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28 October 2010

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

I have enclosed a report of exposure assessments for the Southeast Ecological 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 22-23 June 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](http://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: Southeast Ecological Center Occupational Exposure Assessment

Southeast Ecological Center  
Occupational Exposure Assessment and Medical Surveillance Inclusion  
For  
Department of Interior, Safety Council/Office of Health and Safety  
On-site: 22-23 June 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 exposures<sup>1</sup>.

An on-site visit to the Southeast Ecological Center was conducted on 22-23 June 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.*

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<sup>1</sup> Bullock, Wm.H. and J.S.Ignacio, Eds. 2006. A Strategy for Assessing and Managing Occupational Exposures, 3<sup>rd</sup>. 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  
28 October 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

## Southeast Ecological Center

### Facilities Maintenance

**Process:** Fabrication in Aluminum

Items for field operations are fabricated from aluminum. The process requires cutting aluminum using the plasma torch or mechanical methods. Projects tend to present about once per month and may require several days to complete.

Operating Conditions:

**Task:** Cut Aluminum

Frequency: Monthly

Aluminum is cut using a band saw or compound miter saw.

Duration: <1/2 hour

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: Uncertain

Uncertainty: 1 Uncertain

Risk/Control Priority: 12

Basis: Qualitative Judgement

FIG Priority: 12

Discussion: Sound level and dosimetry data were not available for this task. Both pieces of equipment may produce hazardous noise. Similar equipment used during similar tasks can generate sound levels greater than 100 dBA. At this level the OEL will be exceeded in approximately 18 minutes.

Medical Surveillance

Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1010.95

**Task:** Cut Aluminum, Plasma Cutter

Frequency: Monthly

Cut aluminum using the plasma cutter.

Duration: <1/2 hour

Controls:

Task is conducted outside the shop.

Recommendation:

**AGENT** Aluminum

OEL: 1 mg/m3

Exposure Estimate: mg/m3

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

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: OEL is TLV. Based on the short duration and limited number of cuts OEL is not expected to be exceeded during this task.

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

**Task:** Prepare Joints with Grinder and Belt Sander

Frequency: Monthly

Joints are prepared for welding by grinding with an electric grinder or belt sander.

Duration: &lt;1/2 hour

Controls:

Recommendation:

**AGENT** Noise

OEL: 85 dBA

Exposure Estimate: dBA

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Unacceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 12

Basis: Available Literature

FIG Priority: 12

Discussion: Sound level and dosimetry data were not available for this task and equipment. Similar grinding equipment is known to produce over 105 dbA when grinding metal. At this level the OEL will be exceeded in less than 5 minutes.

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

**AGENT** Particulates, NOC/R

OEL: 15 mg/m3

Exposure Estimate: mg/m3

Health Effects Rating: 1 Reversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 1

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: OEL is PEL for total particulates. OEL is not expected to be exceeded during this task based on its duration.

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

**Task:** Weld Aluminum

Frequency: Monthly

Weld aluminum using MIG or TIG processes.

Duration: 1 - 4 hours

Controls:

Recommendation:

**AGENT** Aluminum OEL: 2 mg/m3

Exposure Estimate: 1.4 mg/m3 Health Effects Rating: 2 Severe, reversible health effects of concern

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

Uncertainty: 0 Certain Risk/Control Priority: 6

Basis: Available Literature FIG Priority: 0

Discussion: Literature reports median aluminum exposure of studied welders in industrial settings as 1.4 mg/m3. In contrast with heavy industrial settings, projects conducted at this facility are expected to be smaller, generally of shorter duration, with the workers conducting numerous tasks such as layout and cutting in addition to welding.

<b>Medical Surveillance</b>	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

**Process:** Fabrication in Steel

Items for facility and field operations are fabricated in steel. Stock pipe is typically used. MIG, TIG or SMAW methods may be used. Process typically occurs once per month. Approximately 80% of the welding is completed using the MIG method.

Operating Conditions:

**Task:** Clean Steel

Frequency: Bi-Annually

Acetone is used to remove coating on stock steel. Solvent is applied with a rag.

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: Product is DuPont Oil and Grease Remover. OEL is TLV-STEL. A very small quantity is used infrequently over a short duration.

<b>Medical Surveillance</b>	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

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**Task:** Weld Steel

Frequency: Monthly

Weld mild steel using the MIG method.

Duration: 1 - 4 hours

Controls:

Recommendation:

**AGENT** Welding fume, NOS

OEL: 5 mg/m3

Exposure Estimate: mg/m3

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

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 2

Basis: Available Literature

FIG Priority: 0

Discussion: OEL is TLV. 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. Exposure for this task is anticipated to be considerably less based on frequency and duration.

**Medical Surveillance**

Justifiable no

Triggered or Critical Exposure no

Reference:

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**Process:** Fabrication of Research Apparatus in Plastic

Various field and laboratory items are fabricated in acrylic and PVC in support of research. This may require cutting with a compound miter saw, grinding with a pneumatic grinder, use of cleaning solvents and cements, and heat welding.

Operating Conditions:

Work is conducted primarily in the facility shop. On-site fabrication of water systems for culture and study tanks may be conducted in the indoor or outdoor wet lab facilities.

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**Task:** Bond Acrylic

Frequency: Monthly

Bond acrylic parts using solvent-based cement. Cement is applied using a swab applicator provided in the cap of the product.

Duration: 1/2 - 1 hour

Controls:

Work is conducted in the maintenance shop. General dilution ventilation fan running.

Recommendation:

**AGENT** Methylene chloride

OEL: 125 ppm

Exposure Estimate: ppm

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

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

Exposure Category: Uncertain

Uncertainty: 1 Uncertain

Risk/Control Priority: 16

Basis: Qualitative Judgement

FIG Priority: 16

**Discussion:** Product used to bond acrylic parts uncertain. MSDS was not available. Acrylic solvents and cement typically contain methylene chloride in concentrations up to 95%. Other components may include MEK (up to approximately 35%), methyl methacrylate monomer (up to approximately 14%), and methyl acetate (up to approximately 35%). OEL is OSHA STEL. Work is conducted in the shop with mechanical dilution ventilation reported. A small quantity of agent is used over a duration of 1/2 to 1 hour.

**Medical Surveillance**

Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1910.1052

**Task:** Clean PVC Pipe

Frequency: Monthly

Oatey brand PVC cleaner is used to clean soil or oil and grease from PVC pipe prior to bonding. Product is applied with applicator swab.

Duration: &lt;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 (&lt;10% OEL; 95th %tile &lt;0.1 OEL)

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 2

**Discussion:** OEL is TLV-STEL. Agent is an irritant and CNS depressant. Agent is 60-100% of the product. Quantity and duration are limited. Multiple agents in this product impact the CNS.

**Medical Surveillance**

Justifiable no

Triggered or Critical Exposure no

Reference:

**AGENT** Cyclohexanone

OEL: 25 ppm

Exposure Estimate: ppm

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

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 2

**Discussion:** OEL is TLV. Agent is an irritant and depresses the CNS. Agent is 3-10% of the product. Quantity and duration are limited. Multiple agents in this product impact the CNS.

**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 (&lt;10% OEL; 95th %tile &lt;0.1 OEL)

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 2

Discussion: OEL is TLV-STEL. Agent is a strong irritant and CNS depressant. Agent is 10-20% of product. Quantity and duration are limited. Multiple agents in this product impact the CNS.

Medical Surveillance Justifiable no  
 Triggered or Critical Exposure no  
 Reference:

**AGENT** Tetrahydrofuran

OEL: 200 ppm

Exposure Estimate: ppm

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

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 2

Discussion: OEL is TLV-STEL. Agent is a strong irritant, can depress the CNS, and damage the liver. It may be readily absorbed through the skin. Agent is up to 10% of product. Quantity and duration are limited.

Medical Surveillance Justifiable no  
 Triggered or Critical Exposure no  
 Reference:

**Task:** Cut and Shape Plastic

Frequency: Monthly

PVC pipe and sheet material and acrylic sheet material are cut using the band saw, compound miter saw, and table saw. The drill press and powered hand sanders may also be used in the fabrication. Combined frequency is monthly and work typically requires less than 1/2 hour.

Duration: &lt;1/2 hour

**Controls:**

Work is primarily conducted in shop facility.

**Recommendation:**

Ensure adequate general dilution or natural ventilation when activity is limited. Consider local exhaust for production work using tools that generate high heat. When possible, use slower speed tools when cutting and shaping PVC to reduce heat and generation of decomposition products.

**AGENT** Hydrogen chloride

OEL: 2 ppm

Exposure Estimate: 0 ppm

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

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 2

**Discussion:** OEL is ACGIH Ceiling. Based on frequency and duration of the task, agent concentration is not likely to be exceeded. NIOSH HHE ()-172-2076 reported on exposure of workers to thermal decomposition of pvc film in a blister packaging operation. Several hazardous components were identified and the study concluded unacceptable exposure to hydrogen chloride from PVC decomposition in the absence of local exhaust ventilation.

**Medical Surveillance** Justifiable no  
 Triggered or Critical Exposure no  
 Reference:

**AGENT** Noise

OEL: 85 dBA

Exposure Estimate: 85 dBA

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Unacceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 12

Basis: Qualitative Judgement

FIG Priority: 12

**Discussion:** Data from reportedly extensive noise monitoring was not available. Tools used in this task vary in noise generation. For example sound level for the slower band saw is expected to be significantly lower than for the compound miter saw. Material composition is also expected to affect sound levels. NIOSH power tool noise data base provides limited sound level data for loaded and unloaded equipment by type and manufacturer. For example for circular saws a range of 102-113 dBA has been recorded for loaded saws. Compound miter cutting acrylic may be expected to produce sound levels in this range and may represent worst case exposure potential for this task. Maximum allowable dose is reached in less than 10 minutes at 102 dBA and less than 1 minute at the higher end of the range.

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

**Task:** Vulcanize Plastic

Frequency: Single Event

Plastic PVC parts are bonded or "welded" by heating a filler material and the base material and then fusing the two together. Task may require the butt to be beveled using a grinder. The task is typically short duration.

Duration: &lt;1/2 hour

**Controls:**

Work is conducted in the shop. Mechanical general dilution is reportedly operated during the task.

**Recommendation:**

**AGENT** Hydrogen chloride

OEL: 2 ppm

Exposure Estimate: ppm

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

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 2

Discussion: OEL is ACGIH Ceiling. Hydrogen chloride may be generated as a thermal decomposition product of heating PVC during this task. Based on frequency and duration of the task, agent concentration is not likely to be exceeded.

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

**Process:** Grounds Keeping

Facilities Maintenance is responsible for grounds keeping of over 20 acres. Several tools are used to maintain vegetation including operation of a brush hog, tractor with a finishing mower attachment, riding mower, string trimmers, powered hedge trimmers, and hand tools. Process also requires application of herbicide.

## Operating Conditions:

**Task:** Apply Herbicide, Power Sprayer

Frequency:

The Gator UTV is driven along the perimeter of the facility while herbicide mixture is applied. Task requires about 2 hours to complete.

Duration: 1 - 4 hours

## Controls:

## Recommendation:

**AGENT** Diquat

OEL: 0.5 mg/m3

Exposure Estimate: mg/m3

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

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 2

Discussion: OEL is TLV for respirable fraction. Agent is a strong irritant. Exposure may result in multiple symptoms related to kidney, liver and CNS effects. Agent is readily absorbed through the skin. Vapor pressure is < 0.00001 mmHg. Inhalation and direct contact with spray mist and liquid are the most important routes of exposure during this task.

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

**AGENT** Glyphosate

OEL:

Exposure Estimate:

Health Effects Rating:  Reversible health effects of concern

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

Exposure Category:

Uncertainty:  Certain

Risk/Control Priority:

Basis: Qualitative Judgement

FIG Priority:

Discussion: Most likely route of exposure is contact with spray mist, resulting in irritant effects. Short term inhalation exposure is not expected to produce significant health effects of concern.

Medical Surveillance Justifiable no  
Triggered or Critical Exposure no  
Reference:

**Task:** Mix and Load Herbicide

Frequency: Bi-Monthly

Herbicide is mixed and loaded into a 20 gallon tank mounted on a Gator UTV with electric pump. Water is added to the tank before the herbicide is measured using a measuring cup and added. Product is dispensed from 2.5 gallon containers. Product was reported as Roundup Pro which contains glyphosate and a surfactant. In addition it was reported that the product also contained diquat which is not a component of Roundup Pro. A related product called QuickPro contains glyphosate, surfactant and diquat.

Duration: <1/2 hour

**Controls:**

Task is conducted outside and in front of the maintenance shop.

**Recommendation:**

**AGENT** Diquat

OEL: 0.1 mg/m3

Exposure Estimate:  mg/m3

Health Effects Rating:  Severe, reversible 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 TLV for respirable fraction. Agent is a strong irritant. Exposure may result in multiple symptoms related to kidney, liver and CNS damage. Agent is readily absorbed through the skin. Vapor pressure is < 0.00001 mmHg. Direct contact with concentrate may be the most important route of exposure during this task.

Medical Surveillance Justifiable no  
Triggered or Critical Exposure no  
Reference:

**AGENT** GlyphosateOEL: Exposure Estimate: Health 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: Most likely route of exposure is skin and eye contact, resulting in irritant effects. Short term inhalation exposure is not expected to produce significant health effects of concern. Barrier protections reported include eye and hand protection.

Medical Surveillance Justifiable no  
 Triggered or Critical Exposure no  
 Reference:

**Task:** Operate Gas Powered Trimmers

Frequency: Bi-Monthly

Operate several gas powered trimmers including an Echo brand string trimmer, Echo brand hedge trimmer, Echo brand edger. Combined use totals approximately 2 hours/day. Task is repeated twice each month.

Duration: 1 - 4 hours

Controls:

Recommendation:

**AGENT** HeatOEL: 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: Task may be conducted during periods of high heat and humidity. Duration of task is approximately 2 hours. Metabolic heat generation is low to moderate. No heat stress monitoring or reduction procedures were reported.

Medical Surveillance Justifiable no  
 Triggered or Critical Exposure no  
 Reference:

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

Basis: Qualitative Judgement

FIG Priority: 

Discussion: Sound level and dosimetry data are not available for this task. Typically, small gas powered tools such as these produce high level hazardous noise. Sound level data for similar tools of this brand were not available. Duration is approximately 2 hours. Use of hearing protection was not reported.

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

**AGENT** Ultraviolet radiation

OEL: 3

Exposure Estimate:

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 3

Basis: Qualitative Judgement

FIG Priority: 3

**Discussion:** Actinic UV exposure to skin can result in sunburn, carcinogenesis, and photosensitization. Eye exposure can result in photokeratitis and cataract generation. Prolonged outdoor work by employees increases risk of health impacts. Personal barrier protections such as long sleeved shirts, sun screen and sun glasses were reported. Quantitative exposure data was not available for this or similar tasks.

**Medical Surveillance** Justifiable no  
 Triggered or Critical Exposure no  
 Reference:

**Task:** Operate Riding Mower

Frequency: Bi-Monthly

Task requires operation of a John Deere riding mower (model not known) for approximately four hours per shift.

Duration: 4 - 8 hours

Controls:

Recommendation:

**AGENT** Heat

OEL:

Exposure Estimate:

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

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 4

Basis: Qualitative Judgement

FIG Priority: 4

**Discussion:** Task must be conducted during periods of high heat and humidity. Duration of task is up to 6 hours. Metabolic heat generation is low. No heat stress monitoring or reduction procedures were reported.

**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: 3 (50-100% OEL; 95th %tile 0.5-1.0 OEL)

Exposure Category: Uncertain

Uncertainty: 1 Uncertain

Risk/Control Priority: 9

Basis: Qualitative Judgement

FIG Priority: 9

**Discussion:** Sound level and dosimetry data are not available for this task. No engineering controls are in place and the task requires extended exposure.

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

**AGENT** Ultraviolet radiation

OEL: 3 mj/cm2

Exposure Estimate: mj/cm2

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 3

Basis: Qualitative Judgement

FIG Priority: 3

**Discussion:** Actinic UV exposure to skin can result in sunburn, carcinogenesis, and photosensitization. Eye exposure can result in photokeratitis and cataract generation. Prolonged outdoor work by employees increases risk of health impact. Personal barrier protections such as long sleeved shirts, sun screen and sun glasses reported. Quantitative exposure data was not available for this and similar tasks.

**Medical Surveillance** Justifiable no  
 Triggered or Critical Exposure no  
 Reference:

**Task:** Operate Tractor

Frequency: Weekly

Operate John Deere K163 tractor. Tractor may be fitted with pto-driven brush hog or finishing mower attachments. Task is conducted approximately 3 times each month for approximately 6 hours per day during the summer season.

Duration: 4 - 8 hours

Controls:

Recommendation:

**AGENT** Heat

OEL:

Exposure Estimate:

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

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 4

Basis: Qualitative Judgement

FIG Priority: 4

**Discussion:** Task must be conducted during periods of high heat and humidity. Duration of task is up to 6 hours. Metabolic heat generation is low. No heat stress monitoring or reduction procedures were reported.

**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 (&gt;10% OEL; 95th %tile &gt; OEL)

Exposure Category: Unacceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 12

Basis: Qualitative Judgement

FIG Priority: 12

**Discussion:** Sound level and dosimetry data are not available for this task. No engineering controls are in place and the task requires extended exposure.

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

**AGENT** Ultraviolet radiation

OEL: 3 mj/cm2

Exposure Estimate: mj/cm2

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 3

Basis: Qualitative Judgement

FIG Priority: 3

**Discussion:** Actinic UV exposure to skin can result in sunburn, carcinogenesis, and photosensitization. Eye exposure can result in photokeratitis and cataract generation. Prolonged outdoor work by employees increases risk of health impact. Personal barrier protections such as long sleeved shirts, sun screen and sun glasses reported. Quantitative exposure data was not available for this and similar tasks.

**Medical Surveillance** Justifiable no  
 Triggered or Critical Exposure no  
 Reference:

**Process:** Vehicle Maintenance

Periodic service of boat engines, vehicles, UTV, and heavy equipment such as the tractor/loader.

**Operating Conditions:**

Vehicle service and engine maintenance is conducted outdoors under a canopy adjacent to the maintenance shop.

**Task:** Service Engines

Frequency: Monthly

Periodic service includes oil and filter changes and checking fluids on a variety of engines including airboat engines, outboard boat engines, UTVs, and fleet vehicles. Vehicle Oil changes are conducted quarterly resulting in an average of approximately four engine services each month, each requiring less than one hour to complete.

Duration: 1/2 - 1 hour

**Controls:****Recommendation:****AGENT** Lubricants; oil, grease

OEL:

Exposure Estimate:

Health Effects Rating: 0 Reversible health effects of little concern

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 0

Basis: Qualitative Judgement

FIG Priority: 0

**Discussion:** Oils and lubricants are used routinely. Primary route of exposure is dermal contact. Barrier protections such as gloves and eye protection were reported.

**Medical Surveillance** Justifiable no  
 Triggered or Critical Exposure no  
 Reference:

**Wet Laboratory****Process:** Field Preservation

Field collection and processing of samples requires the use of fixative and preservative solutions.

**Operating Conditions:**

Work is conducted in the field and on vessels.

**Task:** Decanting at Sea

Frequency:

For some projects, decanting fixative may occur at sea, on the deck of a vessel. Waste is collected for later disposal. Specimens are reportedly soaked in tap water for minimum of 3 days, and then placed into ethanol.

Duration: <1/2 hour

Controls:

Recommendation:

**AGENT** Ethanol

OEL: 1000 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: OELs are PEL and TLV-STEL. OELs are not expected to be exceeded during this task.

<b>Medical Surveillance</b>	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

**AGENT** Formaldehyde

OEL: 0.1 ppm

Exposure Estimate: ppm

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Uncertain

Uncertainty: 1 Uncertain

Risk/Control Priority: 12

Basis: Qualitative Judgement

FIG Priority: 12

Discussion: OEL is REL-C. Fixative is 10% formalin solution. Work is conducted on the deck of a vessel. No exposure data is available for this task. Uncertainty is due to variable natural ventilation, number of samples decanted and quantities of fixative decanted.

<b>Medical Surveillance</b>	Justifiable	yes
	Triggered or Critical Exposure	yes
	Reference:	29 CFR 1910.1048

**Task:** Dispose of Waste Formaldehyde Solution

Frequency:

Waste formaldehyde containing fixative collected from the decanting task in the wet lab is carried to the storage shed and poured into a 30 gallon waste container. Up to 4 gallons may be disposed of at a time.

Duration: <1/2 hour

Controls:

Recommendation:

**AGENT** Formaldehyde

OEL: 0.1 ppm

Exposure Estimate: ppm

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Unacceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 12

Basis: Mathematical Modeling

FIG Priority: 12

**Discussion:** OEL is REL-C. Head space concentration of formaldehyde in the waste container will be approximately 1710 ppm [based on stock 37% formalin (20 C, 37% formaldehyde in solution, and 10% methanol)]. If the reported 4 gallons of headspace is released and dispersed immediately and evenly into a storage shed estimated at 1200 ft<sup>3</sup>, a potential exposure concentration of 0.76 ppm would result.

**Medical Surveillance**

Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1910.1048

**Task:** Field Dilution of Stock Fixative

Frequency:

Using a local water source, 37% stock formaldehyde solution is diluted to a ratio of 9 to 1. Small mouth bottles are used. Task requires less than 5 minutes and may be repeated up to four times per day.

Duration: &lt;1/2 hour

**Controls:**

Work is conducted outdoors, on a boat or on the shore.

**Recommendation:****AGENT** Formaldehyde

OEL: 0.1 ppm

Exposure Estimate: ppm

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Uncertain

Uncertainty: 1 Uncertain

Risk/Control Priority: 12

Basis: Qualitative Judgement

FIG Priority: 12

**Discussion:** OEL is REL-C. Screening samples taken during formaldehyde transfer and dilution tasks demonstrates the potential for unacceptable concentrations to be generated. Available literature describes unacceptable exposure to formaldehyde while transferring concentrated formalin from bulk container and preparing dilutions without ventilation controls in place. The potential for spill may increase in field settings an on vessels.

**Medical Surveillance**

Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1910.1048

**Task:** Preparation of 10% Formalin

Frequency: Quarterly

A 10% formalin solution is prepared from 37% formaldehyde solution. Stock 37% formalin is purchased in 5 and 55 gallon containers. Five gallon batches are prepared at a time.

Duration: 1/2 - 1 hour

**Controls:**

Work occurs in a storage shed.

**Recommendation:**

**AGENT** Formaldehyde

OEL: 0.1 ppm

Exposure Estimate: ppm

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Unacceptable

Uncertainty: 0 Certain

Risk/Control Priority: 12

Basis: Available Literature

FIG Priority: 0

Discussion: OEL is REL-C. Available literature describing similar tasks reports unacceptable exposure to formaldehyde while transferring concentrated formalin from bulk container and preparing dilutions without ventilation controls in place.

**Medical Surveillance**

Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1910.1048

**Task:** Sort Samples

Frequency:

Field samples are sorted at the wet lab. Specimens may be in water, ethanol, or atypically, in 4% formaldehyde solution. Task is conducted daily for a period of 4-6 weeks. Sorting events may occur at least twice per year.

Duration:

**Controls:**

Articulated local exhaust hoods are available, but are typically not used.

**Recommendation:****AGENT** Ethanol

OEL: 1000 ppm

Exposure Estimate: ppm

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

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: OELs are PEL and TLV-STEL. OELs are not expected to be exceeded during this task.

**Medical Surveillance**

Justifiable no

Triggered or Critical Exposure no

Reference:

**AGENT** Formaldehyde

OEL: 0.75 ppm

Exposure Estimate: ppm

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Uncertain

Uncertainty: 2 Highly Uncertain

Risk/Control Priority: 3

Basis: Qualitative Judgement

FIG Priority: 6

Discussion: OEL is PEL. OEL is not expected to be exceeded during the task except in the reportedly infrequent occurrence of sorting specimens contained in 4% formalin. In this case, uncontrolled formaldehyde vapor exposure of unknown concentration is anticipated.

**Medical Surveillance**

Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1910.1048

**Task:** Transport Formalin to the Field

Frequency:

Fixative solution may be transported to the field in pre-filled specimen jars (10% Formalin) or as concentrated solution (37% Formaldehyde) in a 1 gallon, narrow mouth, Nalgen bottle. The solution is either transported outside the passenger compartment of the vehicle or within secondary containment. Task is project based. Projects may require 1-2 weeks. This task may require a total of 8 weeks over 4-10 field trips.

Duration:

Controls:

Recommendation:

<b>AGENT</b> Formaldehyde	OEL:	0.75 ppm
Exposure Estimate: ppm	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: Qualitative Judgement	FIG Priority:	0
Discussion: OEL is PEL. Exposure pathways are controlled by isolation during this task.		
<b>Medical Surveillance</b>	Justifiable	no
	Triggered or Critical Exposure	yes
	Reference:	29 CFR 1910.1048

**Process:** Sample Processing

Samples that have been fixed in formaldehyde solution are returned from the field and processed in the wet laboratory.

Operating Conditions:

The wet laboratory is housed to one side of a large open warehouse-like building.

**Task:** Decanting Fixative

Frequency:

Formaldehyde solution is decanted from sample container into a collection vessel fitted with a funnel. Frequency and duration are variable.

Duration:

Controls:

An articulating local exhaust hood is operated during the task. Centerline capture velocities were measured during a demonstration of the process. The results were: 475 fpm at the face; 125 fpm at 12 inches; 15-30 fpm at 24 inches; <10 fpm at the collection funnel. Smoke did not entrain well at the funnel at the normal hood position. Repositioning improved capture.

Recommendation:

**AGENT** Formaldehyde

OEL: 0.1 ppm

Exposure Estimate: ppm

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Uncertain

Uncertainty: 1 Uncertain

Risk/Control Priority: 12

Basis: Screening Measurement

FIG Priority: 12

**Discussion:** OEL is REL-C. Fixative is 10% formalin solution. Work is conducted under local exhaust ventilation. Colorimetric detector tubes were used to take grab samples to determine formaldehyde concentration. Over the open waste container, the concentration was measured at 0.5-1 ppm without ventilation, demonstrating the potential for hazardous concentrations. At a typical working position with the waste container open, the exhaust system operating, but without decanting, formaldehyde was not detectable. Uncertainty is due to variable placement of local exhaust hood, number of samples decanted and quantities of fixative decanted.

**Medical Surveillance**

Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1910.1048

# Health Risk and Further Information Gathering Priorities

## Southeast Ecological Center

Division, Shop, Project	Process	Task	Agent	Exposure Category	Justified Medical Surveillance	Triggered Surveillance	Health Risk Priority	FIG Priority
Facilities Maintenance	Fabrication of Research Apparatus in Plastic	Bond Acrylic	Methylene chloride	Uncertain	yes	yes	16	16
Facilities Maintenance	Fabrication of Research Apparatus in Plastic	Cut and Shape Plastic	Noise	Unacceptable	yes	yes	12	12
Wet Laboratory	Field Preservation	Decanting at Sea	Formaldehyde	Uncertain	yes	yes	12	12
Facilities Maintenance	Fabrication in Aluminum	Prepare Joints with Grinder and Belt Sander	Noise	Unacceptable	yes	yes	12	12
Wet Laboratory	Field Preservation	Dispose of Waste Formaldehyde Solution	Formaldehyde	Unacceptable	yes	yes	12	12
Wet Laboratory	Field Preservation	Field Dilution of Stock Fixative	Formaldehyde	Uncertain	yes	yes	12	12
Facilities Maintenance	Grounds Keeping	Operate Gas Powered Trimmers	Noise	Uncertain	yes	yes	12	12
Wet Laboratory	Sample Processing	Decanting Fixative	Formaldehyde	Uncertain	yes	yes	12	12
Facilities Maintenance	Fabrication in Aluminum	Cut Aluminum	Noise	Uncertain	yes	yes	12	12
Facilities Maintenance	Grounds Keeping	Operate Tractor	Noise	Unacceptable	yes	yes	12	12
Wet Laboratory	Field Preservation	Preparation of 10% Formalin	Formaldehyde	Unacceptable	yes	yes	12	0
Facilities Maintenance	Grounds Keeping	Operate Riding Mower	Noise	Uncertain	yes	yes	9	9
Facilities Maintenance	Fabrication in Aluminum	Weld Aluminum	Aluminum	Acceptable	no	no	6	0
Facilities Maintenance	Grounds Keeping	Operate Riding Mower	Heat	Acceptable	no	no	4	4
Facilities Maintenance	Grounds Keeping	Operate Gas Powered Trimmers	Heat	Acceptable	no	no	4	4
Facilities Maintenance	Grounds Keeping	Operate Tractor	Heat	Acceptable	no	no	4	4
Wet Laboratory	Field Preservation	Sort Samples	Formaldehyde	Uncertain	yes	yes	3	6
Facilities Maintenance	Grounds Keeping	Operate Tractor	Ultraviolet radiation	Acceptable	no	no	3	3
Facilities Maintenance	Grounds Keeping	Operate Riding Mower	Ultraviolet radiation	Acceptable	no	no	3	3
Facilities Maintenance	Grounds Keeping	Operate Gas Powered Trimmers	Ultraviolet radiation	Acceptable	no	no	3	3
Wet Laboratory	Field Preservation	Transport Formalin to the Field	Formaldehyde	Acceptable	no	yes	3	0
Facilities Maintenance	Fabrication of Research Apparatus in Plastic	Vulcanize Plastic	Hydrogen chloride	Acceptable	no	no	2	2
Facilities Maintenance	Fabrication of Research Apparatus in Plastic	Cut and Shape Plastic	Hydrogen chloride	Acceptable	no	no	2	2

Division, Shop, Project	Process	Task	Agent	Exposure Category	Justified Medical Surveillance	Triggered Surveillance	Health Risk Priority	FIG Priority
Facilities Maintenance	Fabrication of Research Apparatus in Plastic	Clean PVC Pipe	Tetrahydrofuran	Acceptable	no	no	2	2
Facilities Maintenance	Fabrication of Research Apparatus in Plastic	Clean PVC Pipe	Methyl ethyl ketone	Acceptable	no	no	2	2
Facilities Maintenance	Fabrication of Research Apparatus in Plastic	Clean PVC Pipe	Acetone	Acceptable	no	no	2	2
Facilities Maintenance	Fabrication of Research Apparatus in Plastic	Clean PVC Pipe	Cyclohexanone	Acceptable	no	no	2	2
Facilities Maintenance	Grounds Keeping	Mix and Load Herbicide	Diquat	Acceptable	no	no	2	2
Facilities Maintenance	Grounds Keeping	Apply Herbicide, Power Sprayer	Diquat	Acceptable	no	no	2	2
Facilities Maintenance	Fabrication in Steel	Clean Steel	Acetone	Acceptable	no	no	2	0
Wet Laboratory	Field Preservation	Sort Samples	Ethanol	Acceptable	no	no	2	0
Facilities Maintenance	Fabrication in Aluminum	Cut Aluminum, Plasma Cutter	Aluminum	Acceptable	no	no	2	0
Facilities Maintenance	Fabrication in Steel	Weld Steel	Welding fume, NOS	Acceptable	no	no	2	0
Wet Laboratory	Field Preservation	Decanting at Sea	Ethanol	Acceptable	no	no	2	0
Facilities Maintenance	Grounds Keeping	Mix and Load Herbicide	Glyphosate	Acceptable	no	no	1	0
Facilities Maintenance	Fabrication in Aluminum	Prepare Joints with Grinder and Belt Sander	Particulates, NOC/R	Acceptable	no	no	1	0
Facilities Maintenance	Grounds Keeping	Apply Herbicide, Power Sprayer	Glyphosate	Acceptable	no	no	1	0
Facilities Maintenance	Vehicle Maintenance	Service Engines	Lubricants; oil, grease	Acceptable	no	no	0	0