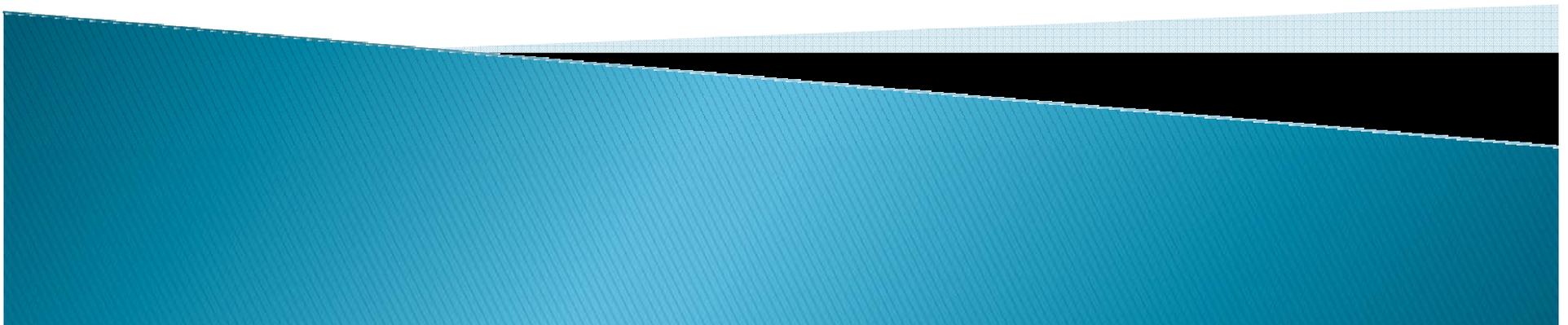


Lead Exposure at an Indoor Range

LCDR Kimberly Chesteen, MPH
USCG Safety & Environmental Health Officer
Miami, FL



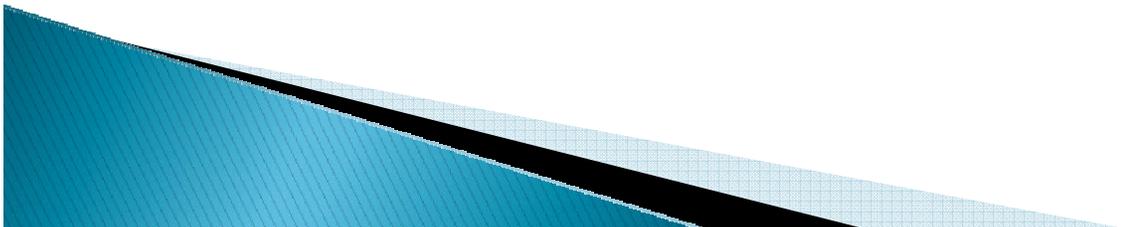
Case Study Objectives



- ▶ Show causal factors relating to exposure
- ▶ Discuss both short and long term courses of action to control exposure

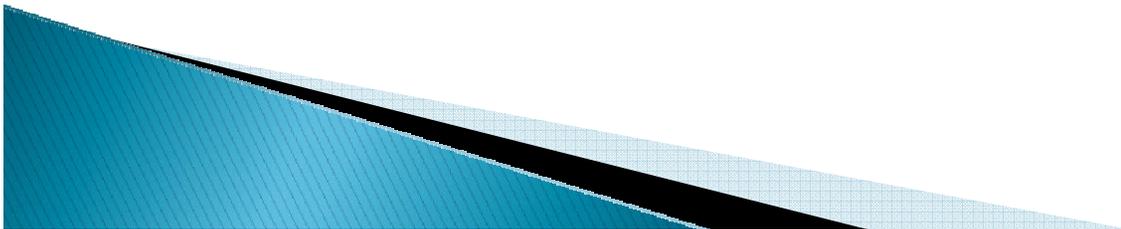
Identification

- ▶ USCG member completed exit physical which showed elevated blood lead levels (April 2007)
- ▶ Member was a Gunner's Mate and senior instructor at indoor range
- ▶ Sector Commander notified our office for Industrial Hygiene survey



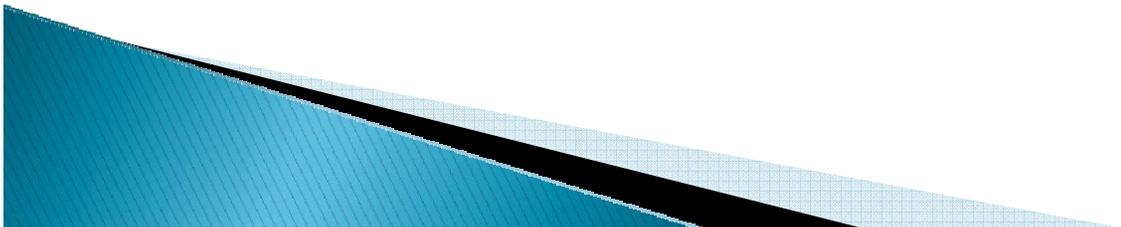
Evaluation

- ▶ Conducted lead dust sampling
- ▶ Conducted personal air sampling for lead
- ▶ Measured linear air velocities
- ▶ Conducted visual assessment of airflow via smoke tests
- ▶ Conducted a visual assessment of the space
- ▶ Requested other range personnel complete biological monitoring



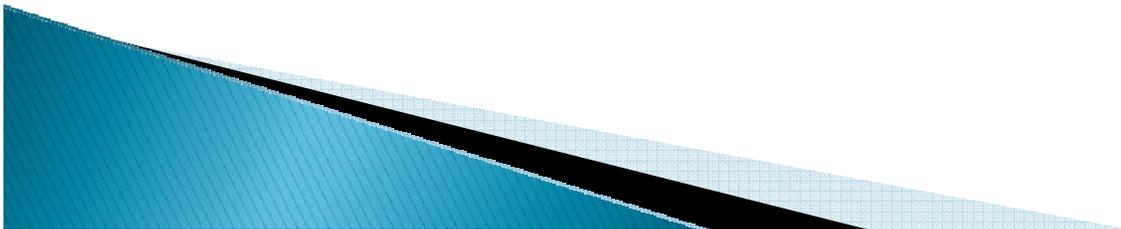
Findings

- ▶ Considerable levels of lead dust in multiple work spaces
 - Dust levels ranged from 108 – 159,030 $\mu\text{g}/\text{ft}^2$
- ▶ Air Sampling
 - Personal air monitoring results all well below OSHA AL for lead dust
- ▶ Biological Monitoring
 - 2 of 5 AD members at 40 $\mu\text{g}/\text{dL}$ blood



Airflow Concerns

- ▶ Visible eddies with smoke tests
- ▶ Positive pressure
- ▶ Structural defects in ductwork
- ▶ Inadequate exhaust system
- ▶ Numerous airflow impediments





Deteriorated Supply Ductwork >>

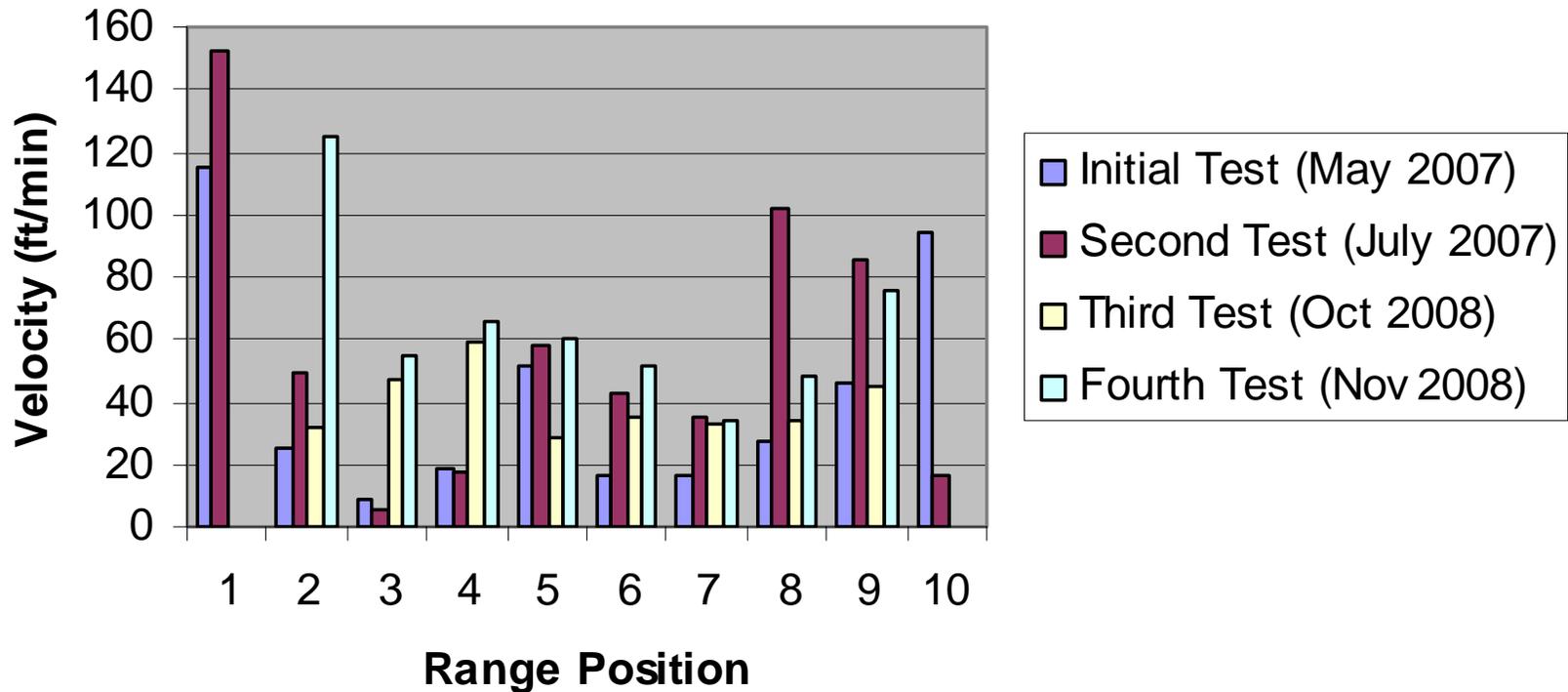
Forced vertical air curtain disrupting linear air flow downrange



Ventilation System >>

Dampers rusted shut

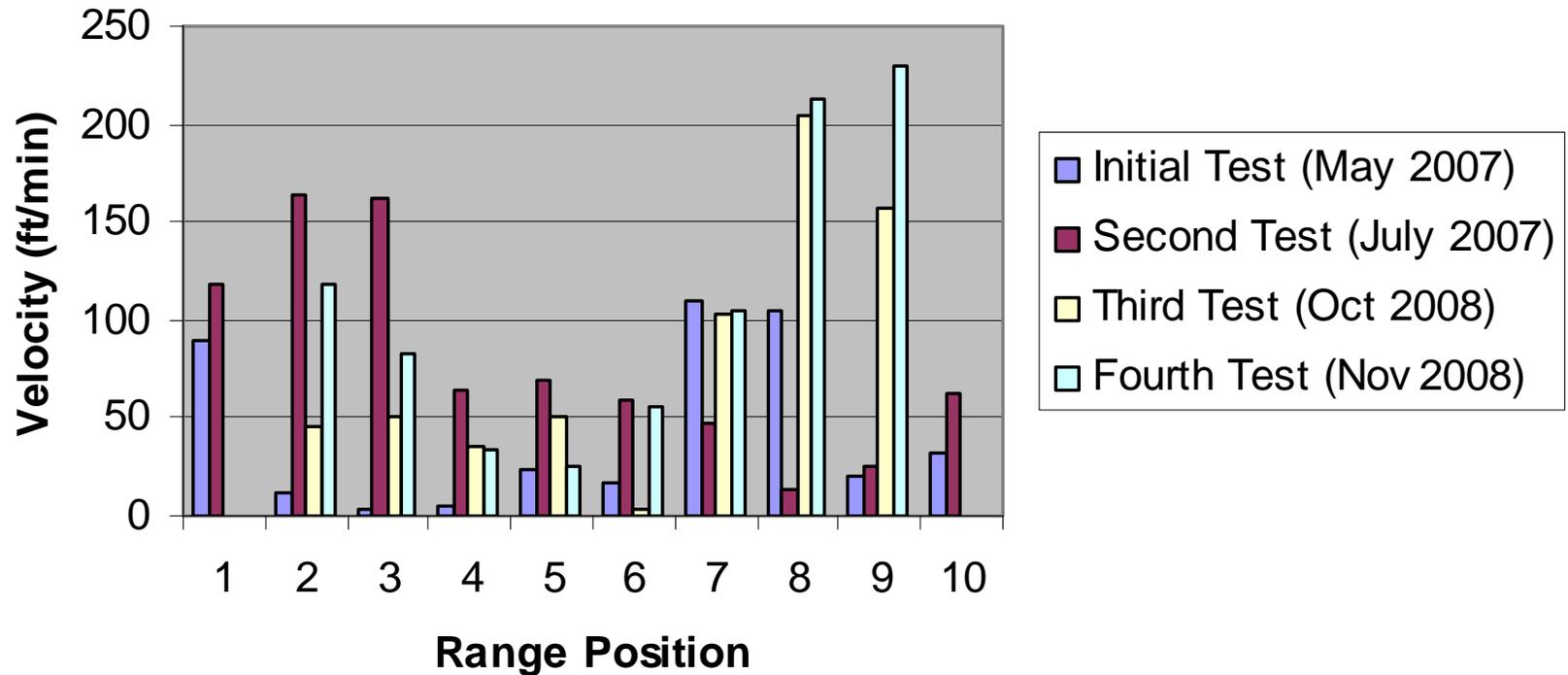
Average Velocity Comparison at Breathing Zone



Comparison of Velocities at Breathing Zone >>>

Note: Initial test showed 6 range positions that did not meet minimum requirements

Comparison at Prone Position

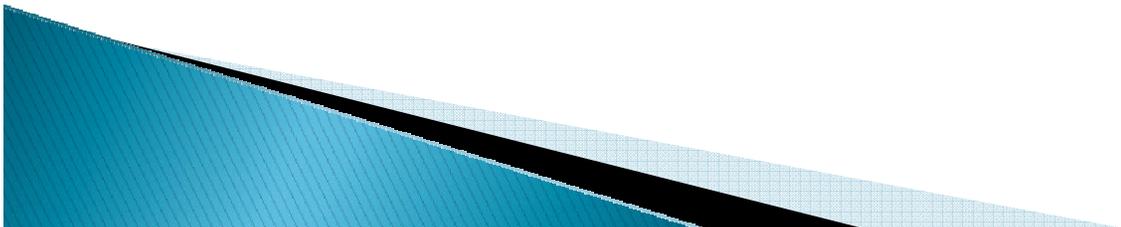


Velocity Comparison at Prone Position >>>

Note: Initial test showed 7 range positions that did not meet minimum requirements

Initial Controls

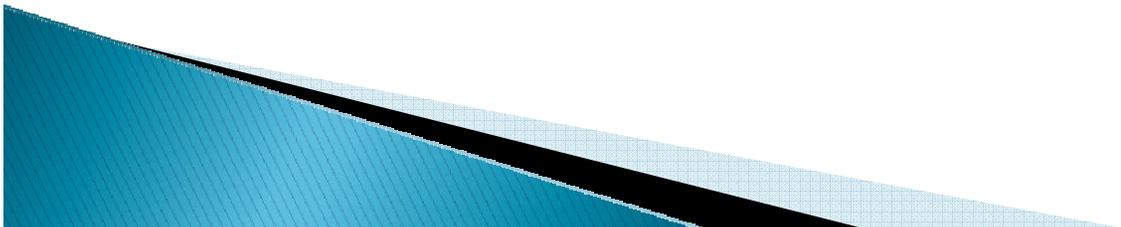
- Worked with Facilities Engineers
 - Repair ductwork & exhaust fan
 - Installed visible alarms for ventilation system
 - Installed pressure gauges across filter banks
- Medical monitoring enforced
 - Enrolled range staff in OMSEP – annual blood Pb test
- Contracted cleaning
 - Post cleaning surface dust range 11 – 176 $\mu\text{g}/\text{ft}^2$
- Safe work practices
- Training – include personal hygiene practices



Long Term Controls

- ▶ Redesign of supply ductwork
 - New supply air wall to distribute more uniform air curtain
 - New exhaust fan and system upgrade to maintain negative pressure

- ▶ \$358K ventilation rebuild
 - Project started in March 2010



Questions?

