PEERLESS Europe
A CECO Environmental Brand

CASE STUDY

skimovex

APPLICATIONS & PRODUCT OVERVIEW

ADVANCED NUT SHELL FILTRATION

Peerless has recently completed successful on site trials of its advanced multi-stage nut shell filtration equipment at one of India's largest oil fields.

PROBLEM

The oil field is currently using a series of two existing nut shell filters, both using an old style of technology, and both operating with nut shell media only.

SOLUTION

The **Peerless Advanced Nut Shell Filtration System** offers a bed of nut shell, along with a bed of two grades of other media. By combining these beds into one vessel, Peerless can ensure high efficiency without adding multi-stages of equipment.

The Gr-Nut Filter is a patented dual media filter design comprising layers of crushed nut shell and fine garnet. Crushed nutshell is a proven medium used for the coalescence and entrapment of oil droplets. Fine garnet has been used for many years in the water industry for fine solids removal and is used in Gr-Nut filters to achieve higher solids and oil filtration specification than normally seen in nutshell filters.

PILOT TRIALS

Trials utilizing the **Peerless Advanced Nut Shell Filtration System** took place in November / December 2015. The pilot unit was operated on a 24 hour round the clock basis with samples being taken from both the filter inlet and the filter outlet at regular intervals. Lab analysis was conducted by Peerless, and verified by the operator. Water was tested for both oil content and total suspended solids.

The trial unit was placed onsite in various locations, and it was connected to the main inlet piping. The customer selected the locations and the only requirement from Peerless was that a 2 BarG differential pressure was required across the units inlet and outlet. Peerless chose to use Nitrogen for the gas scouring during backwash as this was readily available at site.

The media selected for this application, and graded to a specific size distribution determined by Peerless to be ideal for this duty, are grade ETL-430 walnut shells, grade ETL-215 fine garnet and grade ETL-230 coarse garnet.

During normal operation, the water flows in the downward direction through the test filter while oil and solids are removed by the media. During this time, the pressure drop increases through the filter bed and after a period of time approaches the maximum allowable pressure drop of 1 bar. When the maximum pressure drop is reached, the vessel enters backwash.

The flow of backwash water is controlled based on viscosity with higher viscosity requiring lower backwash rates. The backwash water for the trial unit will be taken from the normal filter inlet stream in reverse flow upward through the test vessel. Backwashing is a manual operation in the test unit.

Peerless pilot unit on site under testing in December 2015

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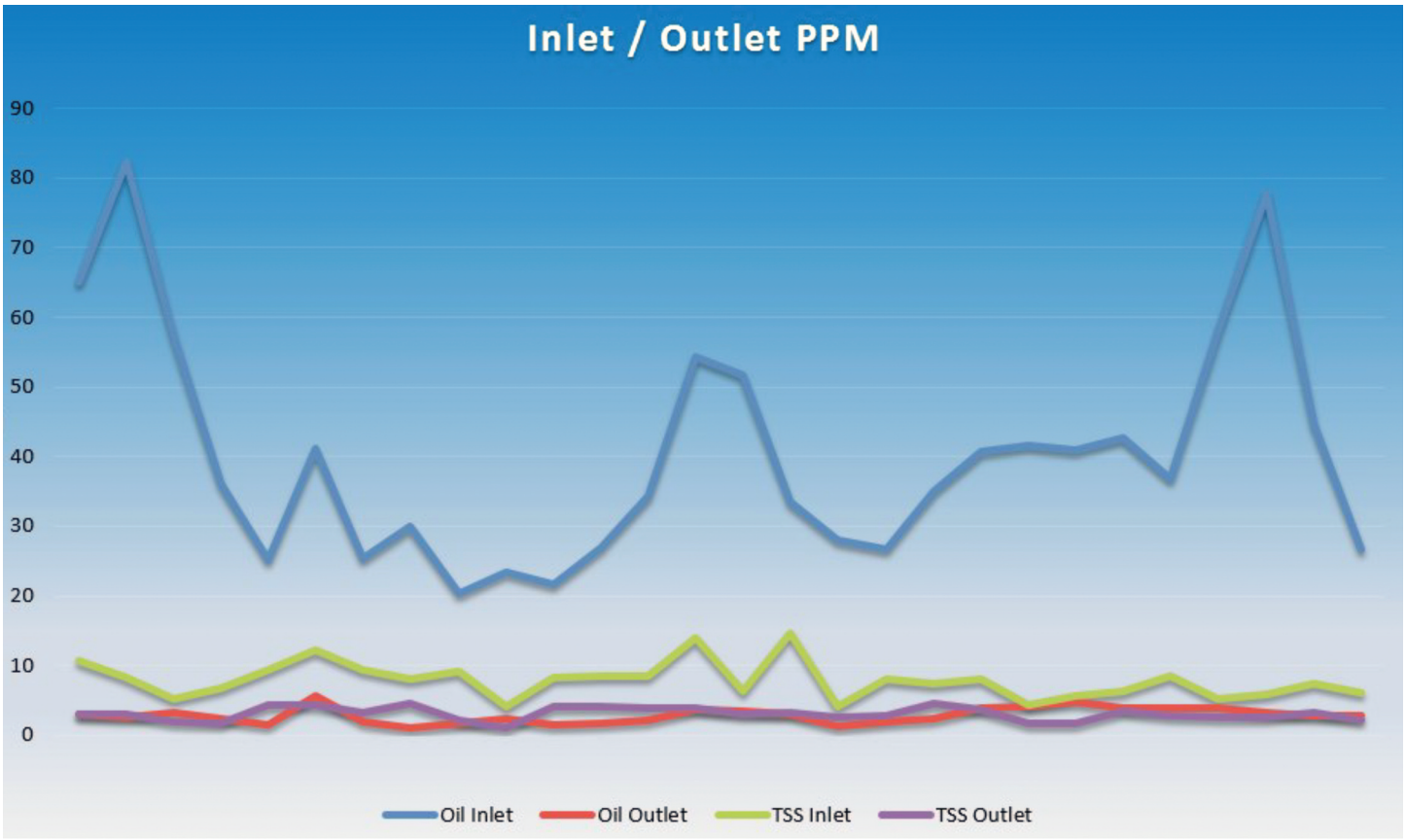

RESULTS

The graphs above show the outstanding performance of the **Peerless Advanced Nut Shell Filtration System** for both PPM of oil in water and PPM total suspended solids (TSS) at a constant temperature of 75°C throughout the trial.

The filter was backwashed on average twice per day. The average run time for each treatment cycle was 12 hours and 26 minutes.

The actual run time varied due to solids content. As would be expected, as the solids concentration increases, the differential pressure rises more quickly and the run time is reduced.

Backwashing was done between 1 and 1.2 BarG, and was set to resume approximately every 12 hours. The differential pressure of the bed after backwashing would return to approximately 0.35 BarG.

Inlet and outlet samples. 64.4 ppm oil in water at inlet. 2.7 ppm oil in water at outlet.

Dirty backwash water after cycle measuring 9,355 ppm of oil in water

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