UCOR
an AECOM-led partnership with Jacobs

PERFORMANCE DOCUMENT COVER PAGE

NOTE: If the following document is printed, this cover page must be attached to the front and the required information filled in below.

Date Printed: _____

Dates Rev. No. Checked:

Document Number: _____ **Revision Number:** _____

Title: _____

Person Checking Revision Number: _____

The attached document was printed from the online Performance Document System. The user must check that the hard copy revision number matches the revision number of the controlled document in the online Performance Document System. For future use, confirm the revision number's accuracy online and record dates that the revision number was checked.

Section Below Completed by the Performance Document Group Only

Document Type: ☒ Administrative ☐ Technical Emergency
☐ Standard Practice ☐ Alarm Response

Required Review Date: 11/22/21 Date Required Review Completed: _____

Document Status: ☐ Maintain As Is ☐ Revise ☐ Delete

If "Maintain As Is," Next Required Review Date: _____

If "Revise" or "Delete," Due Date: _____

UCOR
an AECOM-led partnership with Jacobs

OWNER: Industrial Hygiene	**PPD-IH-5205**	**REVISION: 2**
SUBJECT MATTER AREA: Respirable Silica	**PREPARER: Graham Theobald**	**Page 1 of 21**
PROCESS/PROGRAM DESCRIPTION	**CONCURRENCE/DATE:**	**Linda B. Raulston 10/23/18 [Approval Signature on File]**
TITLE: AIRBORNE SILICA HAZARD ASSESSMENT AND CONTROL	**APPROVED BY/DATE:**	**Walter Czekaj 10/23/18 [Approval Signature on File]**
USQD ☒ UCD ☐ CAT X ☐ EXEMPT ☐	**EFFECTIVE DATE:**	**11/22/18**
USQD/UCD/CAT X No: PSW-MS-PPDIH5205-1476	**REQUIRED REVIEW DATE:**	**11/22/21**
Exhibit L Mandatory Contractor Document No ☐ Yes ☒	**If an Interim Procedure, Expiration Date:**	

This document is approved for public release per review by:

Teresa D. Fancher 10/10/18

UCOR Classification and Information Control Office — Date

REVISION LOG

Revision	Effective Date	Description of Changes	Pages
2	11/22/18	Intent change. Complete rewrite due to significant changes in silica regulations.	All
1	1/22/18	Intent change. Incorporate initial experience with implementation. Correct nonconservative medical surveillance trigger, CAMS item IF-2018-0044.	3-5, 8-12, 14-17
0	9/25/17	Initial Release. Flow-down of industrial hygiene program requirements from recently promulgated OSHA regulations 29CFR1910.1053 and 29CFR1926.1153.	All

PURPOSE

This Process/Program Description (PPD) communicates work requirements for identification and control of respirable crystalline silica as required by 29 Code of Federal Regulations (CFR) 1926.1153, Respirable Crystalline Silica, 10 CFR 851, Worker Protection Program, PPD-EH-1745, *Worker Safety and Health Program*, PPD-EH-1400, *Integrated Safety Management System Program Description*, and applicable UCOR, an AECOM-led partnership with Jacob, (UCOR) contract commitments.

SCOPE

This PPD applies to UCOR self-performed work as well as UCOR subcontractor operations when nature of required work involves potential for workers to be exposed to airborne respirable crystalline silica at or above American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) and Occupational Health and Safety Administration (OSHA) Regulatory Action Level of 25 micrograms per cubic meter of air ($\mu g/m^3$) under any foreseeable conditions.

This PPD applies to use of clays, such as bentonite, incorporated in groundwater well stabilization or in construction of a disposal site liner or cap design. I.e., this PPD applies to sorptive clays involved with construction activities.

This PPD does NOT apply to other Prime Contractor work performed in UCOR facilities, nor does this PPD apply to exposures resulting from processing of sorptive clays, e.g., addition of adsorbents incorporating silica-bearing clays to limit free liquid content of waste containers.

OSHA 1910.1053, Respirable Crystalline Silica, for General Industry does NOT apply to UCOR work activities.

EXPECTATIONS AND STRATEGY

Provide requirements for safely working with respirable crystalline silica at UCOR locations.

OTHER DOCUMENTS NEEDED

- 29 CFR 1926.57, Ventilation
- 29 CFR 1926.1153, Respirable Crystalline Silica
- PPD-IH-5151, *Respiratory Protection Program*
- PPD-IH-5418, *Industrial Hygiene Program*
- PROC-EH-1013, *Accident Prevention Signs, Barricades, and Other Postings*
- PROC-IH-5560, *Workplace Industrial Hygiene Sampling*
- Form-288, Medical Surveillance and Qualification Programs
- Form-2972, Competent Person Designation Form
- ACGIH, *Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents & Biological Exposure Indices (BEIs)*

ROLES AND RESPONSIBILITIES

A. Silica Competent Person

Silica Competent Person's Manager/ Supervisor

1. Designate Silica Competent Person on Form-2972, Competent Person Designation Form, (Module 31836).

2. Silica Competent Person Qualification Requirements:

a. Capable of identifying existing and foreseeable respirable crystalline silica hazards in workplace and has authorization to take prompt corrective measures to eliminate or minimize identified hazards.

b. Possesses knowledge and ability necessary to evaluate implementation of Silica Exposure Control Plan.

Competent Person

3. Performs frequent and regular inspections of job sites, materials, and equipment to verify implementation of Silica Exposure Control Plan.

B. Industrial Hygienist

Industrial Hygienist

1. Reviews and evaluates effectiveness of Silica Exposure Control Plan at least annually and updates as necessary.

C. Exposure Limits

1. ACGIH

a. Threshold Limit Value (TLV): 8-hour Time Weighted Average (TWA) of 25 micrograms per cubic meter ($\mu g/m^3$) respirable (r)

b. Transient peak: 75 $\mu g/m^3$ (r)

c. STEL/Peak Max: 125 $\mu g/m^3$ (r)

2. OSHA

a. Permissible Exposure Limit (PEL): 8-hour TWA of 50 $\mu g/m^3$ (r) without regard to respiratory protection

b. Regulatory Action Level (RAL): 8-hour TWA of 25 $\mu g/m^3$ (r) without regard to respiratory protection

3. NIOSH

a. Immediately Dangerous to Life and Health (IDLH): 250 $\mu g/m^3$ (cristobalite, tridymite); 500 $\mu g/m^3$ (quartz, tripoli)

D. Training

Training Department

1. Address health hazards of respirable crystalline silica in hazard communications training including:

a. Kidney effects,

b. Cancer,

c. Lung effects,

d. Immune system effects (i.e., association with lung infections such as Tuberculosis).

Silica Worker / Silica Competent Person / Workers with potential exposure at or above 25 µg/m3 (OSHA RAL)

2. Complete Training Module 31835, Silica Hazard Awareness, covering:

a. Respirable crystalline silica health hazards,

b. Work tasks potentially resulting in exposure to respirable crystalline silica,

c. Measures to protect workers from exposure to respirable crystalline silica including:

i. Engineering controls,

ii. Administrative controls,

iii. Respirators to be used.

d. Identity of Silica Competent Persons.

e. Purpose and description of medical surveillance program for Silica Workers.

Silica Competent Person

3. Have a designation letter on file, Form-2972, with Training Department (Module 31836).

E. Medical Surveillance

Worker Supervisor and Industrial Hygienist

1. Enroll Silica Workers in Medical Surveillance on UCOR Form-288, Medical Surveillance and Qualification Programs, or subcontractor equivalent within 30 days after initial assignment where respirators will be required for 30 or more days per year.

NOTE: Wearing a respirator for protection against silica at any time during a shift constitutes one day.

Worker Supervisor

2. Make initial (baseline) medical exam specific to requirements of this procedure available at no cost to worker within 30 days after initial assignment where respirators will be required for 30 or more days per year.

a. Silica medical exam in previous three years is acceptable in place of baseline exam.

3. Make medical exam specific to requirements of this procedure available at no cost to workers upon:

a. Upon receipt of Industrial Hygiene (IH) sample results showing unprotected exposure to silica in exceedance of 25 $\mu g/m^3$ (TLV).

b. Notification by employee of potentially work related signs, symptoms, or illness associated with exposure to silica.

Worker Supervisor and Industrial Hygienist

4. Ensure Physician or other Licensed Health Care Professional (PLHCP) has a copy of 29 CFR 1926.1153, Respirable Crystalline Silica.

5. Provide PLHCP with:

a. Description of employee's former, current, and anticipated duties related to respirable crystalline silica exposure.

b. Former, current, and anticipated levels of occupational exposure to respirable crystalline silica.

c. Description of personal protective equipment (PPE) used or to be used by employee, including when and for how long employee used or will use PPE.

d. Information from records of employment-related medical examinations previously provided to employee and currently within control of employer.

Physician/PLHCP

6. Perform medical exam in accordance with 29 CFR 1926.1153, Respirable Crystalline Silica. See Attachment A, Medical Requirements

7. Re-examine Silica Workers a minimum of every 3 years, or more frequently per PLHCP recommendation.

Worker Supervisor

8. Obtain written medical opinion from PLHCP meeting 29 CFR 1926.1153, Respirable Crystalline Silica, requirements within 30 days of medical exam. See Attachment A, Medical Requirements

9. Ensure employee receives a copy of written medical opinion from PLHCP meeting 29 CFR 1926.1153, Respirable Crystalline Silica, requirements from PLHCP within 30 days of medical exam. See Attachment A, Medical Requirements

Worker Supervisor

10. If PLHCP's written medical opinion indicates additional exam by Specialist, employer make medical exam by specialist available within 30 days after receiving PLHCP's written opinion.

11. Provide Specialist with information 29 CFR 1926.1153, Respirable Crystalline Silica, requirements. See Attachment A, Medical Requirements

12. Ensure Specialist explains results of medical exam to employee and provides employee and employer with written medical report within 30 days of exam. See Attachment A, Medical Requirements

F. Exposure Assessment and Sampling

Industrial Hygienist

1. Assess exposure of each employee who is or may reasonably be expected to be exposed at or above 25 $\mu g/m^3$ (OSHA RAL), without regard to respiratory protection, using:

a. Air sampling data

AND/OR

b. Objective data sufficient to accurately characterize employee exposure. Objective data must include:

i. Crystalline silica content of subject material

ii. Source of objective data

iii. Testing protocol and analytical results

iv. Description of process, task, or activity in sufficient detail to demonstrate data reflects comparable scope

v. Other data relevant to process, task, activity, material, or exposure on which objective data was based

2. Perform air sampling:

a. Per PROC-IH-5560, *Workplace Industrial Hygiene Sampling*

b. Per NIOSH Method 7500, Crystalline Silica by XRD.

3. Initial exposure assessment

a. Assess exposure for each employee on the basis of one or more personal samples that reflect exposures of employees on each shift, each job classification, and each work area involving respirable crystalline silica.

b. Where several employees perform the same tasks on the same shift and in the same work area, Project Industrial Hygienist (PIH) may opt to only collect samples representative of worst case scenario exposure.

Industrial Hygienist

c. Samples below 25 µg/m^3 (OSHA RAL) should be considered for Negative Exposure Assessment (See PPD-IH-5418, *Industrial Hygiene Program*).

d. **IF** samples are greater than or equal to 25 µg/m^3 (OSHA RAL) **THEN,** repeat sampling within three months or more frequently per direction of PIH.

4. **Ongoing** Exposure Assessment

a. **IF** most recent samples are less than 25 µg/m^3 (OSHA RAL), **THEN** repeat sampling within six months until two consecutive measurements, taken seven or more days apart, are less than 25 µg/m^3 (OSHA RAL)

b. Reassess exposure when:

i. A change in production, process, control equipment, or work practices is reasonably expected to result in new or additional exposure at or above 25 µg/m3 (OSHA RAL).

ii. There is reason to believe new or additional exposures at or above 25 µg/m3 (OSHA RAL) have occurred.

iii. Improvements in production, process, control equipment, or work practices reduce exposure to below 25 µg/m3 (OSHA RAL).

G. Sample Analysis and Employee Notification

Industrial Hygienist

1. Analyze samples per NIOSH 7500.

2. Employee Notification

a. Provide written employee notification or post sample results in accessible location within 5 days of completion of assessment and per PROC-IH-5560.

b. Include corrective action to reduce employee exposure below 25 µg/m3 (OSHA RAL).

H. Implementation of Control Measures

Silica Competent Person/Work Supervisor

1. Implement controls per:

a. PPD-IH-5418, *Industrial Hygiene Program*

b. PPD-IH-5151, *Respiratory Protection Program*

c. Job Hazard Analysis (Form 1027)

d. Industrial Hygiene Work Permit (Form 3061)

Silica Competent Person/Work Supervisor

2. Implement Engineering and Work Practice Controls to reduce and maintain employee exposure below 25 µg/m^3 (TLV). See Section I, Required Controls, and Attachment B, Recommended Controls.

3. **IF** Engineering and Work Practice Controls are insufficient to reduce exposure to or below 25 µg/m^3 (TLV), **THEN**
continue use to reduce exposure to lowest feasible level and supplement with respiratory protection.

I. Required Controls

1. Implementation required for exposures greater than or equal to 25 µg/m^3 **(**OSHA RAL**)**

a. HEPA filtered vacuuming or wet methods for cleanup.

b. Silica Exposure Control Plan:

i. An IHWP that contains these elements can serve as Silica Exposure Control Plan.

ii. Reviewed and updated annually by PIH.

iii. Includes at a minimum:

- Description of tasks in workplace that involve exposure to respirable crystalline silica
- Required engineering controls, work practices, respiratory protection, and PPE used to limit employee exposure to respirable crystalline silica for each task.
- Required housekeeping measures used to limit employee exposure to respirable crystalline silica.
- Requirements for posting restricted access to work areas, when necessary, to minimize number of employees exposed to respirable crystalline silica and their level of exposure.

J. Prohibited Activities

Workers

1. Abrasive blasting with crystalline silica containing blasting agents, and abrasive blasting on substrates containing crystalline silica where other methods exist. Exemptions to this prohibition must be approved by IH Programs Manager. If exemptions are approved, controls are required in accordance with 29 CFR 1926.57, Ventilation.

2. Dry sweeping or brushing crystalline silica-containing materials.

3. Use of compressed air for movement of potential crystalline silica-containing materials unless used in conjunction with a ventilation system that effectively captures dust created by compressed air.

K. Implementation Verification

Silica Competent Person

1. Perform frequent and regular inspection of job sites, material/debris, housekeeping, and equipment to verify implementation and compliance with Silica Exposure Control Plan requirements.

L. Record Keeping

Physician/PLHCP

1. Maintain the following records per 29 CFR 1910.1020, Access to Employee Exposure and Medical Records

a. Medical records

i. Medical surveillance data for each employee covered by medical surveillance including:

- Name and Social Security Number
- Copy of written medical opinions by PLHCP and Specialist

Industrial Hygienist

b. Information provided to PLHCPs and Specialists.

c. Air monitoring data including:

i. Date of measurement for each sample taken.

ii. Task monitored.

iii. Sampling and analytical methods used.

iv. Number, duration, and results of samples taken.

v. Identity of laboratory that performed analysis.

vi. Type of PPE worn by employees monitored.

vii. Name, social security number, and job classification of all employees represented by monitoring.

d. Objective Data used to characterize employee exposure.

Training

2. Maintain Silica Competent Person designation information (Form-2972).

Attachment A
DEFINITIONS/ACRONYMS
Page 1 of 2

DOE – U.S. Department of Energy

Exposure – The exposure to airborne respirable crystalline silica that would occur if a worker was not using respiratory protection.

HEPA (High-Efficiency Particulate Air) filter – A filter that is at least 99.97% efficient in removing mono-dispersed particles of 0.3 micrometers (μm) in diameter.

ISO – International Organization for Standardization

MERV (Minimum Efficiency Reporting Value) – A consensus standard that rates the overall effectiveness of air filters. A higher MERV rating equates to finer filtration/greater retention. MERV range is from 1-to-16.

NEA – Negative Exposure Assessment

Objective Data – Information, such as air monitoring data from industry-wide surveys or calculations based on the composition of a substance, demonstrating worker exposure to respirable crystalline silica associated with a particular product or material, or a specific process, task or activity. The data must reflect workplace conditions closely resembling or having a higher exposure potential than the processes, types of material, control methods, work practices, and environmental conditions in current operations.

Occupational Exposure Limit (OEL) – A general term referring to the maximum allowable airborne concentration of a hazard to which an individual can be occupationally exposed without defining the promulgating organization (OSHA, ACGIH, NIOSH, etc)

OSHA – Occupational Safety and Health Administration

OSHA Regulatory Action Level – A concentration of airborne respirable crystalline silica of 25 $\mu g/m^3$, without regard to respiratory protection, calculated as an 8-hour time-weighted average (TWA).

Peak Max – Default short-term exposure limits (STEL) that apply to TLV-TWAs which do not have a TLV-STEL. Peak exposure is a 15-minute STEL, represented by 5 times the TLV-TWA value, should not be exceeded at any time during a workday.

Permissible Exposure Limit (PEL) – The OSHA-established allowable concentration in air of a substance to which nearly all workers may be repeatedly exposed 8 hours a day, 40 hours a week, for a 30-year working lifetime without experiencing adverse health effects. 29CFR1926.1153 establishes the PEL for respirable crystalline silica as 50 $\mu g/m^3$, without regard to respiratory protection, as an 8-hour TWA.

Physician or licensed health care professional (PLHCP) – An individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide or be delegated the responsibility to provide some or all of the particular health care services required by this PPD.

Attachment A
DEFINITIONS/ACRONYMS
Page 2 of 2

Project Industrial Hygienist (PIH) – A professional qualified by education, training, and experience to anticipate, recognize, evaluate, and develop controls for occupational health hazards. This individual is either certified in the practice of industrial hygiene (IH) by the American Board of Industrial Hygiene (ABIH) or is current in all requirements of the UCOR Training Position Description (TPD) entitled "Project Industrial Hygienist."

Respirable Crystalline Silica – Quartz, cristobalite, and/or tridymite contained in airborne particles that are determined to be respirable by a sampling device designed to meet the characteristics for respirable-particle-size-selective samplers specified in ISO 7708:1995: Air Quality-Particle Size Fraction Definitions for Health-Related Sampling.

Silica Competent Person – An individual who is capable of identifying existing and foreseeable respirable crystalline silica hazards in the workplace and who has authorization to take prompt corrective measures to eliminate or minimize them, and possesses the knowledge and ability necessary to evaluate implementation of a Silica Exposure Control Plan.

Silica Worker – Workers required to wear respiratory protection for potential exposure to respirable crystalline silica for 30 or more days per year

Specialist – An American Board Certified Specialist in Pulmonary Disease or an American Board Certified Specialist in Occupational Medicine.

Threshold Limit Value (TLV) – The occupational exposure limits promulgated by the American Conference of Governmental Industrial Hygienists (ACGIH). The TLV is the airborne concentration under which it is believed that nearly all workers may be repeatedly exposed, day after day, over a working lifetime, without adverse health effects. In accordance with 10 CFR 851, UCOR is contractually obligated to comply with ACGIH TLVs. The TLV for Respirable Crystalline Silica is 25 $\mu g/m^3$.

Transient Peak – Default short-term exposure limits (STEL) that apply to TLV-TWAs which do not have a TLV-STEL. Transient increases in workers' exposure levels may exceed 3 times the TLV-TWA level for no more than 15 minutes at a time, on no more than 4 occasions spaced 1 hour apart during a workday.

TWA – Time-Weighted-Average

UCOR – UCOR, an AECOM-led partnership with Jacobs

Worker – Term used to identify sections of the Program Description that apply to individuals who perform work solely under UCOR's direction such as Staff Augmentation Subcontractors, contractually designated Subcontractors, and UCOR employees.

Attachment B
MEDICAL REQUIREMENTS
Page 1 of 3

29 CFR 1926.1153:

(h) *Medical surveillance*—**(1)** *General.* **(i)** The employer shall make medical surveillance available at no cost to the employee, and at a reasonable time and place, for each employee who will be required under this section to use a respirator for 30 or more days per year.

(ii) The employer shall ensure that all medical examinations and procedures required by this section are performed by a PLHCP as defined in paragraph (b) of this section.

(2) *Initial examination.* The employer shall make available an initial (baseline) medical examination within 30 days after initial assignment, unless the employee has received a medical examination that meets the requirements of this section within the last three years. The examination shall consist of:

(i) A medical and work history, with emphasis on: past, present, and anticipated exposure to respirable crystalline silica, dust, and other agents affecting the respiratory system; any history of respiratory system dysfunction, including signs and symptoms of respiratory disease (e.g., shortness of breath, cough, wheezing); history of tuberculosis; and smoking status and history;

(ii) A physical examination with special emphasis on the respiratory system;

(iii) A chest X-ray (a single posteroanterior radiographic projection or radiograph of the chest at full inspiration recorded on either film (no less than 14 x 17 inches and no more than 16 x 17 inches) or digital radiography systems), interpreted and classified according to the International Labour Office (ILO) International Classification of Radiographs of Pneumoconioses by a NIOSH-certified B Reader;

(iv) A pulmonary function test to include forced vital capacity (FVC) and forced expiratory volume in one second (FEV1) and FEV1/FVC ratio, administered by a spirometry technician with a current certificate from a NIOSH-approved spirometry course;

(v) Testing for latent tuberculosis infection; and

(vi) Any other tests deemed appropriate by the PLHCP.

(3) *Periodic examinations.* The employer shall make available medical examinations that include the procedures described in paragraph (h)(2) of this section (except paragraph (h)(2)(v)) at least every three years, or more frequently if recommended by the PLHCP.

(4) *Information provided to the PLHCP.* The employer shall ensure that the examining PLHCP has a copy of this standard, and shall provide the PLHCP with the following information:

(i) A description of the employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to respirable crystalline silica;

(ii) The employee's former, current, and anticipated levels of occupational exposure to respirable crystalline silica;

Attachment B
MEDICAL REQUIREMENTS
Page 2 of 3

(iii) A description of any personal protective equipment used or to be used by the employee, including when and for how long the employee has used or will use that equipment; and

(iv) Information from records of employment-related medical examinations previously provided to the employee and currently within the control of the employer.

(5) *PLHCP's written medical report for the employee.* The employer shall ensure that the PLHCP explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of each medical examination performed. The written report shall contain:

(i) A statement indicating the results of the medical examination, including any medical condition(s) that would place the employee at increased risk of material impairment to health from exposure to respirable crystalline silica and any medical conditions that require further evaluation or treatment;

(ii) Any recommended limitations on the employee's use of respirators;

(iii) Any recommended limitations on the employee's exposure to respirable crystalline silica; and

(iv) A statement that the employee should be examined by a specialist (pursuant to paragraph (h)(7) of this section) if the chest X-ray provided in accordance with this section is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.

(6) *PLHCP's written medical opinion for the employer.* **(i)** The employer shall obtain a written medical opinion from the PLHCP within 30 days of the medical examination. The written opinion shall contain only the following:

(A) The date of the examination;

(B) A statement that the examination has met the requirements of this section; and

(C) Any recommended limitations on the employee's use of respirators.

(ii) If the employee provides written authorization, the written opinion shall also contain either or both of the following:

(A) Any recommended limitations on the employee's exposure to respirable crystalline silica;

(B) A statement that the employee should be examined by a specialist (pursuant to paragraph (h)(7) of this section) if the chest X-ray provided in accordance with this section is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.

(iii) The employer shall ensure that each employee receives a copy of the written medical opinion described in paragraph (h)(6)(i) and (ii) of this section within 30 days of each medical examination performed.

(7) *Additional examinations.* **(i)** If the PLHCP's written medical opinion indicates that an employee should be examined by a specialist, the employer shall make available a medical examination by a specialist within 30 days after receiving the PLHCP's written opinion.

Attachment B
MEDICAL REQUIREMENTS
Page 2 of 3

(ii) The employer shall ensure that the examining specialist is provided with all of the information that the employer is obligated to provide to the PLHCP in accordance with paragraph (h)(4) of this section.

(iii) The employer shall ensure that the specialist explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of the examination. The written report shall meet the requirements of paragraph (h)(5) (except paragraph (h)(5)(iv)) of this section.

(iv) The employer shall obtain a written opinion from the specialist within 30 days of the medical examination. The written opinion shall meet the requirements of paragraph (h)(6) (except paragraph (h)(6)(i)(B) and (ii)(B)) of this section.

Attachment C
RECOMMENDED CONTROLS
Page 1 of 6

1. Ventilation systems

- **a.** Designed and maintained to prevent accumulation and re-circulation of respirable crystalline silica dust.

2. Mobile Equipment Cab, Control Booth

- **a.** Maintain as free as practicable from settled dust.
- **b.** Door seals and closing mechanisms function properly.
- **c.** Seals and gaskets intact and function properly.
- **d.** Maintain positive pressure through continuous delivery of fresh air.
- **e.** Air filter at least 95% efficient for particles in the 0.3-to-10 µm range (> MERV-16).
- **f.** Functioning heating and cooling (as appropriate to season).

3. Wet methods:

- **a.** Apply water at flow rates sufficient to minimize release of visible dust.
- **b.** Maintain nozzles and piping to ensure adequate application of wetting agent.

4. Work practices:

- **a.** Minimize generation of airborne respirable crystalline silica.
- **b.** Position workers upwind of work.
- **c.** Minimize accumulation of dust containing respirable crystalline silica.

5. Work area inspection criteria

- **a.** Visible indication that dust control measures are/are not functioning as intended.
- **b.** Exhaust ventilation is present and preventing accumulation of visible airborne dust (indoors and/or enclosed areas).
- **c.** Housekeeping is satisfactory.

Attachment C
RECOMMENDED CONTROLS
Page 2 of 6

Equipment/Task	Engineering Controls & Work Practice Control Methods
1. Stationary Masonry Saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with the manufacturer's instructions to minimize dust emissions.
2. Handheld Power Saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
3. Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less)	Use saw equipped with commercially available dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector that provides the air flow recommended by the tool manufacturer, or greater, and a filter with 99% or greater efficiency and filter-cleaning mechanism.
4. Walk-behind saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
5. Drivable saws	Use saw equipped with integrated water delivery system that continuously supplies water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.
6. Rig-mounted core saws or drills	Use saw equipped with integrated water delivery system that continuously supplies water to cutting surface. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.

Attachment C
RECOMMENDED CONTROLS
Page 3 of 6

Equipment/Task	Engineering Controls & Work Practice Control Methods
7. Handheld and stand-mounted drills (including impact and rotary hammer drills)	Use drill equipped with commercially available shroud or cowling with dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector that provides the air flow recommended by the tool manufacturer, or greater, and a filter with 99% or greater efficiency and filter-cleaning mechanism. Use HEPA-filtered vacuum when cleaning holes.
8. Dowel drilling rigs for concrete	Use shroud around drill bit with a dust collection system. Dust collector equipped with a filter with 99% or greater efficiency and a filter-cleaning mechanism. Use HEPA-filtered vacuum when cleaning holes.
9. Vehicle-mounted drilling rigs for rock and concrete	Use dust collection system with close capture hood or shroud around drill bit with a low-flow water spray to wet dust at the discharge point from the dust collector. OR Operate from within an enclosed cab and use water for dust suppression on drill bit.
10. Jackhammers and handheld powered chipping tools	Use tool with water delivery system that supplies a continuous wet stream or spray of water at the point of impact. OR Use tool equipped with commercially available shroud and dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector that provides the air flow recommended by the tool manufacturer, or greater, and a filter with 99% or greater efficiency and filter-cleaning mechanism.

Attachment C
RECOMMENDED CONTROLS
Page 4 of 6

Equipment/Task	Engineering Controls & Work Practice Control Methods
11. Handheld grinders for mortar removal (i.e., tuckpointing)	Use grinder equipped with commercially available shroud and dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector that provides 25 cubic feet per minute (CFM), or greater, airflow per inch of wheel diameter. Equipped with a filter 99% or greater in efficiency and a cyclonic pre-separator or filter-cleaning mechanism.
12. Handheld grinders for uses other than mortar removal	Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. OR Use grinder equipped with commercially available shroud and dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector that provides 25 cubic feet per minute (CFM), or greater, airflow per inch of wheel diameter. Equipped with a filter 99% or greater in efficiency and a cyclonic pre-separator or filter-cleaning mechanism.
13. Walk-behind milling machines and floor grinders	Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. OR Use machine equipped with dust collection system recommended by the manufacturer. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector that provides the air flow recommended by the tool manufacturer, or greater, and a filter with 99% or greater efficiency and filter-cleaning mechanism. When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in-between passes.

Attachment C
RECOMMENDED CONTROLS
Page 5 of 6

Equipment/Task	Engineering Controls & Work Practice Control Methods
14. Small drivable milling machines (less than half-lane)	Use a machine equipped with supplemental water sprays designed to suppress dust. Water combined with a surfactant. Operate and maintain machine to minimized dust emissions.
15. Large drivable milling machines (half-lane and larger)	For cuts of any depth on asphalt only: • Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust. • Operate and maintain machine to minimize dust emissions. For cuts of four inches in depth or less on any substrate: • Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust. • Operate and maintain machine to minimize dust emissions. OR Use a machine equipped with supplemental water spray designed to suppress dust. Water combined with a surfactant. Operate and maintain machine to minimize dust emissions.
16. Crushing machines	Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (e.g., hoppers, conveyors, sieves/sizing or vibrating components, and discharge points). Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions. Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote control station.
17. Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials.	Operate equipment from within an enclosed cab. When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions.

Attachment C
RECOMMENDED CONTROLS
Page 6 of 6

Equipment/Task	Engineering Controls & Work Practice Control Methods
18. Heavy equipment and utility vehicles for tasks, such as grading and excavating, but not including: demolishing, abrading, or fracturing silica-containing materials.	Apply water and/or dust suppressants as necessary to minimize dust emissions. When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab.