BIG RIVER STEEL

ECO-FRIENDLY WATER TREATMENT PLANT
INTRODUCTION | BIG RIVER STEEL

OSCEOLA

ARKANSAS
1st PHASE:
- 150 Tn EAF
- 150 Tn LF
- 150 Tn RH
- CSP (6 Stands)
- PLS/SPM/CGL/BAF

2nd Phase: 3 Mtpy
CHALLENGES
DESIGN PREMISES

- **DO NOT MIX CIRCUITS**
- **REDUCE INVESTMENT & OPERATION COST**
- **EASY OPERATION AND MAINTENANCE**
- **COMPLETE IN 14 MONTHS**
- **REDUCE WORKS ONSITE**
- **INDEPENDENT AND EFFICIENT OPERATION**
CIVIL DESIGN & EXECUTION

- Proximity of New Madrid, Missouri.
- New Madrid area contains the highest level of seismicity in the central and eastern parts of the United States.

- Very high water level.
- Drain pumps needed and sheet piling must be used.
- Reduce excavations as much as possible.
PIPING DESIGN

• Avoid Corrosion
• Pipes towards buildings ALL buried.
• HDPE pipes

• Tight Project schedule.
• Reduce erection time, waste material and cost.
• PREFABRICATED pipe.
OPERATION & SOFTWARE

- Fully Automated system
- Easy operation and maintenance.

- Efficiency
- Reduce Operational Cost
- Automation and signals gathering improve operation.
MELTSHOP AREA

- NCW EAF+LF+RH
- NCW EAF SPRAYS
- NCW GAS DUCT
- CW DEGASSER
- ELECTRICAL ROOM
HSM (CSP) AREA

- PRETREATMENT
- CW CCM
- NCW HSM +CCM
- CW HSM
- CW LAMINAR
- ELECTRICAL ROOM
COLD MILL AREA

- NCW COLD MILL
- WASTE WATER
- ELECTRICAL ROOM
PRETREATMENT
## IRON REMOVAL

<table>
<thead>
<tr>
<th>DEEP WELLS</th>
<th>REQUIREMENTS</th>
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<tbody>
<tr>
<td>Iron Content 5 ppm</td>
<td>Iron Content 0.1 ppm</td>
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Reliable technology with low operations costs and low investment .... **NEEDED**

**OXIDATION + FILTRATION**

- High retention time needed, civil works increasing, important power consumption, iron removal limited

**GREEN SAND**

- High chemical consumption, high cost, iron removal limited

**DMI 65 MEDIA**

- Not previous aerations needs. Low chemical consumption. High performance.
Catalytic Filtration media

- Tailor made for the removal of Manganese & Iron.
- Silica sand based granular material, its active ingredients are permanently fused into the grain
- DMI-65 performs role of catalyst to promote oxidation of iron and manganese in solution into precipitate
- Also performs highest quality mechanical filtration

Potassium Permanganate not required
Wide pH range
Up to 10 years operation

WATER QUALITY...

- INDUSTRIAL WATER (IRON REMOVED)
- SOFTENED WATER
- DEMI WATER
- EDI WATER
PRETREATMENT

WATER: River

FLOW: 800 m³/h

IRON REMOVAL

RO / SOFTENER

READY FOR FUTURE
PROCESS WATER
COMMON TECHNOLOGY

ALL FILTER SYSTEMS INCLUDE RING FILTERS ONLY

Side filtration 10% NCW
Total Filtration CW

CONTACT SYSTEMS WITH DECANTING BASINS

( 2 UNIT MINIMUM)

SUBMERSIBLE PUMPS IN SCALE PITS AND SLUDGE MANAGEMENT

( STAINLESS & VORTEX)
NCW EAF+LF

WATER: Clean

PRESSURE: 7 bar

FLOW: 1892 m³/h

T DROP: 15°C

FUTURE EXPANSION
NCW Sprays

WATER: Clean

PRESSURE: 7 bar

FLOW: 3100 m³/h

T DROP: 15°C

FUTURE EXPANSION

PROCESS & TECHNOLOGY | BIG RIVER STEEL
NCW Gas Duct

WATER: Clean

PRESSURE: 5.5 bar

FLOW: 3350 m³/h

T DROP: 25 °C

CLOSE CIRCUIT

FUTURE EXPANSION
**CW Degasser**

**WATER:** Dirty

**PRESSURE:** 4 bar

**FLOW:** 1040 m$^3$/h

**TSS outlet:** 80 ppm
WATER: Clean
PRESSURE: 7 bar
FLOW: 4180 m³/h

FUTURE EXPANSION
**CWC CCM**

**WATER:** Dirty

**PRESSURE:** 16/8 bar

**FLOW:** 1165 m³/h

**2x7 mts decanters**

**FUTURE EXPANSION**
**CW HSM**

**WATER:** Dirty

**PRESSURE:** 13/6 bar

**FLOW:** 8000 m³/h

**4X 11 mts. decanter**

**FUTURE EXPANSION**

Diagram:
- **MINOR COOLING**
- **WR COOLING**
- **COOLING TOWERS**
- **COLD WELL**
- **SCALE PIT**
- **DECANTER 1**
- **DECANTER 2**
- **DECANTER 3**
- **DECANTER 4**
- **RING FILTERS**
- **SLUDGE TREATMENT**
**WATER:** Dirty

**PRESSURE:** 2/12 bar

**FLOW:** 7100 m³/h

25% FILTERED
NCW Cold Mill

WATER: Clean

PRESSURE: 6.5 bar

FLOW: 3055 m³/h

FUTURE EXPANSION

PROCESS & TECHNOLOGY | BIG RIVER STEEL
EFFLUENT DISCHARGE
Remove from the waste water and cooling towers blowdown:

- Oils
- Solids
- Heavy metals
- Adjust pH

Accomplish Discharge Permits
Waste Water

WATER: Waste

PRESSURE: 2 bar

FLOW: 100/180 m³/h

OIL REMOVAL (DAF)

PH CONTROL
EFFICIENCY
OPERATIONAL COSTS

H₂O

Chemicals

energy
Low Water Consuming Equipment Selected:

- 12000 m³/h (53000 GPM) filtered.
- Ring Filters reduce drastically backwash water.
- Only 4 m³ per battery.

Sludge Dewatering:

- Installed a Press Plate per Contact Circuit.
- Humidity values up to 20%
- Water recovered.

Water Reuse

- Water used more than one time
- Blowdown distribution system

MORE THAN 30000 M³/H (130,000 GPM) PUMPED !!
Pump Selection: “More is better” (NCW)

“NCW Pumps feed different areas with different simultaneity. Better to split in more pumps and keep soft starter than big pump.”
ENERGY

Variable Speed

- In contact circuits (CW) with flow difference depending on product mix.
- All Cooling Towers fans, due to temperature variations.
CHEMICALS

Close collaboration between BRS / Cheamtreat / Russula

Chemical signals link to main system

Fast Response to system changes (Oil spillages, etc)
• NEW TECHNOLOGY IMPLEMENTED PUSHING TOWARDS MOBILE DEVICES.
• WIFI COVERAGE IN WHOLE WATER FACILITY.
• MONITORIZE WHENEVER, WHEREVER
THANK YOU

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