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10 September 2010

CAPT Tim Radtke, CIH
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CAPT Radtke:

I have enclosed a report of exposure assessments for Dinosaur 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 30-31 August 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: Dinosaur National Monument Occupational Exposure Assessment

Dinosaur National Monument
Occupational Exposure Assessment and Medical Surveillance Inclusion
For
Department of Interior, Safety Council/Office of Health and Safety
On-site: 30-31 August 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 Dinosaur National Monument was conducted on 30-31 August 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

10 September 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

Dinosaur National Monument

Maintenance Division

Process: Chimney Cleaning

Chimneys are cleaned using a chimney brush. Work is conducted from the roof. Creosote and other built up materials fall into closed cast iron wood stoves. A fireplace shovel is used to remove debris to an ash container. Twelve chimneys are cleaned annually in October. All 12 are cleaned in one day.

Operating Conditions:

Task: Clean Chimneys

Chimneys are cleaned using a chimney brush. Work is conducted from the roof. Creosote and other built up materials fall into closed cast iron wood stoves. A fireplace shovel is used to remove debris to an ash container. Twelve chimneys are cleaned annually in October. Each requires approximately 15 minutes. All 12 are cleaned in one day.

Frequency: Annually

Duration: 4 - 8 hours

Controls:

Recommendation:

AGENT Carbon Black

OEL: 3.5

Exposure Estimate:

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 3

Basis: Qualitative Judgement

FIG Priority: 3

Discussion: OEL is for carbon black, however REL is 0.2 mg/m3 in presence of polycyclic aromatic hydrocarbons. Exposure limited based on procedures described. Skin contact is an important route of exposure for PAHs that is not protected against during this task.

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

Process: Fabricate Gates

Gates for fuel storage area are fabricated.

Operating Conditions:

All work is conducted in the welding shop.

Task: Operate Cut-off Saw

Cut-off saw is used to cut tubing. Multiple cuts may be required during a shift. Actual cutting time is short and may typically be less than 30 seconds. Number of cuts varies with the project. Duration depends on material being cut.

Frequency:

Duration:

Controls:

Recommendation:

AGENT Noise

Exposure Estimate: dBA
 Exposure Rating: (>10% OEL; 95th %tile > OEL)
 Uncertainty: Certain
 Basis: Screening Measurement

OEL: 85 dBA

Health Effects Rating: Irreversible health effects of concernExposure Category: Risk/Control Priority: FIG Priority:

Discussion: Sound level measurements made during this task showed levels of 100 and 102 dBA at the operator's ear while cutting 2" square steel tubing. At these levels maximum dose is achieved in approximately 12 minutes. Additional tasks conducted in conjunction with this task such as grinding will quickly increase dose.

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

Task: Operate Grinder

Frequency:

Grind metal using Makita 9000BR Sander, w abrasive wheel. Duration and frequency of use of this tool vary with project.

Duration: <1/2 hour

Controls:

Recommendation:

AGENT Noise

Exposure Estimate: dBA
 Exposure Rating: (>10% OEL; 95th %tile > OEL)
 Uncertainty: Certain
 Basis: Screening Measurement

OEL: 85 dBA

Health Effects Rating: Irreversible health effects of concernExposure Category: Risk/Control Priority: FIG Priority:

Discussion: Sound level measurements made during this task showed levels of 105 and 107 dBA at the operator's ear while grinding 2" square steel tubing. At these levels maximum dose is achieved in as little as 3 minutes. Additional tasks conducted in conjunction with this task will increase dose.

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

Task: Weld Galvanized Steel

Frequency: Single Event

Galvanized pipe is welded using a MIG method. Entire project required 8 hours including cutting, preparing surfaces, and welding. Actual welding time was less than 1 hours. Project required 32 welds, each requiring approximately 1 minute to complete.

Duration: 1/2 - 1 hour

Controls:

Local exhaust ventilation available, however, its use and function was not determined.

Recommendation:

AGENT Zinc oxide fume

OEL: 10 mg/m3

Exposure Estimate: mg/m3

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

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

Exposure Category: Uncertain

Uncertainty: 2 Highly Uncertain

Risk/Control Priority: 8

Basis: Qualitative Judgement

FIG Priority: 16

Discussion: The OEL is NIOSH STEL. Other relevant OELs are PEL (5 mg/m3), NOISH C for zinc oxide (15 mg/m3) and TLV for zinc oxide (2 mg/m3, resp). Similar short duration galvanized welding projects have generated concentrations of greater than 1 mg/m3 total. Worker reported symptoms consistent with zinc oxide exposure after completing this task. Although individual welds are short duration, as many as 32 may be conducted in the welding shop during a shift.

Medical Surveillance Justifiable yes
 Triggered or Critical Exposure no
 Reference:

Process: General Heavy Equipment Operation

A range of heavy equipment is required to complete maintenance requirements. These include back hoes, skid loaders, and diesel powered compressors.

Operating Conditions:

Variable

Task: Operate Bobcat

Frequency: 2 - 3 days/wk

Bobcat multiple used to complete a range of maintenance functions. This equipment can be fitted with jack hammer, post hole digger, and loader, attachments. Duration and frequency of operation is variable, but may require extended use during large projects.

Duration: 1/2 - 1 hour

Controls:

Enclosed cab AC and Heat.

Recommendation:**AGENT** Noise

OEL: 85 dBA

Exposure Estimate: 0 dBA

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 3

Basis: Screening Measurement

FIG Priority: 0

Discussion: Sound level of 82 dBA was measured inside the cab at operating RPM, while equipment was on its trailer. Attachments were not evaluated.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure yes
 Reference: 29 CFR 1010.95

Task: Operate Garbage Truck

Frequency:

Garbage dumpsters are emptied and garbage is delivered and dumped. The task requires operation of the compactor at the rear of the truck approximately 3 times, each requiring less than one minute, for each of 20 dumpsters per day. In addition the operator must operate the forward compactor approximately 4 times per day with each operation requiring less than 5 minutes. Finally, forward hydraulics must be operated to dump the load, again requiring approximately 5 minutes.

Duration:

Controls:

Recommendation:

AGENT Noise

OEL: 85 dBA

Exposure Estimate: dBA

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 6

Basis: Mathematical Modeling

FIG Priority: 0

Discussion: Sound level measurement at the forward and rear operator stations, along with reported exposure duration yielded an estimated 33% of permissible dose in the absence of other noise sources.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure yes

Reference: 29 CFR 1010.95

Process: Seasonal Vehicle and Structure Cleaning

Vehicles of the fleet are winterized in the fall and stored over winter. In spring vehicles and structures are commissioned for seasonal use. Deer mice take up residence and will nest in vehicles, quarters, and other structures. Workers must clean infestation which may require the removal of nesting material, feces, urine, and carcasses.

Operating Conditions:

Task: Clean Stored Vehicles, Out houses, Cabins

Frequency: 2 - 3 days/wk

Seasonal Spring Cleaning. For vehicles, workers open vehicle doors and allow space to ventilate. Then a bleach and water solution is sprayed where there is evidence of feces or urine. The area is then vacuumed with a HEPA filtered vacuum cleaner, after which surfaces are hand wiped and cleaned with soap and water. Rodent infestation is particularly problematic in older vehicles. Approximately 15 vehicles require spring cleaning. Not required for vehicles driven year round. Similar procedures are used for 22 outhouses and 5 cabins.

Duration: 1/2 - 1 hour

Controls:

Workers are provided training in cleaning procedures.

Recommendation:

AGENT HantavirusOEL: Exposure Estimate: Health Effects Rating: Life threatening or disabling injury or illnessExposure Rating: (<10% OEL; 95th %tile <0.1 OEL)Exposure Category: Uncertainty: UncertainRisk/Control Priority:

Basis: Qualitative Judgement

FIG Priority:

Discussion: CDC statistics show that Colorado was among the states with greatest number of cases in the US in 2009 (70 of 500). Exposure risk is lessened by strict adherence to cleaning procedures such as use of natural ventilation, disinfectants, HEPA filtered vacuums, and respiratory protection.

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

Task: Mix Disinfecting Solution

Frequency: Weekly

A working solution of 10% chlorox brand bleach in water is mixed and loaded into 1 qt hand sprayers or a 1 gallon backpack sprayer

Duration: Incidental

Controls:

Recommendation:

AGENT Sodium HypochloriteOEL: Exposure Estimate: Health 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: Primary route of exposure is via spill or splash resulting in direct eye or skin contact with concentrate sodium hypochlorite solution.

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

Task: Rodent Removal

Frequency: Daily

Dead rodents are removed from vehicles or buildings. Some may be caught in snap or glue traps. Rodents and traps are sprayed with sodium hypochlorite solution and allowed to stand for 5 minutes. Rodents and traps are then placed into a zip lock bag and disposed of the in trash.

Duration: <1/2 hour

Controls:

Recommendation:

AGENT Hantavirus

OEL:

Exposure Estimate:

Health Effects Rating: 4 Life threatening or disabling injury or illness

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 4

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: CDC statistics show that Colorado was among the states with greatest number of cases in the US in 2009 (70 of 500). Exposure risk is lessened by strict adherence to cleaning procedures such as use of natural ventilation, disinfectants, HEPA filtered vacuums, and respiratory protection.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

Process: Sewage Pumping

Raw sewage is removed from vault toilets using pumper-tank truck.

Operating Conditions:

Task: Pump Sewage

Frequency:

Raw sewage is removed from vault toilets using pumper-tank truck. The truck has an exterior mounted gas powered pump. One operator is required to start and then operate valves adjacent to the running motor while another handles the suction hose. Each toilet is pumped once per year when it is reported full. There are 22 toilets. One day is required to pump and dump sewage from one toilet. Waste is dumped at the waste water facility. Splash potential exists.

Duration: 4 - 8 hours

Controls:

Workers require state waste water facility operator certification. Workers receive Hepatitis A and tetanus vaccination. Water wash down is available for cleaning and rinsing.

Recommendation:

AGENT Human waste products

OEL:

Exposure Estimate:

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

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 2

Basis: Available Literature

FIG Priority: 2

Discussion: Raw sewage may contain a variety of human pathogens. However, increased risk to sewer workers has not been established. Potential pathogens include Hepatitis A and cryptosporidium. Barrier protections reported will limit exposure to raw sewage. Although not reported, personal hygiene measures may further reduce risk to workers. Reference: Heymann DL (ed). Control of Communicable Diseases Manual, 19th Ed. Washington DC: APHA, 2008.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Noise

OEL: 85 dBA

Exposure Estimate: dBAHealth Effects Rating: Irreversible health effects of concernExposure Rating: (>10% OEL; 95th %tile > OEL)Exposure Category: Uncertainty: CertainRisk/Control Priority:

Basis: Mathematical Modeling

FIG Priority:

Discussion: Task reportedly requires over 4 hours per day. Exposure to hazardous noise is expected to be significantly less. Sound level measurement of pump motor at operator's position showed 105 dBA. At this level the maximum dose is achieved in approximately 6 minutes.

Medical Surveillance

Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1010.95

Process: Trails Maintenance

Sandstone is shaped using powered rock saws and jack hammers or, in wilderness areas, hand tools. Work is conducted as needed to maintain 24 miles of trail.

Operating Conditions:

Task: Operate Rock Saw

Frequency:

Cut and shape sandstone using Stihl TS510. Task is conducted rarely--approximately once in 5 years.

Duration: <1/2 hour

Controls:

Recommendation:

AGENT Noise

OEL: 85 dBA

Exposure Estimate: dBAHealth Effects Rating: Irreversible health effects of concernExposure Rating: (>10% OEL; 95th %tile > OEL)Exposure Category: Uncertainty: CertainRisk/Control Priority:

Basis: Screening Measurement

FIG Priority:

Discussion: Sound level measurement during rock cutting demonstration showed slightly less than 110 dBA at the operator's ear. At this level, the maximum permissible dose will be reached in less than 2 minutes. OEL is expected to be exceeded. Other noise hazardous trails work is will contribute to dose.

Medical Surveillance

Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1010.95

AGENT Particulates, 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: OEL is PEL, Respirable fraction, is not expected to be exceeded based on duration of task.

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: 2 (10-50% OEL; 95th %tile 0.1-0.5 OEL)

Exposure Category: Acceptable

Uncertainty: 2 Highly Uncertain

Risk/Control Priority: 6

Basis: Qualitative Judgement

FIG Priority: 12

Discussion: OEL is TLV, Respirable Fraction. Task is very short duration and conducted infrequently. It is not expected to exceed the OEL when considering duration alone. However, a thick plume of dust was developed during a demonstration cut. Harder sandstone resulted in a thicker dust plume and longer cut time.

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

Process: Woodworking

A variety of woodworking tools are used to repair and fabricate fixtures and parts of structures and may include projects such as structural trim work and building cabinets. Work may be completed in the woodshop using floor and bench mounted tools or in the shop and onsite using portable power tools.

Operating Conditions:

Work conducted in woodshop and on-site.

Task: Operate Floor and Bench Mounted Power Tools

Frequency:

Floor and bench mounted power tools are used to cut and shape woods including redwood, cedar, fir, pine, and medium density fiber board (MDF). Use of MDF is increasing in use. Frequency and duration are highly variable and project based. Estimated 40 days per year are spent on various projects.

Duration:

Controls:

Local exhaust ventilation system is in place. It's function was not evaluated, but heavy dust discharge observed from table saw (blast gate closed) suggests possible limited or ineffective use.

Recommendation:

AGENT Noise

OEL: 85 dBA

Exposure Estimate: dBAHealth Effects Rating: Irreversible health effects of concernExposure Rating: (>10% OEL; 95th %tile > OEL)Exposure Category: Uncertainty: CertainRisk/Control Priority:

Basis: Screening Measurement

FIG Priority:

Discussion: Sound level measurements of shop tools demonstrated operator exposure to hazardous noise levels up to 109 dBA.

Medical SurveillanceJustifiable Triggered or Critical Exposure

Reference: 29 CFR 1010.95

AGENT Wood dust, all other speciesOEL: mg/m3Exposure Estimate: mg/m3Health Effects Rating: Reversible health effects of concernExposure Rating: (50-100% OEL; 95th %tile 0.5-1.0 OEL)Exposure Category: Uncertainty: UncertainRisk/Control Priority:

Basis: Qualitative Judgement

FIG Priority:

Discussion: High dust generation levels were observed during tool demonstration indicating limited effectiveness of local exhaust ventilation system. Some tools were not equipped with local exhaust systems. Frequency and duration of use are variable, but is not expected to be high, based on reporting. OEL is not expected to be exceeded during typical projects. Uncertainty is based on large projects.

Medical SurveillanceJustifiable Triggered or Critical Exposure

Reference:

AGENT Wood dust, Western Red Cedar

OEL: 0.5 mg/m3

Exposure Estimate: mg/m3Health Effects Rating: Reversible health effects of concernExposure Rating: (<10% OEL; 95th %tile <0.1 OEL)Exposure Category: Uncertainty: UncertainRisk/Control Priority:

Basis: Qualitative Judgement

FIG Priority:

Discussion: Projects are less frequent and require less finish work that would result in fine particle generation. Exposure to western red cedar dust can result in the development of rhinitis, dermatitis, and asthma [ACGIH 1991]. Although wood dusts have long been associated with nasal cancer and pulmonary dysfunction, no reports in the available literature specifically describe these conditions in relation to exposure to western red cedar dust (OSHA Safety and Health Guidelines, Western Red Cedar).

Medical SurveillanceJustifiable Triggered or Critical Exposure

Reference:

Task: Operate Powered Portable Woodworking Tools

Frequency:

Portable powered woodworking tools are used to cut and shape woods including redwood, cedar, fir, pine, and medium density fiber board (MDF). Use of MDF is increasing in use. Frequency and duration are highly variable and project based. Estimated 40 days per year on are spent on various projects.

Duration:

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: 1 Uncertain

Risk/Control Priority: 12

Basis: Screening Measurement

FIG Priority: 12

Discussion: Sound level measurements of shop tools demonstrated operator exposure to hazardous noise levels up to 101 dBA. At the upper range, maximum dose will be reached in approximately 12 minutes.

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: 1 Uncertain

Risk/Control Priority: 1

Basis: Qualitative Judgement

FIG Priority: 1

Discussion: Some tools are used for finish work (such as sanders and routers) and so may be used for longer durations and produce finer particulate. Overall, frequency and duration of use are variable, but are not expected to be high, based on reporting. OEL is not expected to be exceeded during typical projects. Uncertainty is based on large projects.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

AGENT Wood dust, Western Red Cedar

OEL: 0.5 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: Projects are less frequent and require less finish work that would result in fine particulate generation. Exposure to western red cedar dust can result in the development of rhinitis, dermatitis, and asthma [ACGIH 1991]. Although wood dusts have long been associated with nasal cancer and pulmonary dysfunction, no reports in the available literature specifically describe these conditions in relation to exposure to western red cedar dust (OSHA Safety and Health Guidelines, Western Red Cedar).

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

Resources Management

Process: Invasive Species Management

Work typically involves one NPS employee working with a group of volunteers. As many as 400 volunteer may be involved in this process annually. Work employs primarily manual methods. Herbicides may be used seasonally in the summer in the canyon, targeting woody species.

Operating Conditions:

Task: Apply Garlon 4

Garlon 4 mixed with JLB Oil is applied to stumps of woody species such as Russian Olive and Tamarisk after branches and stems are removed by with a saw. Frequency and duration are variable. Duration depends on density of target species.

Frequency:

Duration:

Controls:

Recommendation:

AGENT Triclopyr

OEL:

Exposure Estimate:

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: Triclopyr is an irritant. Primary route of exposure is eye and skin contact.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

Task: Mix and Load Garlon 4

Frequency:

Duration: <1/2 hour

Garlon 4 herbicide is mixed directly into 2 gallon backpack or 1 quart hand sprayers and diluted with JLB oil. Garlon product is purchased in 2 gallon containers. Mixing is done at the facility's hazmat locker within a containment "pallet." Product is measured using a graduated measure then poured into the sprayer. Then JLB oil is poured from 2 gallon jugs to achieve a 1:4 Garlon to oil mixture. Mixing may be repeated during a several week period over the course of the year. Frequency varies with duration of project.

Controls:

Recommendation:

AGENT Triclopyr	OEL:	
Exposure Estimate:	Health Effects Rating:	2 Severe, reversible health effects of concern
Exposure Rating: 1 (<10% OEL; 95th %tile <0.1 OEL)	Exposure Category:	Acceptable
Uncertainty: 1 Uncertain	Risk/Control Priority:	2
Basis: Qualitative Judgement	FIG Priority:	2
Discussion: Triclopyr is an irritant. Primary route of exposure is eye and skin contact. Risk increases when transferring concentrated product.		
Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

Process: Paleontological Specimen Preparation and Storage

Laboratory preparation of paleontological specimens has not been conducted by NPS employees since 2006. This work is currently conducted by Brigham Young University students and faculty. Storage of specimens occurs at several locations on the site.

Operating Conditions:

Task: General Laboratory Specimen Storage

Frequency:

Duration:

Storage of laboratory specimens occurs at several locations on the Monument.

Controls:

Continuous monitoring for radon; exhaust ventilation.

Recommendation:

AGENT Radon	OEL:	4 pCu/L
Exposure Estimate: 3 pCu/L	Health Effects Rating:	4 Life threatening or disabling injury or illness
Exposure Rating: 1 (<10% OEL; 95th %tile <0.1 OEL)	Exposure Category:	Acceptable
Uncertainty: 0 Certain	Risk/Control Priority:	4
Basis: Existing Quantitative Data	FIG Priority:	0
Discussion: Continuous monitoring in storage locations with operating exhaust ventilation show levels below environmental exposure limit for residences.		
Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

Health Risk and Further Information Gathering Priorities

Dinosaur National Monument

Division, Shop, Project	Process	Task	Agent	Exposure Category	Justified Medical Surveillance	Triggered Surveillance	Health Risk Priority	FIG Priority
Maintenance Division	Woodworking	Operate Powered Portable Woodworking Tools	Noise	Unacceptable	yes	yes	12	12
Maintenance Division	Woodworking	Operate Floor and Bench Mounted Power Tools	Noise	Unacceptable	yes	yes	12	0
Maintenance Division	Sewage Pumping	Pump Sewage	Noise	Unacceptable	yes	yes	12	0
Maintenance Division	Fabricate Gates	Operate Cut-off Saw	Noise	Unacceptable	yes	yes	12	0
Maintenance Division	Trails Maintenance	Operate Rock Saw	Noise	Unacceptable	yes	yes	12	0
Maintenance Division	Fabricate Gates	Operate Grinder	Noise	Unacceptable	yes	yes	12	0
Maintenance Division	Fabricate Gates	Weld Galvanized Steel	Zinc oxide fume	Uncertain	yes	no	8	16
Maintenance Division	Trails Maintenance	Operate Rock Saw	Silica, crystalline quartz	Acceptable	no	no	6	12
Maintenance Division	General Heavy Equipment Operation	Operate Garbage Truck	Noise	Acceptable	no	yes	6	0
Maintenance Division	Seasonal Vehicle and Structure Cleaning	Clean Stored Vehicles, Out houses, Cabins	Hantavirus	Acceptable	no	no	4	4
Maintenance Division	Seasonal Vehicle and Structure Cleaning	Rodent Removal	Hantavirus	Acceptable	no	no	4	0
Resources Management	Paleontological Specimen Preparation and Storage	General Laboratory Specimen Storage	Radon	Acceptable	no	no	4	0
Maintenance Division	Woodworking	Operate Floor and Bench Mounted Power Tools	Wood dust, all other species	Acceptable	no	no	3	3
Maintenance Division	Chimney Cleaning	Clean Chimneys	Carbon Black	Acceptable	no	no	3	3
Maintenance Division	General Heavy Equipment Operation	Operate Bobcat	Noise	Acceptable	no	yes	3	0
Resources Management	Invasive Species Management	Mix and Load Garlon 4	Triclopyr	Acceptable	no	no	2	2
Maintenance Division	Sewage Pumping	Pump Sewage	Human waste products	Acceptable	no	no	2	2
Maintenance Division	Seasonal Vehicle and Structure Cleaning	Mix Disinfecting Solution	Sodium Hypochlorite	Acceptable	no	no	2	0
Resources Management	Invasive Species Management	Apply Garlon 4	Triclopyr	Acceptable	no	no	2	0
Maintenance Division	Woodworking	Operate Powered Portable Woodworking Tools	Wood dust, all other species	Acceptable	no	no	1	1
Maintenance Division	Woodworking	Operate Floor and Bench Mounted Power Tools	Wood dust, Western Red Cedar	Acceptable	no	no	1	1

Division, Shop, Project	Process	Task	Agent	Exposure Category	Justified Medical Surveillance	Triggered Surveillance	Health Risk Priority	FIG Priority
Maintenance Division	Trails Maintenance	Operate Rock Saw	Particulates, NOS	Acceptable	no	no	1	1
Maintenance Division	Woodworking	Operate Powered Portable Woodworking Tools	Wood dust, Western Red Cedar	Acceptable	no	no	1	0