SEDGWICK COUNTY, KANSAS
DIVISION OF FINANCE
Purchasing Department
525 N. Main, Suite 823 ~ Wichita, KS 67203
Phone: 316 660-7255 Fax: 316 383-7055
http://sedgwickcounty.org/finance/purchasing.asp

ADDENDUM 1
RFB #21-0073
HOT WATER BOILER #1 TUBE REPLACEMENT AND BOIL-OUT PROCEDURE

October 18, 2021

The following is to ensure that vendors have complete information prior to submitting a bid. Here are some clarifications regarding the proposal for the Hot Water Boiler #1 Tube Replacement and Boil-Out Procedure for Sedgwick County Facilities**.**

Questions and/or statements of clarification are in **bold** font, and answers to specific questions are *italicized.*

The Boil-Out Procedure document is attached.

Firms interested in submitting a bid, must respond with complete information and **deliver on or before 1:45 pm CDT, October 26, 2021.** Late bids will not be accepted and will not receive consideration for final award.

"PLEASE ACKNOWLEDGE RECEIPT OF THIS ADDENDUM ON THE BID RESPONSE PAGE."

Sincerely,

Lee Barrier

Lee Barrier
Purchasing Agent

LB/lj

TECHNICAL BULLETIN #8

Boiler Boilout Procedure for Package and Field-Erected Boilers

Introduction

Before a new boiler is put into service, the waterside surfaces should be cleaned to remove fabrication oils, grease, dirt, and any protective coatings. Failure to remove these materials may cause these contaminants to bake onto boiler tube surfaces, resulting in overheating of critical system components. At a minimum, considerable boiler water foaming and steam contamination may be expected if oils and greases are not removed. For these reasons, it is recommended that an alkaline boilout be performed on new boilers prior to startup.

Many manufacturers provide a detailed precleaning procedure that should be followed to ensure any applicable warranties remain in effect. In the absence of such a document, the following procedure may be used for precleaning firetube, package, and field-erected boilers. It should be noted that rust and mill scale may not be completely removed by the alkaline boilout procedure. A separate cleaning approach may be needed to remove metal oxides. Such cleaning is not covered by these instructions. Contact your ChemTreat technical representative to discuss neutral pH cleaning procedures that are available instead of using inhibited acid.

Preliminary Recommendations

To minimize the amount of foreign matter and contamination that could be introduced into the boiler during startup, the preboiler system (condensate receivers, condensate return lines, deaerator storage tank, feedwater lines, etc.) should be flushed and rinsed as thoroughly as possible prior to boiler boilout.

Steam drum internals (cyclones, chevrons, baffles) should be mechanically-cleaned by brushing and/or rinsing before they are installed. Ensure all internal piping, drum manhole plates, and hand-hole plugs on headers are secured prior to boilout.

Temporary sight glasses should be installed since the original sight glasses may become coated, etched, or fouled during the alkaline boilout process. The original sight glasses should be carefully removed and then reinstalled prior to final boiler operation. With fragile mica shields on most flat sight glasses, new

material may be required and should be on-hand prior to re-installation of a sight glass assembly.
Boilout chemicals may be introduced directly into the deaerator storage tank, feedwater line, or the boiler steam drum. Provisions should be made to install temporary chemical fill lines for chemical feed during boilout if the designated chemical feed pumps, tanks, and lines are not yet installed or if the chemicals cannot be added manually.

Ensure all chemical feed pumps are properly operational prior to boilout. All chemical feed lines and sample lines should be flushed to ensure no pluggage exists.

All necessary hydrostatic tests should be performed first on the boiler prior to boilout. During the hydrostatic test, all blowdown, sampling, and drain valves must be checked to ensure they are opening, draining, and closing properly. All valves and drains should be identified and tagged prior to hydrostatic testing.

The feedwater pumps and the deaerator will also be needed during boilout and should be tested to ensure they are operational. Experienced boiler operators must be scheduled for boiler firing and blowdown operation during the boilout.

Note: Arrangements for dumping, sewering, impounding, processing, or other disposal of the alkaline wastewater from the boiler boilout process should be made well ahead of the anticipated boilout date. This wastewater may be hot and contain significant levels of oils and grease and will have a pH in excess of 10.0.

If the plant discharges waste into a POTW (publicly-owned treatment works), obtain permission to discharge the wastewater into the plant sewer outfall. Some surcharges, pH neutralization, etc., may be required.

This water is **not suitable** for direct stream discharge, discharge to a lake, land spreading, or unapproved release into any POTW. Severe penalties may be assessed if unauthorized disposal of this water is detected. If this water must be hauled off site, there will be a cost, depending on the water volume and hauling distance required. As with acid cleaning, the disposal of alkaline boiler boilout wastewater may constitute a significant portion of the total expense of the boilout program if it cannot be suitably disposed of or processed on site.

Boilout Procedures

1. Both the boiler and the feedwater economizer must be filled to normal operating levels with the boilout solution. Steam headers, lines, and superheaters are excluded from chemical boilout, but are cleaned of rust and debris by steam blows during

startup. Backfilling the superheater with condensate or good quality feedwater is recommended to prevent them from receiving the boilout chemical solution.

2. The composition of the boilout solution is typically specified by the boiler manufacturer, depending on the design and operating pressure of the boiler; however, the following generic formulation consisting of TSP **and** NaOH is normally acceptable to most manufacturers:

   - Trisodium phosphate (aka trisodium orthophosphate) at 21 pounds (2,500 ppm) anhydrous TSP per 1,000 gallons of system volume. Anhydrous (dry) TSP is generically available as a white powder, or as ChemTreat B145.

   and

   - Sodium hydroxide (NaOH) at 21 pounds (2,500 ppm) active NaOH per 1,000 gallons of system volume. Liquid caustic, (50 percent NaOH or ChemTreat BL1301) can be substituted for pelleted or granular NaOH at a dosage of 3.3 gallons per 1,000 gallons of system volume.

   - If desired, a nonionic surfactant (such as a nonionic, nonfoaming dishwasher detergent) may be added at 0.1 percent by volume.

   - Care must be taken to prevent excessive foaming during an alkaline boilout. This may occur **if** excessive oils and/or grease are present in the boiler. ChemTreat BL197 antifoam (or equivalent) may be added if foaming occurs.

   - **Note**: Sodium carbonate (soda ash, Na_2CO_3) is not as strongly basic as trisodium phosphate and may be considered only if TSP is not available.

   - As an alternative to the generic boilout formula, ChemTreat CT23 can be used for boilout of smaller boilers such as firetube boilers. CT23 should be used at 4 gallons of product per 100 gallons of boiler volume, for a boilout period of 24–48 hours.

3. After the boilout solution has been added, the drum level must be verified before firing can begin. Recommended procedures for purging the furnace and firing the boiler should be followed. The boilout procedure is normally sufficient for refractory drying, but this should be confirmed with the general contractor and/or boiler manufacturer. All firing equipment, controls, and relief valves should be confirmed to be operating normally.

4. Fire the boiler slowly, bringing the pressure up to 20 percent of design operating pressure over an 8-hour period. Do not exceed 300 psi unless specified by the manufacturer. Hold this pressure for 4–6 hours or longer and ensure adequate boiler circulation by measuring the temperature of the upper and lower boiler drums and headers.

5. After 4 hours (or a time period necessary to ensure good circulation), shut down all of the firing equipment and allow the boiler pressure to decay. With the pressure reduced (see manufacturer's guidelines), blow down all bottom headers, drums, and gauge glasses in sequence. Continue blowdown procedures until the low-level alarm sounds; then discontinue the blowdown and refill the boiler to normal operating water level.

    - **Note**: Do **not** allow the water level to go above the upper sight glass range or to drop below the bottom mark on the sight glass.

6. Re-fire the boiler using the procedure outlined in step 4 and hold the pressure for another 4-hour period. Blow down the boiler as outlined in step 5 and restore normal water level as needed.

7. Frequent samples of the blowdown water should be taken and analyzed for phosphate (PO_4) and alkalinity. Additional chemicals must be added after phosphate and/or alkalinity levels drop below half their original levels. Oil should be monitored in these samples as well.

8. After alkalinity and phosphate levels have stabilized and **no visible** (or measurable) oil is detected, the boiler pressure should be dropped below 25 psig and all vents, headers, and drains should be opened.

9. After the boiler metal temperature drops below safe limits (200°F, or the manufacturer's target), the boiler should be drained and refilled to aid in cooling. Once the boiler is cooled to near ambient temperature, it should be drained again, opened, and inspected. The boilout is successful when all oils and organic deposits have been removed and inspection confirms the boiler is clean and passivated.

10. Refill the boiler with good-quality treated feedwater and add the prescribed boiler treatment chemicals if the boiler is to be returned to service. Add a neutralizing amine or ammonia if it is to be stored wet.

If the boiler is to be out of service for an extended interval (weeks or months), dry storage is recommended instead of wet storage.