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16 September 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 Dillon Field Office 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 10 May 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: Dillon Field Office Occupational Exposure Assessment

Dillon Field Office
Occupational Exposure Assessment and Medical Surveillance Inclusion
For
Department of Interior, Safety Council/Office of Health and Safety
On-site: 10 May 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 Dillon Field Office was conducted on 10 May 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

16 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

Dillon Field Office

Range Management

Process: *Invasive Weed Management*

Mechanical, biological, and chemical methods are used to manage invasive weed species such as spotted knapweed, houndstongue, leafy spurge. A variety of equipment is used to dispense herbicides including backpack sprayers, electric or gas powered pressure sprayers. Pressure sprayers may be mounted on trucks, ATVs, or UTVs with tank size ranging from 200 gallons on pick up mounted units, to 60 gallons on UTVs and 16 gallons on ATVs.

Operating Conditions:

Field locations.

Task: Apply Herbicide as Spot Application using Truck Mounted Sprayer

Frequency: 2 - 3 days/wk

Herbicides are applied as spot treatments adjacent to roads using a truck mounted sprayer and 200 ft of hose. One worker operates truck while another is on the ground making applications. Sprayer is powered by gasoline powered pumps with 8 and 8.5 hp honda engines.

Duration: 4 - 8 hours

Controls:

Recommendation:

AGENT 2, 4-D, amine

OEL: 10 mg/m3

Exposure Estimate: mg/m3

Health Effects Rating: 1 Reversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 1

Basis: Qualitative Judgement

FIG Priority: 1

Discussion: Product is Opti-Amine containing 46.7% or 3.8 pounds/gal agent. Exposure to 2,4-D has been associated with central and peripheral nervous system effects, liver and kidney damage. OEL is REL which is based on central nervous system and irritant effects. Primary route of exposure during this task is dermal and eye contact with spray and mist. Barrier protections were reported.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

AGENT Chlorsulfuron

OEL:

Exposure Estimate:

Health Effects Rating: 0 Reversible health effects of little concern

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 0

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: Product is flowable powder measured and dispensed using a container-integrated measuring device. Agent has low toxicity and irritant effects. One and a quarter ounce of product is required per 25 gallons mixed.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

AGENT Metsulfuran methyl

OEL:

Exposure Estimate:

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 is Escort XP flowable formulation which contains 60% metsulfuran methyl. Agent is primarily an irritant. Eye and skin contact is the primary route of exposure to concentrate agent. Adequate barrier protection was reported. Inhalation exposure is not expected to result in health effects of concern. For every 25 gallons mixed, 1.25 oz of product is required.

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: 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: Sound level data is not available for this task. Small pump engines similar to those used in this task produce hazardous noise. Exposure to operator will vary with distance from the engine. Acceptable exposure determination assumes most work is conducted at a safe distance from the hazardous noise source.

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

AGENT Picloram

OEL: 10 mg/m3

Exposure Estimate: mg/m3

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: Product is Tordon containing 24.4% picloram by weight. Exposure can result in eye, skin, and respiratory system irritation, and nausea. Exposure primarily due to contact with spray and mist. Barrier protections were reported.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

Task: Apply Herbicide using ATV or UTV

Frequency: Daily

ATV and UTV are used in a "stop and go" procedure, in which workers drive to a treatment site, stop and spray. Application may be made while seated and operating the vehicle or the worker may dismount in order to treat a larger area.

Duration: 4 - 8 hours

Controls:

Recommendation:

AGENT 2, 4-D, amine

OEL: 10 mg/m3

Exposure Estimate: 0 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: Product is Opti-Amine containing 46.7% or 3.8 pounds/gal agent. Exposure to 2,4-D has been associated with central and peripheral nervous system effects, liver and kidney damage. OEL is REL which is base on central nervous system and irritant effects. Primary route of exposure during this task is dermal and eye contact with spray and mist. Barrier protections were reported.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Chlorsulfuron

OEL:

Exposure Estimate:

Health Effects Rating: 0 Reversible health effects of little concern

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 0

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: Product is flowable powder measured and dispensed using a container-integrated measuring device. Agent has low toxicity and irritant effects.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Metsulfuran methyl

OEL: 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: Product is Escort XP flowable formulation which contains 60% metsulfuran methyl. Agent is primarily an irritant. Primary route of exposure is eye and skin contact with spray or mist. Adequate barrier protection was reported. Inhalation exposure is not expected to result in health effects of concern.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

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: Uncertain

Uncertainty: 1 Uncertain

Risk/Control Priority: 3

Basis: Qualitative Judgement

FIG Priority: 3

Discussion: Sound level data is not available for this equipment.

Medical Surveillance

Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1010.95

AGENT Picloram

OEL: 10 mg/m3

Exposure Estimate: mg/m3

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 Tordon containing 24.4% picloram by weight. Exposure can result in eye, skin, and respiratory system irritation, and nausea. Exposure primarily due to contact with spray and mist. Adequate barrier protections were reported.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

Task: Apply Herbicide with Backpack Sprayer

Frequency: Daily

Up to 0.5 acres can be treated per day using a backpack sprayer. There is a potential for spill when doning the backpack. Doning the backpack sprayer is a two person operation. Frequency mirrors mixing and loading.

Duration: 4 - 8 hours

Controls:

Recommendation:

AGENT 2, 4-D, amine

OEL: 10 mg/m3

Exposure Estimate: mg/m3

Health Effects Rating: 1 Reversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 1

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: Product is Opti-Amine containing 46.7% or 3.8 pounds/gal agent. Exposure to 2,4-D has been associated with central and peripheral nervous system effects, liver and kidney damage. OEL is REL which is base on central nervous system and irritant effects. Primary route of exposure during this task is dermal and eye contact with spray and mist, and from spill when doning sprayer. Good barrier protections were reported.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

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

Basis: Qualitative Judgement

FIG Priority:

Discussion: Product is flowable powder measured and dispensed using a container-integrated measuring device. Agent has low toxicity and irritant effects.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Metsulfuran methylOEL: mg/m3Exposure Estimate: mg/m3Health 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: Product is Escort XP flowable formulation which contains 60% metsulfuran methyl. Agent is primarily an irritant. Primary route of exposure is eye and skin contact with spray or mist. Adequate barrier protection was reported. Inhalation exposure is not expected to result in health effects of concern.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT PicloramOEL: mg/m3Exposure Estimate: mg/m3Health 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: Product is Tordon containing 24.4% picloram by weight. Exposure can result in eye, skin, and respiratory system irritation, and nausea. Exposure primarily due to contact with spray and mist. Adequate barrier protections were reported.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

Task: Broadcast Application Using ATV or UTV

Frequency: Bi-Monthly

Duration: 4 - 8 hours

ATVs and UTVs are used as a platform for broadcast application of herbicides using Boom Buster nozzles. This procedure uses 3-5 times more concentrate product per load. Application rate of mixed herbicide is 15-30 gallons per acre vice 100 gal/acre for spot spraying. The number of loads per day increases to 10-12 per day. Boom Buster nozzles operate at 40 psi and discharge 4.9 gal per minute.

Controls:

Tyvek coveralls are now required during broadcast treatments. Task is not conducted if winds are greater than 10 mph for any application method. No broadcast treatments are made if winds are greater than 5 mph.

Recommendation:

AGENT 2, 4-D, amine

OEL: 10 mg/m3

Exposure Estimate: 0 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: Product is Opti-Amine containing 46.7% or 3.8 pounds/gal agent. Exposure to 2,4-D has been associated with central and peripheral nervous system effects, liver and kidney damage. OEL is REL which is base on central nervous system and irritant effects. Primary route of exposure during this task is dermal and eye contact with spray and mist. Barrier protections were reported.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

AGENT Chlorsulfuron

OEL:

Exposure Estimate:

Health Effects Rating: 0 Reversible health effects of little concern

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 0

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: Product is flowable powder measured and dispensed using a container-integrated measuring device. Agent has low toxicity and irritant effects. One and a quarter ounce of product is required per 25 gallons mixed.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

AGENT Metsulfuran methyl

OEL:

Exposure Estimate:

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 is Escort XP flowable formulation which contains 60% metsulfuran methyl. Agent is primarily an irritant. Eye and skin contact is the primary route of exposure to concentrate agent. Adequate barrier protection was reported. Inhalation exposure is not expected to result in health effects of concern. For every 25 gallons mixed, 1.25 oz of product is required.

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

Exposure Category: Uncertain

Uncertainty: 1 Uncertain

Risk/Control Priority: 3

Basis: Qualitative Judgement

FIG Priority: 3

Discussion: ATV with electric pump motor. Sound level data is not available for this equipment.

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

AGENT Picloram

OEL: 10 mg/m3

Exposure Estimate: mg/m3

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: Product is Tordon containing 24.4% picloram by weight. Exposure can result in eye, skin, and respiratory system irritation, and nausea. Exposure primarily due to contact with spray and mist. Barrier protections were reported.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

Task: Mix and Load Backpack Sprayers

Frequency: Daily

Backpack sprayers are typically mixed in the field. Water is hauled or collected from natural water sources. Backpack tanks are filled to the prescribed level and then a graduated measure is used to measure and transfer herbicide. Tank capacity was reported at 4 gallons. Task requires 10-15 minutes and may be repeated 2-3 times per day. Task occurs seasonally between the end of May and September. Product is transferred 2.5 gallon containers to 1 qt day-use container using a funnel and then transported to the field site for mixing.

Duration: <1/2 hour

Controls:

Recommendation:

AGENT 2, 4-D, amine

OEL: 10 mg/m3

Exposure Estimate: mg/m3

Health Effects Rating: 1 Reversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 1

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: Product is Opti-Amine containing 46.7% or 3.8 pounds/gal agent. Exposure to 2,4-D has been associated with central and peripheral nervous system effects, liver and kidney damage. OEL is REL which is base on central nervous system and irritant effects. Primary route of exposure during this task is dermal and eye contact. Good barrier protections were reportedly used consistently. Inhalation exposure limited due to the short duration of the task.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Chlorsulfuron

OEL: 5 mg/m3

Exposure Estimate: mg/m3

Health Effects Rating: 0 Reversible health effects of little concern

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 0

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: Product is flowable powder measured and dispensed using a container-integrated measuring device. Agent has low toxicity and irritant effects.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Metsulfuran methyl

OEL:

Exposure Estimate:

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: Product is Escort XP flowable formulation which contains 60% metsulfuran methyl. Agent is primarily an irritant. Eye and skin contact is the primary route of exposure to concentrate agent. Adequate barrier protection was reported. Inhalation exposure is not expected to result in health effects of concern. An eighth of an oz per load is measured using a container integrated measuring device.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Picloram

OEL: 10 mg/m3

Exposure Estimate: mg/m3

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: Product is Tordon containing 24.4% picloram by weight. Exposure can result in eye, skin, and respiratory system irritation, and nausea. This task short duration with the greatest exposure risk related to spills or splash. Adequate barrier protections were reported

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

Task: Mix and Load Mechanical Sprayers

Frequency: Daily

Mix and load electric or gasoline powered pressure sprayers. Sprayers may be mounted on trucks, UTVs, or ATVs. Tank sizes from 200 on pickups, 60 on UTV, 16gal on ATV. Trucks are loaded at the district office. ATVs are loaded in the field using a truck mounted tank to haul water. ATVs may dispense up to 5 loads per day. Task is seasonal, occurring between May and September (may extend into October). Spreaders and silicon-based surfactants (Phase II by Loveland Products; Label and MSDS not available) may be added.

Duration: <1/2 hour

Controls:

Recommendation:

AGENT 2, 4-D, amine

OEL: 10 mg/m3

Exposure Estimate: mg/m3

Health Effects Rating: 1 Reversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 1

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: Product is Opti-Amine containing 46.7% or 3.8 pounds/gal agent. Exposure to 2,4-D has been associated with central and peripheral nervous system effects, liver and kidney damage. OEL is REL which is base on central nervous system and irritant effects. Primary route of exposure during this task is dermal and eye contact. As quantities of concentrate increase, risk of splash or spill increase. Good barrier protections were reportedly used consistently. Inhalation exposure limited due to the short duration of the task. Two quarts product are used per truck load; 3 oz for ATV load.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

AGENT Chlorsulfuron

Exposure Estimate:	<input type="text"/>	OEL:	<input type="text"/>
Exposure Rating:	<input type="text" value="1"/> (<10% OEL; 95th %tile <0.1 OEL)	Health Effects Rating:	<input type="text" value="0"/> Reversible health effects of little concern
Uncertainty:	<input type="text" value="0"/> Certain	Exposure Category:	<input type="text" value="Acceptable"/>
Basis:	Qualitative Judgement	Risk/Control Priority:	<input type="text" value="0"/>
Discussion:	Product is flowable powder measured and dispensed using a container-integrated measuring device. Agent has low toxicity and irritant effects. A quarter of an ounce of product is required per 25 gallons mixed.		
Medical Surveillance		Justifiable	no
		Triggered or Critical Exposure	no
		Reference:	

AGENT Metsulfuran methyl

Exposure Estimate:	<input type="text"/>	OEL:	<input type="text"/>
Exposure Rating:	<input type="text" value="1"/> (<10% OEL; 95th %tile <0.1 OEL)	Health Effects Rating:	<input type="text" value="1"/> Reversible health effects of concern
Uncertainty:	<input type="text" value="0"/> Certain	Exposure Category:	<input type="text" value="Acceptable"/>
Basis:	Qualitative Judgement	Risk/Control Priority:	<input type="text" value="1"/>
Discussion:	Product is Escort XP flowable formulation which contains 60% metsulfuran methyl. Agent is primarily an irritant. Eye and skin contact is the primary route of exposure to concentrate agent. Adequate barrier protection was reported. Inhalation exposure is not expected to result in health effects of concern. For every 25 gallons mixed, .1/4 oz of product is required.		
Medical Surveillance		Justifiable	no
		Triggered or Critical Exposure	no
		Reference:	

AGENT Picloram

Exposure Estimate:	<input type="text"/>	OEL:	<input type="text" value="10"/> mg/m3
Exposure Rating:	<input type="text" value="1"/> (<10% OEL; 95th %tile <0.1 OEL)	Health Effects Rating:	<input type="text" value="2"/> Severe, reversible health effects of concern
Uncertainty:	<input type="text" value="1"/> Uncertain	Exposure Category:	<input type="text" value="Acceptable"/>
Basis:	Qualitative Judgement	Risk/Control Priority:	<input type="text" value="2"/>
Discussion:	Product is Tordon containing 24.4% picloram by weight. Exposure can result in eye, skin, and respiratory system irritation, and nausea. This task short duration with the greatest exposure risk related to spills or splash. Adequate barrier protections were reported. Two quarts of product are required per truck load; 3oz per ATV load.		
Medical Surveillance		Justifiable	no
		Triggered or Critical Exposure	no
		Reference:	

Reviewable Resources, Forestry

Process: *Marking Trees*

Trees are marked using one of four types of paint to identify trees for management action. Products were identified as aerosols and as "rain resistant" (limonene and mineral solvent based) which require manual pump sprayers. Sprayers are cleaned in the field and at the shop.

Operating Conditions:

Field and shop locations.

Task: Application of Tree Marking Aerosol

Application of Type D USFS tree marking paint in aerosol. Black is used for "adjusting" or erasing markings, while other aerosols are used for "road notes." Duration and frequency vary with objective. Marking roads will produce the worst case for aerosol use and may require one day to a week. Task may be conducted annually. Aerosols may be used weekly to some extent.

Fre

Controls:

As an administrative control, workers are advised to be aware of wind direction.

Recommendation:

Frequency:

Duration:

AGENT Acetone

OEL: 500 ppm

Exposure Estimate: 0 ppm

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

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 2

Discussion: OEL is TLV. Product contains 13% Acetone. Road marking projects represent highest exposure potential. As many as 12 16oz cans may be used. More typically 1-2 cans are used per day. Small to moderate (road marking) quantities of agent are applied over an extended period in open outdoor areas. OEL is not expected to be exceeded.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

AGENT Cyclohexane

OEL: 100 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: 1 Uncertain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 2

Discussion: OEL is TLV. Road marking projects represent highest exposure potential. As many as 12 16oz cans may be used. More typically 1-2 cans are used per day. Exposure can result in irritant effects and CNS depression. Percent composition in product was not determined. Small to moderate (road marking) quantities of agent are applied over an extended period in open outdoor areas. OEL is not expected to be exceeded.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

AGENT Stoddard solvent

OEL: 100 ppm

Exposure Estimate: ppm

Health Effects Rating: 1 Reversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 1

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: OEL is TLV. Percent agent in product was not determined. Road marking projects represent highest exposure potential. As many as 12 16oz cans may be used. More typically 1-2 cans are used per day. Small to moderate (road marking) quantities of agent are applied over an extended period in open outdoor areas. OEL is not expected to be exceeded.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

Task: Clean Applicator Guns, Annual

Frequency: Annually

Worker disassembles applicator guns and soaks them in paint thinner on the bench top. Parts are then scrubbed and reassembled.

Duration: 4 - 8 hours

Controls:

Gloves; composition not known.

Recommendation:

Obtain label data and material safety data sheet for product used in this task. Implement an effective hazard communication program and train workers to recognize and understand hazards associated with the chemicals they use.

AGENT Unknown

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: Uncertain

Uncertainty: 2 Highly Uncertain

Risk/Control Priority: 4

Basis: Qualitative Judgement

FIG Priority: 8

Discussion: Agent is unknown by workers reporting this task. Depending on agent used, inhalation and dermal exposure may be cause health effects of concern.

Medical Surveillance Justifiable yes
Triggered or Critical Exposure no
Reference:

Task: Clean Nozzles

Frequency:

Applicator gun nozzles are cleaned periodically in the field. A solvent reported as paint thinner of undetermined composition (no msds, product container or label were available) is run through guns until clean. Waste solvent is collected in 1 quart plastic oil containers or in used paint containers. Task requires about 1 minute. Frequency is tied to use.

Duration: <1/2 hour

Controls:

Recommendation:

Obtain label data and material safety data sheet for product used in this task. Implement an effective hazard communication program and train workers to recognize and understand hazards associated with the chemicals they use.

AGENT Unknown

OEL:

Exposure Estimate: 0

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

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

Exposure Category: Uncertain

Uncertainty: 2 Highly Uncertain

Risk/Control Priority: 4

Basis: Qualitative Judgement

FIG Priority: 8

Discussion: Agent is unknown by workers reporting this task. Product may contain mineral spirits alone or in combination with other agents, or may contain other solvents that may be described as paint thinner.

Medical Surveillance Justifiable yes
Triggered or Critical Exposure no
Reference:

Task: Mark Trees, Manual Pump

Frequency:

Trees are marked with any of three products using a manual "gun" (manual pump) applicator attached directly to the product container. Quantity applied is highly variable, but 1 to 4 quart cans may be used per worker per day.

Duration: 4 - 8 hours

Type A product is described as "water cleanup" and contains 30-35% propylene glycol and 5-10 c10-c13 hydrocarbons (mineral spirits). Type B contains 5-10% limonene and 30-35% propylene glycol. Type C is being phased out, but is still in use while available. Type C contains 30-35% d-limonene, up to 5 % petroleum hydrocarbons and up to 5% cobalt carboxylate. Typically, any product may be used for a project. Frequency varies from daily to bimonthly; projects may require one to several days.

Controls:

Recommendation:

AGENT Cobalt carboxylate

OEL: 0.1 mg/m3

Exposure Estimate: mg/m3

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: OEL is TWA as Co set by a manufacturer. Product may contain up to 5% agent. OEL is not expected to be exceeded during this task.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

AGENT d-limoneneOEL: Exposure Estimate: Health Effects Rating: Reversible health effects of little concernExposure Rating: (<10% OEL; 95th %tile <0.1 OEL)Exposure Category: Uncertainty: CertainRisk/Control Priority:

Basis: Available Literature

FIG Priority:

Discussion: Prolonged exposure to d-limonene may result in irritant effects and defatting of skin. This task is not expected to result prolonged contact with liquid product or mist which would result in irritant effects.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

AGENT Propylene glycol

OEL: 100 ppm

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

Basis: Qualitative Judgement

FIG Priority:

Discussion: OEL is REL. Quantity is for agent. Work is conducted in open areas with generally good natural air movement. Quantity applied in short bursts over a full shift. OEL is not expected to be exceeded.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

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

Basis: Qualitative Judgement

FIG Priority:

Discussion: OEL is TLV. Quantities of products are used in short bursts over the duration of a shift. Task is conducted under conditions of generally good natural air movement. OEL is not expected to be exceeded.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

Health Risk and Further Information Gathering Priorities

Dillon Field Office

Division, Shop, Project	Process	Task	Agent	Exposure Category	Justified Medical Surveillance	Triggered Surveillance	Health Risk Priority	FIG Priority
Reveable Resources, Forestry	Marking Trees	Clean Applicator Guns, Annual	Unknown	Uncertain	yes	no	4	8
Reveable Resources, Forestry	Marking Trees	Clean Nozzles	Unknown	Uncertain	yes	no	4	8
Range Management	Invasive Weed Management	Broadcast Application Using ATV or UTV	Noise	Uncertain	yes	yes	3	3
Range Management	Invasive Weed Management	Apply Herbicide as Spot Application using Truck Mounted Sprayer	Noise	Acceptable	no	yes	3	3
Range Management	Invasive Weed Management	Apply Herbicide using ATV or UTV	Noise	Uncertain	yes	yes	3	3
Reveable Resources, Forestry	Marking Trees	Application of Tree Marking Aerosol	Acetone	Acceptable	no	no	2	2
Reveable Resources, Forestry	Marking Trees	Mark Trees, Manual Pump	Cobalt carboxylate	Acceptable	no	no	2	2
Range Management	Invasive Weed Management	Apply Herbicide as Spot Application using Truck Mounted Sprayer	Picloram	Acceptable	no	no	2	2
Reveable Resources, Forestry	Marking Trees	Application of Tree Marking Aerosol	Cyclohexane	Acceptable	no	no	2	2
Range Management	Invasive Weed Management	Broadcast Application Using ATV or UTV	Picloram	Acceptable	no	no	2	2
Range Management	Invasive Weed Management	Mix and Load Mechanical Sprayers	Picloram	Acceptable	no	no	2	2
Range Management	Invasive Weed Management	Mix and Load Backpack Sprayers	Picloram	Acceptable	no	no	2	2
Range Management	Invasive Weed Management	Apply Herbicide with Backpack Sprayer	Picloram	Acceptable	no	no	2	0
Range Management	Invasive Weed Management	Apply Herbicide using ATV or UTV	Picloram	Acceptable	no	no	2	0
Range Management	Invasive Weed Management	Broadcast Application Using ATV or UTV	Metsulfuran methyl	Acceptable	no	no	1	1
Range Management	Invasive Weed Management	Broadcast Application Using ATV or UTV	2, 4-D, amine	Acceptable	no	no	1	1
Range Management	Invasive Weed Management	Apply Herbicide as Spot Application using Truck Mounted Sprayer	2, 4-D, amine	Acceptable	no	no	1	1
Range Management	Invasive Weed Management	Apply Herbicide as Spot Application using Truck Mounted Sprayer	Metsulfuran methyl	Acceptable	no	no	1	1
Range Management	Invasive Weed Management	Mix and Load Mechanical Sprayers	Metsulfuran methyl	Acceptable	no	no	1	0
Range Management	Invasive Weed Management	Apply Herbicide with Backpack Sprayer	2, 4-D, amine	Acceptable	no	no	1	0
Reveable Resources, Forestry	Marking Trees	Mark Trees, Manual Pump	Stoddard solvent	Acceptable	no	no	1	0
Range Management	Invasive Weed Management	Mix and Load Backpack Sprayers	Metsulfuran methyl	Acceptable	no	no	1	0

Division, Shop, Project	Process	Task	Agent	Exposure Category	Justified Medical Surveillance	Triggered Surveillance	Health Risk Priority	FIG Priority
Range Management	Invasive Weed Management	Apply Herbicide with Backpack Sprayer	Metsulfuran methyl	Acceptable	no	no	1	0
Reveuable Resources, Forestry	Marking Trees	Mark Trees, Manual Pump	Propylene glycol	Acceptable	no	no	1	0
Reveuable Resources, Forestry	Marking Trees	Application of Tree Marking Aerosol	Stoddard solvent	Acceptable	no	no	1	0
Range Management	Invasive Weed Management	Apply Herbicide using ATV or UTV	2, 4-D, amine	Acceptable	no	no	1	0
Range Management	Invasive Weed Management	Apply Herbicide using ATV or UTV	Metsulfuran methyl	Acceptable	no	no	1	0
Range Management	Invasive Weed Management	Mix and Load Backpack Sprayers	2, 4-D, amine	Acceptable	no	no	1	0
Range Management	Invasive Weed Management	Mix and Load Mechanical Sprayers	2, 4-D, amine	Acceptable	no	no	1	0
Range Management	Invasive Weed Management	Mix and Load Mechanical Sprayers	Chlorsulfuron	Acceptable	no	no	0	0
Range Management	Invasive Weed Management	Broadcast Application Using ATV or UTV	Chlorsulfuron	Acceptable	no	no	0	0
Range Management	Invasive Weed Management	Apply Herbicide using ATV or UTV	Chlorsulfuron	Acceptable	no	no	0	0
Range Management	Invasive Weed Management	Apply Herbicide with Backpack Sprayer	Chlorsulfuron	Acceptable	no	no	0	0
Reveuable Resources, Forestry	Marking Trees	Mark Trees, Manual Pump	d-limonene	Acceptable	no	no	0	0
Range Management	Invasive Weed Management	Mix and Load Backpack Sprayers	Chlorsulfuron	Acceptable	no	no	0	0
Range Management	Invasive Weed Management	Apply Herbicide as Spot Application using Truck Mounted Sprayer	Chlorsulfuron	Acceptable	no	no	0	0