Ocean Team Group of Companies

CASE:
Chemical Cleaning of Plate Heat Exchangers

- Effective cleaning took only 1 day of work

Ocean Team helps customers saving time and money by using chemical cleaning of plate heat exchangers instead of ordinary mechanical cleaning methods.

At Asnæsværket DONG Energy A/S was challenged by low efficiency on two of their Alfa Laval plate heat exchangers. The temperature of the process water from the two exchangers was 30 degrees. The normal temperature should preferably be between 25-28 degrees and should not exceed 28 degrees.

This meant that DONG Energy was facing a challenge, which should be solved as soon as possible in order to restore normal production.

***Picture 1** – The two Alfa Laval plate heat exchangers were obviously strongly affected by mussels, snails and other types of marine fouling.*

Mussels blocked the system

At Asnæsværket the plate heat exchangers use seawater for cooling of the process water used for the production.

The low efficiency of the exchangers were found to be caused by extensive occurrence of mussels, snails and other types of marine fouling, which had been brought into the system with the seawater and gradually plugged the seawater side of the heat exchangers.

Usual procedure used by Asnæsværket:
High pressure cleaning – Duration: 2-3 working days

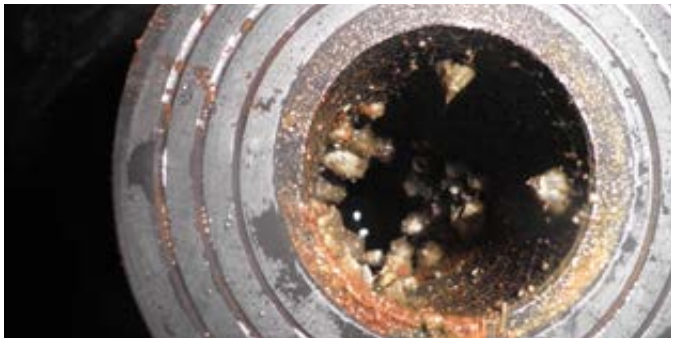
So far the ordinary procedure used by Asnæsværket for cleaning of plugged seawater heat exchangers has been high pressure cleaning.

Manual high pressure cleaning of heat exchangers includes the following procedures:

1. Dismantling of the exchangers
2. Disassembling
3. High pressure cleaning
4. Assembling and sealing
5. Mounting in the process system
6. Tidying up and cleaning of the work area

This process usually takes 2-3 days for each heat exchanger – a process which is repeated every second month for all the exchangers at Asnæsværket.

BEFORE CLEANING



AFTER CLEANING

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However, disassembling of the heat exchangers have on several occasions caused problems for Asnæsværket as they have experienced problems with making the exchangers tight again after cleaning. This resulted in additional costs for new gaskets and other kinds of repair.

Ocean Team's Solution:
Chemical cleaning – Duration: 1 working day
Ocean Team was able to offer Asnæsværket a considerably better and quicker solution. By means of chemistry it was possible to carry out the cleaning in one working day only for each exchanger. The result was a drop of temperature of the process water from the high level at 30 degrees to the normal level at 25 degrees.

The quicker cleaning meant that Asnæsværket could return to normal production considerably sooner and therefore consequently minimize loss of production.
Apart from the shorter duration chemical cleaning also brings the advantage, that the heat exchangers should not be dismantled and disassembled during the cleaning process, as are required when using mechanical cleaning methods. The heat exchangers are shut down in turns and cleaned on the spot. In this way you avoid additional costs due to problems with tightness, cleaning and wear on the working area as well as other unforeseen repair costs.

Picture 2 *– Alfa Laval plate heat exchangers at Asnæsværket.*

High pressure cleaning carried out by staff from Asnæsværket

÷ Duration of cleaning: 2-3 working days each heat exchanger.
÷ The heat exchangers need to be dismantled and disassembled.
÷ After disassembly it can be difficult to make the exchangers tight again after cleaning, which results in additional costs for new gaskets and other kinds of repair.
÷ The mechanical cleaning requires much space. High pressure cleaning of coolers for mussels and snails makes a mess; and it takes time to tidy up and clean the working area – this kind of cleaning wears down the room as well.

Chemical cleaning carried out by Ocean Team

\+ Duration of cleaning: 1 working day for each exchanger.
\+ Efficient cleaning – the temperature of the process water fell from 30 to the normal 25 degrees as a consequence of the chemical cleaning.
\+ The exchangers need not to be disassembled or dismantled. They are shut down in turns and chemically cleaned on the spot which save time as well as money compared to mechanical cleaning methods.
\+ No problems with leakages after cleaning and consequently no additional costs for new gaskets and other repairs in this connection.
\+ No mess in the working area and consequently no extra time and costs required for tidying up and cleaning the working area, which is not subject to wear neither.

= Saving 2-4 working days – as a consequence of quicker cleaning
= Efficient cleaning – the temperature of the process water fell from high 30 degrees to 25 degrees.
= Minimizing loss of production – The first heat exchanger was back in full operation after only 1 day.
= No additional costs – for sealing troubles, cleaning of and wear on the working area.