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REMOVING BOILERS FROM SERVICE

INTRODUCTION:

Proper procedures should be observed when taking a boiler down for inspection. This is necessary in order to minimize boiler stress, and to provide an accurate assessment of the boiler water treatment program. Outlined here are the steps to remove, cool, and drain a boiler in preparation for inspection.

When removing a boiler from service, it is possible to create deposits that were not present during normal operation. This occurs when sludges settle on the hot tubes and bake in place forming hard insulating deposits or scales. These sludges can increase clean up costs and lead to a false understanding of the boiler water treatment program results. Also rapidly cooling a boiler can cause rapid and uneven contraction of the boiler metals and refractory. This will result in stress which can cause costly damage to firebrick or refractory material as well as cause waterside leaks at the tube ends.

PRIOR TO REMOVING A BOILER FROM SERVICE:

Both sludge conditioners and water circulation play an important role in keeping boiler water sludges suspended. Once the boiler is "off line", and the circulation of water stops, boiler water solids will settle and adhere to the boiler tubes. To prevent the rapid settling of

solids and the deposition of sludges on the tubes, corrective actions should be put in place two or three days prior to the actual shut down.

To increase the rate of removal of sludges and to lower the suspended solids level in the boiler, the blowdown should be dramatically increased. Commonly recommended is a 10% increase in the continuous blowdown rate and a doubling or tripling in the bottom blowdown rate.

To keep sludges more fluid for easy removal, the hydrated alkalinity (OH) should be raised to the highest control limit for the boiler. The higher alkalinity will also soften many existing deposits for easier removal.

The sludge conditioner dosage should be doubled as well. This will also make any sludges less adherent and more free flowing.

If a "one-drum" treatment is used, then doubling this treatment is recommended. Use the hydrated alkalinity (OH) test as the control for the increased dosage.

COOLING THE BOILER:

After the boiler has been conditioned for a period of 2 or 3 days, the boiler should then be ready for cooling. This involves

increased blowdown with a slow cooling to prevent stress damage.

Once the boiler is taken "off line" it is important that extensive surface and bottom blowdown be started immediately to remove any settling materials. Being careful not to trip the low water cut-off, blow down the gauge glasses to remove any possible accumulation there as well. Replace the blowdown water with hot, deaerated feedwater to avoid thermal shock and stress.

Repeat this blowdown procedure several times as the boiler cools. A commonly recommended rate of cooling is 100 F per hour. Cooling at a greater rate than that can cause the type of damage mentioned in the Introduction . The draft fan(s) can be used to cool the boiler from the fireside.

Once the pressure in the boiler is down to 5 or 10 psig, a steam vent valve may be opened. This will prevent the forming of a vacuum in the boiler that could damage pressure gauges, manhole covers or gaskets. Vent the boiler until the steam flow stops. Drain the boiler slowly by opening the bottom blowdown lines. Boilers with high hardness make up water or a high solids level should be refilled with hot deaerated feedwater to normal operating level before draining. This will help to prevent water soluble salts from depositing on the boiler surfaces.

PREPARATION FOR INSPECTION:

Remove the manhole covers and handhole covers for inspection as soon as possible after draining the boiler. Do an

immediate initial inspection before any sludge deposits dry. During this initial inspection look for any places where there are heavy sludge deposits. Be sure to record where those areas are. Such information may help determine why these deposits formed. If, for example, there is a large difference in the amount of scale in one area of the boiler versus another, then there may be circulation or blowdown problems in that area of the boiler.

After the initial inspection, the boiler waterside should be immediately washed using a high pressure water hose. For best results, do this while the boiler is still wet and deposits are still soft. Any loose sludge or deposits will be washed away before they bake onto the boiler tubes.

In general, boilers should be washed from the top down. With a Firetube Boiler, the procedure should start with the top manhole being removed for washing out the top of the boiler. Then the handholes should be removed from the sides and lower sections of the boiler and washed out thoroughly. Finally, the bottom blowdown lines should be completely cleaned.

With a Watertube Boiler, the steam drum is washed first. This is then followed by a high pressure wash down of each tube to remove any loose scale or sludge. Next the mud drum (or drums) is washed out. Finally, as with the Firetube Boiler, the bottom blowdown lines should be completely cleaned.

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