

# 26<sup>th</sup> World Gas Conference

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LEARNINGS FROM THE US ENERGY REVOLUTION ON  
EMPLOYEES' EXPOSURES DURING GAS WELLS  
HYDRAULIC FRACTURING & WELL STIMULATION

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# Chemical and Physical Hazards during Well Site Development

- Anticipated exposure risks
  - BTEX and hydrocarbons
  - Noise and thermal stress
- Uncertain exposure risks to well-characterized hazards
  - Crystalline silica, diesel particulate, dermal exposures, vibration
- Uncertain exposure risks to novel hazards
  - Nano-enabled materials, including lubricants and proppants



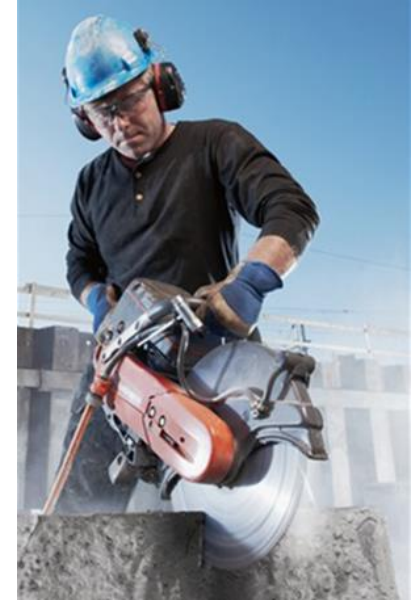
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# Anticipation

**How can we transfer our knowledge of effective silica risk-based exposure controls from other industries?**



Photo credit: NJ Department of Health



Wet methods to reduce exposures in construction



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# Recognition



Photo Credit: NIOSH



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# Evaluation

- Exposure monitoring is required for activities in three main dust generation groups:
  - Dust generation points associated with sand mover loading
  - Dust generation points associated with pumping a hydraulic fracturing stage (pumping operations)
  - Dust generation points outside the process, including spill clean-up and release of dust from worker clothing.
- Knowledge of the exposures from each activities supports the implementation of effective exposure controls



# Controls—Engineering

- Engineering Controls
  - Enclosure and Dust Capture
  - Passive Enclosures
  - Dust Suppression
  - Worker Enclosure and Remote Operation



Enclosed chemical additive unit  
Photo courtesy of TYCROP Manufacturing Ltd.



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# Controls—Work Practices



- Entry Control to Dust Generating/Emitting Areas
- Awareness of Environmental Factors/Site Layout

- Reduce Drop Heights
- Audits and Inspections
- Apply fresh water to roads and around the well site to reduce the dust.
- Silica Competent Person



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# Controls—Personal Protective Equipment

- Selection and Use of Respirators
- Respirator Effectiveness
- Doffing/Cleaning Work Clothing



Mobile Air Shower



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# Questions

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