MASTER CHEMICAL SERVICE Srl

Chemical Cleaning – Cryogenic Cleaning

CONDENSER TUBE CHEMICAL CLEANING

PROBLEM…

Condensers plays a key role in the overall efficiency of a power plant operating with Rankine cycle. Its performances are a factor of how efficiently heat can be transferred from the steam to the cooling water.

A condenser that can pull a stronger vacuum not only results in a higher cycle efficiency but also more potential power output

LOSS OF EFFICIENCY:

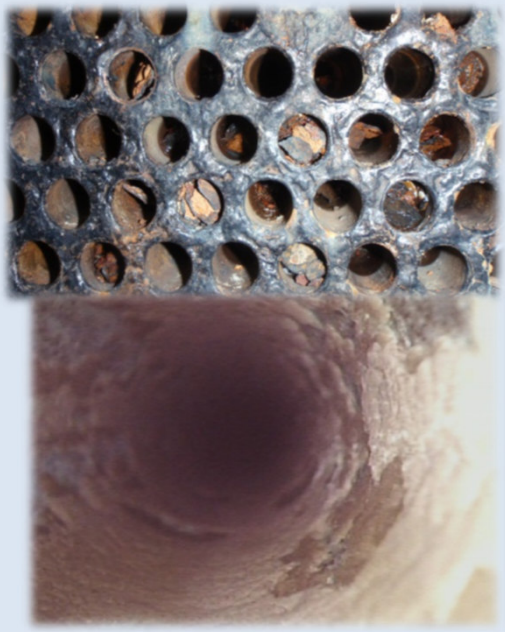
Condenser heat transfer is highly hampered by deposits and fouling of the heat transfer tubes. Efficiency is highly affected by this deposits.

CORROSION:

Long-term fouling deposits can also increase tube corrosion that “hides” under the deposits. This can reduce the life of the condenser tubes.

ENERGY:

Tube deposits increase the pressure loss in the water side which result in higher energy required for the circulating pump and hot well pump.



Tube fouling occurs mostly on the water side of the tubes and composed of calcium carbonate and calcium phosphate, but it can also include manganese deposits, clay, and fine rock silt. In some cases, pieces of rotting or degrading cooling towers can become trapped within the condenser tubes or upon the surface of the tube sheet.

In the case of power plants that use seawater or river water in their circulating water system, fouling can take the form of mud, organic slime, and marine plants and animals. Freshwater cooling systems tend to experience much less biofouling, and for closed-loop systems biofouling is often controlled by regular chlorination.

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Once the fouling has accumulated some sort of cleaning will be required, several methods are available such as plastic or metal brushes, high pressure washing mechanical cleaning. Chemical treatment also are available but they requires big size pumps, huge amount of water, chemicals and produces large volume of waste water to be disposed. Also chemical treatment are not beneficial for non-welded tube-sheet for possible sever corrosion induced by any acid left over in the interstices.

Although physical cleaning methods are effective they don't results in an homogeneous removal of hard deposits as such as carbonates and sulphates.

THE SOLUTIONS…

Master Chemical Services Srl has designed and patented a method for chemical cleaning the tube condenser without interesting the whole volume, avoiding also the acid to come in contact with non-welded tubesheet and interstices. The method also aimed to drastically reduce the amount of chemicals and water used and to be disposed.

We are able to work along with the Client techincal depratment and propose the right solution in terms of chemical composition and procedure to adopt for all kind of condenser tube materials.

A general condenser tube cleaning treatment offered by MCS Srl consists of the following phases:

- Mechanical cleaning/water flushing to remove loose particles which might plug the nozzles used for the chemical treatment (most of the time this is performed with local specialised partners)
- Installation of re-circulating stations and nozzles with temporary hoses connections.
- Acid treatment (depending on the procedure and acid adopted it might last from 30mins to 5-6hrs)
- Water flushing
- Neutraliztion
- Temporary passivation (depending on Client requirements and tube material)

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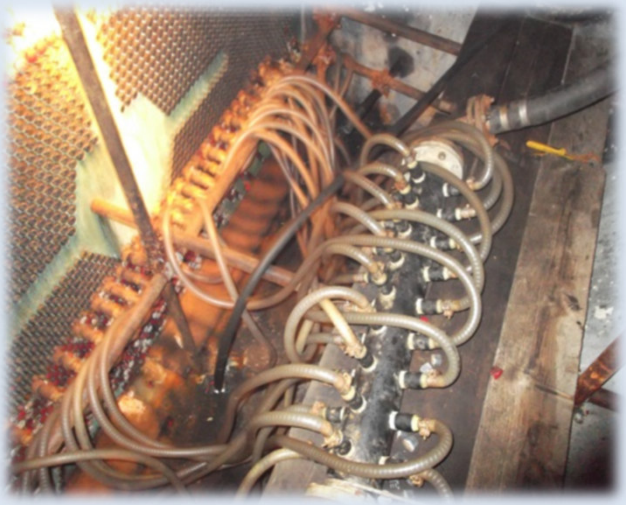
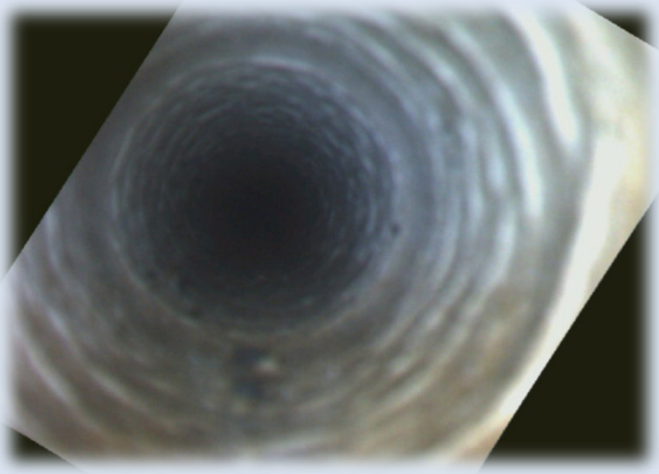
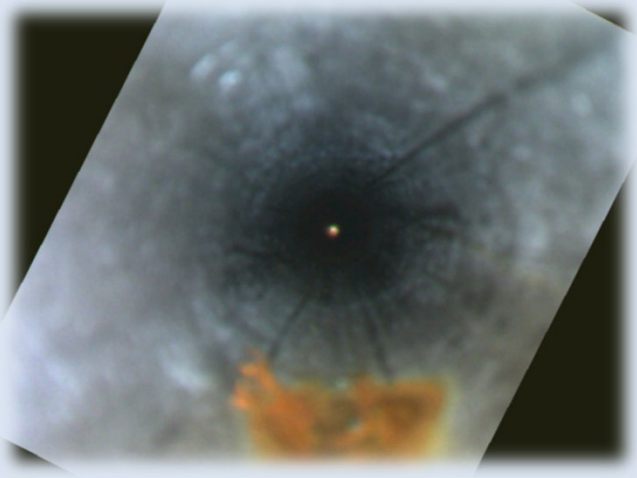
Throughout the treatment our technicians will monitor vital parameters such as:

- Flow rate, velocity, temperature
- Corrosion
- Acidity, pH, Conducibility
- Relative Ions present in the solution (such as Iron, Calcium, Clorides, etc)







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