Health Hazards in Construction

Short description

The purpose of this section is to protect personnel against the hazards associated with exposure to lead, asbestos, mold, silica, UXO, non-ionizing radiation and contaminated soils.

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Content

1 Objective and area of application

This section establishes the minimum requirements for work practices to assure the safety of Centennial employees, subcontractors and other affected personnel who are potentially exposed to the following health hazards:

- Lead
- Asbestos
- Mold
- Crystalline silica
- Contaminated soils
- Unexploded ordnance (UXO)
- Other health hazard air contaminants
- Non-ionizing radiation

Centennial employees and subcontractors may be potentially exposed to health hazards and materials that can adversely affect human health.

The following elements and activities shall be assessed in regards to health hazards on all Centennial project sites in accordance with HSEQ Manual section 6 (Risk Assessment and Operations). The risk assessment shall consider, but not be limited to:

- Changing job site environments and conditions
- Environmental conditions
- Changing workforce including
    - Subcontractors
    - Lower tier contractors
- Diversity of work activities occurring simultaneously
- Exposures to health hazards resulting from own work as well as from nearby activities (“bystander exposure”)

2 Superior and additional applicable documents

1000_GP_11_01_en_7.0 Group Policy on Health, Safety, Environment and Quality (HSEQ)

29 CFR 1910.1025

29 CFR 1910.1000 Table Z-1, Z-2 and Z-3

29 CFR 1910.97 & 1910.268(p)

29 CFR 1926.54

Federal Communication Commission (FCC)

This section of the HSEQ Manual applies to all Centennial employees and subcontractors who are performing work in Centennial facilities and project sites. There may be more stringent requirements than this section as defined by specific State, local or contact specific health hazard requirements. If there is a conflict between this section and other applicable regulations, the more stringent will apply.

3 Definitions

The following definitions of terms are important for an understanding of this section.

Term	Definition
ACM	Asbestos containing material
AST	Above ground storage tank
Acute	Usually occurs rapidly as a result of short-term exposures, and are of short duration
AHERA	Asbestos Hazard Emergency Response Act
Asbestos fiber	A particulate form of asbestos 5 micrometers or longer, with a length-to-diameter ratio of at least 3 to 1
BLL	Blood lead level
Bloodborne Pathogens	Bloodborne pathogens are infectious microorganisms in human blood that can cause disease in humans. These pathogens include, but are not limited to, hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV). Needlesticks and other sharps-related injuries may expose workers to bloodborne pathogens.
Centennial	All Centennial employees, joint venture employees, subcontractors and business partners
Chronic	Generally occur as a result of long-term exposure, and are of long duration
Competent person	Person who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees and has authority to take prompt corrective measures to eliminate or protect against those hazards
CIH	Certified Industrial Hygienist
Crystalline silica	A basic component of soil, sand, granite, and many other minerals. Quartz is the most common form of crystalline silica. Cristobalite and tridymite are two other forms of crystalline silica
EPA	Environmental Protection Agency
f/cc	Fiber per cubic centimeter of air
FR	Flame resistant
Friable	Crumbled or reduced to a powder
HEPA	High Efficiency Particulate Air
HSEQ	Health, Safety, Environment and Quality
HSEQ Director	Leads the HSEQ Team

Lead action level	Action level means employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air (30 ug/m^3) averaged over an 8-hour period
N-95	The N95 respirator is the most common of the seven types of particulate filtering face piece respirators. This product filters at least 95% of airborne particles but is not resistant to oil
OSHA	Occupational Health and Safety Administration
PACM	Presumed asbestos containing material
PCB	Polychlorinated biphenyl
PEL	Permissible Exposure Limit
PPE	Personal protective equipment
PSO	Project Safety Officer
Regulated area	An area established by the employer to demarcate areas where airborne concentrations of contaminants (asbestos, lead or silica) exceed, or there is a reasonable possibility they may exceed, the permissible exposure limits
RF	Radio frequency
TSI	Thermal system insulation
TWA	Time weighted average- measurement of exposure over an 8 hour workday
ug/m^3	Micrograms per cubic meter of air
UST	Underground storage tank
UXO	Explosive weapons such as bombs, bullets, shells, grenades, land mines etc. that did not explode when they were employed and still pose a risk of detonation
ZPP	Zinc protoporphyrin

4 Lead

This section applies to all construction work where a Centennial employee or subcontractor may be occupationally exposed to lead. Construction work includes alteration and repair including painting and decorating, demolition or salvage of structures where lead or materials containing lead are present, removal or encapsulation of materials containing lead, new construction, alteration, repair, or renovation of existing structures that contain lead, installation of products containing lead, lead contamination/emergency cleanup, and transportation, disposal, storage or containment of lead or materials containing lead.

Lead is an elemental metal which is naturally occurring and abundant in nature. Lead can be used or added to materials when manufacturing a variety of end user products for purposes such as corrosion resistance, mildew and mold resistance, malleability, strength, radiation protection, sound proofing and as a drying agent in some products. Common products in which lead can be found are paints such as military vehicles, bridges, steel structures, interior and exterior residential paints (pre 1978 structures), industrial releases and natural soil. The primary routes of exposure for occupational exposure to lead are through inhalation or incidental ingestion (eating or drinking in work areas where lead may be present). However, due to the adverse health effects which lead can have on the human body, working with and around products containing lead shall only be permitted when the following items are accounted for:

- Lead removal / work plan has been submitted and reviewed by a Certified Industrial Hygienist (CIH) or a Certified Safety Professional (CSP)
- Employees / subcontractors have been trained to the appropriate level of his or her activities, exposure limits and required PPE
- Lead removal warning signs have been posted
- Lead removal area has been delineated / barricaded to prevent unauthorized access

4.1 Health effects of lead

Exposure to lead can cause damage to the central nervous system, cardiovascular system, reproductive system, hematological system, and kidneys. When absorbed into the body in high doses, lead can be toxic. In addition, employees and subcontractors can harm their family members through bringing their lead contaminated clothing and equipment home. Children are the most susceptible to lead exposure and have greater health related problems when exposed to lead.

Short-term (acute) overexposure (as short as days) can cause acute encephalopathy, a condition affecting the brain that develops quickly into seizures, coma, and death from cardiorespiratory arrest.

Extended, long-term (chronic) overexposure can result in severe damage to the central nervous system, particularly the brain. It can also damage the blood-forming, urinary, and reproductive systems.

4.1.1 Symptoms of overexposure

Some of the common symptoms of overexposure to lead include:

- Loss of appetite

- Constipation
- Nausea
- Excessive tiredness
- Headache
- Fine tremors
- Colic with severe abdominal pain
- Metallic taste in the mouth
- Weakness
- Nervous irritability
- Hyperactivity
- Muscle and joint pain or soreness
- Anxiety
- Insomnia
- Numbness
- Dizziness

4.2 Routes of entry

Routes of occupational hazardous lead exposure include:

- ingestion of lead-contaminated water, soil, paint chips, or dust
- inhalation of lead-containing particles of soil or dust in air and in fumes
- ingestion of foods that contain lead from soil or water

Lead is most commonly absorbed into the body through inhalation. When employees and subcontractors breathe in lead as a dust, fume, or mist, their lungs and upper respiratory tract absorb it into the body. They can also absorb lead through the digestive system if it enters the mouth and is ingested. Employees and subcontractors at the highest risk of lead exposure are those involved in abrasive blasting, welding, cutting, and burning on steel structures.

Operations with the potential to expose employees and subcontractors to lead include:

- Lead burning
- Grinding
- Chipping
- Using lead-containing mortar
- Power tool cleaning without dust collection systems
- Rivet busting
- Cleanup activities where dry expendable abrasives are used
- Movement and removal of abrasive blasting enclosures
- Manual dry scraping and sanding
- Manual demolition of structures
- Power tool cleaning with dust collection systems
- Spray painting with lead-based paint

4.3 Lead hazard assessment

An initial employee exposure assessment of whether employees are exposed to lead at or above the action level or PEL will be conducted based on:

- Any information, observation, or calculation that indicates employee exposure to lead
- Any previous measurements of airborne lead
- Any employee complaints of symptoms attributable to lead exposure

Objective data and historical measurements of lead may be used to satisfy the initial monitoring requirements given that all conditions (lead levels, work methods) are similar to those during the initial testing of the historical data.

Note: Historical data is only useable within one year from initial testing.

4.4 Elements of a lead work plan

The lead work plan shall include the following minimum elements:

- Location and identification of work areas and materials containing lead
- Assessment of the size and scope of the project
- Identification of the competent person including experience and training including knowlege of:
    - The requirements of 29 CFR 1926.62
    - Air sampling procedures
    - Documentation requirements
- Construction barriers and warning signs
- Cross contamination controls
- Lead assessment data
- Air clearance criteria
- Client approval
- An outline of how lead risks will be controlled, including consideration of appropriate control measures
    - Biological and medical monitoring requirements
    - PPE
    - Protective clothing
    - Containment
    - Negative air requirements
    - Employee decontamination including showers and/or hand/face washing facilities
- Identification of each person with responsibilities under the lead work plan and his or her responsibilities
- Worker and project personnel training:
    - Inspectors- may perform inspection and post-abatement clearance activities.
    - Risk assessors- may perform inspection, post-abatement clearance, lead hazard screen, and risk assessment activities
    - Abatement supervisors- may supervise abatement projects and prepare occupant protection plans and abatement reports
    - Supervisors- may also perform all of the abatement activities that may be performed by abatement workers
    - Project designers- may prepare occupant protection plans and abatement reports for abatement projects
    - Abatement workers- may conduct abatement activities under the direction of certified abatement supervisors
- Air monitoring and containment requirements

- Emergency and first aid procedures including:
  - Eye exposure
  - Skin exposure
  - Inhalation exposure
  - Ingestion
  - Compromised containment
  - Rescue
- Lead and lead containing material waste packaging and disposal procedures

4.5 Negative exposure and monitoring

Employees and subcontractors shall use a method of air monitoring and analysis which has accuracy (to a confidence level of 95%) of not less than plus or minus 20 percent for airborne concentrations of lead. The action level established by OSHA is 30 ug/m^3 (action level), and is the level at which employers are required to begin periodic air monitoring as well as establish procedures for reducing exposures.

At no time shall any unprotected employee or subcontractor be exposed to levels of airborne lead above the OSHA Permissible Exposure Limit of 50 ug/m3.

Employees and subcontractors shall be equipped with all necessary PPE until air monitoring has been completed and a negative exposure assessment has been generated.
If the initial monitoring reveals employee exposure to be below the action level, then the measurements need not be repeated and the PPE may be downgraded. However, signs shall still be posted regarding lead removal work and lead work areas shall still be delineated and/or barricaded to prevent unauthorized access.

Furthermore, whenever there has been a production, process, control or personnel change which may result in new or additional exposure to lead, or whenever the project superintendent or subcontractor competent person has any other reason to suspect a change which may result in new or additional exposures to lead, additional monitoring in accordance with this paragraph shall be conducted. Negative exposure and air monitoring results shall be kept on site and be readily available for review.

4.6 Medical surveillance

The fundamental elements of the lead medical surveillance program include biological monitoring, medical examination, and medical removal.

4.6.1 Biological monitoring

Employees and subcontractors exposed at or above the action level at least one day per year shall be given a blood lead test and a ZPP test. Employees exposed at or above the action level for more than 30 days per year shall receive additional blood lead and ZPP tests at least every 2 months for the first 6 months of the job and every 6 months thereafter for the duration of the job.

For Centennial employees and subcontractors with blood lead levels (BLL) at or above 50 ug/dl, a follow-up test shall be given within 2 weeks after the results are received of the first blood sampling test. Monthly tests shall be conducted for any Centennial employee or subcontractor who is medically removed due to an elevated blood level.

Medical exams shall be made available according to the following schedule to all employees exposed at or above the action level for more than 30 days in any consecutive 12 months.

- At least annually for employees who have had a blood lead level at or above 40 ug/dl at any time during the preceding 12 months
- As soon as possible for employees with signs or symptoms of lead intoxication, pregnant employees, and employees who demonstrate difficulty in breathing during a respirator fit test or during respirator use
- As medically appropriate for employees removed from lead exposure

4.6.2 Medical removal

BLL's at or above the action level or PEL may cause serious negative health effects.

The competent person shall remove employees from their respective job task involving lead who are exposed at or above the action level on each occasion that a periodic and follow-up blood sampling test indicates the employee's blood levels are at or above 50 ug/dl and/or a physician makes a determination indicating a detected medical condition increasing health risks from lead exposure.

4.7 Recordkeeping

Centennial and subcontractors shall maintain any employee exposure and medical records to document ongoing employee exposure, medical monitoring, and medical removal of workers. This data provides a baseline to evaluate the employee's health properly. Employees or former employees, their designated representatives, and regulatory agencies shall have access to exposure and medical records.

In addition, Centennial and subcontractors who have exposed employees shall establish and maintain an accurate record of all monitoring and other data used to conduct employee exposure.

The exposure assessment records shall include, at a minimum:

- Dates, number, duration, location, and results of each sample taken, including a description of the sampling procedure used to determine representative employee exposure
- A description of the sampling and analytical methods used and evidence of their accuracy
- Type of respiratory protection worn, if any
- Name, social security number, and job classification of the monitored employee and all others whose exposure the measurement represents
- Environmental variables that could affect the measurement of employee exposure

All Centennial employees and subcontractors performing lead removal activities shall be trained in the hazards of lead in construction. Training records shall be readily available for review. All medical records related to lead medical surveillance shall be maintained and segregated from all other personnel records for the duration of employment plus a period of thirty (30) years by the appropriate employer.

5 Asbestos

Because of its fiber strength, flexibility and heat resistance asbestos has been used in a variety of building construction materials for insulation, as a binding agent and as a fire retardant. Asbestos has also been used in a wide range of manufactured goods, mostly in building materials (roofing shingles, ceiling and floor tiles, paper products, construction adhesives and asbestos cement products), friction products (automobile clutch, brake, and transmission parts), heat-resistant fabrics, packaging, gaskets, and coatings.

Types of asbestos:

- Chrysotile
- Amosite
- Crocidolite
- Tremolite
- Anthophyllite
- Actinolite

Where asbestos may be found:

- Attic and wall insulation products containing vermiculite
- Vinyl floor tiles and the backing on vinyl sheet flooring and adhesives
- Roofing and siding shingles
- Textured paint and patching compounds used on wall and ceilings
- Walls and floors around wood-burning stoves protected with asbestos paper, millboard, or cement sheets
- Hot water and steam pipes coated with asbestos material or covered with an asbestos blanket or tape
- Oil and coal furnaces and door gaskets with asbestos insulation
- Heat-resistant fabrics
- Automobile clutches and brakes
- Construction adhesives and caulking

Centennial employee and subcontractor exposure to asbestos shall not exceed 0.1 fibers per cubic centimeter (f/cc) of air, averaged over an 8-hour work shift. Short-term exposure shall also be limited to not more than 1.0 f/cc, averaged over 30 minutes. Administrative controls, such as rotation of employees to achieve compliance with either permissible exposure limit (PEL) is prohibited.

On Centennial project sites, if it cannot be demonstrated that asbestos exposure is below the PEL (negative exposure assessment), continuous assessments and monitoring shall be conducted in all class I and II regulated areas. Asbestos exposure shall be controlled at or below the PEL using engineering controls and work practices to the extent feasible. Where engineering controls and work practices do not reduce exposure adequately, PPE shall be provided.

5.1 Classes of asbestos projects

The standards for construction classify the hazards of asbestos work activities and prescribe particular requirements for each classification.

The hazard classes for asbestos work are as follows:

- Class I is the most potentially hazardous class of asbestos jobs and involves the removal of thermal system insulation and sprayed-on or troweled-on surfacing asbestos-containing materials or presumed asbestos-containing materials
- Class II includes the removal of other types of asbestos-containing materials that are not thermal system insulation, such as resilient flooring and roofing materials containing asbestos
- Class III focuses on repair and maintenance operations where asbestos-containing or presumed asbestos-containing materials are disturbed
- Class IV pertains to custodial activities where employees clean up asbestos-containing waste and debris

5.2 Regulated areas

Regulated areas shall be established where Class I, II or III asbestos work is performed. Access to regulated areas shall be controlled by the project superintendent and/or competent person (for asbestos work the CP shall be a Certified Asbestos Supervisor) and only permitted to authorized and trained workers who are wearing appropriate PPE.

The following activities shall be prohibited in regulated areas:

- Eating
- Drinking
- Smoking
- Chewing tobacco
- Chewing gum
- Applying cosmetics

5.3 Protective clothing and decontamination areas

For all Centennial employees or subcontractors exposed to airborne concentrations of asbestos that exceed the PEL, protective clothing such as coveralls or similar full-body clothing, head coverings, gloves, and foot coverings shall be provided and worn. Face shields, vented goggles, or other appropriate protective equipment shall be provided wherever the possibility of eye irritation exists.

Contaminated work clothing shall be placed and stored in closed containers which prevent dispersion of the asbestos outside the container. The Centennial project superintendent and subcontractor asbestos supervisor shall ensure that no employee takes contaminated work clothing out of the change room, except for the purpose of laundering, maintenance, or disposal.

Decontamination areas and hygiene areas shall be provided for Centennial employees and subcontractors that are exposed to asbestos above the PEL.

Decontamination areas shall include:

- Equipment room
- Clean room

- Shower

Note: When it is not feasible to provide a change area adjacent to the work area, or when the work is performed outdoors, employees may clean protective clothing with a portable HEPA vacuum before leaving the regulated area. Employees then must shower and change into “street clothing” in a clean change area.

5.4 Medical examinations

Centennial employees and subcontractors who may potentially be exposed to asbestos shall receive medical surveillance intended to prevent occupational illnesses caused by asbestos. Medical examinations shall be provided and conducted for workers who are exposed for 30 or more days above the PEL in Class I, II or III asbestos projects.

Subcontractors who perform work where exposure to asbestos (abatement, demolition or other similar work) is likely shall implement the following medical surveillance programs:

- Pre-placement medical evaluation
- Periodic or annual medical surveillance
- Job transfer or termination medical surveillance

All medical records related to asbestos medical surveillance shall be maintained and segregated from other personnel records for the duration of employment plus a period of thirty (30) years by the appropriate employer.

5.5 Asbestos work plan

An asbestos work plan shall be developed and submitted for Centennial approval whenever there is potential exposure to friable asbestos or asbestos abatement procedures are anticipated.

The asbestos work plan shall include the following minimum elements:

- A copy of the asbestos survey including locations of areas containing asbestos (AHERA or demolition survey)
- Assessment of the size and scope of the project
- Identification of the competent person (asbestos supervisor)
- Construction barriers and warning signs
- Cross contamination controls
- Air clearance criteria
- Client approval
- An outline of how asbestos risks will be controlled, including consideration of appropriate control measures
    - PPE (including respiratory protection)
    - Protective clothing
    - Containment
    - Negative air requirements
- Identification of each person with responsibilities under the asbestos work plan and his or her responsibilities
- Worker and project training:

    - Awareness
    - Worker
        - Physical characteristics of asbestos
        - Potential health effects of asbestos exposure
        - PPE required for the task
    - Supervisor
    - Management planner
    - Project designer
- Air monitoring and containment requirements
- Emergency and first aid procedures including:
    - Eye exposure
    - Skin exposure
    - Inhalation exposure
    - Compromised containment
    - Rescue
- Asbestos waste packaging and disposal procedures

6 Mold

NOTE: All references to mold or mold spores also include fungus and fungal spores.

Molds are microscopic organisms found everywhere in the environment, indoors and outdoors. Molds become problematic in the indoor environment when excessive moisture is present (i.e., building leaks, mechanical system leaks, vapor intrusion, inadequate ventilation, etc.), which allows an opportune growing environment for fungal spores on organic matter. Before any mold remediation is performed, the source of moisture intrusion must be corrected.

Exposure to molds and mold spores may cause the following symptoms in some individuals:

- Infections
- allergy symptoms
- production of toxins

Inhalation is the exposure of most concern to cleanup workers. Individuals with a weakened immune system, allergies, asthma, sinusitis, or other lung diseases are at greatest risk for being affected by mold or mold spore exposure.

6.1 Health effects of mold exposure

Centennial considers all mold exposure potentially harmful although there are currently no action levels, PEL or Federal regulatory standards for mold exposure. Dead or dormant mold and mold spores may also be harmful when inhaled.

Mold contamination and remediation has been linked to discomfort and health problems including:

- Allergic reactions
- Asthma symptoms

- Irritant effects
- Respiratory problems
- Other non-specific health complaints

In addition to these potential health effects, remediation workers who do not use appropriate PPE may develop hypersensitivity pneumonitis or organic dust toxic syndrome. The longer mold is permitted to grow indoors, the greater the likelihood it may become airborne and cause adverse health effects. When not corrected effectively, mold problems can spread to previously unaffected areas, which may increase health risks to occupants and remediation workers.

6.2 Personal Protective Equipment (PPE)

Molds are known allergens and may be toxic. Investigators shall use Personal Protective Equipment (PPE) while investigating, as well as during remediation/clean-up situations.

The minimum PPE for mold investigation includes, but is not limited to:

- N-95 respirator
- Gloves
- Eye protection

The minimum PPE for remediation includes, but is not limited to:

- Respiratory protection (type determined during the investigation)
- Non-vented goggles
- Protective clothing (e.g., disposable coveralls) to prevent cross contamination and skin contact with mold and chemicals. For areas greater than 100 square feet, ensure that protective clothing covers entire body including head and feet
- Long gloves made of material that will protect user from chemicals handled for surface cleaning

6.3 Mold remediation methods

6.3.1 Small remediation projects (10 square feet of isolated visible mold)

- The work area shall be unoccupied; removing people from adjacent spaces is not necessary but is recommended for infants, persons recovering from surgery, immune suppressed people or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis and severe allergies)
- Containment of the work area is not necessary
- Use dust suppression methods (e.g., misting (not soaking) surfaces prior to remediation)
- Clean and/or remove materials as noted in the approved mold remediation plan
- Seal materials being removed in plastic bags
- The work area and areas used by remediation workers for egress shall be cleaned with a damp cloth or mop and a detergent solution
- Leave area clean, dry and free of visible debris

6.3.2 Medium remediation projects (10-30 contiguous square feet)

- The work area shall be unoccupied; removing people from adjacent spaces is not necessary but is recommended for infants, persons recovering from surgery, immune suppressed people or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis and severe allergies)
- Containment of the work area is not necessary. Cover surfaces in the work area that could become contaminated with secured plastic sheets to contain dust and debris and prevent further contamination
- Use dust suppression methods (e.g., misting (not soaking) surfaces prior to remediation)
- Clean and/or remove materials as noted in the approved mold remediation plan. Seal materials being removed in plastic bags
- The work area and areas used by remediation workers for egress shall be cleaned with a damp cloth or mop and a detergent solution
- Leave area clean, dry and free of visible debris

6.3.3 Large remediation projects (30-100 contiguous square feet)

- If abatement procedures are expected to generate significant amounts of dust (e.g., abrasive cleaning of contaminated surfaces, demolition of plaster walls) or the visible concentration of mold is heavy (i.e., blanket versus patchy coverage) follow the extensive contamination procedures below
- Consult with industrial hygienists or other environmental health and safety professionals with experience performing microbial investigations and/or mold remediation before beginning remediation
- The work area and areas directly adjacent to it shall be unoccupied
- Cover surfaces in the work area and adjacent areas that could become contaminated with secured plastic sheets to contain dust and debris and prevent further contamination
- Seal ventilation ducts/grills in the work area and areas directly adjacent with plastic sheeting
- Use dust suppression methods (e.g., misting (not soaking) surfaces prior to remediation)
- Clean and/or remove materials as noted in the approved mold remediation plan. Seal materials being removed in plastic bags
- The work and surrounding areas shall be HEPA vacuumed and cleaned with a damp cloth or mop and a detergent solution
- All areas shall be left dry and free from contamination and debris

6.3.4 Extensive contamination projects (more than 100 contiguous square feet)

- For remediation of extensive contamination (greater than 100 contiguous square feet in one area), the plan shall address: work area isolation, the use of exhaust fans with HEPA filtration and the design of airlocks/decontamination rooms
- Consult with industrial hygienists or other environmental health and safety professionals with experience performing microbial investigations and/or mold remediation before beginning remediation
- The work area shall be unoccupied. If the containment practices listed below will keep mold spores from leaving the contained area, then it may not be necessary to remove people from surrounding areas. However, removal is still recommended for infants, persons recovering from surgery, immune suppressed people, or people with chronic inflammatory lung diseases (e.g., asthma, hypersensitivity pneumonitis, and severe allergies)

- Before beginning work, cover and seal other surfaces in the work area that could become contaminated with mold spores using plastic sheeting and duct tape; this will help contain dust and debris and prevent further contamination
- Contain the affected area. Completely isolate the area to be evaluated and remediated from occupied spaces using plastic sheeting, or other particulate barrier, sealed with duct tape. Use air locks at entry/exit points and provide a sealed decontamination room that is connected to the containment where mold remediation workers shall remove all PPE and protective clothing before exiting
- Shut off the HVAC system and seal ventilation ducts/grills in the work area and adjacent areas to prevent the spread of spores
- Keep the work area under negative pressure to minimize the spread of spores to adjacent areas. Use an exhaust fan equipped with HEPA filtration to maintain negative pressure
- Use dust suppression methods (e.g., misting (not soaking) surfaces prior to remediation)
- Clean and/or remove materials as noted in the approved mold remediation plan. Seal materials being removed in plastic bags; wipe down or HEPA vacuum the outside surface of the bags of material being removed
- Before removing isolation barriers, HEPA vacuum the contained area and the decontamination room and then clean or mop it with a detergent
- Leave area clean, dry and free of visible debris

6.4 Mold remediation clean up

A variety of mold cleanup methods may be utilized for remediating damage to building materials and furnishings caused by moisture control problems and mold growth. The specific method or group of methods used will depend on the type of material affected. The three most common methods are shown below.

6.4.1 Wet Vacuum

Wet vacuums are vacuum cleaners designed to collect water. Wet vacuums may be used to remove water from floors, carpets and hard surfaces where water has accumulated. Wet vacuums shall not be used to vacuum porous materials, such as gypsum board. They shall be used only when materials are still wet since vacuums may spread spores if sufficient liquid is not present. The tanks, hoses and attachments of these vacuums shall be thoroughly cleaned and dried after use using damp wipes (see below) as mold and mold spores may stick to the surfaces.

6.4.2 Damp Wipe

Whether dead or alive, mold is allergenic, and some molds may be toxic. Mold can generally be removed from nonporous (hard) surfaces by wiping or scrubbing with water, or water and detergent. It is important to dry these surfaces quickly and thoroughly to discourage further mold growth. Instructions for cleaning surfaces, as listed on product labels, shall always be read and followed. Porous materials that are wet and have mold growing on them may have to be discarded. Since molds will infiltrate porous substances and grow on or fill in empty spaces or crevices, the mold can be difficult or impossible to remove completely.

6.4.3 HEPA Vacuum

HEPA vacuums are recommended for final cleanup of remediation areas after materials have been thoroughly dried and contaminated materials removed. HEPA vacuums are also

recommended for cleanup of dust that may have settled on surfaces outside the remediation area. Care shall be taken to assure that the filter is properly seated in the vacuum so that all the air shall pass through the filter. When changing the vacuum filter, remediators shall wear PPE to prevent exposure to the mold that has been captured. The filter and contents of the HEPA vacuum shall be disposed of in well-sealed plastic bags.

6.5 Mold remediation plan

Remediation of mold refers to the process of removing contamination coupled with steps to modify the indoor environment to prevent the recurrence of growth. In many cases it is necessary for the remediation process to include engineering controls and other protective measures to prevent or minimize potentially harmful exposure to workers and occupants.

The objectives of any mold remediation project are:

- Correct the underlying moisture problem
- Effectively and safely remove mold contaminated material, including the mold contaminants in settled dust
- Control contaminants during remediation
- Repair property damage and prevent future loss to building materials and contents

Centennial project sites that require mold remediation (of any size see section 6.3 of this section) shall only allow the remediation process to begin with an approved mold remediation plan. Appendix 1 of this section includes the Mold Remediation Plan Template.

The mold remediation plan shall include the following elements at a minimum:

- Locations of areas that will be remediated
- Assessment of the size and scope of the remediation project
- Identification of the competent person (remediation manager)
- Description of the work and work methods
- Types of biocides and fungicidal agents
- Containment procedures
- Personal Protective Equipment (PPE)
- Tools used for the work
- Construction barriers and warning signs
- HVAC shut down and start up procedures
- HVAC evaluation and remediation procedures
- Moisture and relative humidity control
- Waste packaging and disposal procedures
- Cross contamination controls
- Remediation worker training
- Clearance criteria including:
    - Analytical methods
    - Data evaluation
    - Test conditions
    - Cause of moisture
    - Client approval

6.6 Mold prevention

The most important step in mold prevention is controlling sources of moisture. Performing visual inspections of Centennial facilities and on project sites regularly is extremely important in detecting potential moisture problems or leaks that could lead to the growth of mold or fungal spores. Moisture problems and leaks are often difficult to detect unless a concerted effort is made to identify and examine suspect or potential moisture problems and eliminate sources of dampness, humidity, and moisture to prevent mold growth. Wet or damp spots and wet, non-moldy materials should be cleaned and dried as soon as possible once moisture is discovered (ideally within 24-48 hours).

According to the EPA, specific actions to control moisture and the growth of mold and fungal spores include, but are not limited to:

- Controlling or reducing humidity
- Increasing ventilation or air movement
- Covering cold surfaces with insulation
- Increasing ambient air tempurature

7 Crystalline silica

This section addresses the control of Centennial employees, subcontractor and pedestrian exposure to respirable dust containing crystalline silica (“silica”), which is known to cause silicosis, a serious lung disease, as well as increase the risk of lung cancer and other systemic diseases.

Common silica exposures occur during many construction operations such as, but not limited to the following:

- Using masonry saws
- Using hand operated grinders
- Tuckpointing
- Using jackhammers
- Using rotary hammers
- Using drills
- Drywall finishing
- Flooring (cement based compounds)

Due to the risk posed by respirable silica, it is critical that all Centennial employees and subcontractor personnel, who are exposed to or involved in activities that could potentially create silica dust that is above the action level (25 ug/m3), take specific actions to ensure that the hazards created by respirable silica dust are eliminated or minimized.

The Centennial project superintendent and/or PSO are responsible to verify that subcontractors involved in activities which generate crystalline silica dusts at or above the action level of 25 ug/m3 over an 8 hour time weighted average (TWA) have created and implemented a Written Exposure Control Plan, which addresses the following criteria:

- Follows Table 1 criteria of the OSHA silica standard, or have an equivalent program and monitoring performed by an industrial hygienist
- Effectively implement the silica exposure controls and monitoring the program and supervised by a competent person that reduces worker exposure to 50 micrograms per cubic meter of air or less TWA3
- Reduce the permissible exposure limit (PEL) for respirable crystalline silica to 50 micrograms per cubic meter of air or less, averaged over an 8-hour TWA
- Implement engineering controls (such as water continuously generated at the source, HEPA filtration or ventilation) to limit worker exposure to the PEL
- Provide respirators when engineering controls cannot adequately limit exposure below the PEL
- Limit Centennial employee, subcontractor and/or pedestrian access to high exposure areas through the implementation of barricades and signage
- Offer medical screening/exams to highly exposed workers (those who are above the PEL for more than 30 days per year)
- Train workers on silica risks and how to limit exposure to silica dust
- Implement project and/or task-specific exposure control methods are developed, documented in a plan or on an AHA, communicated and effectively implemented
- Maintain applicable records as part of the Written Exposure Control Plan including
  - Exposure sampling and assessments
  - Respirator fit tests and medical evaluation
  - Training records
- Implement stringent housekeeping practices to avoid exposing personnel to silica

7.1 Hazards from silica exposure

The hazards of silica arise from breathing in the microscopic dust particles. If crystalline silica becomes airborne through construction activities, exposure to fine crystalline silica dust (specifically exposure to respirable silica particles) can lead to a disabling, sometimes fatal disease called silicosis. The fine particles are deposited in the lungs, causing thickening and scarring of the lung tissue. The scar tissue restricts the lungs' ability to extract oxygen from the air. This damage is permanent, but the symptoms of the diseases may not be experienced immediately, rather the symptoms will exhibit a chronic/long term illness.

A worker may develop any of three types of silicosis, depending on the concentration of silica dust and the duration of the exposure:

- Chronic Silicosis- Develops after 10 or more years of exposure to crystalline silica at relatively low concentrations
- Accelerated Silicosis- Develops 5 to 10 years after initial exposure to crystalline silica at high concentrations
- Acute Silicosis- Acute silicosis develops from inhaling large amounts of silica dust over a few days or months. Signs of the disease include shortness of breath, fever, cough and weight loss. Generally, people with acute silicosis have stable health, however for some it may lead quickly to death. It can develop within weeks, or 4 to 5 years, after exposure to very high concentrations of crystalline silica.

Development of silicosis is influenced by several factors, which include:

- Amount and kind of dust inhaled

- Content of crystalline free silica in the dust
- Form of the silica
- Relative size of the inhaled particles
- Length of exposure
- Individual resistance
- Smoking habits
- Disease status
- Age of worker

7.2 Measurement and monitoring (exposure assessment)

An initial exposure assessment shall be conducted whenever Centennial employees or subcontractors are exposed to airborne silica dust at or above the action level unless Table 1: Specified Exposure Control Methods When Working with Materials Containing Crystalline Silica (Appendix 2) is used for controls and PPE selection. Measurements to determine exposure shall be taken and expressed as an eight hour time weighted average (TWA). Air samples shall be taken in the breathing zone (air that would most nearly represent air that would be inhaled) under the supervision of a competent person. Responsibility for the air monitoring shall be relegated to licensed subcontractor or third-party specialist.

Following the initial exposure assessment, the results may be used up to one full year as historical data provided that the exact same type of work procedures, methods, proceses, materials and equipment are used.

It is imparative that during the initial exposure assessment, employees are protected through the implementation of engineering controls and PPE, deliniation of silica hazard areas (also may require an established containment area), posting warning or danger signs, and decontamination of clothing/equipment. PPE may be downgraded once the laboratory/air monitoring results conclude that the silica hazard has been eliminated/controled to below the PEL.

7.3 Exposure controls

When determining measures to reduce or eliminate worker exposure to silica dust, Centennial employees and subcontractors shall utilize the hierarchy of hazard controls in accordance with HSEQ Manual section 6 (Risk Assessment and Operations). Additionally, an exposure control plan shall be developed, implemented and supervised by a competent person. The exposure control plan will include the following elements:

- Identifies task or procedures that create silica dust
- Methods used to protect personnel from exceeding the PEL in accordance with Table 1 or with monitoring data supporting the methods.
- Procedures to restrict work areas from un-authorized or un-protected personnel
- Methods to restrict housekeeping activities that could expose personnel to silica (dry sweeping, compressed air etc.)

The hierarchy of hazard controls is as follows:

- Elimination
- Substitution of less hazardous materials, processes, operations, or equipment
- Engineering controls

- Administrative controls
- Personal protective equipment

7.3.1 Elimination and substitution

Whenever possible, products which do not contain (or contain silica in a lower percentage) will be substituted for products that contain crystalline silica.

7.3.2 Engineering controls

Engineering controls are those controls which are intended to control or otherwise minimize the release of crystalline silica.

Three common forms of engineering control options are:

- Local Exhaust Ventilation (LEV)
- High Efficiency Particulate Air Filtration (HEPA)
- Wet Dust Suppression (WDS)

7.3.3 Administrative controls

Administrative controls are those that aim to control or otherwise minimize the release of silica through the use of work procedure and work methods, rather than by affecting the actual physical work.

Common examples of administrative controls include, but are not limited to:

- Posting of warning signs
- Rescheduling of work as to avoid the activities of others that may create silica dust above the action level
- Relocating unprotected workers away from areas that expose personnel to silica dust above the action level

7.3.4 Personal protective equipment

PPE shall only be used when other controls are not feasible, when other controls are in the process of being installed or when other control methods need to be supplemented to reduce exposure below the PEL.

An air purifying respirator fitted with HEPA cartridges is the most common form of PPE that would be used to minimize personal exposure to silica dust. Dependent on the effectiveness of the other control measures employed, either a “full face” or “1/2 face” air purifying respirator may be used by personnel. The use of respiratory protection shall be in accordance with 6.2 of HSEQ Manual section 11 (Personal Protective Equipment) and/or Table 1: Specified Exposure Control Methods When Working with Materials Containing Crystalline Silica (Appendix 2).

In addition to respiratory PPE, protective clothing (i.e. disposable/washable coveralls) may be used and/or required to help prevent the contamination of the worker’s personnel clothing.

7.3.5 OSHA Table 1 controls

Table 1: Specified Exposure Control Methods When Working with Materials Containing Crystalline Silica (Appendix 2) matches common construction tasks with silica dust control

methods. The dust control measures listed in the table include methods known to be effective, like using water to keep dust from getting into the air or using ventilation to capture dust. In some operations, respirators may also be required. Employees and subcontractors who follow the provisions of Table 1 correctly are not required to measure workers' exposure to silica and are not subject to the PEL.

7.3.6 Silica Written Exposure Control Plan (WECP)

A sample Silica Task Specific Written Exposure Control Plan (WECP) can be found in Appendix 3. As per the OSHA Standard, any company with work above the action level must have a WECP, and site specific exposure control plans based on work processes.

7.4 Training

Centennial employees and subcontractors shall receive training on silica and its health effects (including cancer, lung effects, immune system effects and kidney effects) as well as training on silica operations, control procedures, PPE and medical surveillance program. Training documentation (attendance rosters or certificates) shall be available during operations that expose workers to silica dust above the action level and/or PEL. Centennial will provide one competent person on site any time silica dust is being produced above the action level.

8 Other health hazards

8.1 Unexploded ordnance (UXO)

During construction activities, unexploded ordnance (UXO) may be found or encountered on a Centennial project site or in the immediate vicinity of the work area. If the possible presence of UXO is suspected, the Centennial project superintendent and/or PSO shall conduct a UXO survey and direct work to proceed in a planned and cautious manner using the control measures developed during the survey. If ordnance material is discovered, the Centennial project superintendent and/or PSO will cease work in the vicinity of the item and shall immediately notify the appropriate personnel (internal and external). Internal notification shall be in accordance with HSEQ Manual section 8 (Incident and Near Miss Reporting). External notification shall be in accordance with installation and contract specifications.

Centennial project sites that are identified as potentially containing UXO shall be surveyed to determine the extent of ordenence contamination. The information gathered from the survey shall be used to aid in the design of the construction process and minimize intrusive construction activity work in portions of the project which are contaminated with ordnance. The ordnance survey information can also be used to determine the correct ordnance response actions (including response personnel) for the project site.

If ordnance is found, further excavation on the project shall not be permitted until the potential hazards associated with the ordnance have been mitigated and each employee and subcontractor employee who is working at the project site attends an ordnance identification course. Subsequent new field employees are also required to attend the ordnance identification course prior to beginning work on the project site.

UXO awareness shall be exercised on all military installations even when UXO contamination is not expected. The correct training and notification procedures, in case UXO is discovered, shall be in-place for the construction effort.

8.1.1 Surface UXO inspections

Surface UXO inspections shall be conducted by trained personnel and be considered appropriate for construction activities that do not include any ground disturbance such as excavation and/or trenching.

8.1.2 Sub-surface UXO inspections

Sub-surface UXO inspections shall be completed for any construction activities that include ground disturbances and shall be conducted by personnel who are UXO qualified. Personnel who are not UXO qualified are prohibited from conducting clearance inspections.

8.2 Non-ionizing radiation

Non-ionizing radiation is a series of energy waves produced by oscillating electric and magnetic waves traveling together at the speed of light. The electric and magnetic fields are characterized by a frequency and wavelength. Frequency can be measured by the number of oscillations in the wave per unit of time. Frequency is measured in units of hertz (1 Hz = 1 cycle per second). Wavelength can be measured as the distance of travelled by the wave in 1 oscillation / cycle.

There are many forms of non-ionizing radiation that include, but are not limited to the following:

- Extremely low frequency (ELF)
- Radio frequency (RF)
- Visible light, infrared (IR)
- Ultraviolet (UV)
- Microwave (MW)

8.2.1 Extremely low frequency (ELF)

ELF is characterized as having frequencies of 1 Hz up to 300 Hz. Frequencies this low generate very long wavelengths. For example, an emission source of ELF operating at 60 Hz produces a wavelength that would measure 3,107 miles. Frequencies of this nature are most often produced by power lines, electrical wiring and electrical equipment. Of these sources the most hazardous exposures can be estimated to occur in areas near induction furnaces and high-voltage power lines.

Centennial employees and subcontractors shall be protected from ELF. The following methods shall be considered when protecting from ELF sources:

- Hazard elimination or protection from 50/60 Hz electric-field
- Isolation (LOTO) or shielding methods

These protection guidelines are necessary for workers conducting work in very high ELF field areas. It is more common that where electric fields are very large, access of personnel is restricted by the use of perimeter fencing and warning signs. Working in close proximity to equipment of this nature requires the use of a competent person who can recognize ELF hazards and has the authority to correct hazards.

8.2.2 Radio frequency (RF)

Radio frequency radiation exists as a form of electromagnetic energy (EME) which can be found in the electromagnetic spectrum just under the visible light spectrum. Radio frequency ranges of 3 KHz (AM radio) to 300 GHz (microwaves) and may produce harmful thermal effects to human health.

Some of the common symptoms of overexposure to radio frequency radiation include:

- Heat exhaustion
- Loss of appetite
- Nausea
- Excessive tiredness
- Headache
- Fine tremors
- Metallic taste in the mouth
- Weakness
- Muscle and joint pain or soreness
- Anxiety
- Insomnia
- Numbness
- Dizziness
- Shock / burns (induced / contact current)

In the event that Centennial employees or subcontractors are required to enter an active RF field, a competent person shall asses the PPE required for each particular RF hazard area or controlled area. PPE requirements shall be listed in the RF safety plan. Specific PPE for RF exposure includes, but is not limited to:

- Radio frequency suit
- Electrically rated hard hat
- High voltage gear
    - Arc—flash
    - High voltage gloves
    - Hot sticks
    - FR (flame resistant) clothing
    - Eye protection

Areas which contain known or suspected RF hazards shall be clearly labeled by posting RF safety signs. RF signage shall be placed in an area outside of the RF hazard area. Signs shall only be posted after a competent person has conducted an RF assessment of the area(s). An RF safety plan (if entering a controlled area) shall be developed only after the RF assessment has been conducted. RF signs shall be posted in a visible area and shall comply with FCC category I-IV postings as follows:

- Category I – Informational Posting
    - Green color
    - Information sign indicating RF levels below the general population limit
- Category II – Notice
    - Blue color
    - Area exceeds general population limits but remains below occupational limits

    - Training is required for employees entering the area
- Category III – Caution
    - Yellow color
    - Exceeds occupational limits by ten times or less
    - Training is required for employees entering the area
    - RF monitors and RF suits recommended
- Category IV – Warning/Danger
    - Red or orange color
    - Area exceeds ten times the occupational exposure limits
    - Serious contact injury could occur
    - Training is required for employees entering area

In the event that employees or subcontractors are required to enter a controlled area (Category II, III or IV) or any other areas where RF hazards may be present they shall be required to implement to use of personal RF monitors. Personal protection monitors shall be fully isotropic and shall be able to monitor for RF in the anticipated potential frequencies. Monitors shall be fully calibrated according to manufacturer's specifications. Monitors shall be traceable and have records of National Institute of Standards and Technology (NIST) calibration tests. Centennial employees and subcontractors shall be trained in how to use and maintain RF monitors. Monitors shall be placed on the body in relation to the RF fields. Employees must understand the monitor readings and alarms.

Engineering controls are those that aim to effectively control RF exposure, hazards and emissions through the use of work procedure and work methods. Common examples of engineering controls include, but are not limited to:

- Reduced power protocol (temporarily lower RF emissions to reduce worker exposure)
- Lockout tag out (LOTO) of the RF transmitter or tower
- Shields to reduce RF fields
- Antenna placement

Administrative controls are those that aim to control or otherwise minimize RF exposure, hazards and emissions through the use of work procedure and work methods. Administrative controls for RF shall never be utilized without also implementing the use of engineering controls and PPE. RF signs alone are not sufficient in successfully reducing RF hazards.
Common examples of administrative controls include, but are not limited to:

- Posting of warning signs and regulated area signs
- Training all employees who may access areas where RF hazards exceed the exposure standards
- Flashing lights
- Audible alarms
- Barriers

8.2.3 Infrared radiation (IR)

Infrared radiation is characterized by emission of frequencies just under the visible light spectrum. Infrared radiation is often perceived as heat. The main hazard associated with infrared radiation is whole body heating. Under normal circumstances, it is not anticipated that work in close proximity to an infrared radiation source will take place. However, in the event that work near an IR source is required, a person with expertise in this field shall be consulted for

compliance and a written plan shall be developed to protect both Centennial employees and subcontractors from IR hazards.

8.2.4 Ultraviolet radiation (UV)

Ultraviolet radiation (UV) is characterized by emission frequencies just above those of the visible light spectrum. UV radiation is particularly hazardous due to its high photon energy range and because there are often no acute or visible immediate symptoms in the event of an overexposure. The most common sources of UV radiation are black lights, welding arcs, UV lasers and the sun.

When working near welding activities it is extremely important that shielding efforts, protective clothing and the application of appropriately shaded eyewear are used to protect from UV hazards. Welders and all other personnel directly involved with welding activities welding activities shall don the appropriately shaded protective eyewear and other protective clothing when welding. Likewise, other affected personnel and bystanders shall also be protected from looking directly at welding arcs by erecting welding shields or other acceptable barriers. The below chart provides guidance on the level shielding required.

Operation	Shade Number
Soldering	2
Torch brazing	3 or 4
Cutting- light (up to 1 inch)	3 or 4
Cutting- medium (1-6 inches)	4 or 5
Cutting- heavy (6 inches or more)	5 or 6
Gas welding- light (up to 1/8 inch)	4 or 5
Gas welding- medium (1/8 to 1/2 inch)	5 or 6
Gas welding- heavy (1/2 inch or more)	6 or 8
Atomic hydrogen welding	10-14
Inert-gas metal arc welding - nonferrous (1/16 to 5/32 inch electrodes)	11
Inert-gas metal arc welding- ferrous (1/16 to 5/32 inch electrodes)	12
Shielded metal arc welding (1/16 to 5/32 inch electrodes)	10
Shielded metal arc welding (3/16 to1/4 inch electrodes)	12
Shielded metal arc welding (5/16 to 3/8 inch electrodes)	14
Carbon arc welding	14
Plasma arc cutting up to 100 amps	8

Plasma arc cutting 101-200 amps	10
Plasma arc cutting 201-400 amps	12
Plasma arc cutting greater than 400 amps	14

Working in an outdoor location can potentially expose workers to harmful UV (sunlight) radiation. When working outside for long periods of time it is advised that workers apply a layer of sunscreen / sunblock to adequately protect against sun (UV) damage. This is especially important during summer months and in periods of heat stress. Please see HSEQ Manual section 12- Housekeeping, Sanitation and Environmental Control for additional information on heat related illness.

8.2.5 Laser hazards

Lasers are used for a variety of applications during the construction process. Lasers produce an intense light beam. One of the primary hazards associated with laser use and exposure is thermal heating of body tissues. In certain circumstances laser exposure can result in eye and skin damage.

The following protocol shall be implemented when working with or near a laser:

- Allow only qualified and trained workers operate laser equipment
- Affected personnel shall be provided appropriate eye protection when working in areas in which a potential exposure to direct or reflected laser light greater than .005 watts (five milli-watts)
- Areas in which lasers are used shall be posted with standard laser warning signs
- Beam shutters or caps shall be utilized or the laser turned off when the laser transmission is not actually required or when left unattended for a substantial period of time
- The laser equipment shall bear a label to indicate maximum output
- The laser unit in operation shall be set up above the head level of the workers when possible

8.3 Contaminated soils

Centennial employees and subcontractors may be exposed to potentially contaminated or suspect soils during the course of construction activities. If potentially contaminated soils are identified, all work will cease in the affected area(s) until the soil is properly tested by a certified testing laboratory or qualified person to identify the specific contaminants and the appropriate controls to mitigate any potenial expsoure.

If possible, contaminated soils will be communicated by the customer or responsible party prior to construction activity. Soil investigation shall be completed prior to any excavation or trenching.

This may include investigation of:

- Previous site use and activities
- Exposed spills and/or leaks

- Evidence of:
  - Soil and or material discoloration
  - Odors
  - Differences in soil properties
  - Discovery of abondoned tanks or pipes
  - Buried debris

Contaminated soils may include, but are not limited to, soils containing:

- PCBs
- Petroleum products
- Solvents
- Pesticides
- Lead and other heavy metals
- Arsenic
- Buried wastes (refuse sites)
- Sewage

If soils are tested and identified as contaminated soils then they shall be stored and disposed of in accordance with all applicable Federal, state, local and contract specifications. If temporary stockpiling of contaminated soils is necessary, the following provisions shall apply:

- The stockpile of contaminated soils shall be covered with plastic sheeting or tarps
- Soil runoff shall be prevented
- Contaminated soil stockpiles shall not be stored near storm drains or watercourses
- Stockpiles of contaminated soils shall be removed as soon as possible
- Take precaution and preventative measures to ensure that water, including ground water, does not intermix with contaminated soils

8.4 Bloodborne Pathogens

Centennial employees and subcontractors may be exposed to Bloodborne Pathogens during the course of construction activities. If a project is in an environment where bloodborne pathogen hazards are known to exist, such as a hospital or medical facility, sterilization of the work area shall be completed and verified prior to the start of work. If contaminates are identified, all work will cease in the affected area(s) until proper cleaning and sterilizing actions are accomplished by a qualified person. Immediate notification must be sent to the customer or responsible party upon discovery and prior to any cleaning.

The proper Engineering Controls shall be in place for any project that may encounter such contaminates:

- Hand washing facilities shall readily be accessible to all who have the potential for exposure.
- Onsite personnel will wash their hands and any other exposed skin with soap and water immediately or as soon as possible after contact with blood or OPIM, for 20 seconds, in a manner causing friction on both inner and outer surfaces of the hands.
- Antiseptic hand cleaner/hand wipes and paper towels will be provided when hand washing is not feasible. However, hand washing must still take place as soon as

possible after exposure.
- Eating, drinking, smoking, applying cosmetics, handling contact lenses, etc. is prohibited in work areas where there is the potential for exposure to bloodborne pathogens.
- If professional medical attention is required, a local ambulance/medical transport vehicle will be the first choice; a personal car will be the second. If a personal car is taken, impervious material should be used to prevent contamination of the vehicle.
- Personnel new to the jobsite shall receive training about any potential exposure.

Cleaning of contaminated areas and disposal of contaminated items shall be accomplished by the owner or other party. In the unlikely situation that our employee or subcontractor must clean a comtaminated area or dispose of contaminated items, the following must be adhered to:

- Employees must clean and disinfect when surfaces become contaminated and after any spill of blood.
- Use bleach (1:10 ration bleach to water) to disinfect any affected items or areas. Single-use gloves shall be used and the bleach should be allowed to sit for at least 15 minutes.
- Potentially contaminated broken glass will be picked up using mechanical means, such as dustpan and brush, tongs, etc.
- Contaminated laundry shall be handled as little as possible. Employees who handle contaminated laundry will utilize personal protective equipment to prevent contact with contaminates from coming into contact skin or street clothes.
- Contaminated clothing will remain onsite and placed in appropriate containers**,** labeled and sent directly to the appropriate facility for cleaning. Appropriate Containers shall be accordance with applicable state, federal and local laws preventing leakage during the collection, handling, processing, storage and transport to the appropriate facility.
- Regulated waste, including the gloves, should be placed in appropriate containers, labeled and disposed of in accordance with applicable state, federal and local laws.

Training will be provided by the owner or other competent individual at the time of initial assignment of tasks where occupational exposure may occur. Training shall be tailored to the education and language level of the employee and shall include:

- a discussion on symptoms of bloodborne diseases
- an explanation of the modes of transmission of bloodborne pathogens
- the recognition of tasks that may involve exposures
- an explanation of the use and limitations of methods to reduce exposure, for example engineering controls, work practices and personal protective equipment (PPE)
- information on the types, use, removal, handling, decontamination, and disposal of PPE
- explanation of the basis of selections of PPE
- information on the appropriate actions to take and persons to contact in an emergency involving contaminates
- explanation of the procedures to follow if an exposure incident occurs, including the method or reporting
- an explanation of the signs, labels

9 Other health hazard air contaminants

For guidance on other specific health hazard air contaminants, reference 29 CRF 1910.1000 Table Z-1, Z-2 and Z-3.

10 Health hazard training

Employees and subcontractors shall be trained prior to entry in the specific duties and health hazards associated with his or her work, responsibilities and assignments. Any employee or subcontractor who may be exposed to lead, asbestos, mold or silica hazards shall receive training on the potential hazards associated with the work or task.

Training shall be provided to all affected personnel and, at a minimum, include:

- Regulatory certification training where required (asbestos or lead-based or lead containing paint)
- Hazards related to health hazards (including awareness level training , i.e. mold and silica or for employees working around asbestos and lead hazards but not performing direct work activities)
- Work practices and selection of appropriate protective clothing and equipment
- Methods of evaluating potential health hazards
- Inspection procedures
- Specific requirements of this procedure
- Emergency and evacuation procedures

Retraining is required when:

- Changes in the workplace render previous training incomplete or obsolete
- Changes in the methods of hazard controls or equipment to be used render previous training incomplete or obsolete
- Inadequacies in an employee’s knowledge or use of fall protection systems or equipment indicate that the employee has not retained the requisite understanding or skill

11 Amendment history

Date	Version	Revised content
12.05.2014	1.0	Initial Preparation
08.01.2015	1.1	Addition of paragraph 8.2- “Non-ionizing radiation”
06.01.2016	1.2	Update to silica paragraphs (Paragraph 7) in accordance with OSHA updates and Appendix 2- Table 1: Specific Exposure Control Methods When Working with Materials Containing Crystalline Silica
01.01.2018	2.0	Updates to Paragraph 2 Superior Documents to add the Group Policy and Global Standards, Paragraph 3 Definitions (AHERA, Centennial and HSEQ Director), Paragraph 4.7 Recordkeeping (duration), Paragraph 5.4 Medical Examinations (recordkeeping duration), Paragraph 7 Crystalline Silica (requirements), Paragraph 7.2 Measurement and Monitoring (Air monitoring responsibility), Paragraph 7.3 Exposure Controls (Table 1 inclusion), Paragraph 7.3.6 Silica Written Exposure Control Plan (addition), Paragraph 7.4 Training (Centennial competent person requirement), Appendices 1 and 2 (logo) and Appendix 3 (addition)
04.01.2021	2.1	Update to Paragraph 2 Superior Documents (Group Policy version), Paragraph 3 Definitions (added Bloodborne Pathogens) and new Paragraph 8.4 Bloodborne Pathogens

12 Appendix

Appendix 1: Mold Remediation Plan (0206500_CP_11_25_en_A1.1)

Appendix 2: Table 1: Specified Exposure Control Methods When Working with Materials Containing Crystalline Silica (0206500_CP_11_25_en_A2.1)

Appendix 3: Silica Task Specific Written Exposure Control Plan (WECP) (0206500_CP_11_25_en_A3)

Mold Remediation Plan

0206500_CP_11_25_en_A1.1

Instructions: Complete the Mold/Microbial Remediation Plan Template below. Ensure that site specific aspects are addressed and incorporated into this plan.

Project Title: _____ Contract #: _____

Plan Author (print name): _____ Date: _____

Project Location: _____

Description

In some individuals, exposure to mold can cause a variety of health effects and symptoms, including allergic reactions. This site specific mold remediation plan template presents the means/methods for the remediation/cleanup of mold and moisture problems specific to this project as well as measures designed to protect the health of building occupants and remediators.

Mold can be found almost anywhere; it can grow on virtually any organic substance, as long as moisture and oxygen are present. There is mold that can grow on wood, paper, carpet, foods and insulation. When excessive moisture accumulates in buildings or on building materials, mold growth will often occur, particularly if the moisture problem remains undiscovered or not addressed. It is impossible to eliminate all mold and mold spores in the indoor environment. However, mold growth can be controlled indoors by controlling moisture indoors.

Assess the size of the mold or moisture problem and the type of damaged materials before planning the remediation work. When planning remediation efforts, the following should be addressed:

1. Repair/Remove the water or humidity problem. Complete and carry out repair plan, if appropriate. Revise remediation plan, as necessary, if more damage is discovered during remediation.

2. Completely clean up mold and dry water-damaged areas. Select appropriate cleaning and drying methods for damaged/ contaminated materials. Carefully contain and remove moldy building materials. Use appropriate Personal Protective Equipment (PPE). Arrange for outside professional support, if necessary.

Describe work area/mold contaminated area and materials below:

Use the check boxes below to indicate mold contaminated areas:

Yes	No

Small (10 square feet of visible mold): *The work area shall be unoccupied; removing people from adjacent spaces is not necessary but is recommended for infants, persons recovering from surgery, immune suppressed people or people with chronic inflammatory lung diseases (e.g. asthma, hypersensitivity pneumonitis or severe allergies). Containment of the work area is not necessary.*
Use dust suppression methods (e.g. misting (not soaking) surfaces prior to remediation). Clean and/or remove materials as noted in the approved mold remediation plan. Seal materials being removed in plastic bags. The work area and areas used by remediation workers for egress shall be cleaned with a damp cloth or mop and a detergent solution. Leave area clean, dry and free of visible debris.

Yes	No

Medium (10 - 30 contiguous square feet): *The work area shall be unoccupied; removing people from adjacent spaces is not necessary but is recommended for infants, persons recovering from surgery, immune suppressed people or people with chronic inflammatory lung diseases (e.g. asthma, hypersensitivity pneumonitis and severe allergies). Containment of the work area is not necessary. Cover surfaces in the work area that could become contaminated with secured plastic sheets to contain dust and debris and prevent further contamination. Use dust suppression methods (e.g. misting (not soaking) surfaces prior to remediation). Clean and/or remove materials as noted in the approved mold remediation plan. Seal materials being removed in plastic bags. The work area and areas used by remediation workers for egress shall be cleaned with a damp cloth or mop and a detergent solution. Leave area clean, dry and free of visible debris.*

Yes	No

Large (30-100 contiguous square feet): *If abatement procedures are expected to generate significant amounts of dust (e.g. abrasive cleaning of contaminated surfaces, demolition of plaster walls) or the visible concentration of mold is heavy (i.e. blanket versus patchy coverage) follow the extensive contamination procedures below. Consult with industrial hygienists or other environmental health and safety professionals with experience performing microbial investigations and/or mold remediation before beginning remediation. The work area and areas directly adjacent to it shall be unoccupied. Cover surfaces in the work area and adjacent areas that could become contaminated with secured plastic sheets to contain dust and debris and prevent further contamination. Seal ventilation ducts/grills in the work area and areas directly adjacent with plastic sheeting. Use dust suppression methods (e.g. misting (not soaking) surfaces prior to remediation). Clean and/or remove materials as noted in the approved mold remediation plan. Seal materials being removed in plastic bags. The work and surrounding areas shall be HEPA vacuumed and cleaned with a damp cloth or mop and a detergent solution. All areas shall be left dry and free from contamination and debris.*

Yes	No

Extensive (more than 100 contiguous square feet): *For remediation of extensive contamination (greater than 100 contiguous square feet in one area), the plan shall address: work area isolation, the use of exhaust fans with HEPA filtration and the design of airlocks/decontamination rooms. Consult with industrial hygienists or other environmental health and safety professionals with experience performing microbial investigations and/or mold remediation before beginning remediation. The work area shall be unoccupied. If the containment practices listed below will keep mold spores from leaving the contained area, then it may not be necessary to remove people from surrounding areas. However, removal is still recommended for infants, persons recovering from surgery, immune suppressed people or people with chronic inflammatory lung diseases (e.g. asthma, hypersensitivity pneumonitis or severe allergies). Before beginning work, cover and seal other surfaces in the work area that could become contaminated with mold spores using plastic sheeting and duct tape; this will help contain dust and debris and prevent further contamination. Contain the affected area. Completely isolate the area to be evaluated and remediated from occupied spaces using plastic sheeting or other particulate barrier, sealed with duct tape. Use air locks at entry/exit points and provide a sealed decontamination room that is connected to the containment where mold remediation workers shall remove all PPE and protective clothing before exiting. Shut off the HVAC system and seal ventilation ducts/grills in the work area and adjacent areas to prevent the spread of spores. Keep the work area under negative pressure to minimize the spread of spores to adjacent areas. Use an exhaust fan equipped with HEPA filtration to maintain negative pressure. Use dust suppression methods (e.g. misting (not soaking) surfaces prior to remediation). Clean and/or remove materials as noted in the approved mold remediation plan. Seal materials being removed in plastic bags; wipe down or HEPA vacuum the outside surface of the bags of material being removed . Before removing isolation barriers, HEPA vacuum the contained area and the decontamination room and then clean or mop it with a detergent. Leave area clean, dry and free of visible debris.*

Note: If multiple areas or rooms of a structure/building are contaminated with mold, a plan drawing must be submitted as an attachment to this plan which indicates the contaminated areas as well as the condition of mold contamination as detailed above.

Additional Notes:

Assessment

Has a mold assessment been conducted for suspected contaminated areas?

Yes	No

If yes, who conducted the assessment (explain):

Source of Mold

Refer to 3rd party hazardous mold assessment indicated above.

List all areas or building components/materials in which mold was discovered:

Area #1:	
Area #2:	
Area #3:	
Area #4:	
Area #5:	
Area #6:	
Area #7:	

Additional Notes:

Clean up / Removal Methods

Indicate below the removal methods that will be implemented (select all that apply):

Yes	No	
Yes	No	**Wet Vacuum:** *(in case of porous materials, some mold spores/fragments will remain in the material but will not grow if the material is completely dried). Steam cleaning may be an alternative for carpets and some upholstered furniture.*
Yes	No	**Damp-wipe surfaces**: *with plain water or with water and detergent solution (except wood - use wood floor cleaner); scrub as needed.*
Yes	No	**High-efficiency particulate air (HEPA) vacuum**: *after the material has been thoroughly dried. Dispose of the contents of the HEPA vacuum in well-sealed plastic bags.*
Yes	No	**Discard:** *remove water-damaged materials by hand and place in a sealed plastic bag. This method is usually conducted when inside of a containment. Dispose of as normal waste. HEPA vacuum after the surface/material has dried. Double-wrap/bag all demolished and removed materials in 6-mil polyethylene sheeting/bags. Seal wrapping "goose neck" bag securely and HEPA vacuum before removing from the site. Dispose of contaminated materials in a landfill authorized to receive construction debris.*
Yes	No	**Bleach / Chlorine Solution**: *Thoroughly wash with a 5% Chlorine solution. Scrub and HEPA vacuum to remove chlorine residue and oxidized (dead) fungal spores. Re-clean any areas with visible fungal colonies/mold. See Chlorine/Bleach SDS to reference PPE required for use.*

Describe in detail the tools/equipment that will be used to remove contaminated mold material (this section is to include moisture and relative humidity control, waste packaging and disposal procedures, and cross contamination controls):

Containment

Will remediation methods generate excessive dust or airborne mold particles? Yes | No

- OR -

Will building/structure be occupied? Will other trades/employees potentially be exposed to airborne mold? Yes | No

If yes in either of the above questions, containment will be required. Please indicate below the type of containment that will be implemented. Also reference requirements in the description section above.

Yes | No

Limited: *Use 6-mil polyethylene sheeting ceiling to floor around affected area with a slit entry and covering flap; maintain area under negative pressure with HEPA filtered fan unit. Block supply and return air vents within containment area.*

Yes | No

Full: *Use two layers of fire-retardant polyethylene sheeting with one airlock chamber. Maintain area under negative pressure with HEPA filtered fan exhausted outside of building. Block supply and return vents within containment area.*

Describe in detail the construction barriers and warning signs that will be implemented:

If applicable, describe in detail below, the HVAC shut down and start up procedures as well as the HVAC evaluation and remediation procedures:

A minimum pressure differential of ~5 Pa (0.02 inches w.g.) shall be maintained for negatively pressurized contained areas. Pressure differentials shall be monitored and documented at regular intervals and that a minimum of four air changes per hour be maintained for ventilation and contaminant dilution.

Note: Stop all work if there is a break in the containment barriers, such as unscheduled removal of material from an uncontained side of a wall, and sample for possible dispersion of fungal spores by using a laser particle counter (as a surrogate for direct counting of fungal spores) and by collecting samples with spore traps or sticky tape for analysis by microscopy.

Area Clearance Criteria

Prior to reconstruction activities, a final visual inspection and clearance sampling shall be performed to verify the completeness of the remediation activities. Visual inspection shall be completed using ASTM Designation E-1368-2005 as a general guideline. Visual inspection shall be considered acceptable when no visible viable colonies or dust are present within the work area.

Final air clearance and surface samples shall be collected and submitted for analysis. Clearance samples may consist of the following samples:

- Viable and non-viable air samples using air-o-cell sampling cassettes; and
- Surface samples using tape lifts, swabs or other media the analytical lab requests.

Upon notification that clearance has been achieved, determine whether it is necessary to apply a coat of fungicide enhanced primer to all exposed framing to include the surface of plywood sheathing.

Area clearance conducted by (qualified person, name):	
Organization / Company:	

Personal Protective Equipment (PPE)

Molds are known allergens and may be toxic. Investigators shall use Personal Protective Equipment (PPE) while investigating as well as during remediation/clean-up situations.

The minimum PPE for mold investigation includes but is not limited to:

N-95 respirator

Gloves (Nitrile Glove)

Eye protection

The minimum PPE for remediation includes but is not limited to:

Respiratory protection (type determined during the investigation)

Non-vented goggles

Protective clothing (e.g. disposable coveralls) to prevent cross contamination and skin contact with mold and chemicals. For areas greater than 100 square feet, ensure that protective clothing covers entire body including head and feet

Long gloves made of material that will protect user from chemicals handled for surface cleaning (Nitrile Gloves)

If applicable, list the type of respiratory equipment to be implemented:

Make:	
Model:	
Protection Factor:	

Make:	
Model:	
Protection Factor:	

Make:	
Model:	
Protection Factor:	

Note: Any employee who intends on using a sealed respirator must first complete a medical evaluation to determine if he/she is physically able to wear a sealed respirator and second, a respirator fit test must be conducted to ensure proper fit and seal of the respirator. Fit tests are conducted for each specific respirator. If the employee wishes to use an alternate style/make/model of respirator, an additional fit test will be required. Records of fit tests and medical evaluations must be kept available at the project site.

Personnel

Competent Person for mold remediation:	Name	
	Title	

Mold Remediators / Workers (please print):

Name	
Name	
Name	
Name	
Name	
Name	

Remediation Worker Training

Contractor personnel and subcontractors are required to be trained regarding the hazards and control methods of mold remediation. All involved personnel shall review this Mold Remediation Plan and become familiar with the information therein. Further, the Contractor shall maintain a competent person at the site during all mold remediation activities.

The following individuals have been trained on this remediation plan regarding the hazard and controls of mold remediation. Print Name Below:

Name	Name	Name

Date:	
Competent Person Signature:	
Centennial Rep Name:	
Centennial Rep Signature:	
Date:	

This plan is to be kept on site during mold remediation activities

Table 1: Specified Exposure Control Methods When Working with Materials Containing Crystalline Silica

0206500_CP_11_25_en_A2.1

Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		<4 hours/shift	>4 hours/shift
Stationary masonry saw	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain the tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain the tool in accordance with manufacturer's instructions to minimize dust emissions. - When used outdoors - When used indoors or in an enclosed area	None APF 10	AFP 10 APF 10
Handheld power saws for cutting fiber-cement board (blade diameter of 8 inches or less)	For tasks performed outdoors only: 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 must provide the air flow recommended by the tool manufacturer and have a filter with 99% or greater efficiency (i.e. HEPA).	None	None
Walk behind saws	Use saw equipped with an 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. - When used outdoors: - When used indoors or in an enclosed area:	None APF 10	None APF 10
Drivable saws	For tasks performed outdoors only: Use saw equipped with an 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.	None	None
Rig-mounted core saws or drills	Use saw equipped with an 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.	None	None
Hand-held 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 must provide the air flow recommended by the tool manufacturer or greater and have a filter with 99% or greater efficiency (i.e. HEPA) and a filter cleaning mechanism.	APF 10	APF 10
Dowel drilling rigs for concrete	For tasks performed outdoors only: Use shroud around drill bit with a dust collection system. Dust collector must have a filter with 99% or greater efficiency (i.e. HEPA) and a filter cleaning mechanism. Use a HEPA-filtered vacuum when cleaning holes.	APF 10	APF 10

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 the 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.	None None	None None
Jackhammers and handheld powered chipping tools	Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact. - When used outdoors: - When used indoors or in an enclosed area: 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 must provide the air flow recommended by the tool manufacturer or greater and have a filter with 99% or greater efficiency (i.e. HEPA) and a filter cleaning mechanism. - When used outdoors: - When used indoors or in an - enclosed area:	None APF 10 None APF 10	APF 10 APF 10 APF 10 APF 10
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 must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter	APF 10	APF 25

	and have a filter with 99% or greater efficiency (i.e. HEPA) and a cyclonic pre-separator of filter cleaning mechanism.		
Handheld grinders for uses other than mortar removal	For tasks performed outdoors only: Use grinder equipped with 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 must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency (i.e. HEPA) and a cyclonic pre-separator of filter cleaning mechanism. - When used outdoors: - When used indoors or in an enclosed area:	None None	None APF 10
Walk-behind milling machines and floor grinders	Use grinder equipped with 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	None None	None None

	instructions to minimize dust emissions. Dust collector must provide the air flow recommended by the tool manufacturer or greater and have a filter with 99% or greater efficiency (i.e. HEPA) and a filter cleaning mechanism. When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes.		
Small drivable milling machine (less than half-lane)	Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant. Operate and maintain machine to minimize dust emissions.	None	None
Large drivable milling machine (half-lane or 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 sprays designed to suppress dust. Water must be combined with a surfactant. Operate and maintain machine to minimize dust emissions.	None None None	None None None
Crushing Machines	Use equipment designed to deliver water spray or mist for dust	None	None

	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.		
Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g. hoe ramming or rock ripping) or used during demolition activities involving silica-containing materials	Operate equipment from within an enclosed cab. When workers outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions.	None	None
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 maintain dust emissions. OR When the equipment operator is the only worker engaged in the task, operate equipment from within an enclosed cab.	None None	None None

Silica Task Specific Written Exposure Control Plan

0206500_CP_11_25_en_A3

CENTENNIAL
Part of the Bilfinger Group

SECTION I – Job Description

Date:	Company Name:
Work Area:	Operator Name:
Description of Work:	

SECTION II – Tool Selection

- ☐ Stationary Mason Saw(s)
- ☐ Handheld Power Saw(s)
- ☐ Walk behind Saw(s)
- ☐ Drivable Saw(s)
- ☐ Rig-mounted Core Saw(s) or Drill(s)
- ☐ Handheld and Stand Mounted Drill(s) (includes impact and rotary hammer drills)
- ☐ Crushing Machine(s)
- ☐ Sandblasting (with media containing silica, and/or surfaces containing silica)
- ☐ Dowel Drilling Rig(s)
- ☐ Vehicle-Mounted Drilling Rig(s)
- ☐ Jackhammer(s) and Handheld Powered Chipping Tool(s)
- ☐ Handheld Grinder(s)
- ☐ Walk-behind Milling Machine(s) and Floor Grinder(s)
- ☐ Drivable Milling Machine(s)
- ☐ Heavy Equipment and Utility Vehicle(s) (w/ attachments for demo, grading, excavating)

SECTION III – Control Method

Complete either Option 1 or Option 2 for the control method implemented.

OPTION 1 (Reference OSHA Table 1 on Back Page)

Check all that apply:

- ☐ OSHA Control Method Fully Implemented
- ☐ <4 Hours Exposure ☐ >4 Hours Exposure

Respiratory Protection Required **Yes** or **No**

Required Exposure Reduction Steps:

- ☐ Housekeeping Practices (Exposure Reduction)
- ☐ Written Exposure Plan Available
- ☐ Employee Medical Surveillance (Required for employees who must wear a respirator under the silica standard for 30 or more days a year.)
- ☐ Crystalline Silica hazards communicated to affected employees.

Note: For task involving tools that create crystalline silica exposure that are not lised in OSHA table 1, ie. mortar mixing, must comply with Option 2.

Option 2 (Alternative Controls)

☐ The crystalline silica exposure level has been assessed through industrial hygiene testing, well documented procedures for measuring and controlling dust and/or historical air monitoring conducted by the employer for the work being performed is below the OSHA PEL of 50 µg/m^3.

☐ Written Exposure Plan Available

Alternative Methods Compliance

Check all that Apply:

Engineering Controls

- ☐ Wet Methods to control dust
- ☐ Local Exhaust to capture dust
- ☐ Isolation from dust exposure

Recommended Work Practices

- ☐ Inspection/Maintenance of Controls
- ☐ Proper water nozzle for wet methods
- ☐ Hoses for water or dust collection have proper flow of air or water.
- ☐ Wetting down silica before sweeping
- ☐ Modify work schedule to reduce number of employees exposed to silica.
- ☐ Respiratory Protection Required
- ☐ Houskeeping Practices

SECTION IV – Permit Review / Approval

Completed prior to the start of work.

Supervisor Approval: (Pre-Start Approval) Printed Name/Date:

Competant Person Review: Printed Name/Date:

TABLE 1: SPECIFIED EXPOSURE CONTROL METHODS WHEN WORKING WITH MATERIALS CONTAINING CRYSTALLINE SILICA

Equipment or Task	Engineering and Work Practice Control Methods	Respiratory Protection	
		≤ 4 hour shift	> 4 hour shift
(i) 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 manufacturer's instructions to minimize dust emissions.	None	None
(ii) 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. – When used outdoors. – When used indoors or in an enclosed area.	None APF 10	APF 10 APF 10
(iii) Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less)	For tasks performed outdoors only: • 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 must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency.	None	None
(iv) 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. – When used outdoors. – When used indoors or in an enclosed area.	None APF 10	None APF 10
(v) Drivable saws	For tasks performed outdoors only: • 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.	None	None
(vi) Rig-mounted core saws or drills	• Use tool equipped with integrated water delivery system that supplies water to cutting surface. • Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
(vii) 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 must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. • Use a HEPA-filtered vacuum when cleaning holes.	None	None
(viii) Dowel drilling rigs for concrete	For tasks performed outdoors only: • Use shroud around drill bit with a dust collection system. Dust collector must have a filter with 99% or greater efficiency and a filter-cleaning mechanism. • Use a HEPA-filtered vacuum when cleaning holes.	APF 10	APF 10
(ix) 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 the 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.	None None	None None
(x) Jackhammers and handheld powered chipping tools	• Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact. – When used outdoors. – When used indoors or in an enclosed area. 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 must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. – When used outdoors. – When used indoors or in an enclosed area.	None APF 10 None APF 10	APF 10 APF 10 APR 10 APF 10
(xi) 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 must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.	APF 10	APF 25

Equipment or Task	Engineering and Work Practice Control Methods	Respiratory Protection	
		≤ 4 hour shift	> 4 hour shift
(xii) Handheld grinders for uses other than mortar removal	For tasks performed outdoors only: • 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 must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism. – When used outdoors. – When used indoors or in an enclosed area.	None None None	None None APF 10
(xiii) 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 must provide the air flow recommended by the manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. • When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes.	None None	None None
(xiv) Small drivable milling machines (less than half lane)	• Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant. • Operate and maintain machine to minimize dust emissions.	None	None
(xv) Large drivable milling machines (half lane or 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 must be combined with a surfactant. • Operate and maintain machine to minimize dust emissions	None None None	None None None
(xvi) 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, conveyers, 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.	None	None
(xvii) 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.	None None	None None
(xviii) 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. OR • When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab.	None None	None None