CHATTANOOGA PROCESS™

synthetic crude oil

changing the technology

27th Oil Shale Symposium
Colorado School of Mines, Golden CO
October 15, 2007

Chattanooga Process Features

- **Fluid Bed Reactor**
- **Hydrogen Environment**
- **No combustion in Reactor** (no emissions)
- **Proven sub-processes**
- **Continuous Operation**
- **Multiple Feed stocks: Shale, Sands, Heavy Oil**

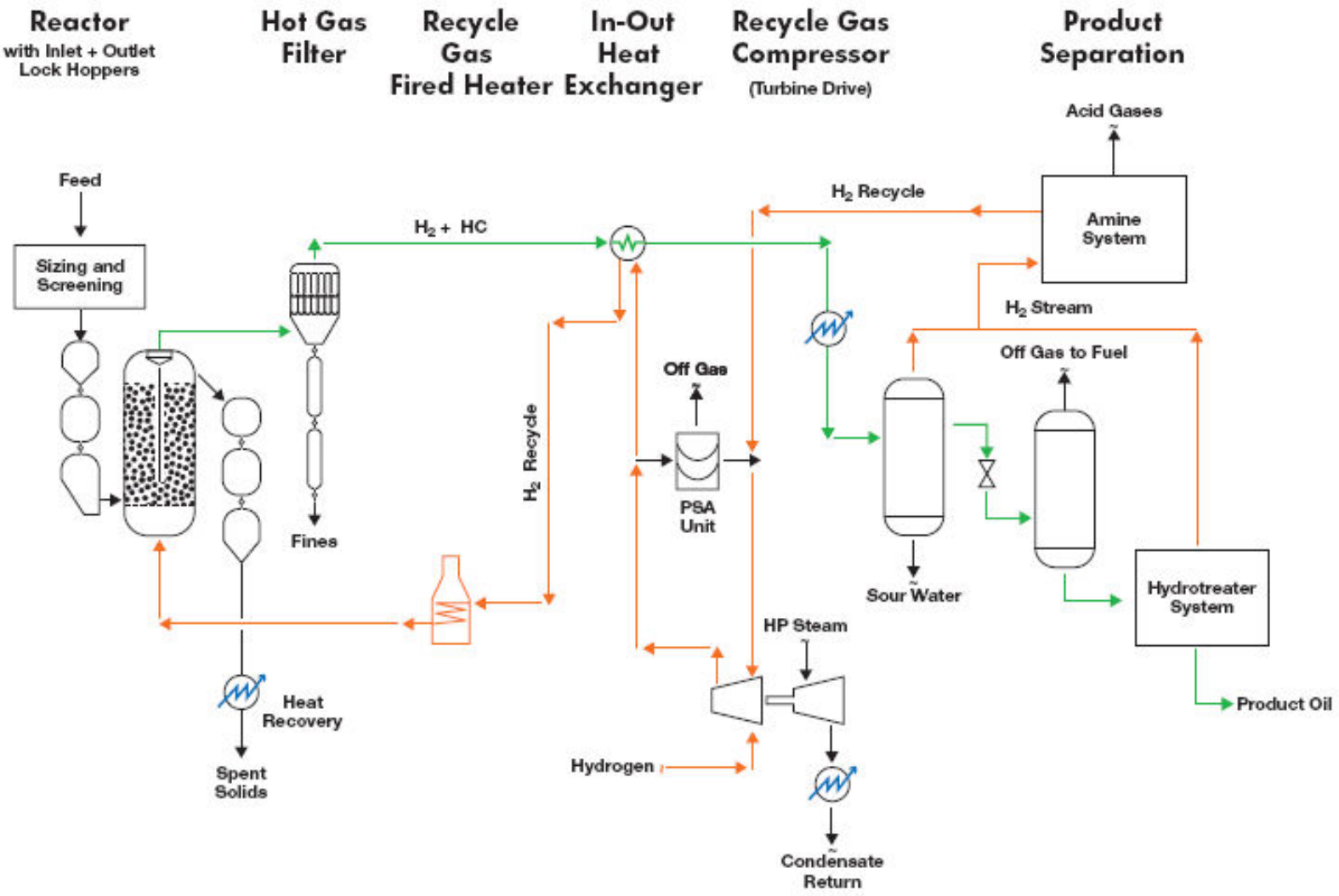
Fluid Bed Reactor

- Temperature less than 1000°F / 537°C
- 600 psig operating pressure
- Low velocity through reactor zone

Hydrogen because …

- Fluidizing medium
- Reactant
- Heat transfer
  - High heat capacity
  - High conductivity
  - Low viscosity

The Chattanooga Process



Patents

- **Five Issued**
  - **Four United States**
  - **One Canadian**
- **Wholly Owned by CC**
- **Additional Patents Pending**

Why Chattanooga Process for Oil Shale ?

- **"For all oil shales, major yield increases can be obtained only by adding more hydrogen to the organics.**
- **Fluid bed reacting gives oil yields of 125% to 200% higher than standard Fischer-Assay.**
- **Optimal temperature for process: under 1000^0F"**

The above are the conclusions of Dr. Burt Davis, Center for Applied Energy Research, U of Kentucky

Environmental Benefits over Other Shale Processes

- Negligible Water Required
- No process Waste Water Discharge
- No SO_2, NO_X or CO_2 Produced in Reactor
- Low Emissions
- Immediate Reclamation of Mined Area

Why Chattanooga Process for Oil Sands ?

- 50% reduction in CO_2 emissions
- Elimination of process generated $S0_2$, NO_x, NH_3
- Lower capital and operating costs
- Complete elimination of tailing ponds and ground water contamination

Chattanooga Process Economic Advantages

- **High Product Quality** (Reactor outlet)
  - 28^{o} – 30^{o} API from Oil Sands
  - 20^{o} - 25^{o} API from Oil Shales
  - 50% reduction of sulfur content
- **Lower capital and production costs per bbl**
- **Reduced energy requirements**
- **Smaller capacity facilities are feasible**
- **Self generates fuel and hydrogen plant make up**

Chattanooga Process Pilot Plants

- National Center for Upgrading Technology
- Located in Alberta
- Pilot Plant I commissioned in 2000
- Pilot Plant II commissioned in 2004

Chattanooga Process Pilot Plant II

Results of Tests Conducted at NCUT

PILOT PLANT I:

- Proved reaction kinetics for bitumen
- Produced 32^0 – 36^0 API oil

PILOT PLANT II:

- Achieved fluidization
- Extracted ~100% of kerogen contained in oil shale

Results of Tests Conducted at NCUT

PILOT PLANT II:

Resource	Yield
Colorado Oil Shale	51.5 gal./US ton *
Kentucky Oil Shale #1	15.4 gal./US ton **
Kentucky Oil Shale #2	12.6 gal./US ton ***

* Fischer Assay - 28.4 g/t
** Fischer Assay - 7.7 g/t
*** Fischer Assay - 6.3 g/t

The company: Chattanooga Corp

The direct Team:

M.J. Karpenski, President/CEO,
31 yrs Div. P/CEO Foster-Wheeler

J.A. Doyle, Chairman,
37 yrs EVP, WR Grace Corp

C.G. Kirkbride, Director
son of original Patent author

L.J. McEvoy, Director, VP
34 yrs EVP F-W Corp

F. Hildebrandt, Director, SVP
35 yrs Federated Chem., Ltd.

A.M. Howarth, Director, VP
20 yrs operations & Bell Labs

W.E. Poist, Director, VP
32 yrs CPA & Mgmt Cons.

G.J. Porges, Counsel
32 yrs Mng Partner, PHKP

Extended Team:

P.J. Davies, retired, **Chief Mining Eng., Bechtel Corp.**

Dr. T. Knowlton, **Technical Dir., Particulate Solids Research Inc.**

Dr. R. Thais, **Chrmn, Christian Bro. U. Chem. E Dept Head**

Dr. B Davis, **Professor, U. Kentucky Center for Applied Energy Research**

The Portfolio: **4 US and 1 CA Patents, 3 US and 3 CA Applications**
Patent Counsel: **Morgan & Finnegan**

Key Partners: **Alberta Research Council / National Center for Upgrading Technologies (NCUT) , PSRI, CAER / UK, DOE**

Chattanooga Process Summary

- **Proven Technology**
  - Ready to move to Demonstration Plant
  - Multiple Feed stocks
  - Patent Protection
- **Sound Economics**
  - Higher Yield = Higher Profitability
  - Superior Product Quality
  - Upfront Hydrogen Use = Greater Cycle Efficiency
  - Minimal Reclamation Cost
- **Environmentally Beneficial**
  - Minimal Emissions
  - Minimal Water Requirements and Impacts
  - Shorter Permitting Cycle

Chattanooga Corp

Martin J. Karpenski, CEO/President

Thank you.

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