

AUSTRALASIAN BOILER & HRSG USERS GROUP: Owner/operators of fired boilers, HRSGs share experiences to resolve common issues

The experiences shared at the Australasian HRSG Users Group (AHUG) annual meeting have been chronicled for the last decade in **CCJ**. Beginning here, and going forward, you'll also benefit from the lessons learned/best practices of fired-boiler owner/operators facing technical and operational issues closely related to those in HRSGs.

The first annual meeting of the Australasian Boiler & HRSG Users Group (ABHUG), chaired by Barry Dooley of Structural Integrity Associates Inc, attracted 75 participants from Australia, Japan, New Zealand, Thailand, UK, and US to the Brisbane Convention & Exhibition Centre, Oct 30-Nov 1, 2019. About half of the participants were users.

The agenda included 21 technical presentations and a welding workshop that brought together multiple experts to present on the latest standards, welding of service-exposed materials, ligament cracking in superheater headers, cold repair of Grade 91 material, etc.

5. Hex chrome

A practical presentation focused on hexavalent chromium contamination of high-chrome materials in gas turbines, HRSGs, steam turbines (casing bolts), and steam piping was made by David Addison, principal, Thermal Chemistry Ltd, a frequent contributor to **CCJ**. He covered how and where hex chrome forms, the health risks it poses, PPE requirements, best work practices, proper disposal, etc.

Recall that chromium, a common alloy element in high-temperature/high-pressure steels used in powerplants, has multiple oxidation states. To illustrate: Chromium III is essential for human health; Chromium VI (hexavalent chromium) is extremely toxic. Chromium VI is also easily managed with standard industrial hygiene and personal protection strategies applied, combined with neutralization where needed.

Risks associated with welding of high-chromium materials are well understood in the industry, as are possible hazards during some chemical cleaning procedures.

Recently, however, hexavalent chromium has been identified on gas-turbine hot-gas-path components (Fig 4), steam-turbine hot external components (bolts), and on the external surfaces of hot HRSG/boiler piping.

For gas and steam turbines, there's a link to calcium-containing anti-seize pastes often used on hot components.

The yellowish appearance can be misinterpreted as sulfur deposits from the fuel. "Bright yellow HRSG gas-side deposits should be considered a major warning sign, and treated with significant caution," noted Addison.

Although understood and manageable, this alert involved one particular slide labeled "unconfirmed risk areas" and offered the following details:

Upper and lower crawl spaces with:

- High-chromium pipework.
- High-chromium liner places.
- Oxygen atmospheres.
- High temperatures.
- Insulation containing calcium oxide.
- Potential for rain water ingress that allows for calcium leaching.

For HRSGs:

- Superheater/evaporator upper and lower crawl spaces.
- Gas-turbine exhaust ductwork—mainly on the insulation side of plates.



4. GT combustor basket spring clips showing deposit of hexavalent chromium