

Hot Topic Hour

Activated Carbon – Status Update

4/12/12

Who is Norit Activated Carbon?

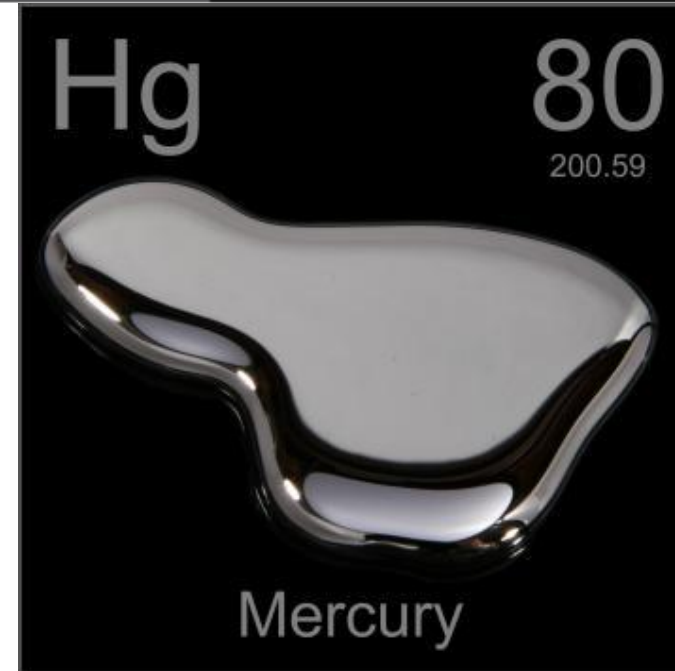
- Wholly owned subsidiary of Norit NV, a world leader in purification technology.
- Worldwide leader in activated carbon technology, for nearly 100 years.
- Engineering and fabrication of activated carbon handling equipment and systems.
- Pioneers in the use of activated carbon in flue gas for Mercury Reduction

Norit Americas Statistics

- 2 plants in Marshall, TX and Pryor, OK
- 1 joint venture plant in Bienfait, SK
- 10 production lines
- Terminal operations in Sauget, IL
- Capacities:
 - Up to 180 Million Pounds coal based carbons
- 335 Employees
- Energy efficient generating 90% of our own power

Approaches to Mercury Removal

- Gold Catalyst
- Coal Blending
- Fuel Additives
- MerScreen Fixed Bed - EPRI
- Granular Activated Coke – SO_x
- Selective Catalytic Reduction/Wet Scrubbing – NO_x , SO_x
- Non-Activated Carbon Sorbents
- Activated Carbon Sorbents

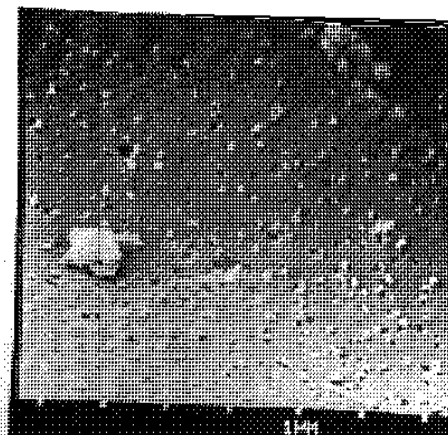
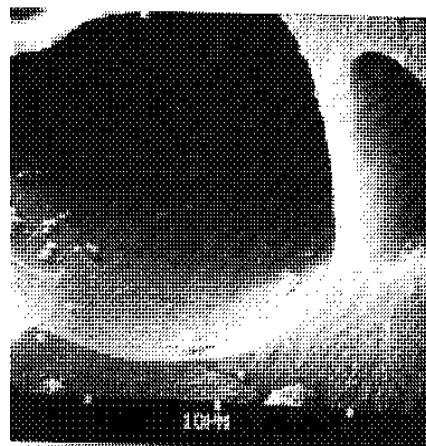
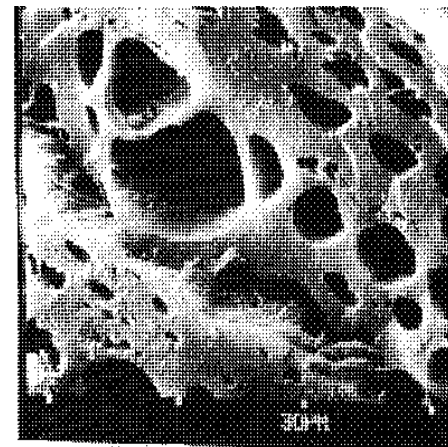
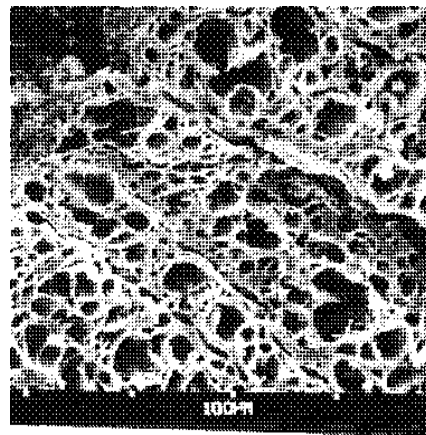


Activated Carbon Status and Trends

- Leading technology for mercury removal from flue gas.
- Supplying requirements to the majority of units subject to consent decrees or state regulations.
- New products have been developed for low rank fuels and non-interference with power generation fly-ash sales into the cement business.
- Optimization of currently installed systems and product application to individual systems is currently very active.
- New products in development for specific applications, such as interference from sulfur compounds in the flue gas.

Overview - DARCO Hg-LH EXTRA

- Created for use in challenging applications in the flue gas market
- Produced using Norit's new patent-pending process.
- Improved oxidative capability resulting in faster adsorption kinetics
- Superior working capacity in baghouse applications and higher efficiency in ESPs.

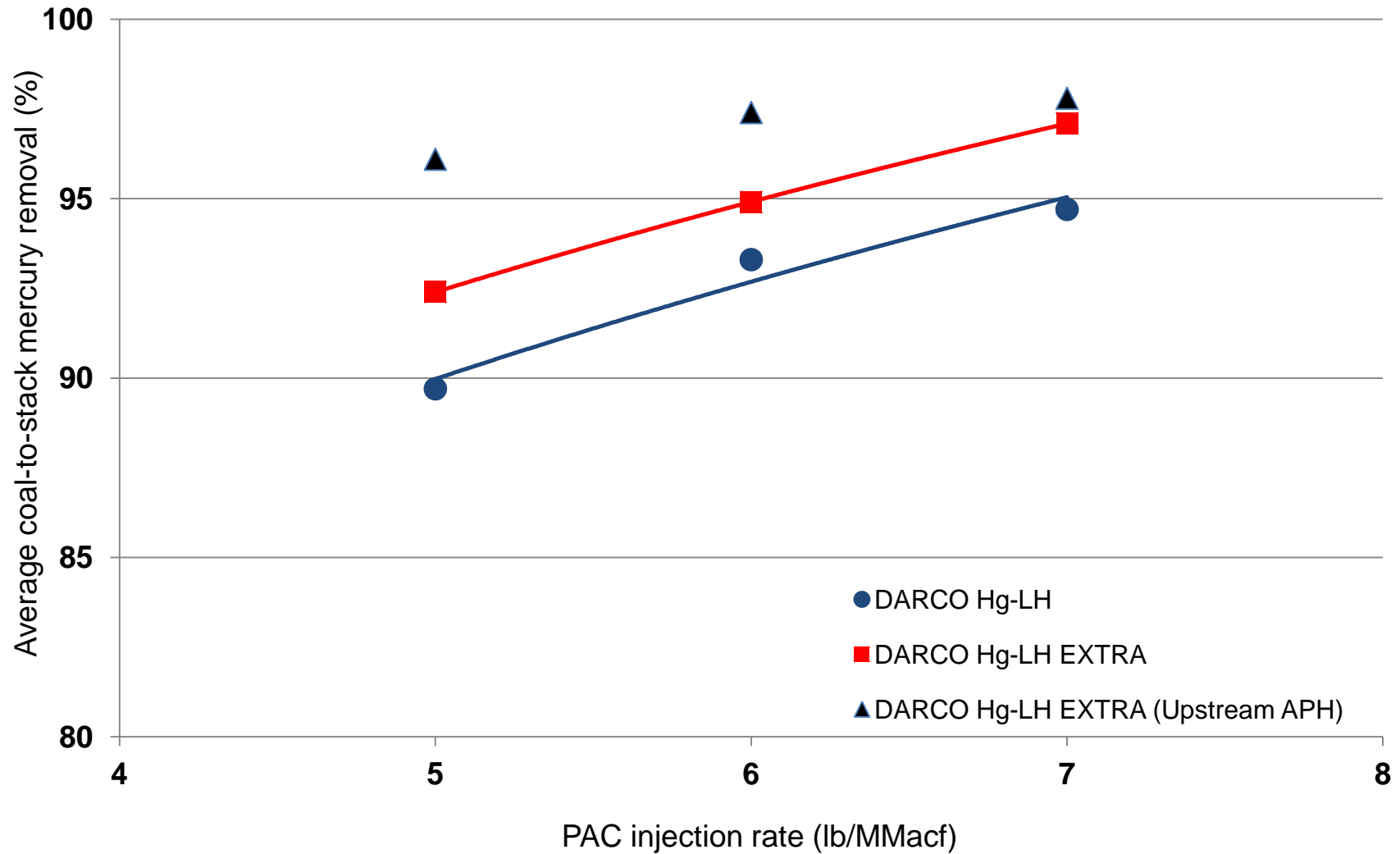


Full Scale Injection – IL Plant (~500 MW)

- Fuel Source:
 - Powder River Basin
- Mercury Removal Measurements:
 - Coal-to-stack (EPA Method 30B)
- Process Equipment:
 - Particulate control: ESP
 - PAC injection downstream (315 F) and upstream (775 F) of air preheater
- Flue Gas Parameters:
 - Gas flow rate: 1.9 Mmacfm



Mercury Removal Results



DARCO EXTRA Summary

- Norit used its new patent-pending technology to develop DARCO Hg-LH EXTRA for use in challenging applications in the flue gas market
- DARCO Hg-LH EXTRA:
 - has demonstrated improved performance compared to the industry benchmark
 - can potentially reduce carbon injection rates by as much as 20-50% in challenging flue gas applications
 - has become an important part of our optimization partnership with our customer base

purification for life

Norit
leading in purification

Activated Carbon