

Heat-Transfer-System Maintenance During Slow Periods

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Periods of reduced heat-transfer-fluid (HTF) system operation offer opportunities for mechanical integrity engineers to perform necessary maintenance. Here are suggestions for using the downtime for maintenance tasks.

Safety

These activities support ongoing safety of the HTF unit.

Leak repairs. Repair wet insulation and underlying leak points to help avoid potential fires. Repack valve stems, replace gaskets and make repairs to flange-pairs where temporary injectable sealant was used.

Equipment repairs or replacement. Use proper process-entry and lock-out/tag-out permitting procedures for equipment to be properly prepared for repair or replacement.

Sample port installation. This requires tie-points for high-pressure inlet and low-pressure return, and a means for cooling fluid for collection.

Fire safety equipment checks. Check handheld fire extinguishers, monitor nozzles, safety showers, sprinkler systems and the gas sparge for the heater firebox.

Restock area safety supplies. Replace used spill-response kits and oil-drying media, gloves and first-aid supplies. Ensure that supplies are not expired and are in usable condition.

Preventive maintenance

Preventive maintenance (PM) and integrity-assurance checks are best accomplished while systems are down.

Inspections. Evaluate area switch gear, pressure-relief devices, heater coils or burners, thin-walled expansion joints or flex-hose, utility systems such as cooling water, instrument air or nitrogen, barrier fluid systems, lubricant checks and top-ups. For pumps and heaters, see the manufacturer-issued inspection and PM guidance.

Calibrations. Conduct periodic checks of liquid level instruments and flowmeters, critical interlocks, pressure sensors and transmitters to ensure proper control of HTF temperatures and protect HTF life.

Mechanical integrity checks. Vibration monitoring and repair, vessel inspections for corrosion and wall thickness, and proper operation of the inert-gas blanketing system

Alignments. Alignment checks for motor shafts of rotating equipment, including pumps, blowers and fans

System flushes and cleaning. Poor performance may be due to system deposits. Consult the fluid manufacturer for the best cleaning option. For HTF side cleaning, keep fluid and system compatibility in mind. If the activities require outside resources, schedule appointments in advance.

Fluid servicing

Recent fluid analysis results should be discussed with your HTF technical expert in advance of shutdown periods to determine what actions might be necessary to ensure uneventful ongoing operations. Observations should include looking for elevated acidity, unusual or large amounts of solids, contaminants, and degree of thermal degradation present.

Fluid sampling for quality check-up. Collect a representative (that is, well-circulated) sample for analysis. Samples should be cooled to less than 200°F and promptly sealed for proper assessment. Review questions around proper sample collection with the fluid manufacturer, and discuss the results and any recommendations made in case planning for action is required.

Filters/strainers. Filters operate full-time, and continually collect debris. Replace or clean filter elements and pump-suction strainers, if needed. Examine the debris for any unexpected materials; this can indicate in-service materials that are incompatible with the HTF. For systems without filters, commercial filtration service providers are available. If connections to and from the HTF system are required, identify connection points, or plan to have them added.

Fluid quality improvement via partial to full replacement. Poor fluid quality can require different measures, including venting, drying of excess moisture, filtration, dilution or even replacement.

Getting the analysis in-hand prior to shutdown can enhance opportunities for problem resolution prior to restarting. If new fluid or support services are required, make arrangements for during a shutdown.

Dispose of 'light ends.' Organic vent condensate from HTF systems will require drumming out and proper disposal. Consult with site waste-management supervision for assistance.

General

Routine area maintenance can fall to the bottom of the priority list, but downtimes can allow catching up on these important tasks:

Housekeeping. To improve operational effectiveness, oily residues should be cleaned from walkways, structural steel, siding, equipment and piping to reduce fire risk. Downtime allows a chance to put equipment, tools, buckets, hose and others back in place, if needed.

Line labeling. Pipe racks can become congested, which makes tracing pipeline routes difficult. Line labeling and direction-of-flow arrows can help. This includes HTF piping as well as process and utility piping. Ordering the labels in advance is advised.

Equipment/valve labels and tags. Vessel labeling is an OSHA requirement, but labeling of valves and minor equipment can also be helpful to operators and mechanics, as well as aiding training programs.

Tie-ins for future needs. Potential needs for piping modifications can include tie-points for new circuits, piping upgrades, additional or new instrumentation, repairs to old piping, and addition of thermal expansion loops. These should all require engineering planning in advance of the shutdown to ensure system specifications are properly met.

Training. Operator training should involve an in-depth review of the system, its components, flows and controls while the system is down. ■

Editor's note: Content written by Conrad Gamble, Eastman

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