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TECHNICAL PUBLICATION

INFORMATION & STRATEGY FOR THE
FACILITY MANAGER

PROPER BOILER LAY-UP

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Introduction

The best program for preventing scale and corrosion during the operation of the boilers can be wasted by improper shut down, improper lay-up, and improper maintenance on the boilers during downtime. Continued maintenance of the entire boiler systems, even during downtime, is essential in protecting the boilers against corrosion.

General Preparation

During operation, the solids are dispersed both chemically and mechanically (by natural circulation of water). However, when the boiler is shutdown, circulation stops. As such, any excess solids will settle onto the waterside surfaces and become adherent deposits. Boiler water cools down during shutdown, decreasing the solubility of most solids, and increasing the potential for precipitation. If a boiler is drained while hot, the continued evaporation of water will cause the excess solids to concentrate and precipitate on the waterside surfaces...and possibly bake on the hot surfaces too.

To prevent these problems, the solids level must be reduced by increasing blowdowns prior to shutdown. The blowdown rate should be gradually increased, both via continuous and bottom blowdown. Chemical feed rate may have to be increased to offset the chemical loss through higher blowdown rate. Lastly, boilers should never be taken down hot.

When boilers are removed from service, they can be laid up either WET or DRY. The choice depends on how long a boiler would be laid up.

WET Lay-up

WET lay-up entails keeping a boiler filled with treated water. It allows the boiler to be returned to service within a short notice. Under this method, the boiler water chemistry must be prepared before shutting down.

As water cools down, it will absorb more oxygen, increasing potential for pitting corrosion. To prevent this problem, the oxygen scavenger level must be increased up to the high end of the operating range.

The boiler water pH must be maintained at the high end of operating range as well to ensure against any acidic conditions.

The scale inhibitor level must also be maintained at the high end of the operating range. The additional dispersion properties of the inhibitor will assist in preventing the minerals from becoming insoluble at the lower temperature.

The boiler must be filled to the top with the above treated water to force out as much air as possible. Otherwise, trapped air will gradually consume the oxygen scavenger in the water. Excessive trapped air may consume all of the available oxygen scavenger, causing the boiler to corrode.

It is important that the chemicals are well distributed in the boiler water, by firing up the boilers lightly to provide some circulation of the chemicals.

It is also important that analytical tests on the boiler water be conducted regularly to ensure the maintenance of the proper chemistry.

DRY Lay-up

Dry lay-up entails draining the water out of the boiler completely. This method is used for longer outages. Under this method, the boiler metal surfaces must be kept dry or the air must be kept out.

Idle boilers are vulnerable to attack when air contacts moist metal surfaces. To prevent corrosion, either the boiler metals must be dried completely or air must be forced out by nitrogen blanketing.

To dry the boiler metals, circulate warm air through the boiler. Adding desiccants would also help. Seal and blanket off all openings to the boiler to prevent air, or steam incursion.

For nitrogen blanketing, pressurize the boiler with nitrogen while draining. The nitrogen will force all the air out. Pressurize all system to prevent air incursion.

It is also important that inspection be done regularly for evidence of corrosion and to replace the desiccants if necessary. Reseal and restore to proper conditions.