OSHA’s Proposed Rule

➢ Two proposed standards:
  – One for General Industry and Maritime
  – One for Construction

➢ Offer common sense, flexible approaches for employers
Public Participation

- OSHA welcomes and encourages public input on the proposed silica rule.
  - Written comments
  - Public hearings
  - Post-hearing comments
- Comments and testimony are carefully considered
- OSHA’s final rules are based on evidence in the record as a whole
Dates

- November 12, 2013 – Notice of intention to appear due
- December 11, 2013 – Written comments due
- March 4, 2014 – Public Hearing
Silica Exposures of Concern

- Workers can become ill if they inhale **respirable** crystalline silica
  - Respirable particles are very small (1/100\(^{th}\) the size of a grain of sand)
  - Can penetrate deeply into the lungs
  - Can’t be seen or smelled and must be measured using air sampling equipment
Exposure and Health Risks

Exposure to respirable crystalline silica has been linked to:

- Silicosis;
- Lung cancer;
- Chronic obstructive pulmonary disease;
  and
- Kidney and immune system disease
Health Benefits of Rule

- Nearly 700 fatalities avoided annually
  - Lung cancer: 165
  - Silicosis and other non-cancer lung diseases: 381
  - End-stage kidney disease: 153

- Over 1,600 silicosis cases avoided annually
Underreporting of Silica-Related Diseases

- Deaths and illnesses from diseases other than silicosis not attributed to silica exposure
- No comprehensive counting of new silicosis cases or deaths
- Under-recognition and under-reporting even where there is reporting
- Death certificate data flawed & limited
Underreporting of Silicosis Cases

- Goodwin et al. (2003) examined X-rays of deceased workers from New Jersey – 8.5% of them had silicosis not previously identified.

- Rosenman et al. (2003) identified substantial underreporting of new silicosis cases – analyses indicated 3,600 to 7,300 new cases per year from 1987 to 1996.
NIOSH Recommendations

OCCUPATIONAL EXPOSURE TO
CRYSTALLINE SILICA

NIOSH Hazard Review
Health Effects of Occupational Exposure to
Respirable Crystalline Silica

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Center for Disease Control
National Institute for Occupational Safety and Health

OSHA®
Some Reasons for the Proposed Rule

- Current Permissible Exposure Limits (PELs) are formulas that many find hard to understand
- Construction/shipyard PELs are obsolete particle count limits
- General industry formula PEL is about equal to 100 µg/m³; construction/shipyard formulas are about 250 µg/m³
Most Important Reason for the Proposed Rule

- Current PELs do not adequately protect workers
- Extensive epidemiologic evidence that lung cancer and silicosis occur at exposure levels below 100 µg/m³
Some International Silica OELs

- Canada
  - Alberta – 25 μg/m³
  - Nova Scotia – 25 μg/m³
  - Saskatchewan – 50 μg/m³
- Italy – 25 μg/m³
- Ireland – 50 μg/m³
- Netherlands – 75 μg/m³
OSHA’s Proposed Rule

- Establishes new PEL of 50 μg/m$^3$
- Includes provisions for:
  - Measuring worker exposures to silica;
  - Limiting access to areas where workers could be exposed above the PEL;
  - Use of dust controls;
  - Use of respirators when necessary;
  - Medical exams for highly exposed workers;
  - Worker training; and
  - Recordkeeping.
Flexibility for Exposure Measurements

- Fixed schedule option
- Performance option – assess as necessary to adequately characterize exposures
- Exposure monitoring not required for construction employers who choose to implement dust controls listed in Table 1
Measuring Silica Exposures

Silica exposure can be accurately measured at proposed AL and PEL.

Proposed standard ensures reliability of measurements by specifying:
- Sampling and analysis methods to use
- Laboratory qualifications
Flexibility for Dust Controls

- Employers can use any dust or work practice controls to protect workers, such as:
  - Water sprays
  - Enclosures
  - Vacuum dust collection systems
  - Prohibiting dry sweeping
Dust Controls

Grinding without dust controls

Grinder with vacuum dust collector
Use of Respirators

➢ Allows for respirator use when
  – Dust or work practice controls cannot reduce exposures to the PEL
  – Dust controls are being installed
OSHA Listens to Small Business Concerns

- Small businesses asked OSHA to simplify compliance, while maintaining worker protection.

- OSHA proposes Table 1 which reduces employer burdens of having to determine:
  - Employee exposures
  - What types of controls are needed
Additional Flexibility for Construction Employers

➢ Table 1 in the construction standard matches tasks with effective dust control methods and respirators.

➢ If employers choose to follow Table 1:
  – They would not have to determine worker exposures to silica
  – They would have to offer medical exams to workers doing tasks that require respirators for more than 30 days a year
Table 1. Exposure Control Methods for Selected Construction Operations

<table>
<thead>
<tr>
<th>Operation</th>
<th>Engineering and Work Practice Control Methods</th>
<th>Required Air-Purifying Respirator (Minimum Assigned Protection Factor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using Stationary Masonry Saws</td>
<td>Use saw equipped with integrated water delivery system. (Plus additional specifications)</td>
<td>None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HR/day</th>
<th>≤ 4 hr/day</th>
<th>&gt; 4 hr/day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Medical Surveillance

- Covers workers exposed above PEL for 30 or more days per year
- Initial exam followed by periodic exam every 3 years
- Exam includes medical and work history, physical exam, chest X-ray, and pulmonary function test (TB test on initial exam only)
### Distribution of Silica Exposures by Sector (Total Affected Employees)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Silica Exposure Range</th>
<th>&lt;25 μg/m³</th>
<th>25-50 μg/m³</th>
<th>50-100 μg/m³</th>
<th>100-250 μg/m³</th>
<th>&gt;250 μg/m³</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction</strong></td>
<td></td>
<td>998,485</td>
<td>202,883</td>
<td>227,529</td>
<td>204,276</td>
<td>216,003</td>
<td>1,849,175</td>
</tr>
<tr>
<td></td>
<td></td>
<td>54.0%</td>
<td>11.0%</td>
<td>12.3%</td>
<td>11.0%</td>
<td>11.7%</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>General Industry/Shipyards</strong></td>
<td></td>
<td>123,274</td>
<td>58,617</td>
<td>45,840</td>
<td>35,670</td>
<td>56,924</td>
<td>320,326</td>
</tr>
<tr>
<td></td>
<td></td>
<td>38.5%</td>
<td>18.3%</td>
<td>14.3%</td>
<td>11.1%</td>
<td>17.8%</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>1,121,759</td>
<td>261,500</td>
<td>273,369</td>
<td>239,946</td>
<td>272,927</td>
<td>2,169,501</td>
</tr>
<tr>
<td></td>
<td></td>
<td>51.7%</td>
<td>12.0%</td>
<td>12.6%</td>
<td>11.1%</td>
<td>12.6%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Provision</td>
<td>Exposure Level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤AL</td>
<td>≥AL but ≤PEL</td>
<td>&gt;PEL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) Exposure assessment</td>
<td>Initial assessment if employees reasonably expected to be exposed ≤AL OR Follow Table 1 (for construction)</td>
<td>Initial assessment if employees reasonably expected to be exposed ≤AL</td>
<td>Initial assessment if employees reasonably expected to be exposed ≤AL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 months OR Performance option OR Follow Table 1 (for construction)</td>
<td>Periodic monitoring every 3 months OR Performance option OR Follow Table 1 (for construction)</td>
<td>Periodic monitoring every 3 months OR Performance option OR Follow Table 1 (for construction)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) Regulated areas and access control</td>
<td>None</td>
<td>None</td>
<td>Establish and implement regulated areas OR Establish and implement written access control plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provision</td>
<td>≤AL</td>
<td>≥AL but ≤PEL</td>
<td>&gt;PEL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------</td>
<td>-----</td>
<td>--------------</td>
<td>------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) Methods of compliance</td>
<td>None</td>
<td>None</td>
<td>Use engineering and work practice controls where feasible OR Follow Table 1 (for construction)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(g) Respiratory protection</td>
<td>None</td>
<td>None</td>
<td>Provide respiratory protection to workers when exposures &gt;PEL OR Follow Table 1 (for construction)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provision</td>
<td>( \leq \text{AL} )</td>
<td>( \geq \text{AL} ) but ( \leq \text{PEL} )</td>
<td>( &gt;\text{PEL} )</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------------------</td>
<td>-----------------------------------------------</td>
<td>------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(h) Medical surveillance</td>
<td>None</td>
<td>None</td>
<td>Provide initial exam within 30 days of assignment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Hazard communication</td>
<td>Provide information and training</td>
<td>Provide information and training</td>
<td>Provide information and training</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(j) Recordkeeping assessment</td>
<td>Maintain exposure assessment records</td>
<td>Maintain exposure assessment records</td>
<td>Maintain exposure assessment and medical records</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Changes to Proposed Rule based on Small Business Input

- Specific hygiene provisions removed (e.g., change rooms, shower facilities, lunchrooms).
- Prohibition of compressed air, brushing, and dry sweeping only when PEL can be exceeded.
- Access control plan permitted in lieu of regulated areas.
- Limited competent person requirement to access control plan use.
Changes to Proposed Rule based on Small Business Input (cont.)

- Both fixed and performance option for exposure determination
- Initial medical surveillance can be offered within 30 days instead of pre-placement.
- Specific methods for laboratory analysis included
- Table 1 limits respirator use for tasks performed <4 hours/day
Consistency with Consensus Standards

➢ Industry has recognized the need for comprehensive standards addressing the hazards of crystalline silica.

➢ Voluntary consensus standards have been adopted for general industry (ASTM E 1132 – 06) and construction (ASTM E 2626 – 09).

➢ These voluntary standards include provisions for exposure measurement, use of dust controls, respiratory protection, medical surveillance, and training.
California Rule for Silica

- Cal/OSHA silica rule for construction - effective October 22, 2008.
- Concerns the cutting, grinding, coring and drilling of concrete and masonry materials.
- Requires the use of water or local exhaust dust controls to reduce dust generated by cutting, grinding, coring and drilling concrete and masonry materials when performed with powered tools or equipment.
Estimates of Those Affected by Proposed Rule

- 2.2 million workers
  - Total of 1.85 million in construction and 320,000 in GI and maritime
  - 1.3 million in small establishments
  - 580,000 in very small establishments

- 534,000 establishments
  - Total 477,000 in construction and 57,000 in GI and maritime
  - 470,000 small establishments
  - 356,000 very small establishments
Monetized Benefits and Costs Per Year

- Costs: $663 million annually
  - Construction – $495 million
  - General industry – $168 million

- Net Benefits: $2.8 to $4.7 billion annually over the next 60 years
### Annualized Compliance Costs in GI, Maritime, and Construction (2009 dollars)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Engineering Controls (includes Abrasive Blasting)</th>
<th>Respirators</th>
<th>Exposure Assessment</th>
<th>Medical Surveillance</th>
<th>Training</th>
<th>Regulated Areas or Access Control</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Industry</td>
<td>$88,442,480</td>
<td>$6,914,225</td>
<td>$29,197,633</td>
<td>$2,410,253</td>
<td>$2,952,036</td>
<td>$2,580,728</td>
<td>$132,497,363</td>
</tr>
<tr>
<td>Maritime</td>
<td>$12,797,027</td>
<td>N/A</td>
<td>307,117</td>
<td>304,024</td>
<td>343,500</td>
<td>70,302</td>
<td>14,229,242</td>
</tr>
<tr>
<td>Construction</td>
<td>$242,579,193</td>
<td>$84,004,516</td>
<td>$44,552,948</td>
<td>$76,012,451</td>
<td>$47,270,844</td>
<td>$16,745,663</td>
<td>511,165,616</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$343,818,700</td>
<td>$90,918,741</td>
<td>$74,421,757</td>
<td>$79,069,527</td>
<td>$50,266,744</td>
<td>$19,396,743</td>
<td>657,892,211</td>
</tr>
</tbody>
</table>

[OSHA logo]
### Annualized Compliance Costs in GI, Maritime, and Construction (Percentages by Sector and Provision)

<table>
<thead>
<tr>
<th>Industry</th>
<th>Engineering Controls (Includes Abrasive Blasting)</th>
<th>Respirators</th>
<th>Exposure Assessment</th>
<th>Medical Surveillance</th>
<th>Training</th>
<th>Regulated Areas or Access Control</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Industry/ Maritime</td>
<td>69%</td>
<td>5%</td>
<td>20%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>100%</td>
</tr>
<tr>
<td>Construction</td>
<td>47%</td>
<td>16%</td>
<td>9%</td>
<td>15%</td>
<td>0%</td>
<td>3</td>
<td>100%</td>
</tr>
<tr>
<td>Total</td>
<td>52%</td>
<td>14%</td>
<td>11%</td>
<td>12%</td>
<td>8%</td>
<td>3%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Average Annualized Compliance Costs per Affected Establishment (2009 dollars)

<table>
<thead>
<tr>
<th>Industry</th>
<th>All Establishments</th>
<th>SBA Small Entities</th>
<th>Very Small Entities (&lt; 20 Employees)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Industry/</td>
<td>$2,571</td>
<td>$2,103</td>
<td>$616</td>
</tr>
<tr>
<td>Maritime</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>$1,022</td>
<td>$798</td>
<td>$533</td>
</tr>
<tr>
<td>All</td>
<td>$1,185</td>
<td>$912</td>
<td>$539</td>
</tr>
</tbody>
</table>

OSHA®
Cost Revisions Based on Small Business Input (Analytic Modifications)

- Unit Costs Disaggregated by Firm Size
  - Training
  - Exposure Monitoring
  - Medical Surveillance

- Current Compliance Rates Adjusted
  - Training (56% to 25%)
  - Exposure Monitoring (33% to 0%)
  - X-Rays (35% to 0%)

- Other
  - Adjusted Costs to Reflect Rule Changes
  - Updated Unit Cost Estimates
Updates to Respirator Costs based on Small Business Input

- Updated costs associated with respirators
  - The respirator itself
  - Accessories (e.g., filters)
  - Training
  - Fit testing
  - Cleaning

- Added costs for respirator program
Expanded Economic and Feasibility Analyses Based on Small Business Input

- Added data on normal year-to-year variations in prices and profit rates
- Estimated potential international trade impacts
Employment Effects Analysis

- **Background**
  - Analysis conducted by Inforum, a well-recognized macroeconomics modeling firm
  - Costs of OSHA rule by type of cost and by industry fed into model; model run for 10-year period, from 2014-2023
  - Inforum ran model twice: once without OSHA costs (to establish baseline) and once with silica rule costs included; the difference determined the employment impacts
Employment Effects Analysis

Results

- Negligible impact on employment, but positive (about 860 “job-years” gained per year, on average, over the 10-year period)
- Results vary by year
- Results vary by industry (positive in construction; negative in general industry)
- But negligible in all cases, from a macroeconomics perspective
Silica Web Page
http://www.osha.gov/silica

OSHA

Occupational Safety & Health Administration

Crystalline Silica Rulemaking

Exposure to silica can be deadly, and limiting that exposure is essential. Every year, many exposed workers not only lose their ability to work, but also to breathe. This proposal is expected to prevent thousands of deaths from silicosis — an incurable and progressive disease — as well as lung cancer, other respiratory diseases, and kidney disease. Workers affected by silica are fathers, mothers, sisters and brothers lost to entirely preventable illnesses. We're looking forward to public comment on the proposal.

Dr. David Michaels, Assistant Secretary of Labor for Occupational Safety and Health

OSHA estimates that the proposed rule will save nearly 2,000 lives and prevent 1,600 new cases of silicosis per year, since the full effects of the rule are realized.

The proposed rule is the result of extensive review of scientific evidence relating to the health risks of exposure to respirable crystalline silica, analysis of the diverse industries where worker exposure to crystalline silica occurs, and extensive outreach efforts with stakeholders.