

# **Managing Exposure to Harmful Contaminants in Precious Metals**

## **Refining.**

### **The Royal Canadian Mint's approach.**

Charles Daoust\*, Manager Assay Operations

Rob Sargent, Director Refining and Inventory Management

Royal Canadian Mint (RCM), Canada

613-415-8653, [daoustc@mint.ca](mailto:daoustc@mint.ca)

Incoming Dore and recycling refining streams often contain hazardous elements such as lead, thallium, cadmium, and arsenic (to name a few). These contaminants pose a risk to the health and safety of refining employees. This presentation will give an overview as to the RCM's approach to identifying and controlling exposure risks to such elements.

This presentation will touch on the following topics:

1. Evaluation of deleterious elements in various feedstock at receipt to the RCM.
  - a. Which elements to study – how far down the periodic table of elements does one go?
  - b. A look at sampling strategies based on historical data, volumes, and appearance/shape of feedstock
  - c. Evaluation of technologies for sampling (use of hand-held spark, vs XRF) and how to keep employees safe during the process.
2. Broader scope evaluation on contaminant loading in the plant through industrial hygiene sampling.
  - a. Surface loading (wipe) sampling is an effective way of broadly validating problem areas and wipe sampling was conducted throughout the entirety of the manufacturing environment. This type of sampling across a large production facility can be difficult and costly and must be well executed in order to provide meaningful data. We discuss strategies for success; when and what to wipe and how to make sense of the data.
  - b. Air sampling is also a useful tool in determining efficacy of engineering controls and potential exposure from specific tasks and is used extensively at the RCM.
3. Mitigating risks
  - a. Engineering controls play a vital role in reducing exposure potential at the source of fume and dust emissions, however, must be evaluated and validated to be effective and are used to validate the limits on incoming deleterious elements.
  - b. Personal Protective Equipment (PPE) will also be reviewed including changes enacted from findings from industrial hygiene sampling.
  - c. Accidental ingestion as well as inhalation are biggest risk, upholding of stringent Industrial Hygiene practices is very important in promoting a safe work environment, but what does that mean?
4. Monitoring through Biological Exposure Indices (BEI)
  - a. BEI sampling is an effective tool in validating the efforts of the points above. Baselines are taken for new employees and deviations from these values are addressed.