## CASE STUDY: CHROMIUM VI (Cr VI) SURFACE DEBRIS/STAINING

**Project Description: Boiler and Cooling Water Treatment Lead Chromate Corrosion Inhibitors**

**Scope of Services:** AET was contracted by a new property owner of a highrise office building to respond to an OSHA inspection resulting from a former maintenance engineer's complaint that working conditions in the building caused serious health implications. The OSHA inspection/complaint focused on reported accumulations of surface debris in the secondary pump rooms throughout the building. These mechanical areas contain piping, valves and pumps for the building's boiler and cooling water treatment system. Reportedly, the debris was a dry precipitate from a lead chromate corrosion inhibitor used in the system until approximately 1995. Water treatment chemicals are added to the boiler and cooling water system to reduce corrosion and the buildup of sludge and scale.

**AET's Investigative Approach/Sampling/Decision-Making:**

1. ***Visual Inspection:*** Evidence of a cream or light colored debris or staining was noted in several secondary pump rooms.

2. ***Bulk Sampling:*** Samples of debris were collected and found to contain low concentrations of Cr VI, Chromium III and lead. No MSDS were available for review to identify the specific corrosion inhibitor used. Review of the current water treatment chemicals found no lead or chromium content.

**Health Implications:** NIOSH considers all Cr VI compounds to be occupational carcinogens associated with lung, nasal and sinus cancers. Excessive cancer cases are often found with electroplating, welding and Chromate painting operations. Skin contact with Cr VI can also cause irritation, ulcers, sensitization and allergic contact dermatitis. OSHA's Cr VI Standard 29 CFR 1910.1026 has a PEL of 5.0 ug/$m^3$ and an action limit of 2.5 ug/$m^3$ as an 8 hour TWA exposure. 1910.1026 (j) Housekeeping requires employers to maintain surfaces free of accumulations of Cr VI dust and perform prompt cleanup of spills.

**AET Experience:** Evidence of accumulations of surface debris is a significant part of the site reconnaissance evaluation in every Phase I ESA. Cr VI contaminated debris are mostly lemon/yellow to orange to red in color. Industrial processes with Cr VI exposures include electroplating, dye manufacturing, leather tanning, wood preserving and pigments used in paint, ink, or plastic manufacturing. High exposures of Cr VI can occur during welding on stainless steel.

**Remediation:** Although the current corrosion inhibitors used in the water treatment system did not contain lead or chromium, disturbance of the existing surface debris in mechanical areas during sweeping, cleaning, etc. can result in airborne toxic chemical exposures. Cleanup of the surface debris was performed by first isolating the secondary pump room followed by HEPA vacuuming and wet wiping all surfaces. Exposure monitoring results found airborne Chromium VI levels approximately 15% OSHA's PEL and 29% AL during cleaning activities. Workers performing cleanup activities wore NIOSH approved respiratory protection and protective clothing.

When you need professional industrial hygiene advice email Alan Sutherland, CIH, CHMM at a.sutherland@aetinc.biz or call 610-891-0114. We provide nationwide services; phone consultations are free. Check out the full range of environmental contracting/consulting services on our website www.aetinc.biz.

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