WET STEAM - CARRYOVER & SUPERHEATER FAILURE

Steam Drum with Internals like Baffles, Cyclone and Demister is always designed to supply Dry Steam inlet to Primary Super heater coils in boiler operating condition on the entire boiler steam loading range. Steam Drum design with incorrect internals and its fitment may lead to water droplets carryover and wet steam entry to Primary Super heater coils in boiler operating condition.

These impacts are very high on boiler operation cost as final steam temperature achievement is a big task and specific steam consumption of plants will increase. Further, super heater coil replacement, emergency plant shutdown, non performance of boiler steam output, safety concern during operation tube failures etc are additional maintenance aspects & losses.

These deficiencies may be arising during engineering design, during boiler capacity enhancement modification & retrofit, during erection, during boiler repair & maintenance.

As we know that Both High Pressure Drop & Low Pressure Drop are dangerous for Super heater Coils.

1. High / Low Velocities of steam inside tubes causing less cooling of coils thus metal temperatures remain on higher side.
2. Higher velocity of Steam means higher pressure drop across Super heater coils & Lower velocity of Steam means Low pressure drop across super heater coils.
3. Less Flow of Steam through super heater coils is not desirable.

CASE History:

LOW FINAL SUPERHEATER TEMPERATURE & SUPER HEATER TUBE FAILURE

A boiler was modified for capacity enhancement. The cyclone and demister increased in steam drum, no. of super heater coils increased, water wall area increased. During operation, repeated super heater tube failures with swelling, Bulged & long term overheat symptoms and low final steam temperature issues were noticed.

Few other boiler consultants provide an idea to customer for installation of:

1. Header with turbo separator in between steam drum & primary super heater
2. Increase No. of Cyclone and demister
3. Increase no. of stage / pass in super heater
4. Chemical cleaning of Alloy Super heater coils
5. Replacement of all steam drum internals & demister with new design

On our detailed investigation and analysis, outcome as given below:

1. Wrong installation of Feed water pipe in steam drum
2. Poor design of cyclone
3. Choking of demister pads
4. Steam short circuiting through baffles
5. Steam short circuiting through demister
6. Heavy Water carryover to Primary Super heater
7. Internal thick scale deposit in super heater coils

After implementation of above correction to avoid water carryover, desired final steam temperature achieved.

Photo of Boiler before Correction:

We suggest to reviewing before start the boiler operation:

1. Boiler technical details & auxiliaries before starting the process of steam generation.

2. Boiler water chemistry parameters as per recommendation of standard code.

3. Use of water treatment chemicals as per recommendation of standard code.

4. Steam drum level operation control within the safe limits

5. Boiler Startup & Shutdown procedure

6. Avoid Water Carryover, Priming & Foaming during boiler operation

Unite Energy Corporation LLP, Ghaziabad, U.P., India is keen to provide the Boiler Spares, Sales & Services, Retrofit & Site Repairs of Boiler & Auxiliaries, Performance Evaluation, Shop & Site Fabrication, Erection & Commissioning, Design Modification & Feasibility Study, Consultancy & troubleshooting support to mitigate the irregularities in the plant, minimize breakdown & downtime and improvise design & system performance to improve the overall plant's health and performance.

Regards
Pramesh Kumar Jain
Chief Executive - Technical
Mobile: **+91 9868499319**
Email: **pramesh.uniteenergy@gmail.com**