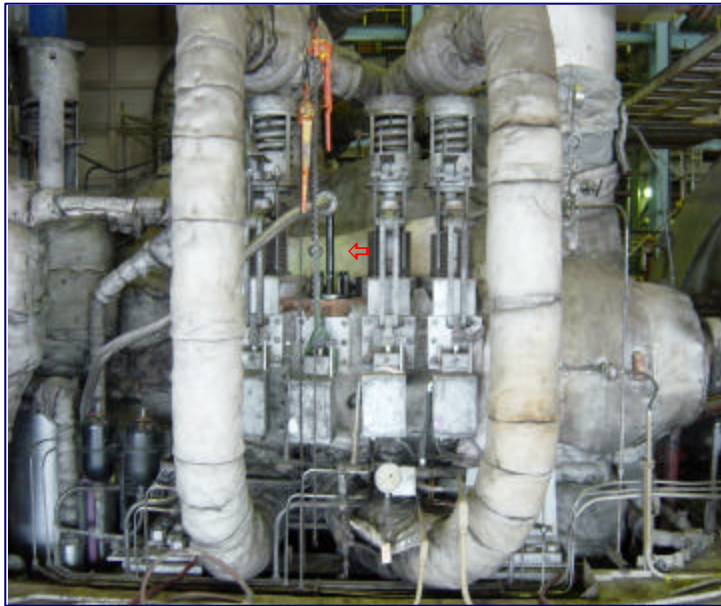



Removing Copper from Steam Turbines

PPS

Stop Lost Turbine Efficiency Caused by Copper Deposit Products



BJ Process and Pipeline Services (BJ PPS) Chemical Cleaning Services provides a safe foamed chemical solution to remove the copper oxide deposits on the turbine buckets, stationary blades and rotor blades.

Chemical Injection Point on Turbine Control Valves 

Applications

On an operational fossil boiler plant in which the feedwater systems, attemperation systems, and/or the condenser contains copper metallurgy, operational corrosion of these systems transports copper oxides through the steam generator and deposits copper oxides on the buckets and first pass blades on the steam turbine. Power units experiencing these copper deposits; realize lost generation capacity due to the steam being slightly deflected through the first pass blades. This 3-4% lost efficiency can cost a plant well over \$1M annually in lost production. This lost production can be effectively regained with periodic chemical cleaning with a foam injection application from BJ Process and Pipeline Services. This cleaning process has proven to effectively remove approximately 35-50 pounds of copper oxide products. Operating plants using these applications have realized immediate loss generation regained with a project cost payback of less than one week.



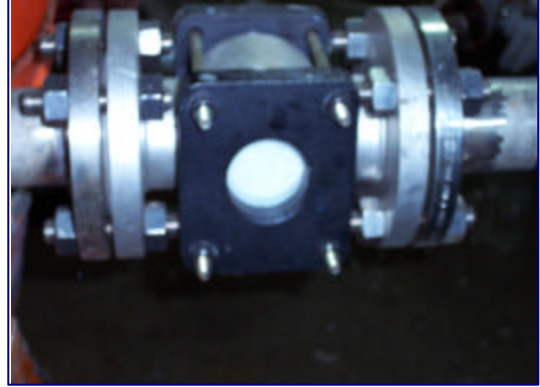
Typical Turbine Foam Job Chemical Mix & Waste Storage Layout

Features

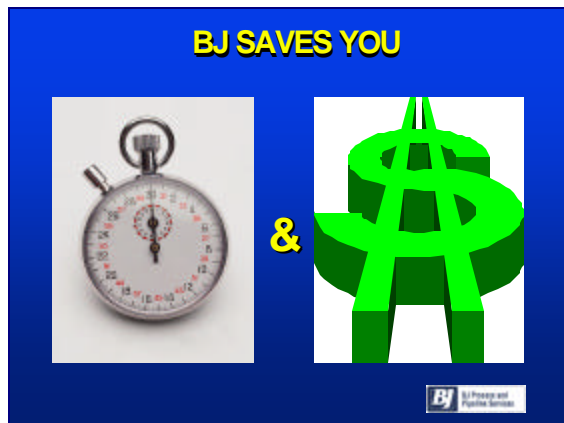
- Uses effective chemistry that is non-corrosive to turbine parts.
- Waste generated is easily disposed non-hazardous waste.
- QA/QC chemistry verifies all copper deposits removed.
- Foam quality monitored through out the cleaning.
- Cleaning process completed in 1-2 shifts.
- An experienced supervised process.
- Minimal unit pipe modifications required.
- Minimal plant utilities required



↑ BJ PPS Compact Foam Generating Equipment



↑ Final Inspection Sight-Glass Assures Clean and Consistent Foam Generation



Control Valve Injection Point ↑

Benefits

Case Histories Prove Improved Performance:

- No Turbine Damage
- Complete Removal of Copper Deposits
- Lost Megawatts Regained
- Quick and Short Outage Required
- Economical with Quick Pay Back
- Safe
- Environmentally Friendly



The above features and/or data are supplied solely for informational purposes and BJ Services Company makes no guarantees or warranties, either express or implied, with respect to their accuracy or use. All product warranties and guarantees shall be governed by the standard contract at the time of sale or delivery of service. Actual product performance or availability depends on the timing and location of the job, the type of job and the particular characteristics of each job.