OSHA INFOSHEET

Silica Exposure during Hydraulic Fracturing

The National Institute for Occupational Safety and Health (NIOSH) identified exposure to airborne silica as a health hazard to workers conducting some hydraulic fracturing operations. This INFOSHEET discusses the hazards of silica, how you can be exposed, what actions employers must take to reduce exposures, and your rights as a worker.

In May 2012, NIOSH reported that workers may be exposed to dust with high levels of respirable crystalline silica (silica) during hydraulic fracturing. Silica is a common mineral found in the earth's crust. It occurs primarily as quartz and is a major component of the sand, clay and stone materials used to make everyday products such as concrete, brick and glass. Large amounts of sand are frequently used in hydraulic fracturing operations ("fracking").

What are the health hazards of silica?

- **Silicosis** is a lung disease caused by breathing in very small particles of silica that cause inflammation and scarring in the lungs and reduces the lungs' ability to use oxygen. Workers who breathe silica dust day after day are at greater risk of developing silicosis.
- Breathing in silica also increases the risk of **lung cancer and other diseases,** such as tuberculosis, chronic obstructive pulmonary disease, and kidney and autoimmune diseases.

How are workers exposed to silica on hydraulic fracturing sites?

Dust containing silica can be released when sand is off-loaded from transport trucks and transported through movers, along transfer belts, and into blender hoppers. You can be exposed to silica if you breathe the dust.

Primary sources where dust can be released include:

- Thief hatches (access ports) on top of the sand movers while the machinery is running during refilling (hot loading).
- Open side-fill ports on the sand movers during refilling operations.
- On-site vehicle traffic, such as sand trucks.
- Transfer belts under the sand movers.
- Sand poured into, or mixed in, the blender hopper and on transfer belts.
- Operation of transfer belts between the sand mover and the blender.
- End of the sand transfer belt (dragon's tail) on sand movers.

How do you know if silica is being released into the air?

To determine silica exposure levels, your employer should collect air samples using devices that measure the amount of silica in a worker's breathing zone. This enables employers to determine which jobs may expose workers to silica and the levels of silica in the air. The OSHA permissible exposure limit for worker exposure to silica is approximately 0.1 mg/m^3 for pure quartz silica.

Silicosis-damaged lung.
Photo credit: CDC

Airborne silica dust at sand mover and transfer system.
Photo credit: NIOSH

How can worker exposures to silica in the air be reduced?

➢ **Reduce the amount of silica dust.**
Work practices that can be used now:
- Cap unused fill ports on sides of sand mover.
- Reduce distance that sand falls (e.g., between the end of the dragon's tail and T-belts).
- Limit the number of workers and the time that workers must spend in areas where silica dust is in the air.
- Consider modifications to equipment so that dust operations can be performed remotely.
- Apply water-based products to roads and around the well site to reduce the amount of airborne dust.

Work practices that involve equipment modification:
- Enclose points where dust is released (e.g., skirting around bottom/sides of sand movers, shrouding around and at the end of the dragon's tail).
- Use door seals and HEPA filtration on enclosed operator cabs or booths where possible.
- Use local exhaust ventilation on machines or equipment to collect dust.
- Replace transfer belts with screw augers on sand movers in new designs or retrofits.

➢ **Use respirators when required.**
When respirators are required, your employer must have a respiratory protection program that meets the requirements of OSHA's Respiratory Protection standard (29 CFR 1910.134). This program must include proper respirator selection, fit testing, medical evaluations, and training. All respirators need to be NIOSH-approved.

➢ **Inform and train workers on the hazards of silica and other chemicals.**
OSHA's Hazard Communication standard requires your employer to provide workers training and access to safety data sheets (SDSs) on silica sand and other hazardous chemicals used or produced during hydraulic fracturing operations.

WORKER RIGHTS

Under OSHA law, employers have the responsibility to provide a safe workplace.

Workers must receive information and training (in a language and vocabulary they can understand) about workplace hazards, methods to prevent them, and the OSHA standards that apply.

Workers can review records of work-related injuries and illnesses as well as get copies of test results that find and measure hazards.

Workers may confidentially ask OSHA to inspect their workplace if they believe that their employer is not following OSHA standards or that there are serious hazards.

Workers have the right to use their rights under the law, including their right to report a work-related injury or illness, free from discrimination or retaliation.

For more information, to ask a question, or to file a complaint, visit www.OSHA.gov or call 1-800-321-OSHA (6742). It is confidential.

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Occupational Safety and Health Administration