## United States Air Force School of Aerospace Medicine





# Control of Heavy Metal Dusts 17 May 2011

U.S. AIR FORCE

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### **Overview**

- Introduction
- Control
- Housekeeping
- Verification
- Sampling





#### Introduction



- OSHA issued citation at Robins AFB in 2010
  - Heavy metal dusts were major issue
- No standard or "safe" level for surface loading
- OSHA calls for "free as practicable"
  - Will not provide guidance on how clean is clean
- Contamination needs to be evaluated
  - Beyond simple airborne hazard evaluation
- Drafted contamination control & housekeeping guidance



#### Introduction



- Heavy metal dusts are particulate matter that has deposited on surfaces
  - Hex Chrome, Lead, & Cadmium are common
- Generated by grinding, sanding, or other work
- Often associated within Regulated areas
  - Spread from regulated to non-regulated areas





#### Introduction



- The Atlanta OSHA office staffed a letter indicated potential hazard at AF depots
- In addition to Robins AFB depot
  - Hill AFB and Tinker AFB depots have been inspected
  - Still waiting to see outcome
- Robins has worked toward separating processes
  - Depainting processes are being colocated



#### **Control**

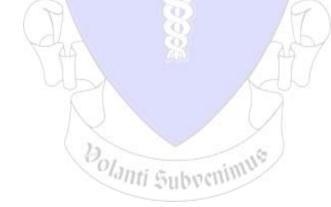


- Control contamination at the source
  - Hierarchy of controls is still applicable
  - Adequate controls will reduce housekeeping needs
- HEPA vacuum is recommended for collection
- Wet cleanup methods also work well
- Primary controls are vents and HEPA vacuums
  - Ventilation helps prevent spread of dusts
  - HEPA vacuums control dusts before release
  - Ventilated sanders and attached cowls are ideal





- Heavy metal dust is major source of contamination
- Other sources include:
  - Removal of the parts being worked on
  - Carts used to transport parts
  - Personnel that leave the regulated area
  - Tools and PPE







- Parts that have been worked on & parts transport carts
  - Clean before they leave regulated area
  - Do not use compressed air for cleaning
- Regulated areas and items within
  - Use HEPA vacuum or wet methods
  - Wet wipe, mop or "zamboni" floors and surfaces



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- Workers leaving regulated area
  - Do not wear PPE outside of regulated area
  - Contamination control during PPE removal
  - Reuse of PPE is not permitted
  - Ensure tools are properly cleaned







- May need to clean non-regulated areas
  - Will depend on nature of contamination spread
- Pay special attention to break/lunch areas
  - PPE of any type should not be permitted
- Appropriate cleaning frequency is difficult
  - Will depend on sampling and feasibility
- Work center housekeeping plan is needed
  - Identify what and how often to clean



#### Verification



- Verify implementation of housekeeping plan
  - Review house keeping logs
  - Visual "white glove" method
  - In select situations: swipe sampling
- OSHA has required Robins to perform sampling
  - As part of close out: 6 samples at each shop
  - Robins identified 38 applicable shops
  - 6 weeks weekly sampling = 1368 swipes
  - AF does not recommend for other bases

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## Sampling



- Swipes are one method of sampling
  - Can inform a health risk assessment
  - Can inform decision on need for housekeeping
- 4 types of swipe sampling
  - Targeted
  - Rate of deposition
  - General characterization
  - Determine contamination spread

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## Sampling

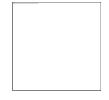


- Swipe sampling has limitations
  - A lot of uncertainty and variability
  - Interpretation of results is difficult (no standards)
  - Statistically meaningful = a lot of samples





## Sampling



- General approach
  - Due to variability need more than one sample
  - Methods presented in the guide are screening or presence/absence, not representative or "clearance"
  - All samples are not equal
    - Screening samples should be biased to find contamination
    - If nondetect for biased samples, contamination not an issue



#### **Current/Future Work**



- Determine homogeneity of deposition
- Evaluate contamination spread (How far?)
- XRF methods for sampling
- Looking to evaluate cleaning methods





#### **Questions?**



