www.silica-safe.org: A Resource for the Oil and Gas Industry for Compliance with the OSHA Respirable Crystalline Silica (RCS) Standard

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Silica in the Oilfield Summit 2.0
April 14, 2021

BACKGROUND:

- **Key provisions of the RCS Standard:**
  - **1910.1053(c)**: Permissible Exposure Limit (PEL): 50 micrograms per cubic meter (50 µg/m^3), calculated as an 8-hour time weighted average (TWA)
  - **1910.1053(f)(2)**: Written Exposure Control Plan (ECP):
    - Describe **tasks** that involve exposure to RCS
    - Describe **engineering controls, work practices, and respiratory protection** used to limit exposure to RCS
    - Describe **housekeeping measures** used to limit exposure to RCS
    - Review and evaluate for effectiveness at least annually, and updated as needed
    - Make readily available, upon request, to each employee, designated representative, and the Department of Labor/OSHA

RESOURCE TO HELP COMPLY WITH ECP REQUIREMENTS: www.silica-safe.org

POLL QUESTION 1:

Before this presentation, were you familiar with the website www.silica-safe.org?

a. No
b. Yes

RESOURCE TO HELP COMPLY WITH ECP REQUIREMENTS:

www.silica-safe.org

Work Safely with Silica

A ONE-STOP SOURCE OF INFORMATION ON
HOW TO PREVENT A SILICA HAZARD AND PROTECT WORKERS

About • Know the Hazard • Regulations & Requirements • What's New • Create-A-Plan Search GO

Know the Hazard

Workers may be exposed to dangerous levels of silica dust when cutting, drilling, grinding, or otherwise disturbing materials that contain silica. These materials and tasks are common on construction and oil and gas jobs. Breathing that dust can lead to serious, often fatal illnesses. This section contains information that workers – and contractors – need to know to recognize the hazard, understand the risk factors, and work safely with silica.

Control the Dust

There are ways **contractors** can reduce the dust and reduce the hazard. This easy to use planning tool takes you step-by-step through conducting a **job hazard analysis for silica**, selecting appropriate controls, and creating a job-specific plan to eliminate or reduce silica hazards. You can save as a pdf, print and/or email your plan.

CREATE-A-PLAN

Training & Other Resources

Find silica-related handouts, fact sheets, videos, toolbox talks and other resources for workers and contractors.

What's Working

Contractors, workers, manufacturers, and researchers are on the lookout for the best ways to control silica dust. Learn what is happening in the field and share what you are doing.

Ask a Question

Get answers to commonly asked questions about silica and ask one of your own.

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Referenced in:

- Industry testimony, evidence in support of the silica standard, and preamble to the final standard
- OSHA's Small Entity Compliance Guide for the RCS Standard for Construction

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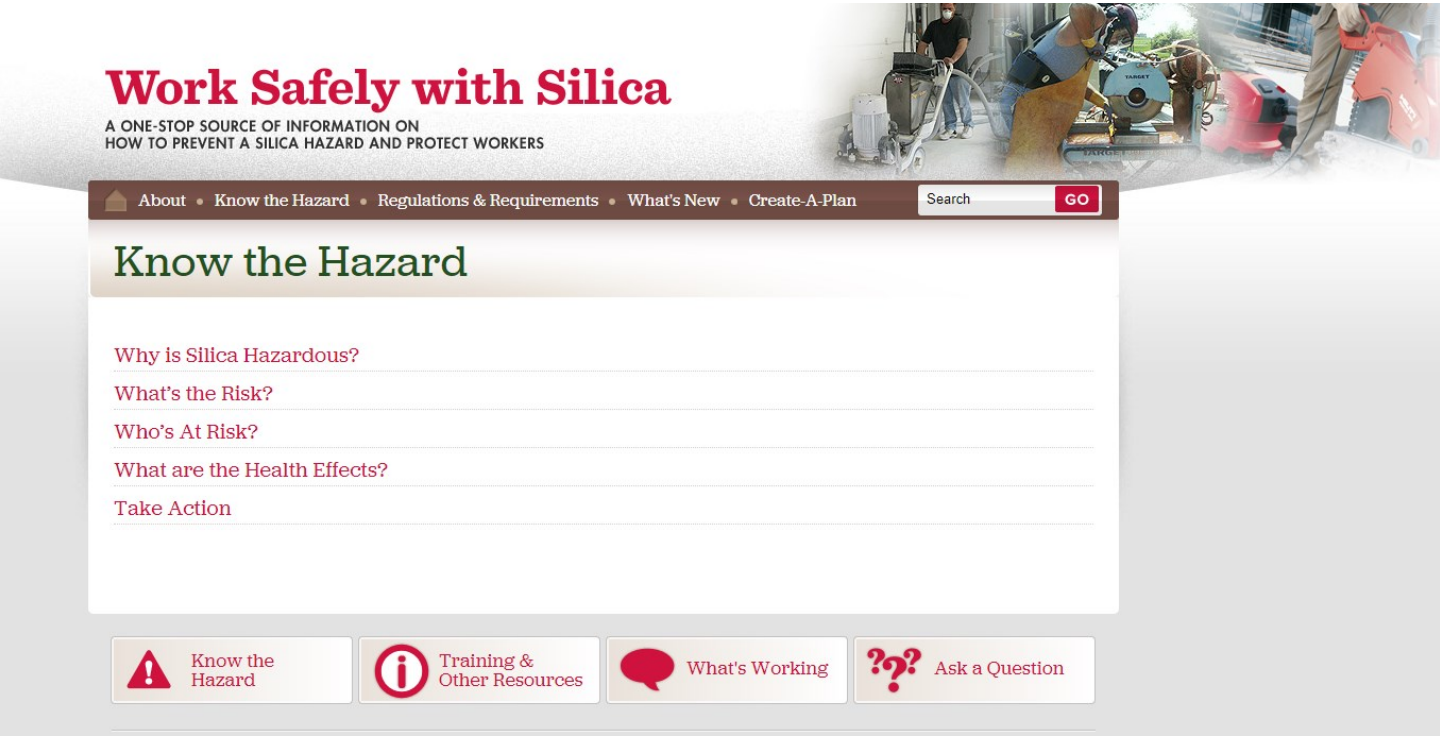

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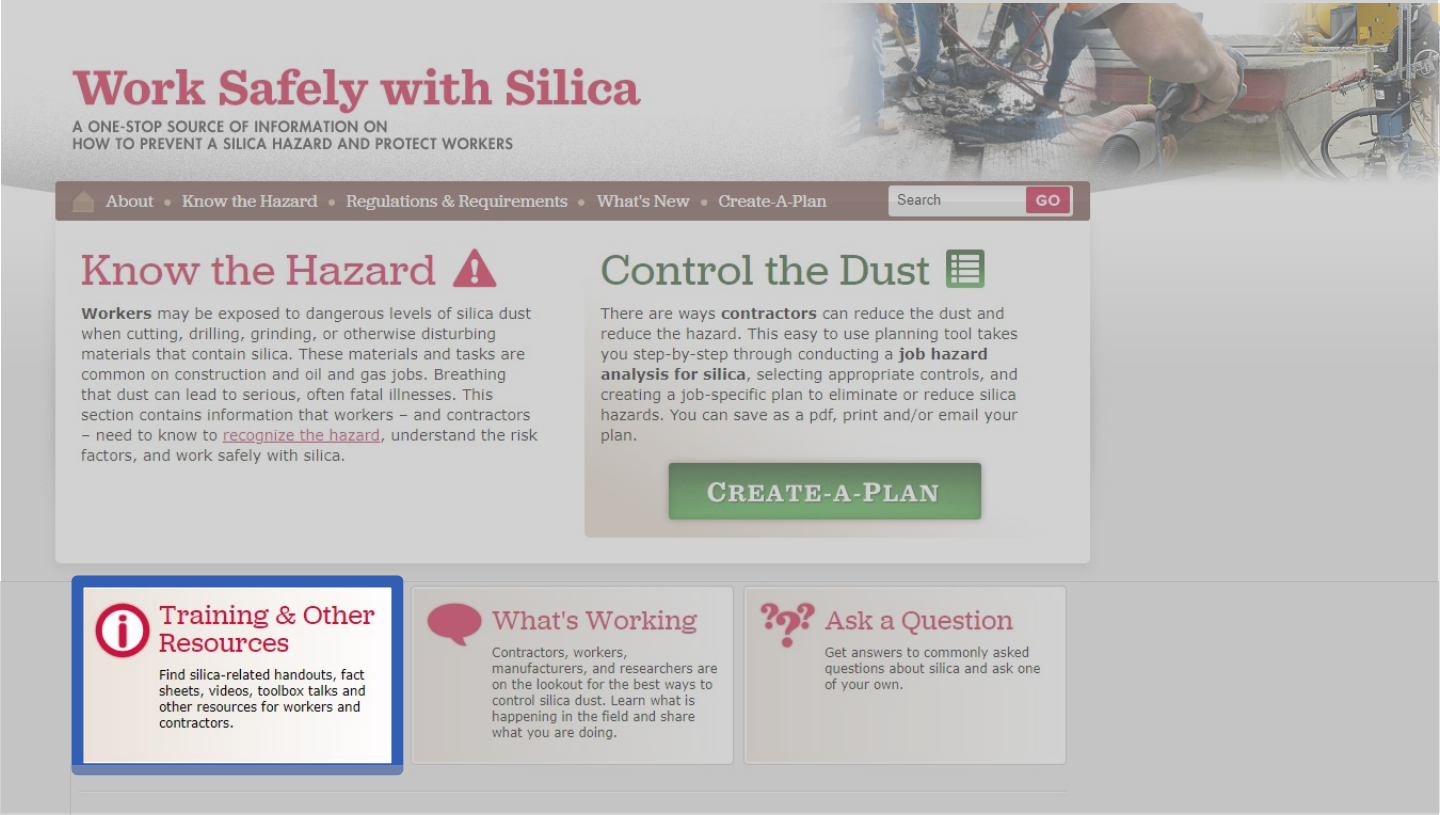

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Search GO

Training and Other Resources

Training and Other Resources > Oil & Gas Resources

Oil & Gas Resources

FEB 26, 2019
Small Entity Compliance Guidefor the Respirable Crystalline Silica Standard for General Industry and Maritime
OSHA
A guide intended to help small businesses understand and comply with OSHA's Respirable Silica Standard for General Industry and Maritime.

FEB 21, 2019
Hazard Alert - Worker Exposure to Silica during Hydraulic Fracturing
OSHA & NIOSH

FEB 21, 2019
Oil and Gas Well Drilling and Servicing eTool
OSHA

▸ Return to "Training and Other Resources"

Know the Hazard | Training & Other Resources | What's Working | Ask a Question

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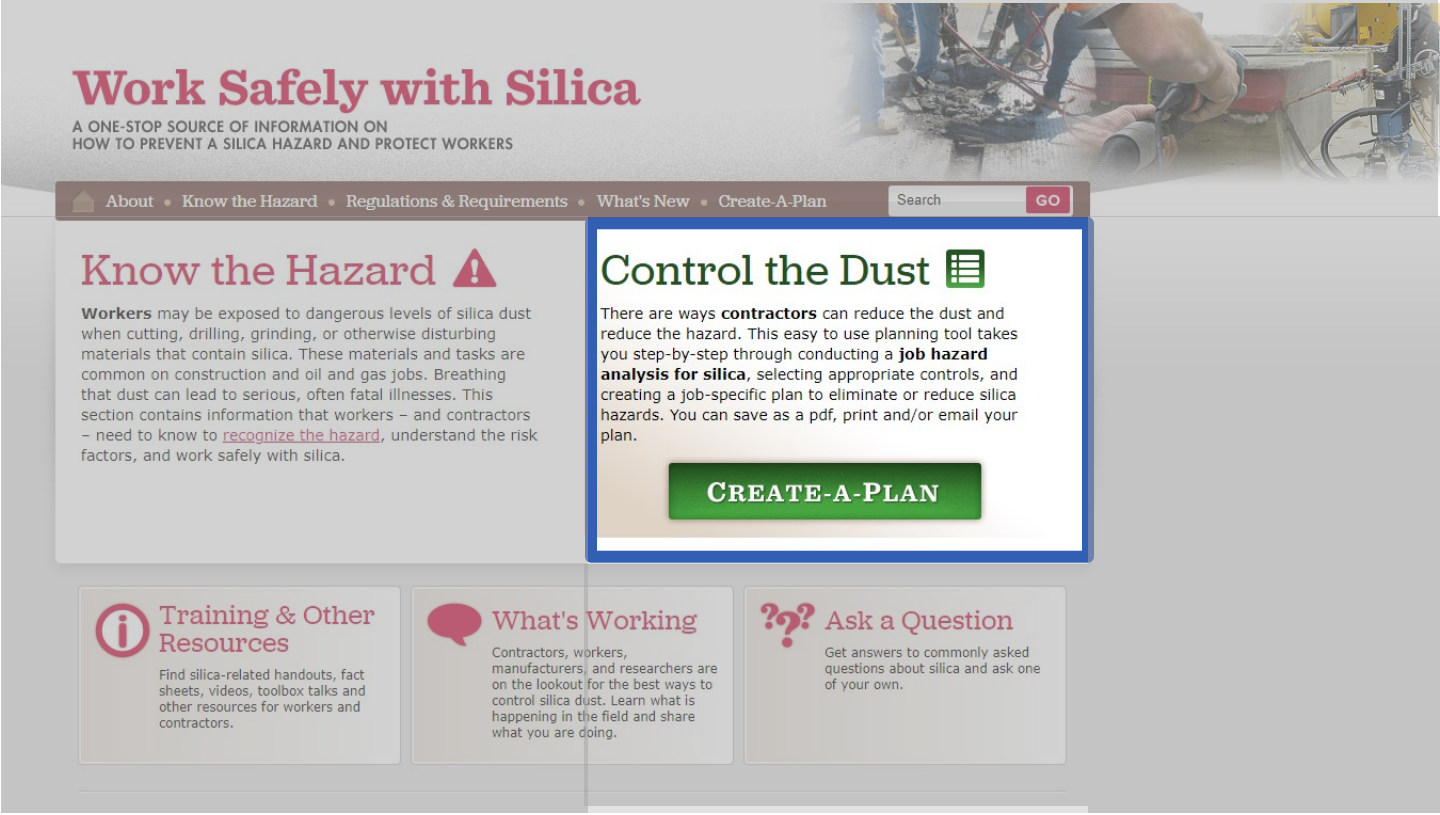

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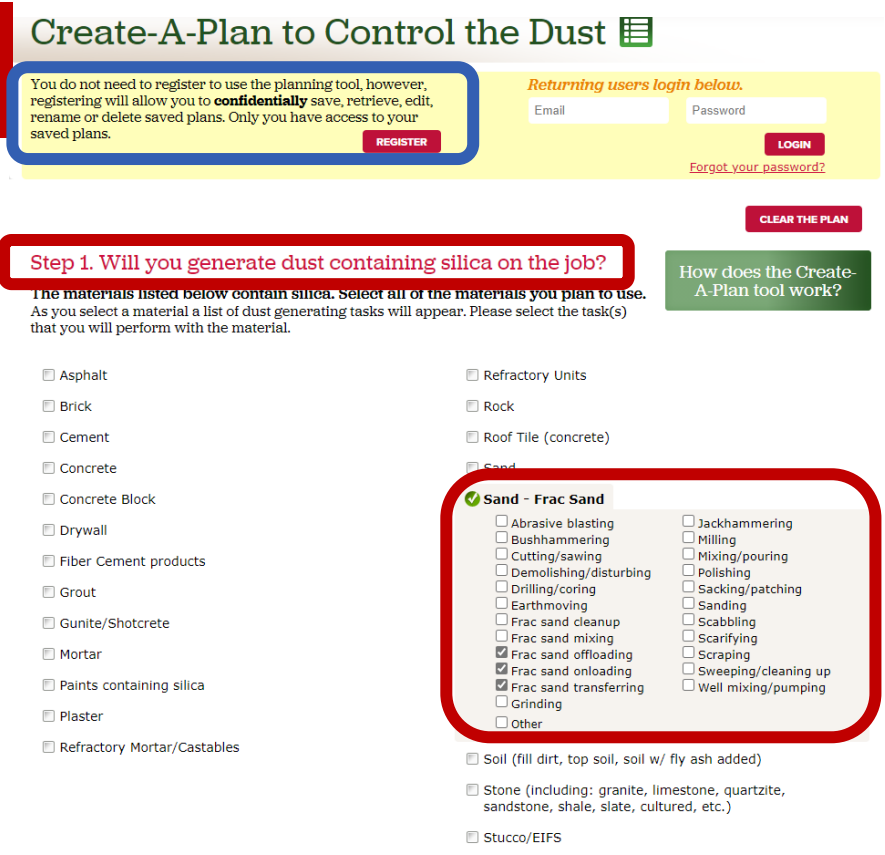
Step 1

Materials and tasks



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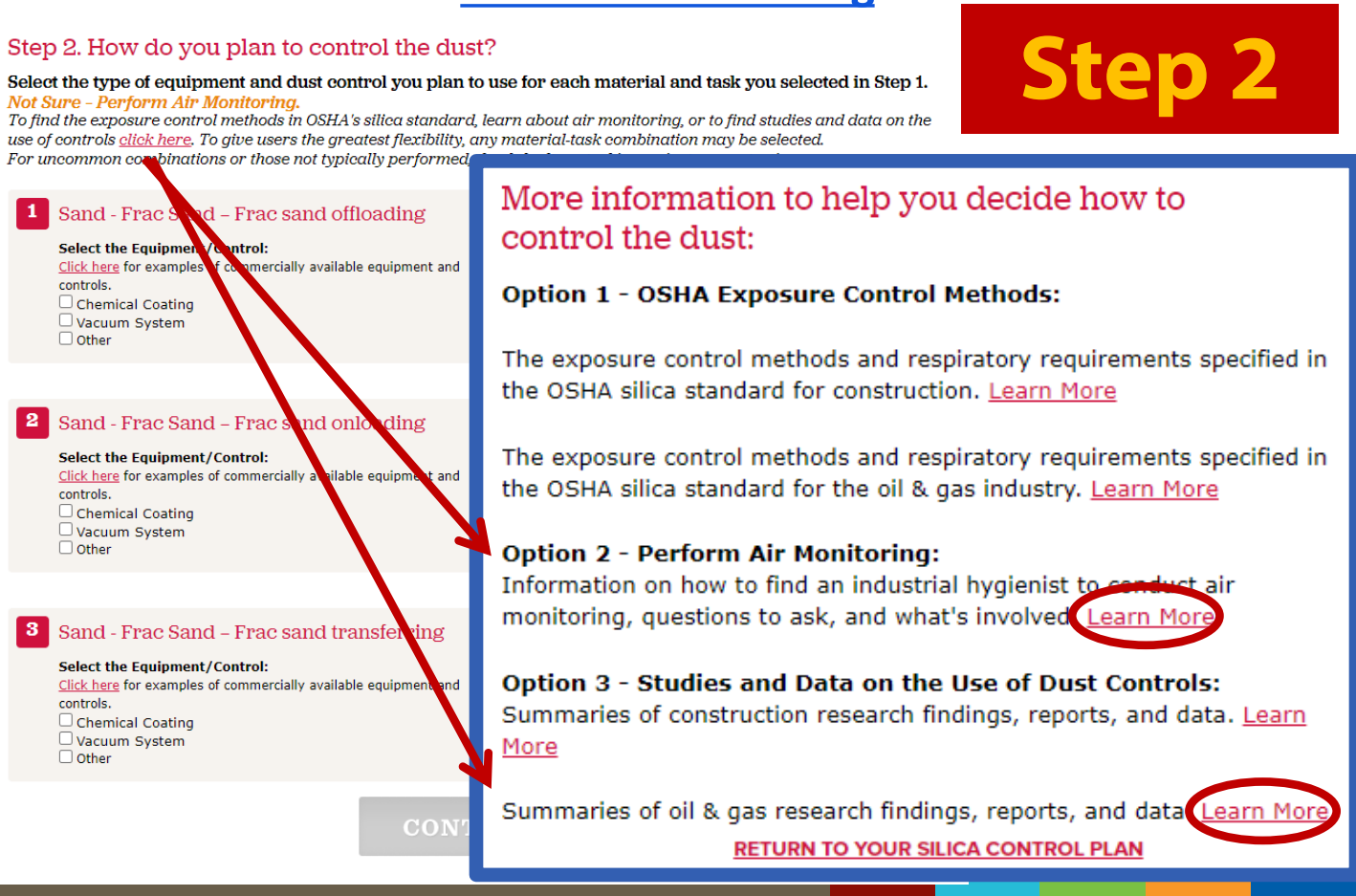
Step 2



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Option 2 - Perform Air Monitoring

Sampling the air for respirable silica when a dust-producing task is being performed is the best way to determine if and how much silica dust is in the air the worker is breathing. *(Note: MSHA requires regular sampling of sand and gravel pits, rock crushers, aggregate recycling, and stone quarries.)*

Personal air monitoring is necessary to:

- ensure exposures aren't exceeding OSHA's Permissible Exposure Limit (PEL) for silica *(or MSHA's PEL if applicable);*
- verify engineering controls are working effectively; and
- choose the right respirator, if one is needed.

There are three key steps:

1. A professional industrial hygienist (IH) collects the air sample after discussions with workers to determine typical and worst-case exposures. (You can learn about IH qualifications and find one in your location at www.aiha.org).
2. The IH sends the sample to a qualified laboratory where the total amount of dust and the amount of silica dust will be measured. Typically, it will take roughly a week to receive the results, depending on the lab and whether the sample was rushed.
3. Based on the sample's silica content, the IH will recommend dust control options for the material and task.

Watch a video to learn more about air monitoring....

- **Air Sampling for Worker Silica Dust Exposure 2001**, MSHA
- **Obtaining a Dust Sample**, MSHA
- **Respirable Dust and/ or Silica Sampling NIOSH 0600/7500**, Galson Laboratories

Finding an industrial hygienist or a lab - the following are on-line resources:

- **The American Industrial Hygiene Association's** website includes a list of consultants broken down by the type of work they perform.
- **The American Board of Industrial Hygiene's** website contains a database of certified industrial hygienists (CIHs) that you can search by location. CIHs have met the minimum requirements for education and experience, and through examination have demonstrated a minimum level of knowledge and skill in all of the key areas of the field. This certification is the main quality control for the profession.
- **The American Industrial Hygiene Association Laboraty Accreditation Program**'s website includes a list of accredited laboratories:
- The **MiningUSA.com** website includes a list of consultants and the type of testing services provided by each company.

Note: Some insurance carriers offer on-site safety and health consultations including air sampling and air monitoring. Contact your carrier to find out if this service is available.

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POLL QUESTION 2:

Has your company conducted exposure assessments/air monitoring to determine compliance with the PEL in the OSHA RCS Standard?

a. No
b. Yes
c. Not applicable

RESOURCE TO HELP COMPLY WITH ECP REQUIREMENTS: www.silica-safe.org

POLL QUESTION 3:

Do you anticipate your company will be fully compliant by June 23, 2021 in using engineering and work practice controls to reduce and maintain all employee exposures to RCS to or below the PEL?

a. No
b. Yes
c. Unknown
d. Not applicable

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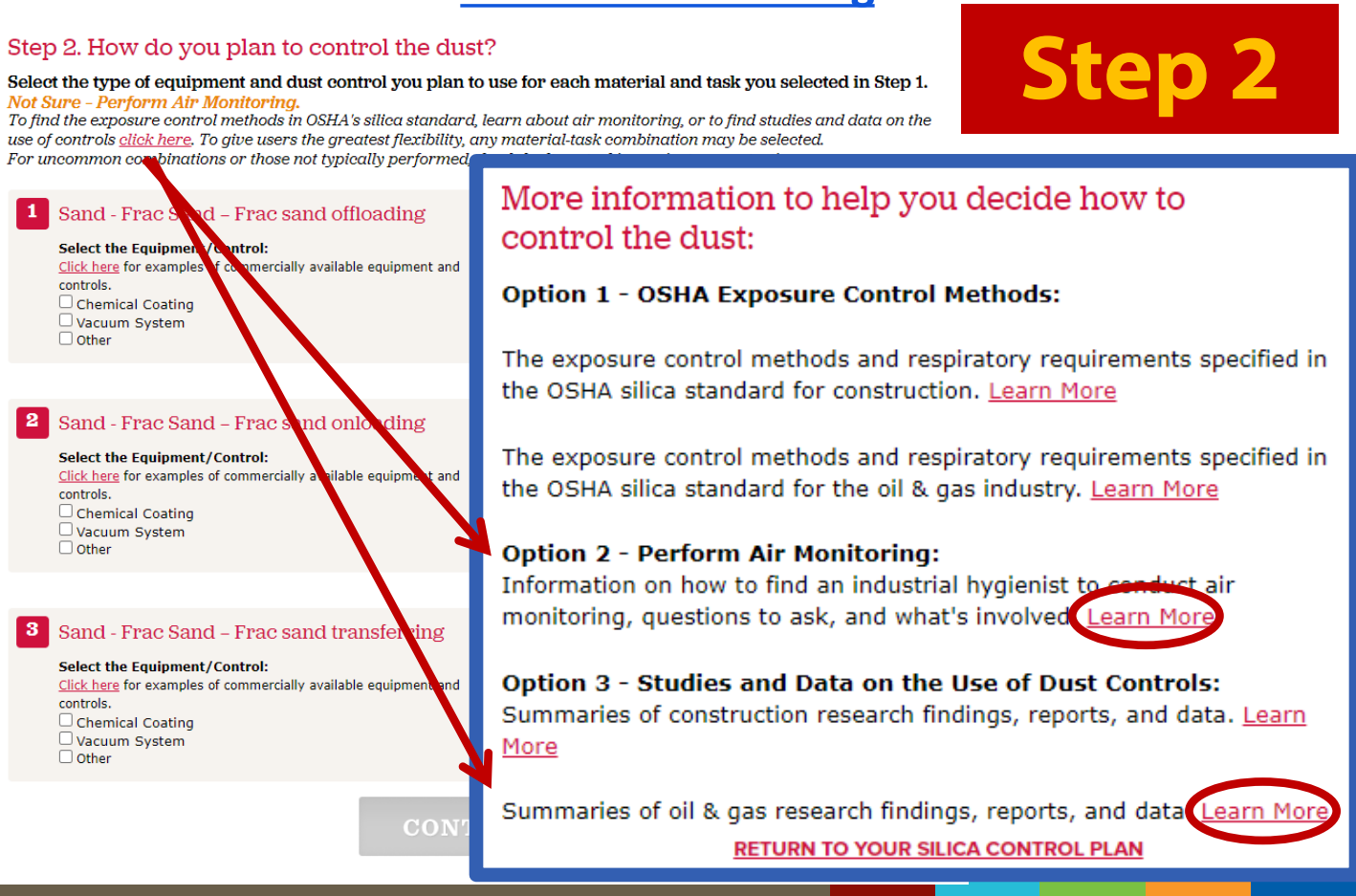
Step 2



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Option 3 - Oil & Gas Studies and Data on Silica Exposure and the Use of Dust Controls

Material, Task, Etc.	Year of Study	Title	Summary
Sand Transfer & Loading	2018	Dust Supression Hopper reduces dust liberation during bulk loading: Two case studies	Sand that is being transferred and loaded can release dust into the work environment. For bulk loading sand into trucks or trains, NIOSH evaluated a Dust Supression Hopper (DSH) at two industrial sand processing plants. Results show that the DSH reduced airborne respirable dust levels by 39-88%, depending on the sand size being loaded.
Sand movers	2017	Evaluation of an improved prototype mini-baghouse to control the release of respirable crystalline silica from sand movers	This article details the results of the evaluation of generation 3 of the NIOSH Mini-Baghouse Retrofit Assembly (NMBRA) at a sand mine in Arkansas in 2015. 168 area air samples were collected at 12 locations on and around a sand mover with and without the NMBRA installed. Analytical results for respirable dust and respirable crystalline silica (RCS) indicated the use of the NMBRA effectively reduced concentrations of both respirable dust and RCS downwind of the thief hatches. Reductions of airborne respirable dust were estimated at 99+%; reductions in airborne RCS ranged from 98-99%. Use of an improved filter fabric and a larger area of filter cloth led to substantial improvements in filtration and pressures during these trials, as compared to the generation 2 NMBRA.
Sand movers	2016	In-Depth Survey Report: Field Evaluation of the NIOSH Mini-Baghouse Assembly Generation 3 for Control of Silica Dust on Sand Movers	This NIOSH report provides detailed results and the complete dataset of the evaluation of the 3rd generation of the NIOSH mini-baghouse retrofit assembly (NMBRA) that occurred at Southwestern Energy Sand Company in North Little Rock, Arkansas in 2015. Results indicate that the mini-baghouse retrofit assembly effectively reduced both respirable dust and respirable crystalline silica (RCS) downwind of the thief hatches. Measurements of the static pressure inside the bags remained low throughout filling of the sand mover, avoiding the need to suspend sand transfer and manually shake filter bags. Analysis of a bulk sample of the dust collected by the baghouse assembly during this trial showed the presence of silicon, silica monoxide and the silica dioxide radicals which are indicators of freshly fractured quartz, a particularly hazardous form of RCS. Design enhancements are proposed to provide weather resistance and ease of clamping of the mini-baghouse.
Sand movers	2016	The development and testing of a prototype mini-baghouse to control the release of	This article details the results of a trial of the 2nd generation NIOSH mini-baghouse at a sand mine in Arkansas in 2013. During the trial, area air samples were collected at 12 locations on and around a sand mover with and without the mini-baghouse control installed. Analytical results for respirable dust and RCS indicate the use of the mini-baghouse effectively reduced both respirable dust

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Step 2

Step 2. How do you plan to control the dust?

Select the type of equipment and dust control you plan to use for each material and task you selected in Step 1.
Not Sure - Perform Air Monitoring.
To find the exposure control methods in OSHA's silica standard, learn about air monitoring, or to find studies and data on the use of controls click here. To give users the greatest flexibility, any material-task combination may be selected.
For uncommon combinations or those not typically performed, the default control is respiratory protection.

1 Sand - Frac Sand – Frac sand offloading — COMPLETED

Select the Equipment/Control:
Click here for examples of commercially available equipment and controls.
- [x] Chemical Coating
- [ ] Vacuum System
- [ ] Other

Describe the specific task and equipment/control you plan to use for this job.

2 Sand - Frac Sand – Frac sand onloading

Select the Equipment/Control:
Click here for examples of commercially available equipment and controls.
- [x] Chemical Coating
- [ ] Vacuum System
- [ ] Other

Describe the specific task and equipm use for this job.

3 Sand - Frac Sand – Frac sand transferring

Select the Equipment/Control:
Click here for examples of commercially available equipment and controls.
- [ ] Chemical Coating
- [x] Vacuum System
- [ ] Other

Describe the specific task and equipm use for this job.

CONTINUE

Examples of Equipment and Control Options* for the material and task you selected.

Chemical Coating

1. *Covia DST™ (DustShield)*
   - See how it works
   - Manufacturer
2. *Sentinel™ Dust Suppressant*
   - Manufacturer
   - Learn More: Webinar
3. *ArrMaz SandTec® USDA Certified Biobased Product*
   - See how it works
   - Manufacturer
   - Learn More: Oil & Gas: Silica Dust Control in Hydraulic Fracturing
   - Learn More: Brochure
   - Learn More: Infographics

RETURN TO YOUR SILICA CONTROL PLAN

*CPWR does not endorse any specific equipment or product. Many factors influence the effectiveness of a control including maintenance, user s and training, the appropriateness of the equipment/control for the task, and manufacturer instructions/requirements. Respiratory protection m be needed when controls do not bring the silica exposures down to or below OSHA's Permissible Exposure Limit (PEL).

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POLL QUESTION 4:

Are you currently using (or plan to use) an engineering control developed within your company, a commercially available control, or both to meet the OSHA RCS standard requirements to control employee exposures related to hydraulic fracturing operations?

a. Developed within your company
b. Commercially available
c. Both
d. Not applicable

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POLL QUESTION 5:

What engineering controls will you use to meet the OSHA RCS standard requirements for engineering controls? (Check all that apply.)

a. Chemical coatings/dust suppressant technology
b. Vacuum collection and filtration system
c. Use of non-silica proppant (e.g., ceramic)
d. Sand transfer system utilizing non-pneumatic proppant containment and delivery (i.e., gravity-fed modular bins or silos)
e. Sand transfer systems utilizing extendable belt conveyance/shielding and shrouding that mechanically move sand to delivery points
f. Wet sand technique
g. Other
h. Not applicable

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Step 3

Step 3. Complete your Silica Control Plan

Company:

Person Completing the Plan/Title:

Jobsite/Project:
(name, location, lat/long (If applicable), etc.)

Description of Work:

Please fill in the name and title of the competent person for silica on a construction project or responsible person on an oil and gas project.
Click here for an explanation of the competent person's role on construction projects and what is required under 29 CFR 1926.1153 (g)(4). Click here for an explanation of the responsible person's role on oil and gas projects and what is required to implement a general industry plan under 29 CFR 1910.1053(f).

Exposure Assessment and Controls

1. **Materials:** Sand - Frac Sand **Task:** Frac sand offloading
   Equipment and Control(s): Chemical Coating
2. **Materials:** Sand - Frac Sand **Task:** Frac sand onloading
   Equipment and Control(s): Chemical Coating
3. **Materials:** Sand - Frac Sand **Task:** Frac sand transferring
   Equipment and Control(s): Chemical Coating

Please describe the procedures to restrict access to work areas in construction as required by 29 CFR 1926.1153 (g)(1)(iv).
Restricting access to work areas and regulated areas, when necessary, minimizes the number of employees exposed to respirable crystalline silica and their levels of exposure, including exposures generated by other employers or sole proprietors.

For the oil and gas industry, please describe the procedures to establish, demarcate, and limit access to regulated areas as required by 29 CFR 1910.1053(e).
Click here for an explanation of the general industry requirement.

Please use the space below to describe the training that will be provided to workers engaged in dust-producing tasks and those working nearby.
Click here for the construction requirements under 1926.1153(i)(2). Click here for an explanation of the elements of a training program for oil and gas workers 1910.1053(i)(3).

Please describe the housekeeping measures that will be used on the project to limit employee exposure to respirable crystalline silica as required by 29 CFR 1926.1153 (f) in construction or 29 CFR 1910.1053(h) in oil and gas.
Click here to learn more about recommended housekeeping activities for construction. Click here for oil and gas recommended housekeeping activities.

Please use the space below to describe the medical surveillance that will be provided.
Click here to learn about medical surveillance requirements for construction (29 CFR 1926.1153(h)). Click here for oil and gas medical surveillance requirements (29 CFR 1910.1053(i)).

Please use the space below to describe other things that need to be taken into consideration when controlling dust on this project.
Click here to learn more about possible things to consider.

CONTINUE

**CPWR does not endorse any specific equipment or product. Many factors influence the effectiveness of a control including maintenance, user skill and training, the appropriateness of the equipment/control for the task, and manufacturer instructions/requirements. Respiratory protection may be needed when controls do not bring the silica exposures down to or below OSHA's Permissible Exposure Limit (PEL).*

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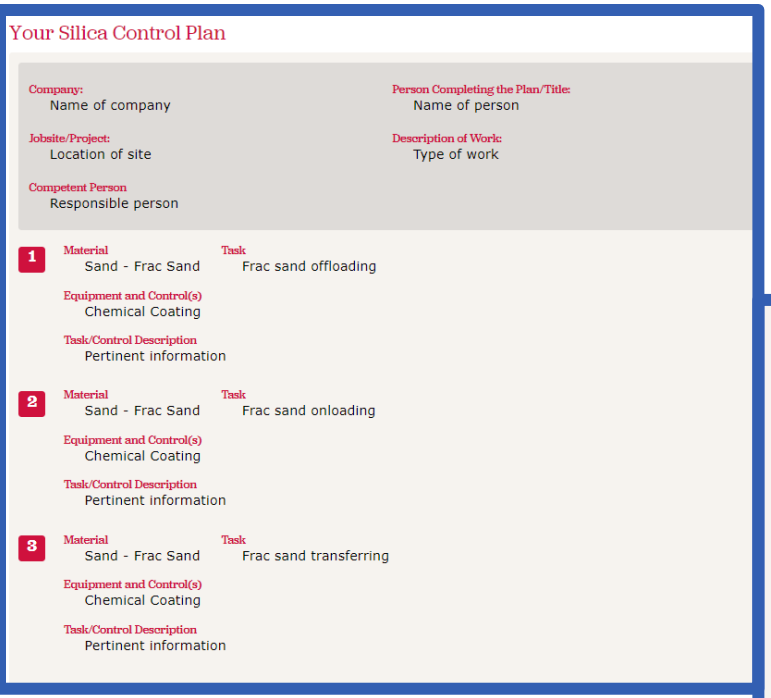
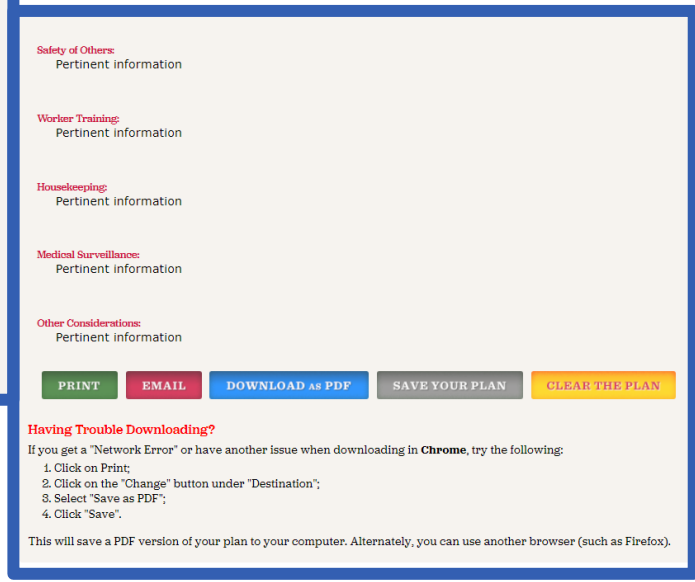


Final Plan: Print/Email/ Download/Save



Poll Question 6 (not anonymous):

Would you be interested in providing further information on your control so that it might be included on www.silica-safe.org as an option?

a. No
b. Yes

Thank you!

BKing1@cdc.gov

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.