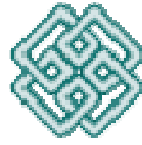


# Chattanooga Process

*A Process Using Heated Pressurized  
Hydrogen Fluidized Bed Producing  
High Grade SCO from Oil Sand,  
Heavy Oil, Bitumen, Oil Shale*

12 June 2008  
Calgary, AB

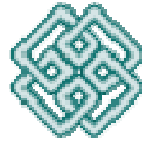


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## Chattanooga Process Features

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

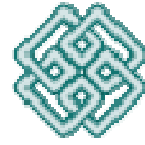


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## Fluid Bed Reactor

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



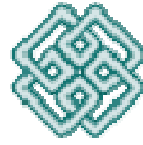
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## Hydrogen because ...

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



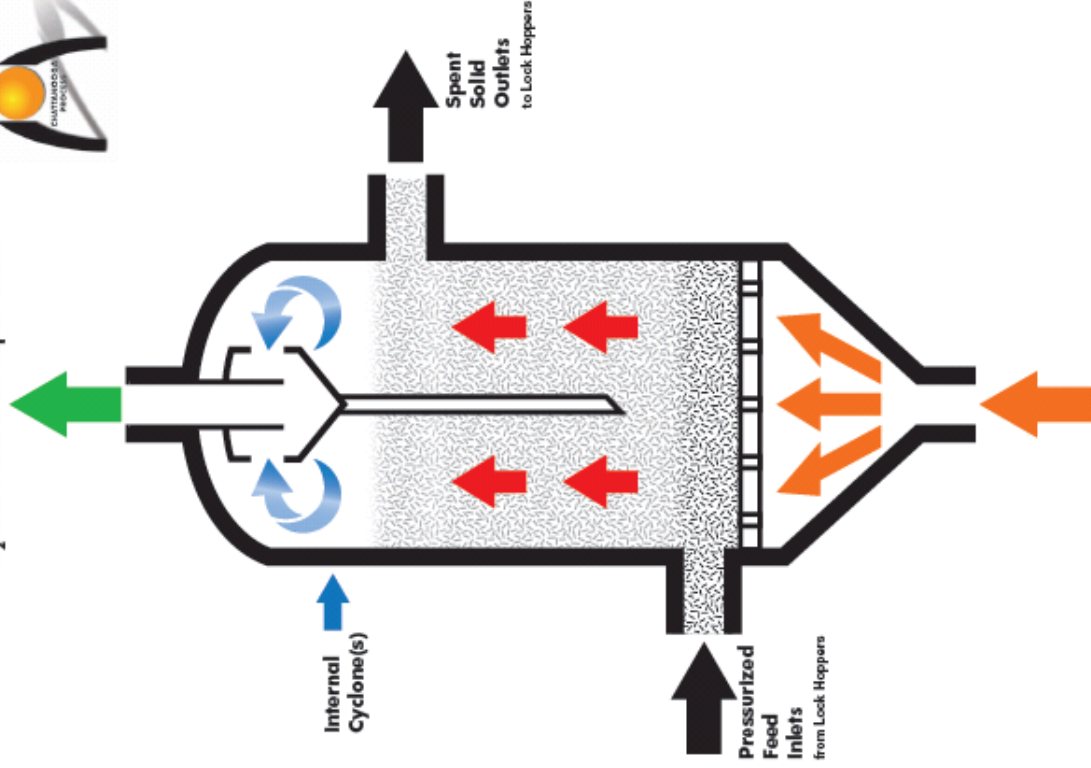
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# Chattanooga's Pressurized Fluid Bed Reactor

H<sub>2</sub>-Rich Product Oil Vapor Outlet



Pressurized Hot Hydrogen Inlet



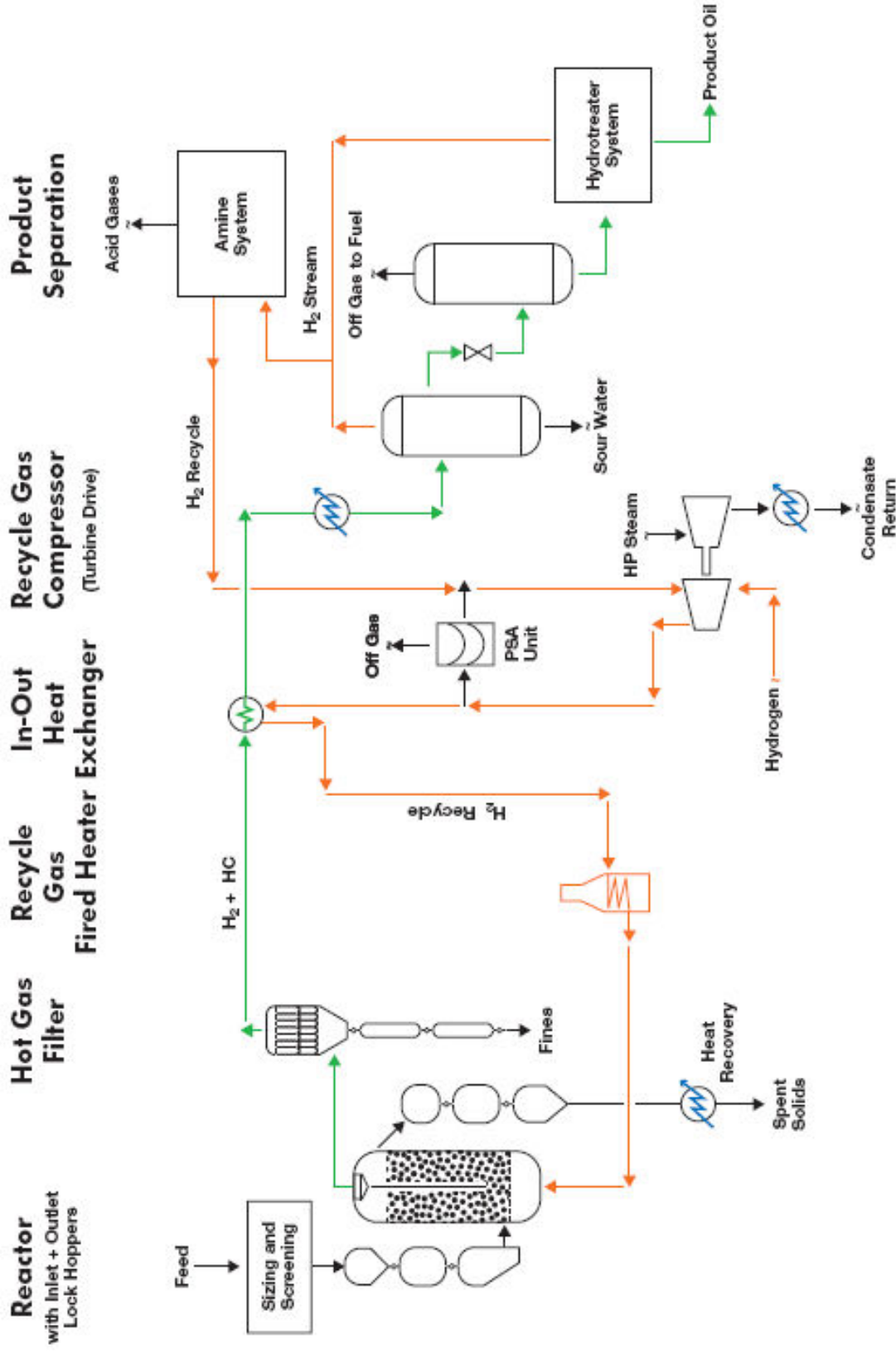
2008



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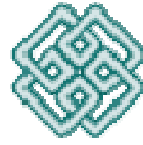


# The Chattanooga Process



## Patents

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



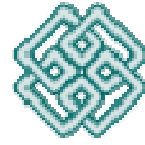
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## Why Chattanooga Process for Oil Shale ?

- “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°F”

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



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## Environmental Benefits over Other Shale Processes

- Negligible Water Required
- No process Waste Water Discharge
- No SO<sub>2</sub>, NO<sub>x</sub> or CO<sub>2</sub> Produced in Reactor
- Low Emissions
- Immediate Reclamation of Mined Area



## Why Chattanooga Process for Oil Sands ?

- 50% reduction in CO<sub>2</sub> emissions
- Elimination of process generated SO<sub>2</sub>, NO<sub>x</sub>, NH<sub>3</sub>
- Lower capital and operating costs
- Complete elimination of tailing ponds and ground water contamination

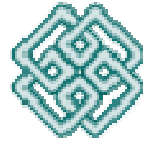


## Chattanooga Process Economic Advantages

- **High Product Quality**
  - 28° - 40°\*\* API from Oil Sands
  - 20°\* - 36°\*\* API from Oil Shales
  - < 20 ppm sulfur content
- **Lower capital and production costs per barrel**
- **Reduced energy requirements**
- **Smaller capacity facilities are feasible**
- **Self generates fuel and hydrogen plant make up**

\* Reactor Outlet

\*\* After hydrotreating



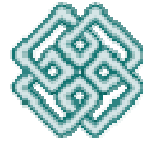
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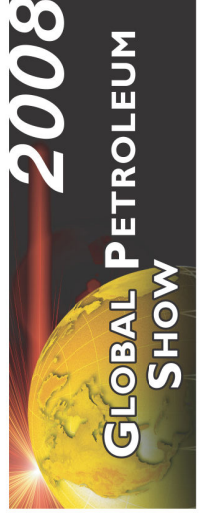
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## Chattanooga Process Pilot Plants

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

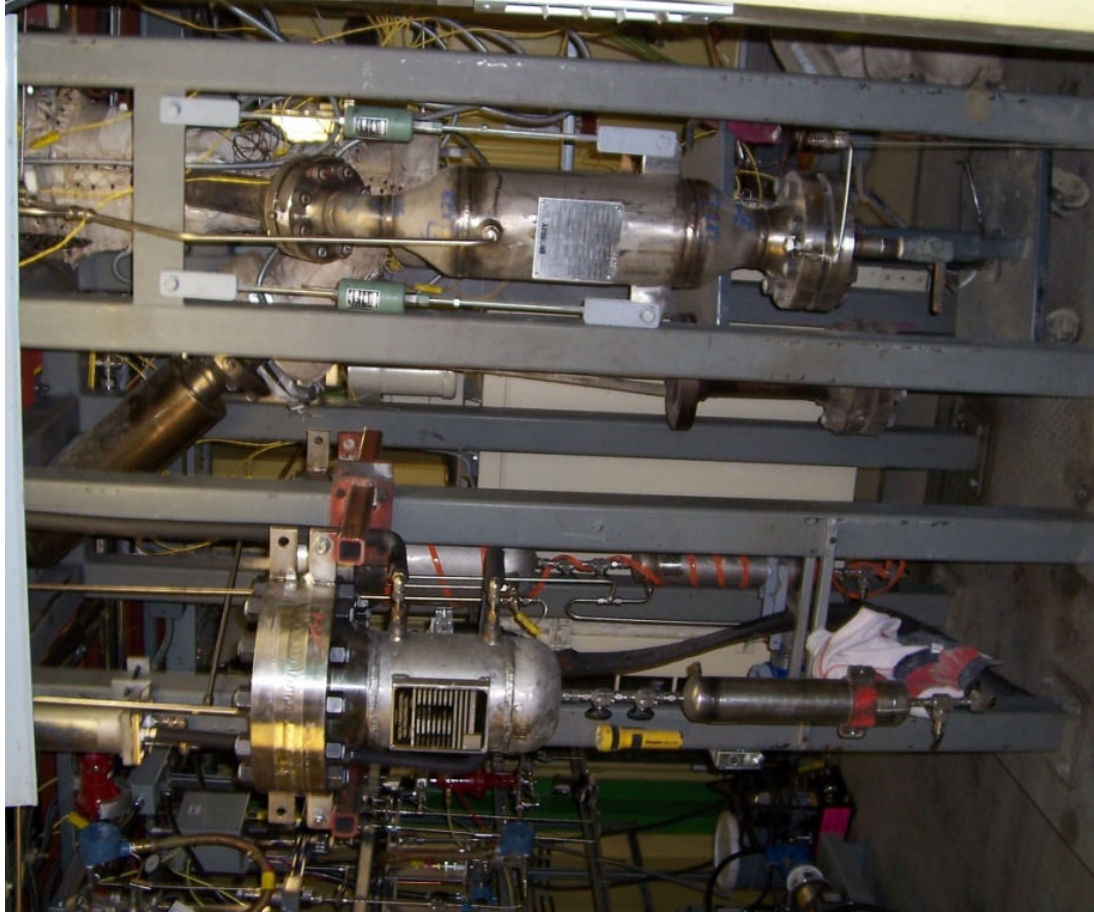
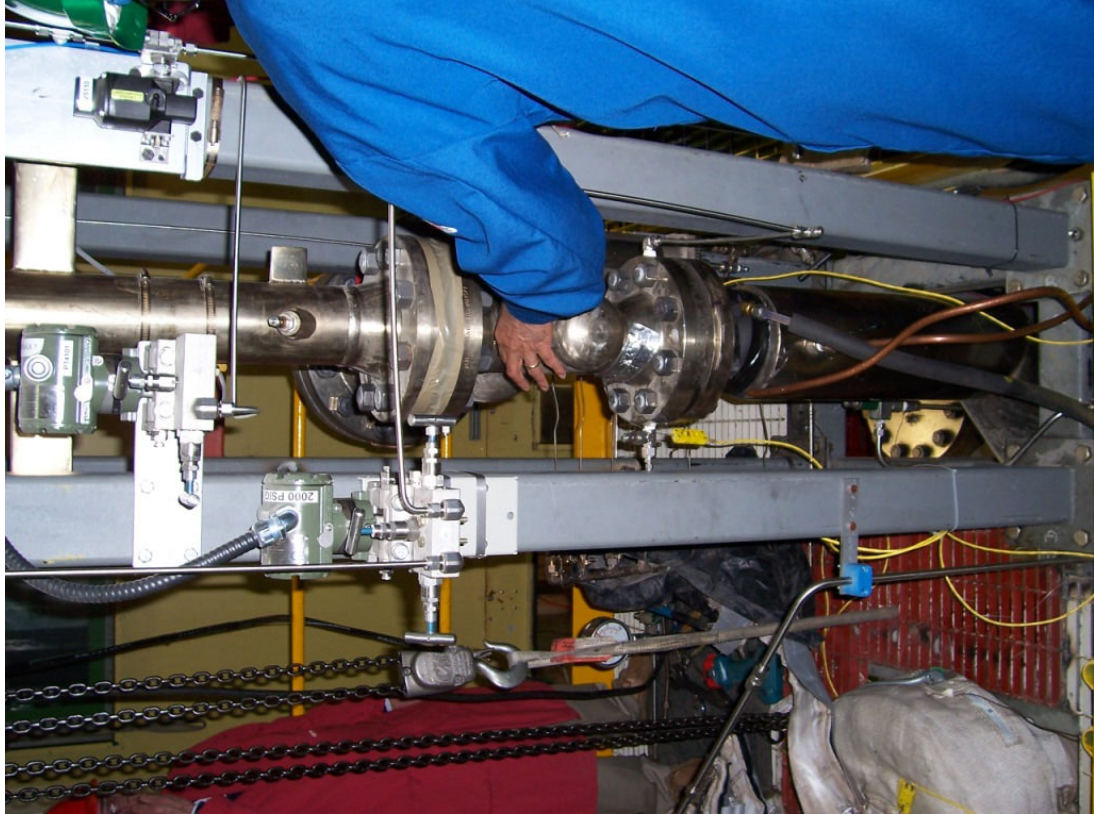


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# Chattanooga Process Pilot Plant II



2008  
GLOBAL PETROLEUM  
SHOW  
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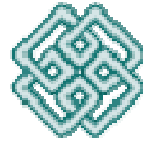
## Results of Tests Conducted at NCUT

### PILOT PLANT I:

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

### PILOT PLANT II:

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



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# Results of Tests Conducted at NCUT

## PILOT PLANT II:

<u>Resource</u>	<u>Yield</u>
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



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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.,

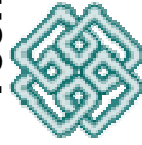
**Particulate Solids Research Inc.**

*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



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# Chattanooga Process Summary

## Proven Technology

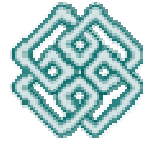
- Ready to move to Demonstration Plant
- Multiple Feed stocks
- Patent Protection

## • 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



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## **Chattanooga Corp**

**Martin J. Karpenski, CEO/President**

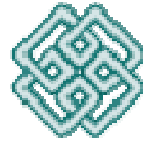
**Thank you.**

**973-377-1848**

**Mkarpenski@aol.com**

**Email: [info@chattanooga-corp.com](mailto:info@chattanooga-corp.com)**

**[www.chattanooga-corp.com](http://www.chattanooga-corp.com)**



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