

# Hexavalent Chromium Safety Bulletin Summary

September 2019

*Disclaimer: this document is a summary of safety bulletins and information released to industry from relevant third parties and should not be relied on solely. All safety bulletins/notices can be obtained off of your Energy UK Health and Safety contact, and are available as annexes to this document.*

## Background

In previous Generation Health and Safety Forum's ("GHSF"), there have been various discussions around the emerging issue of Hexavalent Chromium Cr(VI). It was requested that Energy UK develop a document on Hexavalent Chromium Cr(VI) highlighting the key points of current industry knowledge.

## Purpose

This document is to act as a summary of information received to date, to provide Energy UK members with an overview of the emerging issue of Hexavalent Chromium Cr(VI).

## What is Hexavalent Chromium Cr(VI)?

Hexavalent Chromium Cr(VI) is one of the valence states (+6) of chromium. It is widely used in electroplating, anodising and dye production industries, but has recently been identified on thermal generating assets.

## What are the effects of Hexavalent Chromium Cr(VI)?

Hexavalent Chromium Cr(VI) is a recognised toxin and carcinogen, which if ingested or inhaled may affect the respiratory system, kidneys, and liver. It can also cause dermatitis and severe irritation to the eyes.

Exposure to high levels of airborne, oral, or dermal hexavalent chromium Cr(VI) compounds is associated with an increased risk of lung cancer and other adverse health effects to the kidneys, liver, skin, lungs and eyes.

## Where is Hexavalent Chromium Cr(VI) occurring?

Chromium is present in power stations as it is added to alloy steel to increase hardness and reduce corrosion. In the electricity generation sector, it has been identified that Hexavalent Chromium Cr(VI) is present on coal-fired and CCGT generating sites.

There is the potential for Cr(VI) to be present in areas such as; HP steam pipework, Gas Turbine combustor components, and Gas Turbine exhausts if calcium-containing insulation or anti-seize products are used. This can occur on CCGT or coal-fired plants.

## What is causing Hexavalent Chromium to occur?

The root cause is currently under investigation, and Energy UK understands that various manufacturers, operators and Operation and Maintenance (O&M) providers are collaborating to ascertain this. Initial views are that its presence occurs when three specific parameters are simultaneously satisfied:

1. Calcium based product is present
2. Temperatures greater than 300°C
3. Chromium Steel is present.

Calcium can be present in various forms but the most common are anti-seize lubricants and calcium-based insulation blocks.

Members need to be aware that Hexavalent Chromium deposits (yellow, sulphur-like staining) are difficult to identify under sodium lighting so need to satisfy themselves that alternative lighting methods e.g., white light LEDs are used.

## Advised Control measures

Caution should be taken at all power stations, with an assumption that Hexavalent Chromium Cr(VI) will be present. O&M providers and manufacturers are advising the use of appropriate Personal Protection Equipment (PPE) when handling hardware, and for careful visual examinations or borescope inspections to be carried prior to work to minimise heavy metal exposure.

It should be noted that Cr(VI) has a workplace exposure limit (given in EH40) of 0.05 mg/m<sup>3</sup> (8-hour TWA), and that Cr(VI) has been designated as a carcinogen and capable of causing occupational asthma. Cr(VI) also has a Biological Monitoring Guidance Value of 10 µmol chromium/mol creatinine in urine (post shift).

It is recommended that Energy UK members consider, where appropriate, undertaking preparatory surveillance and air sampling to confirm that workplace exposure limits are not exceeded with all results documented for reference. And this is supported by adequate information and communication with staff and contractors likely to be exposed.

Particular considerations that should be taken are:

- Avoid skin and eye contact with any deposit resembling Hexavalent Chromium Cr(VI). Always wear disposable nitrile gloves and eye protection.
- If the work being carried out could cause the substance to become airborne, proper respiratory protection and face shield or eye protection must be worn as additional PPE.
- No eating, drinking or smoking during work, or after until good hygiene practices are carried out, including thoroughly washing all skin that may have come into contact with the substance.

Energy UK members have experience of the use of WD-40 (or similar) and cloths to immobilise and wipe away Cr(VI) residue, although a specific COSHH assessment must be completed at the asset level to determine the appropriate control measures to prevent exposure where reasonably practicable.

Energy UK will continue to work proactively among its memberships to provide a forum for conversation and assist industry in the identification process of the cause and occurrence trend of Hexavalent Chromium Cr(VI). If you have any further information, would like to be involved in these discussions, or would like to understand more about Hexavalent Chromium CR(VI), please contact your health and safety contact at Energy UK.

### **Hazard classification**

Some members have classified the hazard presented by Cr(VI) as “general” and others as “system derived”. Clarification is currently being sought via the Energy UK GHSF and Energy UK Safety Rules Forum with a final objective of an agreed common position across the UK Power Sector.