Morenci Environmental Services



October 2019

- Used aerosol cans <u>must</u> be disposed of in an aerosol can satellite accumulation drum
 - Accidentally punctured or damaged aerosol cans should also be placed in an aerosol can satellite accumulation drum
- The contents inside a used aerosol can is considered a hazardous waste and can not be mixed with any other waste

Questions? Or need more information call: Environmental Services (928) 865-6000









Industrial Hygiene

October 2019



PROVEN ASSETS. FUNDAMENTAL VALUE.



Introduction

"Industrial hygiene is that science and art devoted to the anticipation, recognition, evaluation and control of those environmental factors or stresses arising in or from the workplace that may cause sickness, impaired health and well-being, or significant discomfort among workers or among citizens of the community"





What does that mean?



- Industrial Hygiene provides support with the "Health" or Occupational Illness aspects of Health & Safety
- Manages the following programs
 - Respiratory Protection
 - Radiation
 - Asbestos (along with Environmental)
 - Hearing Conservation
 - Hazard Communication
 - Medical Surveillance
 - Lead Management
 - Sampling/Exposure Monitoring
 - Others







How do fatality rates from occupational illness compare to fatality rates from injuries?





The Institute for Health Metrics and Evaluation's (IHME) study of global disease burden attributes 88,000 premature deaths in 2013 to workers' exposure to airborne particulates in the formal mining sector (excludes illegal or artisanal mining).

Deaths attributable to chronic exposures to particulates outstrip accident related deaths by approximately 6 to 1.



Freeport Top 5

- Silica
- Welding Fumes (Cr-VI, Mn, Ni, and others)
- Sulfuric Acid Mist
- Heavy Metals (As, Cd, Hg, Pb, etc.)
- Diesel Particulate Matter (DPM)









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- Personal Monitoring
 - Can be noise or airborne agents
 - Methods defined by OSHA, NIOSH
 - Samples are sent to a accredited laboratory
 - Performed for employees full work shift







Why perform personal sampling?



- Determine if PPE is adequate
- Comply with regulatory agencies
- Determine what controls would need to be put in place
- Incident investigation
- Determine Medical Evaluations and annual monitoring needs





Crystalline Silica/Quartz





- Basic component of soil, sand, granite, and many other minerals
- Hazardous when it is broken down by chipping, cutting, drilling, or ground into respirable size particles
- Crystalline Silica is classified as a human lung carcinogen
- Respirable dust (4.0 µm) enters deep lungs and cannot be removed, scar tissue is then formed which reduces lungs capacity to transfer oxygen.
- Irreversable
- Locations....





Crystalline Silica/Quartz

- Found in our operations:
 - Mining & processing operations: rock dust
 - Hot metal operations: some refractory materials
 - Downstream operations: concentrate dust
- Excessive exposure can cause silicosis, COPD, and lung cancer
- Exposures are generally understood; some gaps
- Variety of controls in place, but respirators are often necessary





Welding Fumes





- Contains:
 - Metals: Aluminum, Antimony, Arsenic, Beryllium, Cadmium, Chromium, Cobalt, Copper Iron, Lead, Manganese, Molybdenum, Nickle, Silver, Tin, Titanium, Vanadium, Zinc
 - Gases: Argon, Helium, Nitrogen, Carbon Dioxide, Nitric Oxide, Nitrogen Dioxide, Carbon Monoxide, Ozone, Phosgene, Hydrogen Fluoride
- Acute exposures: eye, nose, throat irritation, dizziness and nausea. (Metal Fume Fever, Stomach Ulcers, Parkinson's Like symptoms)
- Chronic Exposure: Lung damage, Various types of cancer including lung, larynx, and urinary tract



Welding Fumes







- Widespread in our operations. Highest risks:
 - Stainless steel welding and Cr-VI
 - Hot work on liner steel (dippers, loader buckets, and similar; crush & convey liners, etc.) and Mn and Cr-VI
- Excessive exposure can cause lung cancer, eye cancer, neurological impairment
- Cr-VI exposures are not fully evaluated
- Controls rely heavily on respirators

Sulfuric Acid Mist

- Found in our operations:
 - Electrowinning Tankhouses
 - Electrorefining Operations
- Airborne mist causes laryngeal cancer, possibly lung cancer (acid in liquid form is not classified as a carcinogen)
- Exposures:
 - Well understood with respect to regulatory limits
 - Not fully understood relative to new standards
- Variety of controls in place, but respirators are often necessary





Found in our operations: Anywhere diesel engines operate

- Highest risk at underground mines
- Possible risk in shops, other enclosed areas
- Excessive exposure can cause lung cancer
- Exposures:
 - Well understood with respect to regulatory limits
 - Questions about what level of exposure is safe; possible future issue in many locations
- Engineering controls available to reach current OEL

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Diesel Particulate Matter







Others:



- Asbestos:
 - Natural occurring mineral, group of 6 types
 - Thin needle like fibers when inhaled are trapped leading to inflammation, scaring, and eventually cancers
 - Exposures managed by Environmental and Industrial Hygiene departments
- Lead:
 - Heavy metal
 - Exposures are most detrimental to small children
 - Causes developmental delays, abdominal pain, neurologic changes, and irritability at high levels can be fatal.







Others

- Radiation
 - Energy traveling through space in the form of waves or particles
 - 2 Types on site:
 - Ionizing: X-rays, alpha, beta, gamma, neutrons
 - Non-Ionizing: microwaves, UV light, radar, etc.
 - Radiation License managed by Radiation Safety Officer
 - Exposures are minimized through
 - Shielding around sources, limiting time in zones, and increasing distance from source
 - Radiation Dosimetry
 - Badges are assigned to individuals and should not be removed from site or shared
 - Notify RSO if lost
 - Badges are collected and analyzed quarterly





Respiratory Protection Program



- Supervisor Role
 - Ensure employees are "fit for duty", by being clean shaven, and have a clean and in good order respirator
 - Periodic audits to ensure proper wear; no straps on hard hats, all straps are tight, etc.
 - Allow employees time to complete annual medical monitoring
 - Question needs for PPE



Hearing Conservation



- Supervisor Role
 - Provide employees with hearing protection devices
 - Ensure they are being utilized properly
 - Allow time for annual medical monitoring
 - Question need for PPE





Hazard Communication



- Chemical Storage
- Safety Data Sheets
 - All products must be approved through Health and Safety and environmental before being brought onsite
 - Employee's need basic understanding of what they are working with
 - Supervisors are asset in knowing where to go and how to produce a SDS for employees







Reference Slides



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