP System for FMG.



(Above) View of Combustion End and Hydrocarbon Vapour Cyclones.



(Above) View inside the ATP Processor Combustion Zone.



(Above) View of Cooling Zone (Feed and Discharge End).

A) Project Construction

The FMG plant site is located inland and approximately 450 km from the nearest deep water port. Many of the large diameter components of the ATP Processor had to be shipped in sections then welded and field machined to meet the required tolerances.

These erection procedures include field welding and **leading edge field machining process** that has overcome previous machine size restrictions.

ATP Processor Mechanical Summary:

- Rotating length = 63 m (206 ft)
- Outer shell diameter = 8.5 m (28 ft)
- Support tyre diameter = 11 m (36 ft).
- Operating weight = 2,800 tonnes (3,100 tons)
- Operating speed = 4.0 rpm
- Installed drive power = 2800 kW (3750 hp)



(Left and Below) The "ATP Center Support" section of the outer shell – manufactured in **Malaysia**. Shipping weight was 164 tonnes.



(Above) The ATP Center Support with Preheat Tube connections.



(Above) The ATP Center Support with Preheat Tube connections.

1) Introduction

The Fushun Mining Group (FMG) is a large state owned coal mining, coal processing, and manufacturing company based in Fushun, China. FMG is in the final stages of constructing an oil shale processing plant using the Alberta Taciuk Process (ATP) Technology under license from UMATAC Industrial Processes – ATP Systems, a Division of AECOM Canada.

FMG is famous in China for its West Open Pit coal mine, one of the largest in the world measuring 6 km long, 2.2 km wide, and 400 m deep. Coal production capacity of this facility is 8.4 million tonnes/year. The oil shale at the mine lies above the coal deposit and is mined as over-burden.

FMG produces oil from a portion of the oil shale using a vertical retort technology, but the vertical retorts can not process the fine portion of the crushed oil shale. The fines are currently being discarded. Once the ATP System is in operation, the rejected fines will be redirected to the ATP plant.



(Left) Field machining of the 11 m (36') diameter support tyres on-site. **This was a leading edge field-machining operation** successfully completed under challenging conditions in China.



(Above and Left) Assembly of the ATP Processor on the plant site in Fushun, China.

(Below) View of assembled ATP Processor.

3) The FMG Project, Fushun, China

Design and construction of the first FMG ATP plant commenced in early 2006 and was originally scheduled for completion in late 2008. A combination of equipment delivery delays, high demand for commodities world wide, pressures within China due to the Olympic preparations and limited Chinese engineering availability resulted in delay of the plant completion date to early 2010.



The FMG ATP facility has a rated oil shale processing capacity of 1,750,000 tonnes/year (230 t/h).

If operating results from the first unit meet expectations, FMG will install three to five additional ATP System trains, and opportunities for expansion into other locations in China are opened.

Project Highlights

- **First application of the ATP Technology to Chinese oil shale.**
- **Design teams located in Canada, Germany, and China.**
- **Leading edge field machining technique was proven. This has overcome previous equipment size restrictions.**
- **Environmental performance has been enhanced and greenhouse gas emissions reduced.**



(Above) Feed and Ash Handling Systems.



(Above) Hydrocarbon Vapour Scrubber and Fractionator (Oil Recovery).



(Above) Oil Recovery plant.

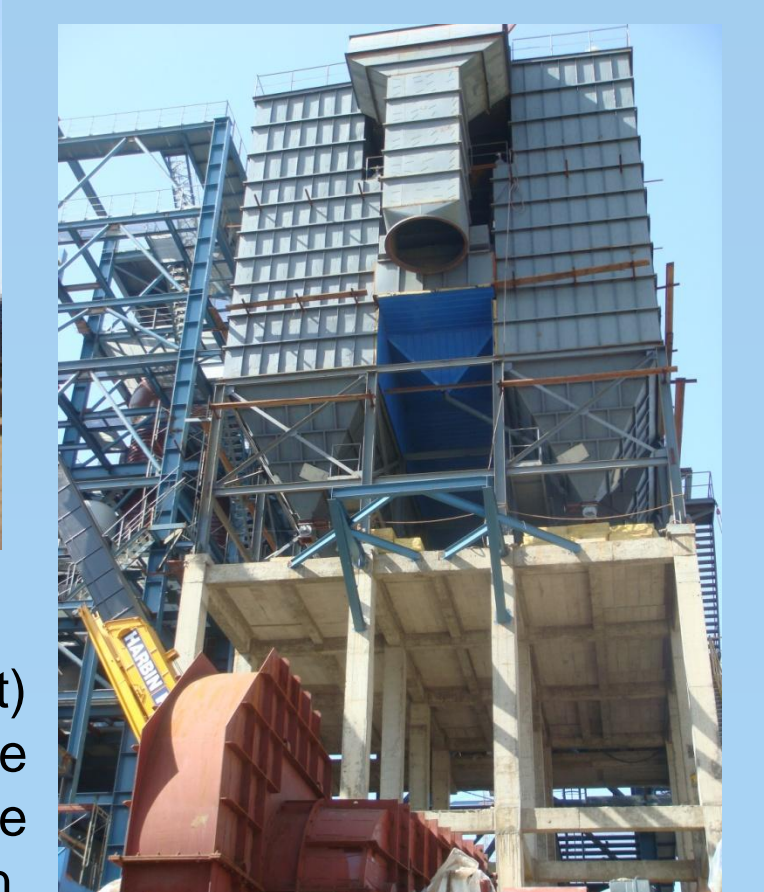
B) Environmental Performance

The first ATP System being constructed at FMG will be used to confirm and demonstrate the plant's ability to achieve the targets set for the project. The design teams have implemented new equipment configurations and design changes to improve environmental performance, including:

- Installing equipment to recover heat from the hot flue gas and spent shale leaving the ATP Processor. This equipment reduced greenhouse gases by 15%.
- A preheat gas thermal oxidizer to destroy potentially odorous compounds.
- Wet scrubbing of sulphur dioxide and ammonia from the flue gas to reduce pollutant emissions.
- Use of high efficiency baghouse dust collectors to minimize particulate emissions.
- Improving resource utilization by making use of the 20% of the shale that is currently discarded.
- Achieving fuel self sufficiency – no imported fuel (such as natural gas) is required to operate the ATP Processor.



(Left) Off Gas Heater.



(Right) High efficiency baghouse dust collectors and flue gas fan.