Cutting Water Cycle

- Coke Chute
- Coke Pit
- Cutting Water Runoff
- Coke Bed Filter
- Maze Pumps
- Bar Screen
- Overflow Weir
- Coke Settling Maze
- Jet Pump
- Elwood Decoking Valve
- Jet Tank
- To Coke Pit
Problem

• Coke fines pass settling maze
  – Nozzles
  – Pumps
  – Pipes
Ideal Solution

- Protect downstream equipment
- High reliability
- Low operation & maintenance
- Recovers coke fines
- Low investment cost
- Easily incorporated into existing system
- Zero impact to environment
Proposed Solution
Technical Specifications

- Provides continuous filtration
- Flows: 110 to 12,000 gpm
- Flange Sizes: 2 to 24 inches
- Screens: 10 to 3,000 micron
- Polyester epoxy coated body (optional SS)
- Stainless steel screens
- Backwash; pressure, timer or manual
- NEMA 4x enclosure for control
Refinery Solution
Decoking System

- 7 hours between coke cutting
- 2 hours of peak coke
- Maximum fluid temperature; 150°F
- Minimum fluid temperature; 70°F
- Pipe Size; 6”
- Estimated Flow; 1000 gpm
- Fluid sample taken
Particulate Spectrum

- 1-10 um; Mustard, Carbon Black Toner
- 11-15 um; Copier Toner
- 16-50 um; Ginger
- 51-90 um; Cement Dust
- 100-1000 um; Beach Sand
Particle Distribution
by Count
tss=262ppm

Particle Count

11-15 um 16-50 um 51-92 um >92 um

Particle Size

Coking.com
More Production • Less Risk!

ELWOOD FLUID POWER
Particle Distribution by Volume

- 1-10 um
- 11-15 um
- 16-50 um
- 51-92 um
- >92 um

Particle Volume

Particle Size
Specifications

• First Stage (80 micron)
  – 8” Main
  – (4) 4” filters with 80 micron screen
  – Remove approx. 60%

• Second Stage (25 micron)
  – 8” Main
  – (4) 4” filters with 25 micron screen
  – Remove approx. 15% to 20%

• Isolation valves

• NEMA 4x control
Costs

• $95,000 for filter system
• Additional costs
  – Installation costs
  – Costs associated with environment
Preventative Maintenance

• Monthly
  – Activate by-pass & isolation valves

• Quarterly
  – Check & clean coarse screens
  – Trigger manual rinse
### Wear Items

<table>
<thead>
<tr>
<th>Description</th>
<th>List Price</th>
<th>Typ. Lifetime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaft Bearings</td>
<td>$37.00 ea. (8)</td>
<td>1-2 yrs.</td>
</tr>
<tr>
<td>Hydraulic Repair Kit</td>
<td>$96.00 ea. (8)</td>
<td>5 yrs.</td>
</tr>
<tr>
<td>Solenoid</td>
<td>$105.00 ea. (8)</td>
<td>5-10 yrs.</td>
</tr>
<tr>
<td>Flush Valve Actuator</td>
<td>$198.00 ea. (16)</td>
<td>5-10 yrs.</td>
</tr>
<tr>
<td>Fine Screen (80 um)</td>
<td>$1,194.00 ea. (4)</td>
<td>5-10 yrs.</td>
</tr>
<tr>
<td>Fine Screen (25 um)</td>
<td>$2,339.00 ea. (4)</td>
<td>5-10 yrs.</td>
</tr>
<tr>
<td>Dirt Collector Assm.</td>
<td>$556.00 ea. (8)</td>
<td>5-10 yrs.</td>
</tr>
<tr>
<td>Coarse Screen</td>
<td>$278.00 ea. (8)</td>
<td>10 yrs.</td>
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</tbody>
</table>
Typical Maintenance Costs

$2,600 per year
Water Maintenance
Fluid Maintenance

• Dilution
• pH
• Bacteria & fungi levels
• Water hardness
• Filtration
<table>
<thead>
<tr>
<th>Fluid Guidelines</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>8.0 to 9.5</td>
</tr>
<tr>
<td>Hardness</td>
<td>50 to 200 ppm</td>
</tr>
<tr>
<td>Servo, proportional valves</td>
<td>40 micron</td>
</tr>
<tr>
<td>Directional, pressure control valves</td>
<td>75 micron</td>
</tr>
<tr>
<td>Descale, stop valves</td>
<td>150 micron</td>
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</tbody>
</table>
Installations
Summary
Proposed vs. Ideal Solution

- Protect downstream equipment
- High reliability
- Low operation & maintenance
- Recovers coke fines
- Low investment cost
- Easily incorporated into existing system
- Zero impact to environment
Getting Started

• Fluid type
• Viscosity if not water
• Min/Max fluid temperature
• Min/Max environmental temperature
• Min/Max system pressure
• Flow rate
• Piping size
• Size of particulate to filter
• Fluid sample
• System schematic
Other Products
Raymond Erbe
Vice-President & GM

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