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Case Study

Major Petroleum Refinery
Process Gas Compressor
Chemical Clean & HVOF

Project Overview:

PetrolinkUSA recently completed a project for a major petroleum refiner on a process compressor. The lube oil system for the compressor had never been cleaned in over 30 years of service and would benefit greatly from PetrolinkUSA's services. The unit was down for a major maintenance outage which created the perfect opportunity to address the ISO cleanliness of the oil and oil system. PetrolinkUSA custom engineered and performed a successful reservoir and chemical cleaning coupled with a high velocity hot oil flush (HVOF) to return the system to acceptable ISO and API cleanliness specifications. In order to meet the needs of both the Reliability and Estimator stakeholders, the job was submitted with a not to exceed bid.

Preparation:

PetrolinkUSA organized a pre-job walk down and established a process and procedure document to ensure seamless job execution. This document listed all the required pre-engineered jumpers and connection spools which allowed the team to arrive onsite with all the necessary parts preventing unnecessary delays while facilitating a safe and efficient start up. The oil system consisted of plain carbon steel piping which necessitated a chemical cleaning prior to the HVOF. The customer point of contact, safety requirements, equipment staging, and final cleanliness specifications were all established and customer approved during this stage.

PetrolinkUSA arrived at the job location to begin rigging up to the lube oil system including the heat exchangers, filter vessels, overhead accumulator, and supply/return piping. The heat exchanger bundles were pulled and cleaned at an offsite facility. The flushing equipment was rigged up quickly and safely due to PetrolinkUSA's custom flushing trailers and skids that facilitate efficient set-up when arriving onsite.

Chemical Cleaning:

The chemical cleaning process consists of two stages: a degreaser stage and pickle stage. After all spools and jumpers were installed, the chemical flush began by heating and circulating a high alkalinity degreaser in the system piping and external reservoir. This degreaser was circulated for four hours in order to break up hydrocarbon deposits in the system. Once complete, water and nitrogen were used to flush and purge the system of degreaser. All low points in the system piping were checked to confirm the piping was completely flushed of degreaser. The degreaser was also removed from the external reservoir in preparation for stage two.

An environmentally safe pickling agent replaced the degreaser for the second stage and was heated to temperature while circulating through the system. High point bleeds were used to ensure that the chemical was in contact with all internal surfaces throughout the system. The chemical was then blocked into the system for approximately 12 hours. Again, the system was purged of the pickling agent using water, nitrogen, and draining via low point bleeds.

High Velocity Hot Oil Flush

The system was reconfigured to utilize the organic system reservoir and the existing oil for a high velocity oil flush. During rig up valves were installed at every bearing supply point to ensure high velocities system wide. A targeted plan was utilized to isolate every part of the system using the for mentioned valves along with alternating flow between heat exchangers and filter vessels. The heat exchanger bundles were reinstalled once the vast majority of contamination had been removed from the system and included in the flush. Once verification screens were in accordance with API 614 and approved by the client, the total flush time ended at approximately 51 total hours.



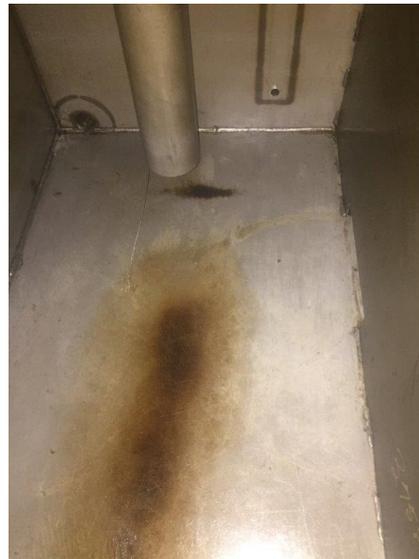
Before **After**
API 614 Screen on 6" Return Line

Reservoir Cleaning:

The oil was purged and drained from the system and disposed of at the clients preference. With the oil removed, PetrolinkUSA moved forward with the reservoir cleaning. Once clean, new oil was filter filled into the system using one micron BETA 1000 micro-glass filters. Oil analysis resulted in a 13/12/8 ISO particle count.



Before



After

Reservoir Cleaning Results