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14 August 2010

CAPT Tim Radtke, CIH
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Office of Occupational Health and Safety
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CAPT Radtke:

I have enclosed a report of exposure assessments for Grand Staircase-Escalante National Monument as part of the DOI Exposure Assessment and Medical Surveillance Inclusion project. In the report you will find two attachments and guidance for reading and interpreting assessment results. One attachment presents the processes, tasks, and agents that were evaluated during the 16 March 2010 on-site visit with details of the associated exposure profiles that were developed. The other provides a health risk-based prioritized summary list of process-task-agent groups for control and further information gathering.

An Access database containing complete data and supporting documentation is available for download at www.BleicherCIH.com/DoleA4TR.html (please note that the page address is case sensitive). This database file will be updated periodically as assessments and profiles are completed for additional facilities.

Please do not hesitate to contact me if you have any questions.

Sincerely,

David P. Bleicher, CIH

Enclosure: Grand Staircase—Escalante National Monument Occupational Exposure Assessment

Grand Staircase—Escalante National Monument
Occupational Exposure Assessment and Medical Surveillance Inclusion
For
Department of Interior, Safety Council/Office of Health and Safety
On-site: 16 March 2010

Exposure assessments have been conducted as a part of the Department of Interior's Exposure Assessment and Medical Surveillance Inclusion Determination initiative. The objective of this effort is to document work processes at DOI facilities, describe the individual tasks associated with those processes, identify hazardous agents that are used or generated during the task, and characterize employee exposure to those agents. The ultimate goal is to identify similarly exposed groups (SEGs) within and between bureaus in order to facilitate exposure management requirements including exposure control, validation of medical surveillance, and prioritized use of limited occupational health resources.

Methods.

Exposure assessments were conducted following the strategy set forth by the American Industrial Hygiene Association's Exposure Assessment Strategies Committee for assessing and managing occupational exposures¹.

An on-site visit to the Grand Staircase—Escalante National Monument was conducted on 16 March 2010 by David P. Bleicher, CIH to characterize selected processes and collect information needed to develop task-agent exposure profiles. A number of methods were available and used to gather this information. Characterization of processes, tasks, conditions and controls, and agent identification was obtained through observation of work sites and facilities, documentation of procedures, material safety data sheets, and importantly, worker interview. Data useful for estimating exposure was obtained through screening and short term measurement, historical sampling data, mathematical modeling, and the scientific literature.

Two reports are provided for this facility (Attachments A and B). One presents the processes, tasks, and agents that were evaluated during the site visit along with details of the associated exposure profile. The other is a health risk-based prioritized summary list of process-task-agent groups for control and further information gathering.

Task-Agent Exposure Profile Detail Report.

Task-agent exposure profiles are based on observation and employee description of processes. Due to the nature of many DOI missions, processes and tasks can be highly variable—task duration, frequency, and operating conditions can differ from one iteration to another. Therefore, process and task characterizations were frequently, and necessarily, reported as “typical” with a range of conditions described. Judgments about worker exposure are based on the tasks as presented in this report. When actual processes or the conditions under which they are carried out differ from those recorded, the exposure profile and classification should not be generalized without appropriate consideration of variables.

Reading the Report.

¹ Bullock, Wm.H. and J.S.Ignacio, Eds. 2006. A Strategy for Assessing and Managing Occupational Exposures, 3rd. AIHA Press, Fairfax.

The Task-Agent Exposure Profile Detail Report is arranged in hierarchical fashion by Division or Project, Process, Task, and Agent. Process entries include a brief description of the process and when appropriate, unique operating conditions. Task entries include a brief characterization of the task, a description of any controls in place, the duration and frequency of occurrence, and appropriate recommendations. It should be noted that many task characterizations and agent exposure profiles will immediately suggest rather obvious recommendations. Some of these have been included in the report. However, in many cases it would not be appropriate to make definitive control recommendations without more careful consideration of control strategies and factors that would affect their efficacy (e.g. design, economic, and cultural factors) which is beyond the scope of the exposure assessment project.

Exposure Profile. Information used to develop the exposure profile is found for each Agent under a Task. It is important to understand that the exposure profile accounts for engineered and administrative controls and reflects potential worker exposure in the absence of personal protective equipment such as respirators.

- Exposure Category: Exposures have been categorized as Acceptable, Unacceptable, or Uncertain.
- OEL: The Occupational Exposure Limit or OEL is the threshold value used as a standard for comparison with the exposure estimate. OELs may describe full shift or short-term acceptable or unacceptable exposure limits.
- Exposure Rating & Exposure Estimate: When possible the Exposure Rating is based on quantitative data which yields an Exposure Estimate. In practice, very little quantitative information is available to support a judgment. In the absence of strong quantitative data, it is often practical and reasonable to categorize an exposure as acceptable, unacceptable, or uncertain based on qualitative or semi-quantitative information. However, in these cases it is difficult to assign intermediate exposure ratings as a fraction of the OEL, therefore an exposure rating of 4 is assigned to clearly unacceptable exposures and a rating of 1 for those that are clearly acceptable.
- Health Effects Rating: The Health Effects Rating reflects both the severity and permanence of the health impacts of an unacceptable exposure.
- Uncertainty Rating: The Uncertainty Rating provides an indicator of the level of certainty associated with the exposure profile. For example; exposure estimates based on definitive monitoring studies would be highly certain while profiles based on screening measurement, mathematical modeling, data from similar activities, or qualitative judgment may add degrees of uncertainty. Other factors that may affect the industrial hygienist's assignment of an uncertainty rating are inadequate understanding of health impacts by scientific community and excessive generalization of the task activity or conditions during the characterization process.
- Basis & Discussion: The Basis for the estimated exposure, its assignment to an exposure category, and the factors affecting certainty is given. A brief Discussion of available information and factors leading to judgments about the exposure profile is also provided.
- Risk/Control Priority: A Risk/Control Priority is calculated as the product of the Health Effects Rating and the Exposure Rating. Ratings range from 0 for the lowest risk exposures to a high of 16.
- FIG Priority: When uncertainty exists in the exposure profile, further information gathering may be required to resolve it. FIG Priority is calculated as the product of the Risk/Control Priority and the Uncertainty Rating. Both the Risk/Control Priority and the FIG Priority values may be used to more efficiently direct resources to control exposures and resolve exposure questions. FIG priority ratings range from a low of 0 to a high of 32.

Medical Surveillance. The exposure profile provides validation of, or indicates justification for, medical surveillance programs. In the report, medical surveillance is Justifiable when the exposure category is unacceptable or uncertain. Note that justifiable means simply that an unacceptable (or uncertain) exposure is identified. It does not suggest that medical surveillance is required, needed or even useful. On the other hand, some exposures are designated as Triggered or Critical Exposures. For unacceptable or uncertain exposure to some agents, medical surveillance may be triggered or required by regulation. A critical exposure refers to unacceptable or uncertain exposure to an agent which may pose very severe and irreversible health effects if not controlled. Examples include potent human carcinogens.

David P. Bleicher, CIH

14 August 2010

Attachment A: Task-Agent Exposure Profile Detail Report

Attachment B: Health Risk and Further Information Gathering Priorities Report

Task-Agent Exposure Profile Detail Report

Grand Staircase-Escalante National Monument

Maintenance Division

Process: *Paint Kiosks*

Wooden kiosks are primed with alkyd primer applied by brush and then spray painted with latex paint. Surfaces are prepared by manual scraping. Clean up is with water and detergent.

Operating Conditions:

Work is conducted on-site on previously installed kiosks.

Task: Apply Alkyd Primer

Alkyd primer is applied by brush as a spot touch up.

Frequency: Single Event

Duration: 1/2 - 1 hour

Controls:

Recommendation:

AGENT Petroleum Distillate

OEL: 500 ppm

Exposure Estimate: ppm

Health Effects Rating: 0 Reversible health effects of little concern

Exposure Rating: 1 (<10% OEL; 95th %tile <0.1 OEL)

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 0

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: OEL is PEL TWA. Task is of short duration, using small quantities. Agent has low V.P. and high threshold.

Medical Surveillance Justifiable no

Triggered or Critical Exposure no

Reference:

Task: Spray Paint Application

Latex paint is applied using a traditional paint sprayer with 1 pint canister at 35 psi. A fine mist is created. Thinned in the container with water as need. One large project may require 6 hours over a three day period. Projects may occur only once every 3-4 years. Quantity not reported.

Frequency: Single Event

Duration: 1 - 4 hours

Controls:

A worker is assigned as a spotter to monitor drift toward visitors and vehicles, keeping up wind.

Recommendation:

AGENT Ethylene glycol

OEL: 100 mg/m3

Exposure Estimate: mg/m3

Health Effects Rating: 1 Reversible health effects of concern

Exposure Rating: 1 (<10% OEL; 95th %tile <0.1 OEL)

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 1

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: SDS and product composition not available. OEL is TLV-C and is not expected to be exceeded.

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

AGENT Titanium dioxide

OEL: 10 mg/m3

Exposure Estimate: mg/m3

Health Effects Rating: 1 Reversible health effects of concern

Exposure Rating: 1 (<10% OEL; 95th %tile <0.1 OEL)

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 1

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: MSDS and composition of product not available. OEL is TLV and is not expected to be exceeded.

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

Process: Repair and Fabricate in Steel

Repair, fabricate, and install steel fixtures such as information kiosks. Process may require some surface grinding prior to welding, but grinding is minimal to maintain rustic appearance of the kiosk. Process may also include bullet hole repair and trailer repair.

Operating Conditions:

Work is conducted on-site in open areas

Task: Weld Steel, MIG

Frequency: Bi-Annually

Steel fixtures and equipment are fabricated or repaired using MIG with Weflux core wire, for finer work.

Duration: 1/2 - 1 hour

Controls:**Recommendation:****AGENT** Welding fume, NOS

OEL: 5 mg/m3

Exposure Estimate: mg/m3

Health Effects Rating: 1 Reversible health effects of concern

Exposure Rating: 1 (<10% OEL; 95th %tile <0.1 OEL)

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 1

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: NIOSH (HETA 85-252-1625) studies of indoor small parts production MIG and MAG welding operations have shown acceptable full shift exposure to welding fume agents.

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

Task: Weld Steel, Shielded Methal Arc

Frequency: Quarterly

Steel fixtures and equipment are fabricated or repaired using Stick welding methods and 7011 rod reported.

Duration: 1 - 4 hours

Controls:

Recommendation:

AGENT Welding fume, NOS

OEL: 5 mg/m3

Exposure Estimate: mg/m3

Health Effects Rating: 1 Reversible health effects of concern

Exposure Rating: 1 (<10% OEL; 95th %tile <0.1 OEL)

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 1

Basis: Qualitative Judgement

FIG Priority: 1

Discussion: MSDS 7011 not available. 6011 contains 90% iron and up to 5 % manganese; not chromium or nickle. Task duration variable. Task conducted out doors. NIOSH (HETA 85-252-1625) studies of indoor small parts production MIG and MAG welding operations have shown acceptable full shift exposure to welding fume agents.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

Process: Sign Fabrication, Wood

Trail signs are constructed in exterior grade plywood. A number of common woodshop tools are used in the construction process, including a table saw, jig saw (hand tool), and router. Finish work includes hand sanding and painting.

Operating Conditions:

Cutting work is reportedly conducted outdoors when weather permits. Otherwise it is conducted in the shop. No mechanical ventilation present.

Task: Apply Alkyd Enamel

Frequency: Monthly

Apply alkyd enamel paint to routed letters using a brush.

Duration: 1/2 - 1 hour

Controls:

Recommendation:

AGENT Ethylene glycol

OEL: 100 mg/m3

Exposure Estimate: mg/m3

Health Effects Rating: 1 Reversible health effects of concern

Exposure Rating: 1 (<10% OEL; 95th %tile <0.1 OEL)

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 1

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: Very short duration task involving very limited quantities of product.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

Task: Operate Power Hand Tools

Frequency: Monthly

Operate jig saw and router to form panels and cut letters.

Duration: 4 - 8 hours

Controls:

Recommendation:

AGENT Noise OEL: 85 dBA

Exposure Estimate: dBA Health Effects Rating: 3 Irreversible health effects of concern

Exposure Rating: 4 (>10% OEL; 95th %tile > OEL) Exposure Category: Unacceptable

Uncertainty: 0 Certain Risk/Control Priority: 12

Basis: Qualitative Judgement FIG Priority: 0

Discussion: Sound level measurements were not available for these tools, however, routers typically produce sound levels near the operator's ear approaching 100 dBA. At this level the allowable dose would be reached in 15 minutes. The reported duration of this task indicates these tools will be used for at least one hour in combination. Using the router alone or in combination with other power tool use during this process, the OEL is expected to be exceeded.

Medical Surveillance Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1010.95

AGENT Wood dust, all other species OEL: 1 mg/m3

Exposure Estimate: mg/m3 Health Effects Rating: 1 Reversible health effects of concern

Exposure Rating: 2 (10-50% OEL; 95th %tile 0.1-0.5 OEL) Exposure Category: Acceptable

Uncertainty: 1 Uncertain Risk/Control Priority: 2

Basis: Qualitative Judgement FIG Priority: 2

Discussion: Wood cut is softwood. OEL is TLV TWA. Duration of this task was reportedly long--between 4-8 hours. Continuous use for this duration is not expected but would result in wood dust exposure. Workers exposed to wood dusts have experienced a variety of adverse health effects such as eye and skin irritation, allergy, reduced lung function, asthma, and nasal cancer. Therefore, NIOSH recommends limiting wood dust exposures to prevent these health problems.

Medical Surveillance Justifiable no

Triggered or Critical Exposure no

Reference:

Task: Operate Table Saw

Frequency: Monthly

Operate table saw to cut plywood from 4x 8 sheets of exterior grade material down to finished size.

Duration: <1/2 hour

Controls:

Recommendation:

AGENT Noise

OEL: 85 dBA

Exposure Estimate: 0 dBA Health Effects Rating: 3 Irreversible health effects of concern

Exposure Rating: 4 (>10% OEL; 95th %tile > OEL) Exposure Category: Unacceptable

Uncertainty: 0 Certain Risk/Control Priority: 12

Basis: Qualitative Judgement FIG Priority: 0

Discussion: Sound level measurements were not available for this equipment, however, table saws typically produce sound levels near the operator's ear of about 100 dBA. At this level the allowable dose would be reached in 15 minutes. Used alone or in combination with other power tool use during this process, the OEL is expected to be exceeded.

Medical Surveillance Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1010.95

AGENT Wood dust, all other species

OEL: 1 mg/m3

Exposure Estimate: mg/m3 Health Effects Rating: 1 Reversible health effects of concern

Exposure Rating: 1 (<10% OEL; 95th %tile <0.1 OEL) Exposure Category: Acceptable

Uncertainty: 0 Certain Risk/Control Priority: 1

Basis: Qualitative Judgement FIG Priority: 0

Discussion: Wood cut is softwood. Saw blade expected to greater coarse particulate fraction. OEL is TLV TWA for respirable fraction and not expected to be exceeded for the process as it was described based of short duration of the task. Workers exposed to wood dusts may experience a variety of adverse health effects such as eye and skin irritation, allergy, reduced lung function, asthma, and nasal cancer. NIOSH recommends limiting wood dust exposures to prevent these health problems.

Medical Surveillance Justifiable no

Triggered or Critical Exposure no

Reference:

Task: Prime and Paint, Brush and Roller

Frequency: Monthly

Apply latex primers and topcoat using brush and roller. This task requires about 10 minutes for primer application, and, after curing, another 10 minutes to apply the top coat.

Duration: 1/2 - 1 hour

Controls:

Recommendation:

AGENT Ethylene glycol

OEL: 100 mg/m3

Exposure Estimate: mg/m3 Health Effects Rating: 1 Reversible health effects of concern

Exposure Rating: 1 (<10% OEL; 95th %tile <0.1 OEL) Exposure Category: Acceptable

Uncertainty: 0 Certain Risk/Control Priority: 1

Basis: Qualitative Judgement FIG Priority: 0

Discussion: MSDS and product composition not available. OEL is TLV-C and is not expected to be exceeded during very short duration with limited quantity and application method.

Medical Surveillance Justifiable no

Triggered or Critical Exposure no

Reference:

Resources Division, Paleontology Program

Process: Field Collection of Fossil Specimens

Methods are dependant on matrix. Shale requires more mechanical processes such as use of pick axe, hammers and chisels, while work in sandstone requires mechanized equipment such as demolition saws and jack hammers, as well as heavy sledges to expose fossils. Once exposed the fossils are treated with poly vinyl acetate (Vinac) dissolved in acetone to stabilize them. Specimens are then wrapped in paper and plaster before being transported.

Operating Conditions:

Work is conducted outdoors.

Task: Mix PVA Sealant

PVA is dissolved in acetone. A one liter nalgene bottle is filled approximately 3/4 full with acetone from a 1 gallon container. Sixty grams of PVA beads are measured and added to the acetone. The bottle is capped and the PVA is allowed to dissolve over a 48 hour period. Then it is shaken, then filled to a full 1 liter volume.

Frequency: Monthly

Duration: <1/2 hour

Controls:

Work is conducted outdoors.

Recommendation:

AGENT Acetone

OEL: 750 ppm

Exposure Estimate: 0 ppm

Health Effects Rating: 2 Severe, reversible health effects of concern

Exposure Rating: 1 (<10% OEL; 95th %tile <0.1 OEL)

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: OEL is STEL. Low to moderate concentrations may develop during transfers. Spills could result in unacceptable short-term exposures. Skin exposure may occur during transfers. Use of gloves was not reported.

Medical Surveillance Justifiable no

Triggered or Critical Exposure no

Reference:

Task: Operate Demolition Saw

Operate gas powered demolition saw to remove waste rock from around a fossil specimen. This tool may be used at 4 sites per year. This task may require 4-8 hours per day for approximately 8 days at each of the 4 sites.

Frequency:

Duration: 4 - 8 hours

Controls:

Work is selectively scheduled to be conducted when natural ventilation is favorable to remove dust plume generated.

Recommendation:

AGENT Noise

OEL: 85 dBA

Exposure Estimate: 0 dBA Health Effects Rating: 3 Irreversible health effects of concern

Exposure Rating: 4 (>10% OEL; 95th %tile > OEL) Exposure Category: Unacceptable

Uncertainty: 0 Certain Risk/Control Priority: 12

Basis: Available Literature FIG Priority: 0

Discussion: OEL is TLV. No sound level measurements were available for this piece of equipment, however, levels greater than 90 or 95 dBA would be expected. At 90 dBA the OEL would be exceeded after 2.5 hours and at 95 dBA the OEL would be exceeded in less than one hour. The reported duration of use was 4-8 hours per day. OSHA reports concrete joint cutter output at 99-102 dBA and partner saw TWA exposure (7 hr sample) of 98 dBA (note OSHA criteria will result in a dramatically lower value than ACGIH TLV).

Medical Surveillance Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1010.95

AGENT Silica, crystalline quartz

OEL: 0.25 mg/m3

Exposure Estimate: mg/m3 Health Effects Rating: 3 Irreversible health effects of concern

Exposure Rating: 3 (50-100% OEL; 95th %tile 0.5-1.0 OEL) Exposure Category: Uncertain

Uncertainty: 2 Highly Uncertain Risk/Control Priority: 9

Basis: Qualitative Judgement FIG Priority: 18

Discussion: Previous bulk samples of sandstone matrix showed 48% quartz silica suggesting high potential for crystalline silica dust generation, especially considering the possible duration of the task. Exposure is uncertain because work conducted outdoors and is reportedly selectively conducted when winds favor control of the dust that is generated. Also, as noted in May 2005 report of a laboratory process involving use of an air scribe tool on a similar matrix, high quartz silica in the matrix may not directly translate to high respirable crystalline silica.

Medical Surveillance Justifiable yes

Triggered or Critical Exposure no

Reference:

Task: Operate Jack Hammer

Frequency: 2 - 3 days/wk

Use portable, gas powered jack hammer to remove waste rock around fossil specimen. Work is conducted periodically, about four times per year and may require two days on site. Make and model of jack hammer was not reported

Duration: 4 - 8 hours

Controls:

Selectively schedule work to be conducted when natural ventilation is favorable to remove dust plume generated.

Recommendation:

AGENT Noise

OEL: 85 dBA

Exposure Estimate: 0 dBA Health Effects Rating: 3 Irreversible health effects of concern

Exposure Rating: 4 (>10% OEL; 95th %tile > OEL) Exposure Category: Unacceptable

Uncertainty: 0 Certain Risk/Control Priority: 12

Basis: Qualitative Judgement FIG Priority: 0

Discussion: No sound level measurements were available for this piece of equipment, however, levels greater than 90 or 95 dBA would be expected and could reach 110 dBA. At 90 dBA the OEL would be exceeded after 2.5 hours and at 95 dBA the OEL would be exceeded in less than one hour. At 110 dBA the OEL would be exceeded in just over 1 minute. The reported duration of use was 4-8 hours per day

Medical Surveillance Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1010.95

AGENT Silica, crystalline quartz

OEL: 0.025 mg/m3

Exposure Estimate: 0 mg/m3 Health Effects Rating: 3 Irreversible health effects of concern

Exposure Rating: 3 (50-100% OEL; 95th %tile 0.5-1.0 OEL) Exposure Category: Uncertain

Uncertainty: 2 Highly Uncertain Risk/Control Priority: 9

Basis: Qualitative Judgement FIG Priority: 18

Discussion: Previous bulk samples of sandstone matrix showed 48% quartz silica suggest high potential for crystalline silica dust generation, especially considering the possible duration of the task. Exposure is uncertain because work conducted out doors and is reportedly selectively conducted when winds favor control of the dust that is generated. Also, as noted in May 2005 report of a laboratory process involving use of an air scribe tool on a similar matrix, high quartz silica in the matrix may not directly translate to high respirable crystalline silica.

Medical Surveillance Justifiable yes

Triggered or Critical Exposure no

Reference:

Task: Stabilize Specimen with PVA Glue

Frequency: 2 - 3 days/wk

PVA glue is applied to the specimen using a disposable eye dropper or poured from a one liter nalgene bottle, then allowed to cure. This task requires approximately 5 minutes.

Duration: <1/2 hour

Controls:

Recommendation:

AGENT Acetone

OEL: 750 ppm

Exposure Estimate: ppm Health Effects Rating: 2 Severe, reversible health effects of concern

Exposure Rating: 1 (<10% OEL; 95th %tile <0.1 OEL) Exposure Category: Acceptable

Uncertainty: 0 Certain Risk/Control Priority: 2

Basis: Qualitative Judgement FIG Priority: 0

Discussion: OEL is STEL. Small quantities used outdoors.

Medical Surveillance Justifiable no

Triggered or Critical Exposure no

Reference:

AGENT Poly vinyl alcohol

OEL: mg/m3

Exposure Estimate: mg/m3

Health Effects Rating: Reversible health effects of little concern

Exposure Rating: (<10% OEL; 95th %tile <0.1 OEL)

Exposure Category:

Uncertainty: Certain

Risk/Control Priority:

Basis: Qualitative Judgement

FIG Priority:

Discussion: Not expected to be a health concern via inhalation, ingestion, or skin contact.

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

Task: Use Sledge Hammer and Chisel

Frequency: Daily

Use 3 and 5 pound geologist's sledge hammers striking a cold steel chisel. Frequency and duration is variable, but may be used at 5 to 10 sites per year, each requiring an average one week.

Duration: 4 - 8 hours

Controls:

Recommendation:

AGENT Noise

OEL: 140 dB

Exposure Estimate: dB

Health Effects Rating: Irreversible health effects of concern

Exposure Rating: (<10% OEL; 95th %tile <0.1 OEL)

Exposure Category:

Uncertainty: Uncertain

Risk/Control Priority:

Basis: Qualitative Judgement

FIG Priority:

Discussion: OEL is for impact noise. Sound levels produced are not known and frequency of strikes was not reported. Sound level of individual strikes is expected to be well below 140 dB. More frequent and lighter strikes may make this task a continuous noise risk.

Medical Surveillance	Justifiable	yes
	Triggered or Critical Exposure	yes
	Reference:	29 CFR 1010.95

AGENT Silica, crystalline quartz

OEL: mg/m3

Exposure Estimate: mg/m3

Health Effects Rating: Irreversible health effects of concern

Exposure Rating: (<10% OEL; 95th %tile <0.1 OEL)

Exposure Category:

Uncertainty: Uncertain

Risk/Control Priority:

Basis: Qualitative Judgement

FIG Priority:

Discussion: This task may be conducted concurrently with other dust generating tasks, however when conducted alone, OEL is not expected to be exceeded. Also, respirable fraction is expected to be lower using this method vice other power tools such as demolition saw and jack hammer.

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

Task: Wrap Fossils for Transport

Frequency:

Duration: 1 - 4 hours

Fossils are wrapped in a jacket of burlap and plaster to protect the specimen during transport to the laboratory. Burlap is cut into strips and dredged in plaster of paris that has been mixed in a 2 gallon dish tub. One to two minutes is required to mix a batch of Plaster of Paris. Ten to 15 batches may be required over the duration of a dig (3-4 batches in a day).

Controls:

Recommendation:

AGENT Plaster of Paris	OEL:	5 mg/m3
Exposure Estimate: 0 mg/m3	Health Effects Rating:	0 Reversible health effects of little concern
Exposure Rating: 1 (<10% OEL; 95th %tile <0.1 OEL)	Exposure Category:	Acceptable
Uncertainty: 0 Certain	Risk/Control Priority:	0
Basis: Qualitative Judgement	FIG Priority:	0

Discussion: OEL is 10 mg/m3 total and 5 mg/m3 respirable dust (Particulates NOS). Dust generated is calcium sulfate hemihydrate. Concentrations are not expected to exceed the OEL during mixing. Each batch requires from 4 to 5 pounds of dry plaster of paris. Use of barrier protections from dermal exposure to mixed plaster were not reported. Prolonged exposure of skin could result in irritation, dermatitis and drying of the skin.

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

Process: Process Paleontological Specimens

Fossils received from the field are cleaned in the laboratory. A cast saw is used to remove field applied plaster-burlap jacket. Dust is removed with a brush. Actone is used to soften the poly vinyl acetate glue that was applied in the field. Acetone contained in a jar is applied using a brush. Work is conducted at a lab bench. There could be more than one individual conducting the process at a time. Dental tools are used to remove the softened glue. Fine matrix removal is accomplished using air scribbing tools. Cracks are stabilized with ECA glue.

Operating Conditions:

Work is conducted in the laboratory.

Task: Clean Fossils

Frequency: 2 - 3 days/wk

Duration: 1 - 4 hours

Fossils received from the field are cleaned in the laboratory. Actone is used to soften the poly vinyl acetate glue that was applied in the field. Acetone contained in a jar is applied using a brush. Work is conducted at a lab bench. Task is conducted for 3 hours per day. There could be more than one individual conducting the process at a time. Dental tools are used to remove the softened glue. Volunteers from the Utah Friends of Paleontology are trained by Monument Paleontology program.

Controls:

None.

Recommendation:

AGENT Acetone

OEL: 500 ppm

Exposure Estimate: 23 ppm

Health Effects Rating: 2 Severe, reversible health effects of concern

Exposure Rating: 1 (<10% OEL; 95th %tile <0.1 OEL)

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 2

Basis: Screening Measurement

FIG Priority: 0

Discussion: OEL is TLV. A short term sample (22 minutes) collected while a single worker conducted this task showed an acetone breathing zone concentration of 23 ppm. Concentrations are expected to be greater when additional workers are conducting the task using the same quantities of acetone over a period of up to 3 hours, but not expected to exceed the OEL. The laboratory has capability of providing dilution ventilation via a nearby overhead hood.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

Task: Open Jacket

Frequency: Monthly

Use cast saw to remove field applied plaster-burlap jacket. Surfaces may be swept with a brush and cracks in the fossil stabilized with ECA glue.

Duration: 1 - 4 hours

Controls:

Recommendation:

AGENT Plaster of Paris

OEL: 5 mg/m3

Exposure Estimate: mg/m3

Health Effects Rating: 0 Reversible health effects of little concern

Exposure Rating: 1 (<10% OEL; 95th %tile <0.1 OEL)

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 0

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: OEL is 10 mg/m3 total and 5 mg/m3 respirable dust (Particulates NOS). Dust generated is calcium sulfate hemihydrate. Concentrations are not expected to exceed the OEL during the limited cutting required of this task over a 1-4 hour period.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

Task: Remove Matrix Material from Fossils

Frequency: 2 - 3 days/wk

Air Scribe tools (fine reciprocating chipper driven by compressed air) are used to remove matrix material from the fossil specimen. The air jet keeps work clear of debris. Work is conducted on a lab bench within a sand table. Hammers and chisels may be used to remove large pieces of material.

Duration: 4 - 8 hours

Controls:

Hepa filtered dry wall vacuum with flexible duct with hood within 4 inches of the work.

Recommendation:

AGENT Noise

OEL: 85 dBA
 Exposure Estimate: 87 dBA Health Effects Rating: 3 Irreversible health effects of concern
 Exposure Rating: 4 (>10% OEL; 95th %tile > OEL) Exposure Category: Unacceptable
 Uncertainty: 1 Uncertain Risk/Control Priority: 12
 Basis: Existing Quantitative Data FIG Priority: 12

Discussion: Noise dosimetry conducted May 2005 demonstrated a TWA exposure of 87 dBA while conducting this task (less than full shift).

Medical Surveillance Justifiable yes
 Triggered or Critical Exposure yes
 Reference: 29 CFR 1010.95

AGENT Radon

OEL: 4 pCu/L
 Exposure Estimate: 1 pCu/L Health Effects Rating: 4 Life threatening or disabling injury or illness
 Exposure Rating: 2 (10-50% OEL; 95th %tile 0.1-0.5 OEL) Exposure Category: Acceptable
 Uncertainty: 0 Certain Risk/Control Priority: 8
 Basis: Existing Quantitative Data FIG Priority: 0

Discussion: Sampling conducted in May 2005 showed laboratory radon concentrations of 1 pCu/L.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Silica, crystalline quartz

OEL: 0.025 mg/m3
 Exposure Estimate: ##### mg/m3 Health Effects Rating: 3 Irreversible health effects of concern
 Exposure Rating: 3 (50-100% OEL; 95th %tile 0.5-1.0 OEL) Exposure Category: Acceptable
 Uncertainty: 1 Uncertain Risk/Control Priority: 9
 Basis: Existing Quantitative Data FIG Priority: 9

Discussion: Matrix is sandstone. Personal exposure monitoring conducted in May 2005 demonstrated personal exposure of 0.16 mg/m3, respirable fraction, by gravimetric analysis and <0.024 mg/m3 for crystalline silica in the respirable fraction sample. Bulk analysis of the matrix material showed 48% quartz silica. HEPA filtered local exhaust system was apparently installed after the sampling occurred.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

Task: Stabilize Fossil, Medium Viscosity Glue

Frequency: Monthly

Joints and cracks are treated with medium viscosity cyanoacrylate glue using a hypodermic syringe and needle to stabilize fossils as the jacket is being removed. Glue is poured into small cups from which the syringe is filled. The syringe is flushed with acetone several times to clean it. Acetone is reused several times.

Duration: 1 - 4 hours

Controls:

Recommendation:

AGENT Acetone

OEL: 500 ppm

Exposure Estimate: ppmHealth Effects Rating: Severe, reversible health effects of concernExposure Rating: (<10% OEL; 95th %tile <0.1 OEL)Exposure Category: Uncertainty: CertainRisk/Control Priority:

Basis: Qualitative Judgement

FIG Priority:

Discussion: Based on quantity used (2 ml of product) and reported duration (1-4 hours) the OEL is not expected to be exceeded.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Ethyl cyanoacrylate

OEL: 0.2 ppm

Exposure Estimate: ppmHealth Effects Rating: Reversible health effects of concernExposure Rating: (<10% OEL; 95th %tile <0.1 OEL)Exposure Category: Uncertainty: CertainRisk/Control Priority:

Basis: Qualitative Judgement

FIG Priority:

Discussion: ECA reportedly used. OEL is TLV for MCA. Because ECA has a very low vapor pressure (0.17 mmHg) and only small quantities are used over a period of 1-4 hours the OEL is not expected to be exceeded.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

Task: Stabilize Fossils, Low Viscosity Glue

Frequency: Monthly

Fossils are stabilized by soaking specimen in a tray of low viscosity ethyl cyanoacrylate. ECA is diluted with acetone. Task is conducted under canopy hood and does not require constant attention.

Duration: 1 - 4 hours

Controls:

Task is conducted under canopy hood.

Recommendation:

AGENT Acetone

OEL: 500 ppm

Exposure Estimate: ppmHealth Effects Rating: Severe, reversible health effects of concernExposure Rating: (<10% OEL; 95th %tile <0.1 OEL)Exposure Category: Uncertainty: CertainRisk/Control Priority:

Basis: Engineering Controls in Place

FIG Priority:

Discussion: Approximately 10 ml of product is used in this task. Although the agent is has a high vapor pressure and would be expected to vaporize quickly, the task is conducted under a canopy hood and does not require constant attention of the worker (canopy hood would otherwise drawn vapor through the attending worker's breathing zone). Under these conditions, the TLV TWA and STEL are not expected to be exceeded.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Ethyl cyanoacrylate

OEL: 0.2 ppm

Exposure Estimate: ppm

Health Effects Rating: 1 Reversible health effects of concern

Exposure Rating: 1 (<10% OEL; 95th %tile <0.1 OEL)

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 1

Basis: Engineering Controls in Place

FIG Priority: 0

Discussion: OEL is TLV for MCE. Approximately 10 ml of product is used in this task. Task is conducted under a canopy hood and does not require constant attention of the worker (canopy hood would otherwise drawn vapor through the attending worker's breathing zone).

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

Health Risk and Further Information Gathering Priorities

Grand Staircase-Escalante National Monument

Division, Shop, Project	Process	Task	Agent	Exposure Category	Justified Medical Surveillance	Triggered Surveillance	Health Risk Priority	FIG Priority
Resources Division, Paleontology Program	Process Paleontological Specimens	Remove Matrix Material from Fossils	Noise	Unacceptable	yes	yes	12	12
Maintenance Division	Sign Fabrication, Wood	Operate Table Saw	Noise	Unacceptable	yes	yes	12	0
Resources Division, Paleontology Program	Field Collection of Fossil Specimens	Operate Jack Hammer	Noise	Unacceptable	yes	yes	12	0
Resources Division, Paleontology Program	Field Collection of Fossil Specimens	Operate Demolition Saw	Noise	Unacceptable	yes	yes	12	0
Maintenance Division	Sign Fabrication, Wood	Operate Power Hand Tools	Noise	Unacceptable	yes	yes	12	0
Resources Division, Paleontology Program	Field Collection of Fossil Specimens	Operate Jack Hammer	Silica, crystalline quartz	Uncertain	yes	no	9	18
Resources Division, Paleontology Program	Field Collection of Fossil Specimens	Operate Demolition Saw	Silica, crystalline quartz	Uncertain	yes	no	9	18
Resources Division, Paleontology Program	Process Paleontological Specimens	Remove Matrix Material from Fossils	Silica, crystalline quartz	Acceptable	no	no	9	9
Resources Division, Paleontology Program	Process Paleontological Specimens	Remove Matrix Material from Fossils	Radon	Acceptable	no	no	8	0
Resources Division, Paleontology Program	Field Collection of Fossil Specimens	Use Sledge Hammer and Chisel	Noise	Uncertain	yes	yes	3	3
Resources Division, Paleontology Program	Field Collection of Fossil Specimens	Use Sledge Hammer and Chisel	Silica, crystalline quartz	Acceptable	no	no	3	3
Maintenance Division	Sign Fabrication, Wood	Operate Power Hand Tools	Wood dust, all other species	Acceptable	no	no	2	2
Resources Division, Paleontology Program	Process Paleontological Specimens	Clean Fossils	Acetone	Acceptable	no	no	2	0
Resources Division, Paleontology Program	Field Collection of Fossil Specimens	Mix PVA Sealant	Acetone	Acceptable	no	no	2	0
Resources Division, Paleontology Program	Process Paleontological Specimens	Stabilize Fossil, Medium Viscosity Glue	Acetone	Acceptable	no	no	2	0
Resources Division, Paleontology Program	Field Collection of Fossil Specimens	Stabilize Specimen with PVA Glue	Acetone	Acceptable	no	no	2	0
Resources Division, Paleontology Program	Process Paleontological Specimens	Stabilize Fossils, Low Viscosity Glue	Acetone	Acceptable	no	no	2	0
Maintenance Division	Repair and Fabricate in Steel	Weld Steel, Shielded Metal Arc	Welding fume, NOS	Acceptable	no	no	1	1
Maintenance Division	Sign Fabrication, Wood	Apply Alkyd Enamel	Ethylene glycol	Acceptable	no	no	1	0
Maintenance Division	Repair and Fabricate in Steel	Weld Steel, MIG	Welding fume, NOS	Acceptable	no	no	1	0

Division, Shop, Project	Process	Task	Agent	Exposure Category	Justified Medical Surveillance	Triggered Surveillance	Health Risk Priority	FIG Priority
Maintenance Division	Sign Fabrication, Wood	Prime and Paint, Brush and Roller	Ethylene glycol	Acceptable	no	no	1	0
Maintenance Division	Sign Fabrication, Wood	Operate Table Saw	Wood dust, all other species	Acceptable	no	no	1	0
Maintenance Division	Paint Kiosks	Spray Paint Application	Ethylene glycol	Acceptable	no	no	1	0
Resources Division, Paleontology Program	Process Paleontological Specimens	Stabilize Fossils, Low Viscosity Glue	Ethyl cyanoacrylate	Acceptable	no	no	1	0
Resources Division, Paleontology Program	Process Paleontological Specimens	Stabilize Fossil, Medium Viscosity Glue	Ethyl cyanoacrylate	Acceptable	no	no	1	0
Maintenance Division	Paint Kiosks	Spray Paint Application	Titanium dioxide	Acceptable	no	no	1	0
Resources Division, Paleontology Program	Field Collection of Fossil Specimens	Stabilize Specimen wih PVA Glue	Poly vinyl alcohol	Acceptable	no	no	0	0
Maintenance Division	Paint Kiosks	Apply Alkyd Primer	Petroleum Distillate	Acceptable	no	no	0	0
Resources Division, Paleontology Program	Field Collection of Fossil Specimens	Wrap Fossils for Transport	Plaster of Paris	Acceptable	no	no	0	0
Resources Division, Paleontology Program	Process Paleontological Specimens	Open Jacket	Plaster of Paris	Acceptable	no	no	0	0