

Occupational Health Hazard Overview

- History
- Key Terms
- Actual & Potential Health Hazards
- Sampling Strategy
- Results
- Controls

History

- NIOSH
- Bechtel/ATC
- Liberty Mutual/ATC

Key Terms

- Threshold Limit Value (TLV) Vs
Permissible Exposure Limit
- ACGIH Vs OSHA
- Occupational Exposure Limit (OEL)
- Action Level
- Extended Work Shift Impact

Actual and Potential Health Hazards

- Acute Hazards (Short Term)
- Chronic Hazards (Long Term)

Agent	TLV	STEL/		PEL		Comment
		C	PEL	STEL/C		
Welding Fume	5	-	5	-		(mg/m3) PEL is for respirable dust
Beryllium	0.002	0.01	0.002	0.005		(mg/m3) PEL STEL/C is C; N/C = 0.0002 Inhalable
Cadmium	0.002	-	0.005	-		(mg/m3) TLV for respirable; See Table Z-2 for exclusions in 29 CFR 1910.1027 (mg/m3) III TLV = 0.5; IV TLV = 0.05; IV PEL =
Chromium	0.05	-	1	0.1		C 0.1
Cobalt	0.02	-	0.1	-		(mg/m3)
Copper	0.2	-	0.1	-		(mg/m3)

Acute Hazards (Short Term)

- **Respiratory concerns** related to Smoke Inhalation
- **Confined Space Entry** (O₂ deficiency, carbon monoxide, and hydrogen sulfide) + physical hazards
- **Carbon Monoxide** from smoke and vehicle/tool exhaust

Acute (Continued)

- **Freon (R-22)** release from refrigeration plant.
- **R-22 breakdown products**
- **Hydrogen Sulfide**
- **Noise** from equipment & tools

Chronic Hazards (Long Term)

- **Asbestos** - sprayed on insulation may have been present in Tower 1. Smaller quantities in other buildings.
- **Metals** - chromium, cadmium, cobalt, lead, and other metals contained in building materials, building furnishings and soil
- **Silica** from concrete demolition

Chronic (Continued)

- **PAHs** from hot spots
- **Diesel fume** from diesel engines
- **Noise** from equipment
- **Mercury** from residual building components

Sampling Strategy

- **Initial strategy** established by NIOSH and continued by Bechtel and ATC.
- Liberty Mutual / ATC **modified strategy** due to changing work conditions, initiated a job-specific focus.

Sampling Strategy (Continued)

- In addition to exposing agents previously being measured, the following were added:
 - **Acid Gases** - potential breakdown products of Freon
 - **H2S and SO2** - in response to odors in the southwest corner of the site.
 - **Noise** - mostly from concrete demolition
 - **Mercury** - in response to concerns expressed by Uniformed Services

Sampling Strategy (Continued)

- Current plan calls for taking about **90 eight hour TWA measurements per week**. In addition, real-time measurements are being made for hydrogen sulfide, carbon monoxide, dust, and noise.

Sampling Plan

Analyte	# Samples per Week		
	Original Plan	Current Plan	New Plan (As of 1/1/2002)
Carbon Monoxide	28	22 (minimum)	15 (minimum)
Asbestos	42	15.5*	10
Total Dust & Metals	42	9	9
Respirable Dust and Silica	12	7.25*	10
Aromatic Hydrocarbons	8	14	6
PAHs	8	8	0
Aldehydes	8	7.5*	0
Ozone	4	5.5*	6
Diesel Exhaust	4	7.5*	8
Acid Scan	0	13.5	6
Hydrogen Sulfide	0	As Needed	6
Mercury	0	As Needed	5
Noise	0	As Needed	12

Overall Results Summary

- 44 Analytes + Noise
- 3,075 Data Points
- Vast Majority <50% Of OEL, Most ND

Results (11/19 & Earlier)

- Only 3 time-weighted average personal samples were found to be above OSHA PELs:
 - A lead concentration of 230% of PEL on a grapple operator on 10/17
 - A quartz concentration of 500% of PEL on a laborer during concrete demolition on 11/16
 - A quartz concentration of 150% of PEL on concrete mixer operator on 11/19

Results

- Sulfuric Acid:
 - 3 Torch Cutters Between 75% & 120%
- Asbestos
 - 3 Operators & 1 Torch Cutter Between 50% and 100%

Results

- Hydrogen Sulfide
 - 12/8 - AREA, Outside Grace Trailer - 160%
- Ozone
 - 12/26 - Torch Cutter - 190%
- Silica
 - 12/18 - Operator In Depression WTC #4 - 820%

Results (11/20 & Later)

- Diesel
 - 7 Greater Than 50% but Less Than 100% Of OEL (Opr's, Burners, Spotters, Washers)
 - 12/4 - Torch Cutter On Surface - 150%
 - 12/4 - Torch Cutter On Surface - 250%
 - 12/2 - Grappler Operator - 300%
 - 12/6 - Grappler Operator - 440%

Results - CO

- 114 measurements
- 112 <50%
- 1 @ 52% OEL
- 1 @ 120% OEL
- Several High Peaks

Results - Mercury

- 16 Samples, All ND, <1% OEL

Results - Noise

- Elevated levels:
 - Hoe Ram Operator
 - Concrete Saw Operator
 - Jack Hammer Operator

Controls

- Confined space entry procedures
- Respiratory protection for workers in the inner zone and for specific tasks, such as concrete work and torch cutting.
- Good torch cutting practices: using long torches, keeping head out of the plume, wearing respirator.

Controls (Continued)

- Hearing protection for pneumatic hammer operation, concrete cutting, etc.
- Wet methods for concrete work
- Elevated exposure feedback loop

Future Sampling Strategy

- Emphasis On:
 - Silica during concrete work
 - Metals during torch cutting
 - Carbon Monoxide - more work now being done on lower levels
 - Noise - more work now on concrete demo
