



# Biomass Program

## Thermochemical R&D

### Pulsed Black Liquor Reformer Materials Evaluation

The Pulse Enhanced Steam Reformer technology is being developed by Manufacturing & Technology Conversion International, Inc. (MTCI) and ThermoChem, Inc. as a way to recover the chemicals used to digest wood in the papermaking process while generating electricity for the pulping facility.

The pulping chemicals in black liquor include sodium hydroxide and sodium sulfide or sulfite. At process temperatures ( $>600^{\circ}\text{C}$ ), these compounds are caustic and can corrode the equipment they come in contact with.

The materials used for the reformer are critical as their performance directly impacts the technical and economic viability of the technology. Researchers are investigating the behavior of a number of metals and refractory materials in a system that simulates the conditions in a Pulse Enhanced Steam Reformer. These tests will help to identify those materials that perform well in the corrosive, high temperature environments encountered in the reformer.



Twelve-tube pulse heater module.

### R&D Pathway

Researchers will modify the process development unit at the MTCI facility to accommodate a 12-tube pulse heater module and reproduce the arrangement that would be found in a full-scale unit.

Metallic and refractory samples will be removed at regular intervals, and these samples will undergo comprehensive tests to help identify the most appropriate materials for the MTCI reformer.

### Benefits

- Optimal materials for black liquor processing equipment
- Acceleration of black liquor gasification technology with national energy, environmental and cost benefits

### Applications

Materials will be applied to black liquor gasification technology in pulp and paper mills, but could also be applied in high temperature, corrosive environments in the chemicals and petroleum industries.

### Project Partners

Oak Ridge National Laboratory  
Manufacturing & Technology  
Conversion International, Inc.  
ThermoChem, Inc.

### Project Period

FY 2003 – FY 2005

### For more information contact:

Parrish Galusky  
National Energy Technology Laboratory  
[Parrish.Galusky@netl.doe.gov](mailto:Parrish.Galusky@netl.doe.gov)

EERE Information Center  
1-877-EERE-INF (1-877-337-3463)

Visit the Web site for the Office of the  
Biomass Program (OBP) at  
[www.eere.energy.gov/biomass.html](http://www.eere.energy.gov/biomass.html)

September 2004