

Fundamentals Health Hazard Risk Assessment

Presented to

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Conference**

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by

Ron B. Read MS, DPh, CIH

READ CONSULTING LLC

Phone: 731.676.0430

Health Hazard Risk Assessment

 This presentation is limited to the following employee stressors:

- Air contaminants
- Noise exposure
- Heat Stress

Media Workers Hazards

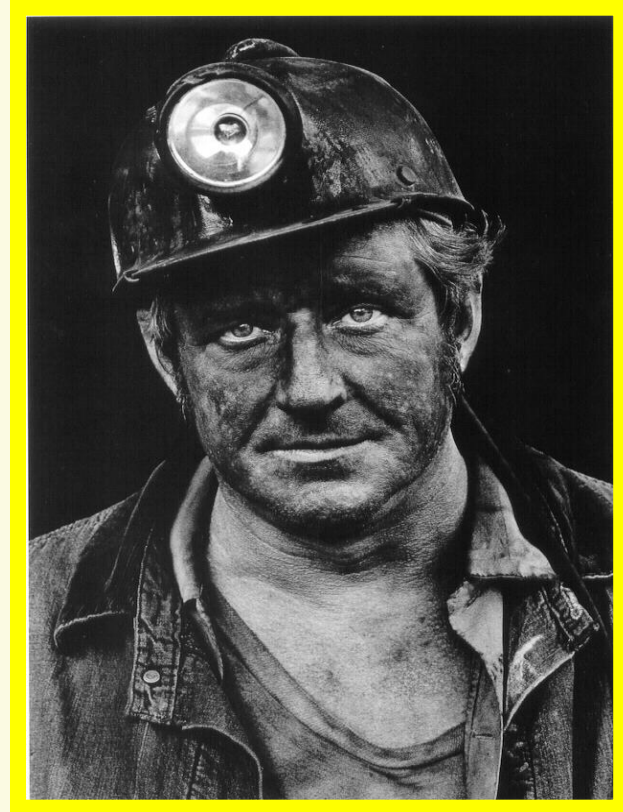


Occupational Health

➤ **Mr. Lee Hipshire**

❖ **By age 46 he had
26 years
underground**

❖ **A few years later
he took an early
retirement and
died at the age of
56**



Occupational Health

➤ **Mr. Louis Harrell**



- ❖ **28 years of Loyal and Faithful Service**
- ❖ **Two years and one day after retirement, Mr. Harrell died at age 62**

What Is?

📄 Industrial Hygiene

📄 Hazard Verses Toxicity????? Are they the same?

INTRODUCTION

- ☞ In the past Industrial Hygiene air testing was done somewhat randomly
- ☞ Testing was conducted for the most obvious and what was perceived as the most hazardous
- ☞ Health Hazard Risk Assessment techniques were developed

Simplified HHA

Health Hazard assessment

- subjective process
- used to establish priorities
- relies on professional judgment
- SDSs
- previous air testing
- process flow information
- mass balance analysis

What are Health Hazards?

Physical

- What are some examples
- How are they measured

Chemical

- What are some examples
- How are they measured

HHRA

- ☞ The use of a HHRA, not only is cost effective but better allocates sampling resources
- ☞ It provides a cleaner more defensible position
- ☞ **But most importantly, we believe that workers can be better protected by using this approach**

OSHA Health Hazards

 Irritant

Sensitizer

 Carcinogen

Target Organ

 Corrosive


Highly Toxic

 Toxic

Heat Stresses

 Hearing loss

Dose Response Relationship

 The toxic potency of a chemical is defined by the relationship between the amount (the dose) of a chemical and the response that is produced in a organism

Types of Exposure

- 📄 Acute – (Short term) – A single exposure lasting less than 24 hours
- 📄 Chronic – (Long term) – Exposures are essentially for the lifetime of the species
- 📄 Sub chronic – Repeated exposures of less than a lifetime (e.g. 3 months)

Type of Exposures

 Local

 Systemic

 Cumulative

 Poisoning

Type of Exposure

Local

- The site of action takes place at the point of contact
- The site:
 - skin,
 - mucous membrane of the eyes, nose, mouth, throat
 - or anywhere along the respiratory or gastrointestinal system



Systematic

- The toxic substance has been absorbed and distributed throughout the body
- How does this happen????

Type of Exposure

Cumulative Effects

- Over a period of time, the material is only partially excreted and the remaining quantities are gradually collected
- The retained toxic compound accumulates and becomes great enough to cause pathological response





Poisoning

- A toxic substance is absorbed and distributed by the blood stream throughout the body
- Absorption reaches a point where it causes impairment of physiological function

Factors to Consider

☞ Rate of Entry and Route of Exposure

☞ Age

☞ State of Health

☞ Previous Exposure

☞ Environmental Factors

☞ Host Factors

Routes of Entry

 Percutaneous (Skin)

 Inhalation (most common)

 Oral

 Ocular

Classification of Contaminants

 Gases and Vapors

 Aerosols

 Dust/Particulates

Classifications

☰ Hepatotoxic Agents

☰ Nephrotoxic Agents

☰ Neurotoxic Agents

☰ Agents Attacking Hematopoietic System


☰ Agents Damaging the Lungs


☰ Carcinogens

☰ Mutagens

☰ Teratogens

☰ Sensitization



 The HHRA priority is assigned by considering the following:

- actual or estimated exposure concentration
- seriousness of the hazard

Basic Steps - HHRA

Discuss with plant management procedures and expectations

- conduct a walk-through of the facility
 - departments and key operations
 - list potential chemical hazards (health and physical)
- talk to associates, get their input
- review SDSs
- determine health effect category and assessment priority

Basic Steps (continued)

- review existing control measures
- closing conference with facility management
- provide a written report with task summary
- develop IH sampling strategy based on risk

Exposure Category	Exposure Level (Monitoring Data Available)	Exposure Potential (Professional Judgement)	Example Characteristics
A	< 5% of the OEL	No direct contact with the agent.	<ul style="list-style-type: none"> ■ chemical handled in closed system or vacuum ■ remote loading/charging of chemical to process ■ control room available to monitor process/reduce exposure to noise or chemicals
B	5% to 25% of the OEL	Infrequent contact with agent during shift or frequent contact at low levels or concentrations.	<ul style="list-style-type: none"> ■ making small additions manually to process ■ charging or dumping low volatility or low dusting material periodically ■ good LEV provided to control exposure to agent ■ noise levels less than 80 dBA
C	25% to 50% of the OEL	Any contact with agent at moderate levels or concentrations	<ul style="list-style-type: none"> ■ manually charging/dumping material with adequate LEV ■ LEV hoods near point of operation to capture agent ■ noise levels between 80 and 85 dBA
D	50% to 100% of the OEL	Any contact with agent at high levels or concentrations.	<ul style="list-style-type: none"> ■ manually charging/dumping material with poor LEV ■ handling highly volatile/dusty materials in area with poor LEV ■ noise levels between 85 and 90 dBA
E	>100% of the OEL	Frequent contact with agent at very high levels or concentrations.	<ul style="list-style-type: none"> ■ manually charging/dumping material with no LEV ■ poor ventilation in work area while manually handling chemical ■ noise levels greater than 90 dBA

OEL = Occupational Exposure Limit. (The OSHA PEL for materials with dedicated OSHA standards or the current ACGIH TLV.)

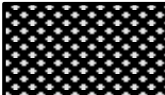




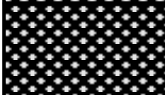
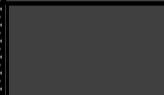

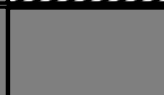



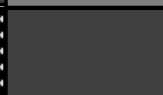
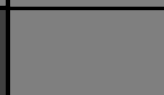


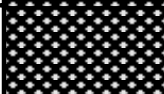
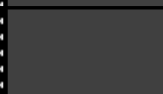
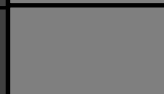



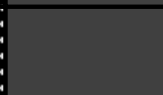
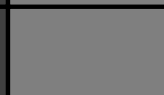

LEV = Local Exhaust Ventilation

Health Effect Category	Potential Health Effect	Example Characteristics
0	Reversible health effects of little concern; no health effects documented from exposure	<ul style="list-style-type: none"> ■ odor causing a complaint but no significant health symptoms reported ■ nuisance dust with no documentation of respiratory effect ■ nuisance material with no documented adverse health effects
1	Mild, reversible health effects	<ul style="list-style-type: none"> ■ mild irritation of eyes, skin, respiratory system not capable of long term health effects ■ mild health symptoms reported (e.g. headaches, nausea)
2	Moderate but reversible health effects	<ul style="list-style-type: none"> ■ moderate irritation to eyes, skin, or respiratory system with potential for minor health effects ■ moderate health symptoms reported.
3	Severe/Irreversible health effects of concern (from either long term or short term exposure)	<ul style="list-style-type: none"> ■ highly corrosive to eyes, skin, or respiratory system ■ potential for long-term systemic body organ effects ■ classified as a potential human carcinogen ■ skin or respiratory sensitizer ■ potential reproductive hazard
4	Immediately life threatening or disabling illness or injury is possible.	<ul style="list-style-type: none"> ■ highly toxic material ■ known carcinogen ■ known reproductive hazard ■ known to cause long term damage to internal body organ or system

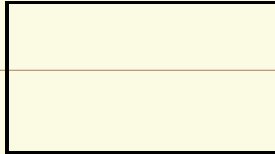
Assessment Priority Determination

Using the Health Effect and Exposure Categories, monitoring priorities are assigned. Use the chart below and the key to the right to determine monitoring priorities. Note that the priority is coded with a letter and a single digit number, from A-0, which indicates a very low priority, to E-4, which indicates a very high priority.

Categories and resulting priorities for each agent are listed on the Assessment Summary Sheets beginning on the next page.

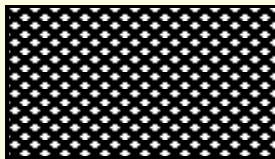
<u>ASSESSMENT</u> <u>MATRIX</u>		Final Exposure Rating				
		A	B	C	D	E
Health Effect Rating	4					
	3					
	2					
	1					
	0					

Monitoring Priority



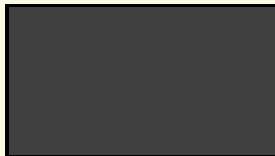
Very Low

Low potential - No further action required.



Low

Occasional monitoring for changes in operating parameters.



Medium

Controlled by training or work practices. Perform initial and occasional monitoring.



High

Monitoring data should be used to determine additional control needs. Periodic follow-up needed to maintain control.



Very High

Controls should be in place. Monitoring data should be used to assess effectiveness of controls. Follow-up needed.



 In the end we hope to accomplish

- better protection for our associates
- IH sampling conducted in a cost effective manner
- assist with control measures
- help protect the company's bottom line

A spiral-bound notebook with a cream-colored page and a brown cover. The spiral binding is on the left side. A horizontal line is drawn across the page, approximately one-third of the way down from the top. The text "QUESTIONS???" is written in a large, dark brown, serif font, centered on the page below the line.

QUESTIONS???