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16 September 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 the National Interagency Fire Center 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 19-20 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: NIFC Occupational Exposure Assessment

National Interagency Fire Center
Occupational Exposure Assessment and Medical Surveillance Inclusion
For
Department of Interior, Safety Council/Office of Health and Safety
On-site: 19-20 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 the National Interagency Fire Center was conducted on 19-20 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

15 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

National Interagency Fire Center

Recondition Shop

Process: *Recondition Hand Tools*

A variety of fire suppression tools are reconditioned. In particular, this assessment targeted grinding tasks.

Operating Conditions:

All work is conducted in a dedicated grinding shop in which four grinding stations have been established.

Task: Sharpen Tools

Hand tools are ground at one of four large belt grinders. This task has been evaluated on several occasions. See supporting documents for reports of an engineering evaluation and design study of local exhaust ventilation; a study of ventilation system efficacy; and personal exposure monitoring results. As many as 1000 tools may be sharpened per day.

Frequency: Daily

Duration: 1 - 4 hours

Controls:

Local exhaust system is in place. Current system is a modification of long standing system. Flow rates at the face of the capture hoods were measured during this EA and demonstrated velocities ranged from 1780 to 1910 fpm. However, observation during grinding revealed that little particulate (observed as spark) entered the hood during most of the grinding demonstrations. Workers are administratively rotated so that time spent at grinder is typically less than 2 hours per day.

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: 0 Certain

Risk/Control Priority: 12

Basis: Screening Measurement

FIG Priority: 0

Discussion: OEL is TLV. Screening sound level measurements were used to estimate a dose of 162.5 % of the acceptable limit during a 2 hour exposure. Dosimetry data obtained in 2006 for this task demonstrated a TWA exposure of 88.2 dBA over an unspecified sample duration.

Medical Surveillance

Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1010.95

AGENT Particulates, NOC/R

OEL: 5 mg/m3

Exposure Estimate: 1.3 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: Existing Quantitative Data

FIG Priority: 2

Discussion: OEL is PEL (respirable); PEL for total particulate is 15 mg/m3. Previous sampling revealed total particulate concentrations of 7.07 and 10.1 mg/m3 during this task resulting in 8 hour TWAs of 0.91 and 1.3 mg/m3. Since these samples were collected, improvements in the local exhaust system have been made, such as improved capture velocity and make up air (however, capture efficacy deficiencies were noted), which may reduce particulate exposure. In addition increased capture velocities may have improved capture of respirable fraction. Administrative controls reduce individual exposure to approximately 2 hours. OEL is not expected to be exceeded under these conditions.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

Remote Sensing/Fire Weather Support Unit

Process: Maintaining Remote Weather Stations

Technicians trouble shoot, repair and refurbishment remote weather station componenants.

Operating Conditions:

Task: Soldering

Frequency:

Soldering is required during fabrication and repair of electronic components and fabrication of cables. Frequency and duration are variable, but may require up to a full shift. There are multiple workstations in the work space. A "solder sucker" is used to remove and capture, and filter molten solder. Traditional soldering iron opertes at 700-800 F. Lead-tin solder 60/40 44 rosin core is used.

Duration:

Controls:

A recirculating high efficiency filter system referred to as a "solder sucker" is used to remove molten solder from a board.

Recommendation:

AGENT Lead

OEL: 50 ug/m3

Exposure Estimate: 0 ug/m3

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: Existing Quantitative Data

FIG Priority: 0

Discussion: Personal exposure monitoring conducted 7/17/07 demonstrated concentrations of lead below the limit of detection during spot soldering work using lead-tin solder.

Medical Surveillance Justifiable no
Triggered or Critical Exposure yes
Reference: 29 CFR 1910.1025

Process: Refinish Weather Station Components

Weather station sensors and components are painted. One or more technicians will paint each day.

Operating Conditions:

Task: Abrasive Blasting

Weather station components are blasted in an enclosed glove box using aluminum oxide or glass beads or a combination of the two materials. Duration is very short; less than 2 minutes. The blaster may be used several times per day.

Frequency: Daily

Duration: <1/2 hour

Controls:

Work is conducted within a ventilated glove box blasting unit.

Recommendation:

AGENT Noise

OEL: 85 dBA

Exposure Estimate: 76 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: Screening Measurement

FIG Priority: 0

Discussion: Sound level measurement of the blaster in operation showed that the equipment produced hazardous noise at 91.2 dBA at the operator's position. Short duration exposure will not result in exceedance of the OEL. The estimated dose with a typical duration of 15 minutes will result in a dose of approximately 13%.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure yes

Reference: 29 CFR 1010.95

AGENT Particulates, NOC/R

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: Engineering Controls in Place

FIG Priority: 0

Discussion: OEL is PEL, respirable fraction. Based on short duration of task and adequate engineering controls in place the OEL is not expected to be exceeded.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

Task: Apply Humiseal

Humiseal product is applied as an aerosol to seal aluminum components, but may also be used on steel parts.

Frequency: 2 - 3 days/wk

Duration: <1/2 hour

Controls:

Work is conducted in paint booth. Hood face is approximately 4 ft X 3 ft. Face velocity measurements demonstrated that velocity was consistently within a range of 61-79 fpm across the face, with the exception that the velocity in the lower right corner was 45 fpm.

Recommendation:

AGENT Acetone

OEL: 750 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: Percent composition of agent in product was not available. Less than one 12-16 oz can reportedly used per day. OEL is TLV-STEL. Engineering controls in place, limited quantities, and short duration make exposure greater than the OEL unlikely.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Methyl ethyl ketone

OEL: 300 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: Percent composition of agent in product was not available. Less than one 12-16 oz can reportedly used per day. OEL is TLV-STEL. Engineering controls in place, limited quantities, and short duration make exposure greater than the OEL unlikely.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Toluene

OEL: 20 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: Percent composition of agent in product was not available. Less than one 12-16 oz can reportedly used per day. OEL is TLV. Engineering controls in place, limited quantities, and short duration make exposure greater than the OEL unlikely.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

Task: Apply Paint

Frequency: Daily

Components taken down to bare metal are painted using an aerosol product (Krylon 1501). Task is typically very short, requiring approximately 2 minutes per job. An individual technician may complete 12-15 jobs on a high volume day.

Duration: <1/2 hour

Controls:

Work is conducted in paint booth. Hood face is approximately 4 ft X 3 ft. Face velocity measurements demonstrated that velocity was consistently within a range of 61-79 fpm across the face, with the exception that the velocity in the lower right corner was 45 fpm.

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:	Engineering Controls in Place	FIG Priority: 0
Discussion:	Product contains 30-50% agent. Approximately one 12-16 oz can is used per day. OEL is TLV-STEL. Engineering controls in place, limited quantities, and short duration make exposure greater than the OEL unlikely.	
Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

AGENT Methyl ethyl ketone	OEL:	300 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:	Engineering Controls in Place	FIG Priority: 0
Discussion:	Product contains 5-10% agent. Approximately one 12-16 oz can is used per day. OEL is TLV-STEL. Engineering controls in place, limited quantities, and short duration make exposure greater than the OEL unlikely.	
Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

AGENT Xylenes

OEL: 150 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: Engineering Controls in Place

FIG Priority: 0

Discussion: Product contains 10-30% agent. Approximately one 12-16 oz can is used per day. OEL is TLV-STEL. Engineering controls in place, limited quantities, and short duration make exposure greater than the OEL unlikely.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

Task: Apply Primer

Frequency:

Components taken down to bare metal are primed using an aerosol product containing acetone, xylene, and ethylbenzene. Task is typically very short, requiring from a couple of minutes up to 12-15 minutes per day during an 8-10 hour shift. Priming is required for 3-5% of sensors.

Duration:

Controls:

Work is conducted in the paint booth. Hood face is approximately 4 ft X 3 ft. Face velocity measurements demonstrated that velocity was consistently within a range of 61-79 fpm across the face, with the exception that the velocity in the lower right corner was 45 fpm.

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: Engineering Controls in Place

FIG Priority: 0

Discussion: Percent composition of agent in product was not available. Less than one 12-16 oz can reportedly used per day. OEL is TLV-STEL. Engineering controls in place, limited quantities, and short duration make exposure greater than the OEL unlikely.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Ethylbenzene

OEL: 125 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: Engineering Controls in Place

FIG Priority: 0

Discussion: Percent composition of agent in product was not available. Less than one 12-16 oz can reportedly used per day. OEL is TLV-STEL. Engineering controls in place, limited quantities, and short duration make exposure greater than the OEL unlikely.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Xylenes

OEL: 150 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: Engineering Controls in Place

FIG Priority: 0

Discussion: Percent composition of agent in product was not available. Less than one 12-16 oz can reportedly used per day. OEL is TLV-STEL. Engineering controls in place, limited quantities, and short duration make exposure greater than the OEL unlikely.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

Task: Remove Paint and Corrosion, Manual

Frequency: Daily

Paint and corrosion are removed using scratch pads (Scotch Brite), files, and 409 cleaner. Cleaning requirement is variable and dependant on the location that the station was used, duration of use, and environmental conditions. Cleaning of heavy soil is conducted in the shop bay otherwise cleaning is conducted in the electronics shop.

Duration: 1 - 4 hours

Controls:

Some technicians reportedly may use disposable N95 or N100 filtering face pieces during this task.

Recommendation:**AGENT Particulates, NOC/R**

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 for respirable fraction. Based on duration and use of manual methods, OEL is not expected to be exceeded.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

Small Engine Repair Shop

Process: Mark 3 Pump Reconditioning

Mark 3 water pumps are reconditioned after being received from the field. After reconditioning, each pump undergoes a 5-10 minute test procedure at the ventilated and enclosed test bench.

Operating Conditions:

Run up tests are conducted within an enclosed test room equipped with exhaust ventilation.

Task: Clean Parts

Parts are cleaned in a parts washer using Solvent 142-66.

Frequency: Bi-Monthly

Duration: <1/2 hour

Controls:

Recommendation:

AGENT Naphthenic Distilate

OEL: 5 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: 1 Uncertain

Risk/Control Priority: 1

Basis: Qualitative Judgement

FIG Priority: 1

Discussion: Product reported as Solvent 142-66. MSDS for this product shows agent is Solvent Naphtha CAS #64742-88-7. OEL is TLV. Duration is typically short. OEL is not expected to be exceeded.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

Task: Mark 3 Pump "Run Up"

Reconditioned pumps are "run up" to test their function. Testing requires 5-10 minutes. As many as 8 pumps may be tested per day per person.

Frequency:

Duration: 1/2 - 1 hour

Controls:

Testing is conducted in a dedicated room equipped with local exhaust ventilation and acoustical material. Centerline velocity of the approximately 4 inch diameter exhaust duct was recorded at greater than 2500 fpm.

Recommendation:

AGENT Carbon Monoxide

OEL: 200 ppm

Exposure Estimate: ppm

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: Screening Measurement

FIG Priority: 0

Discussion: OEL is REL-C. During observed testing, the duct to the local exhaust system became disconnected from the engine's exhaust. Grab sampling with colormetric detector tube demonstrated a CO concentration of approximately 10 ppm.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

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: Screening Measurement

FIG Priority: 0

Discussion: Screening sound level measurement demonstrated 99 dBA at the mechanics ear during run up. At this level, the maximum dose will be reached after approximately 20 minutes. At reported the frequency and duration of this task, OEL is expected to be exceeded.

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

Smoke Jumpers**Process:** Equipment Fabrication

The hot knife is used to cut and finish edges of nylon fabric and webbing when fabricating equipment such as harnesses, bags, parachute containers.

Operating Conditions:

Shop Facility.

Task: Hot Knife

Frequency: Daily

The hot knife is used to cut and finish edges of nylon fabric and webbing when fabricating equipment such as harnesses, bags, parachute containers. Work may be conducted by up to 50 smoke jumpers, however most of this work is conducted by a core of 20-30 individuals. Maximum duration is 1 hour and frequency is variable. Task may be conducted daily in certain seasons, particularly during October through December.

Duration: 1/2 - 1 hour

Controls:

Work is conducted under a canopy hood that has been converted to provide a 6 inch flexible local exhaust duct and unflanged hood. Centerline velocity was 850 fpm at the face. A 25 fpm contour may be approximated by the following distances from the hood face (facing the hood): 90 deg left: 16"; 45 deg left: 15"; centerline: 12"; 45 deg right: 12"; 90 deg right: <12" (within the plastic curtain).

Recommendation:

AGENT Hydrogen cyanide	OEL:	4.7 ppm
Exposure Estimate: 0 ppm	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: Engineering Controls in Place	FIG Priority:	0
<p>Discussion: OEL is TLV-C. Personal sampling conducted during this task in June 2004 showed airborne concentrations of less than the limit of detection. In addition, ventilation system is capable of capturing and removing most thermal decomposition products that are generated when work is conducted close to the exhaust hood as was reported and demonstrated.</p>		
<p>Medical Surveillance</p> <p>Justifiable no</p> <p>Triggered or Critical Exposure no</p> <p>Reference:</p>		

AGENT Nitrogen dioxide	OEL:	4.7 ppm
Exposure Estimate: 0.05 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
<p>Discussion: OEL is REL-STEL. Personal sampling conducted during this task in June 2004 showed airborne concentrations of 0.045 ppm. In addition, the ventilation system is capable of capturing and removing most thermal decomposition products that are generated when work is conducted close to the exhaust hood as was reported and demonstrated.</p>		
<p>Medical Surveillance</p> <p>Justifiable no</p> <p>Triggered or Critical Exposure no</p> <p>Reference:</p>		

Wildland Fire Fighting General Operations.

Process: Fire Suppression

Anchor, flank and control wildfire. Direct or indirect may be implemented, but circumstance may still require operations to be conducted within areas which contain a number of unique hazards. These include H2S near oil and gas pads, uranium mines, eronite containing dust, naturally occurring asbestos, and pathogenic organisms such as the Valley Fever causal agent. There are approximately 8400 DOI wildland firefighters nation-wide, including 3600 from the BLM. Shifts typically do not exceed 16 hours. Assignments are from 14 to 21 days with a required 2 days off before the next assignment.

Operating Conditions:

Task: Fire Suppression in Way of Oil and Gas Pads

Fire fighters have been required to enter oil and gas pad areas where sour crude is being pumped.

Controls:

Recommendation:

Frequency: Daily

Duration: extended shift

AGENT Hydrogen sulfide

OEL: 15 ppm

Exposure Estimate: ppm

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

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

Exposure Category: Uncertain

Uncertainty: 2 Highly Uncertain

Risk/Control Priority: 16

Basis: Available Literature

FIG Priority: 32

Discussion: OEL is TLV. Other applicable OELs are TLV-STEL 5 ppm, NIOSH C 20ppm as a single peak within a shift. Recognition of the characteristic odor and development of symptoms in firefighters working in oil fields has been documented. Attempts to quantify exposure failed as a result of problems with instrumentation. GM odor detection concentration is 0.0094 ppm (AIHA Odor Thresholds). ASTR reports odor is detectable at about 0.5 ppb, but olfactory nerve fatigue occurs in 2 to 15 minutes at concentrations over 100 ppm. Exposure is uncertain.

Medical Surveillance	Justifiable	yes
	Triggered or Critical Exposure	no
	Reference:	

Task: Wildland Firefighting in Way of Eronite

Frequency: Daily

Fire fighters have been required to enter and work in areas where eronite occurs, presenting a fiber exposure potential.

Duration: extended shift

Controls:

Recommendation:

AGENT Eronite

OEL:

Exposure Estimate:

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

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

Exposure Category: Uncertain

Uncertainty: 2 Highly Uncertain

Risk/Control Priority: 16

Basis: Available Literature

FIG Priority: 32

Discussion: Eronite is an asbestos-like mineral that occurs in many Western states, is associated with gravel mining, and linked to mesothelioma. Exposure to eronite as a result of surface mining gravel in North Dakota has received attention. Exposure data applicable to firefighters is not available.

Medical Surveillance	Justifiable	yes
	Triggered or Critical Exposure	no
	Reference:	

Task: Wildland Firefighting in Way of Naturally Occuring Asbestos

Frequency: Daily

Fire fighters have been required to enter and work in areas where naturally occuring asbestos occurs.

Duration: extended shift

Controls:

Recommendation:

AGENT Asbestos

OEL: 50 ug/m3

Exposure Estimate: ug/m3

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

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

Exposure Category: Uncertain

Uncertainty: 2 Highly Uncertain

Risk/Control Priority: 16

Basis: Available Literature

FIG Priority: 32

Discussion: In areas where it occurs naturally in surface material, asbestos can occur in high levels. Aggressive fire suppression tasks would be expected to create airborne fibers at levels of concern. Quantitative data on firefighter exposure at these locations is not available.

Medical Surveillance

Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1910.1001

Health Risk and Further Information Gathering Priorities

National Interagency Fire Center

Division, Shop, Project	Process	Task	Agent	Exposure Category	Justified Medical Surveillance	Triggered Surveillance	Health Risk Priority	FIG Priority
Wildland Fire Fighting General Operations.	Fire Suppression	Wildland Firefighting in Way of Naturally Occuring Asbestos	Asbestos	Uncertain	yes	yes	16	32
Wildland Fire Fighting General Operations.	Fire Suppression	Fire Suppression in Way of Oil and Gas Pads	Hydrogen sulfide	Uncertain	yes	no	16	32
Wildland Fire Fighting General Operations.	Fire Suppression	Wildland Firefighting in Way of Eronite	Eronite	Uncertain	yes	no	16	32
Recondition Shop	Recondition Hand Tools	Sharpen Tools	Noise	Unacceptable	yes	yes	12	0
Small Engine Repair Shop	Mark 3 Pump Reconditioning	Mark 3 Pump "Run Up"	Noise	Unacceptable	yes	yes	12	0
Remote Sensing/Fire Weather Support Unit	Refinish Weather Station Components	Abrasive Blasting	Noise	Acceptable	no	yes	6	0
Smoke Jumpers	Equipment Fabrication	Hot Knife	Hydrogen cyanide	Acceptable	no	no	4	0
Small Engine Repair Shop	Mark 3 Pump Reconditioning	Mark 3 Pump "Run Up"	Carbon Monoxide	Acceptable	no	no	4	0
Remote Sensing/Fire Weather Support Unit	Maintaining Remote Weather Stations	Soldering	Lead	Acceptable	no	yes	3	0
Recondition Shop	Recondition Hand Tools	Sharpen Tools	Particulates, NOC/R	Acceptable	no	no	2	2
Remote Sensing/Fire Weather Support Unit	Refinish Weather Station Components	Apply Primer	Acetone	Acceptable	no	no	2	0
Remote Sensing/Fire Weather Support Unit	Refinish Weather Station Components	Apply Primer	Xylenes	Acceptable	no	no	2	0
Remote Sensing/Fire Weather Support Unit	Refinish Weather Station Components	Apply Primer	Ethylbenzene	Acceptable	no	no	2	0
Remote Sensing/Fire Weather Support Unit	Refinish Weather Station Components	Apply Paint	Acetone	Acceptable	no	no	2	0
Remote Sensing/Fire Weather Support Unit	Refinish Weather Station Components	Apply Paint	Methyl ethyl ketone	Acceptable	no	no	2	0
Remote Sensing/Fire Weather Support Unit	Refinish Weather Station Components	Apply Paint	Xylenes	Acceptable	no	no	2	0
Remote Sensing/Fire Weather Support Unit	Refinish Weather Station Components	Apply Humiseal	Methyl ethyl ketone	Acceptable	no	no	2	0
Remote Sensing/Fire Weather Support Unit	Refinish Weather Station Components	Apply Humiseal	Toluene	Acceptable	no	no	2	0
Remote Sensing/Fire Weather Support Unit	Refinish Weather Station Components	Apply Humiseal	Acetone	Acceptable	no	no	2	0
Small Engine Repair Shop	Mark 3 Pump Reconditioning	Clean Parts	Naphthenic Distillate	Acceptable	no	no	1	1

Division, Shop, Project	Process	Task	Agent	Exposure Category	Justified Medical Surveillance	Triggered Surveillance	Health Risk Priority	FIG Priority
Remote Sensing/Fire Weather Support Unit	Refinish Weather Station Components	Remove Paint and Corrosion, Manual	Particulates, NOC/R	Acceptable	no	no	1	1
Remote Sensing/Fire Weather Support Unit	Refinish Weather Station Components	Abrasive Blasting	Particulates, NOC/R	Acceptable	no	no	1	0
Smoke Jumpers	Equipment Fabrication	Hot Knife	Nitrogen dioxide	Acceptable	no	no	1	0