

David P. Bleicher, MS., MSPH
Certified Industrial Hygienist
8136 Snipe Court
Juneau, Alaska 99801
(907) 321-4931
David@BleicherCIH.com

20 September 2010

CAPT Tim Radtke, CIH
Department of the Interior
Office of Occupational Health and Safety
755 Parfet Street
Suite 364
Lakewood, CO 80215

CAPT Radtke:

I have enclosed a report of exposure assessments for Theodore Roosevelt National Wildlife Refuge Complex 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 14 April 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: Roosevelt National Wildlife Refuge Complex Occupational Exposure Assessment

Theodore Roosevelt National Wildlife Refuge Complex
Occupational Exposure Assessment and Medical Surveillance Inclusion
For
Department of Interior, Safety Council/Office of Health and Safety
On-site: 14 April 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 Theodore Roosevelt National Wildlife Refuge was conducted on 14 April 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

20 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

Theodore Roosevelt National Wildlife Refuge Complex

Forest Management

Process: Tree Marking

Trees are marked for management action using a manual spray gun attachment to a 1 quart tree marking paint product.

Operating Conditions:

Work is conducted in open and forested areas.

Task: Mark Trees

Frequency: Daily

Duration: 4 - 8 hours

Trees are marked with a tree paint (Nelson) applied using a manual spray gun attached to the product container. Frequency is project based and may include two or more events per year. Approximately 100 trees can be marked per 1 quart can of product. Four to six cans may be used during a day or marking event. A marking event may last from weeks to more than one month.

Controls:

Workers reportedly take advantage of breezes to clear aerosol away.

Recommendation:

AGENT Methanol

OEL: 200 ppm

Exposure Estimate: ppm

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

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: OEL is TLV. Agent is 15% of product. Quantity is for a single day maximum. OEL is not expected to be exceeded during this task due to quantity used over a full shift in open, well ventilated outdoor conditions.

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. Agent is 35% of product. Quantity is for a single day maximum. OEL is not expected to be exceeded during this task due to quantity used over a full shift in open, well ventilated outdoor conditions.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

Law Enforcement

Process: *Emergency Medical Service*

Emergency medical services are limited to CPR and first aid only.

Operating Conditions:

Task: Provide First Aid and CPR

Frequency: Single Event

Provide first aid and CPR. It was reported that this task "never" occurs.

Duration:

Controls:

Universal Precautions

Recommendation:

AGENT Bloodborne Pathogens

OEL:

Exposure Estimate:

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 3

Basis: Qualitative Judgement

FIG Priority: 3

Discussion: Exposure rating is based on reported non-occurrence. However, workers that are expected to perform EMS may be considered "occupationally exposed" as defined by 29 CFR 1910.1030.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure yes

Reference: 29 CFR 1910.1030

Process: *Weapons Qualification*

Law enforcement personnel are required to complete weapons qualification every six months.

Operating Conditions:

Qualification takes place at various ranges which may include outdoor and enclosed ranges such as at the Mississippi law enforcement training academy and at Pearl, MS.

Task: Weapons Qualification

Frequency: Bi-Annually

Weapons qualification requires firing 30 rounds with hand gun, 12 rounds with shot gun, and 20 rounds with a 223 rifle.

Duration: 1 - 4 hours

Controls:

Recommendation:

AGENT Lead

OEL: 50 ug/m3

Exposure Estimate: 8 ug/m3

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 6

Basis: Existing Quantitative Data

FIG Priority: 0

Discussion: Exposure of shooters and instructors at outdoor firing ranges has been shown to be in the range of non-detectable to 8 ug/m3, well below OEL and action level (see NIOSH HHE supporting document). However, potentially significant dermal exposure has been documented. In addition, significant contamination of clothing has been demonstrated. Environmental variables such as wind velocity and direction, number and composition of rounds (e.g. service vice green rounds--use was not reported) are expected to impact dermal and inhalation exposure potential.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure yes

Reference: 29 CFR 1910.1025

AGENT Noise

OEL: 140 dB

Exposure Estimate: 140 dB

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Unacceptable

Uncertainty: 0 Certain

Risk/Control Priority: 12

Basis: Available Literature

FIG Priority: 0

Discussion: Range activities typically result in exposure to impact noise exceeding 140 dB and doses exceeding 85 dBA in both indoor and outdoor ranges.

Medical Surveillance

Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1010.95

Maintenance**Process:** Apply Insecticide

Granular insecticidal bait containing Cyhalothrine is applied liberally to fire ant mounds using an applicator cup. Process is conducted seasonally in the spring.

Operating Conditions:

Task: Apply Insecticide, Bait

Frequency: Single Event

Granular insecticidal bait containing Cyhalothrine is applied liberally to fire ant mounds using an applicator cup. Process is conducted seasonally in the spring.

Duration: 1/2 - 1 hour

Controls:

Recommendation:

AGENT Cyhalothrine

OEL:

Exposure Estimate:

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 3

Basis: Qualitative Judgement

FIG Priority: 3

Discussion: Three or more 2.5 pound bags are used per year. Toxicity uncertain, but MSDS indicates toxicity via inhalation and skin absorption. Granular formulation poses reduced risk of inhalation and skin absorption. Glove use was reported. Exposure is expected to be acceptable based on product formulation and the frequency and duration of the task.

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

Process: Dozer Operation

A D4 Cat dozer is used to clear low water crossings, "push" roads, spread gravel, and fill ditches during pipe installation, among other uses.

Operating Conditions:

Task: Operate Dozer

Frequency: Daily

A D4 Cat dozer is used to clear low water crossings, "push" roads, spread gravel, and fill ditches during pipe installation, among other uses.

Duration: 4 - 8 hours

Controls:

Equipment is not fitted with a cab.

Recommendation:

AGENT Heat

OEL:

Exposure Estimate:

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

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

Exposure Category: Acceptable

Uncertainty: 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 variable, but may require up to a full shift. 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 (>10% OEL; 95th %tile > OEL) Exposure Category: Unacceptable
 Uncertainty: 1 Uncertain Risk/Control Priority: 12
 Basis: Qualitative Judgement FIG Priority: 12

Discussion: No sound level or dosimetry data are available for this task and equipment. Task is recognized as employees as noise hazardous as would be anticipated for this type of equipment without engineering controls (cab).

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

AGENT Stinging Insects

OEL:
 Exposure Estimate: Health Effects Rating: 2 Severe, reversible health effects of concern
 Exposure Rating: 1 (<10% OEL; 95th %tile <0.1 OEL) Exposure Category: Uncertain
 Uncertainty: 1 Uncertain Risk/Control Priority: 2
 Basis: Qualitative Judgement FIG Priority: 2

Discussion: Employees report stings as a result of disturbing "ground bees" (vespidae) while conducting task. One worker reported multiple stings and the development of an allergic reaction and anaphylactic response. Uncertainty is due to individual sensitivity to stings.

Medical Surveillance Justifiable yes
 Triggered or Critical Exposure no
 Reference:

Process: Drinking Water Chlorination

Sodium hypochlorite stock solution is mixed and loaded into a proportioner tank and injected automatically into water system piping.

Operating Conditions:

Task: Mix and Load Sodium Hypochlorite Solution

Frequency: Bi-Monthly

Four gallons of bleach (approximately 5.25 % sodium hypochlorite) are added directly into a 40 gallon mixing tank from 1 gallon containers. Water is added. Tank is checked no more frequently than once every two weeks.

Duration: Incidental

Controls:

Recommendation:

AGENT Sodium Hypochlorite

OEL: 2 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 WEEL C. Exposure risk is related to splash or spill that may result in exposure to skin and eyes. No protective eye wear was reported.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

Process: Fabrication of Water Control Structures

Boxes or half-round flash boards are fabricated as water control structures. Process requires welding to fit water control boards and attach them to culvert. Tasks include cutting steel pipe using an oxy-acetylene torch, grinding to clean and shape parts, and SMA welding. In some cases recycled asphalt coated pipe is used. Approximately one day is required to complete a structure. Eight to ten are completed over a period of 2-3 months, generally in the spring.

Operating Conditions:

Work is completed either in the field or in the shop. Large projects may require construction in place at a field site.

Task: Cut Rolled Steel Pipe using Oxy-Acetylene Torch

Frequency: 2 - 3 days/wk

Parts are cut and fitted using and oxy-acteylene torch. Work is typically conducted in the shop. An electric grinder may be used to smooth cut edges.

Duration: 1 - 4 hours

Controls:

An exhaust fan located in gable of the shop and open doors provides some movement of air.

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 (<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. OEL is not expecte to be exceeded for this task based duration and conditions of the task.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

Task: Remove Asphalt from Pipe

Frequency: 2 - 3 days/wk

Material used for fabrication includes used oil field pipe which has been coated with asphalt. Asphalt is removed using a chipping hammer to remove the build of the material, then the remainder is burned using an oxy-acetylene torch. Clean with chipping hammer to remove bulk, then burn off residual with torch. An area of 12 inches is cleaned around the work area. Work is typically conducted just outside shop door.

Duration: 1/2 - 1 hour

Controls:

Recommendation:

AGENT Asphalt Fume	OEL:	0.5 mg/m3
Exposure Estimate: mg/m3	Health Effects Rating:	1 Reversible health effects of concern
Exposure Rating: 1 (<10% OEL; 95th %tile <0.1 OEL)	Exposure Category:	Uncertain
Uncertainty: 1 Uncertain	Risk/Control Priority:	1
Basis: Qualitative Judgement	FIG Priority:	1
Discussion: OEL is TLV. Other relevant OEL is NIOSH Ceiling of 5 mg/m3. Exposure is uncertain.		

Medical Surveillance	Justifiable	yes
	Triggered or Critical Exposure	no
	Reference:	

Task: Weld Steel

Frequency: 2 - 3 days/wk

Steel is welded using SMAW and 6011 and 7018 rod.

Duration: 1 - 4 hours

Controls:

An exhaust fan located in gable of the shop and open doors provides some movement of air.

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 (<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 and is not expected to be exceeded base to actual duration of welding.		

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

Process: General Operations

During the course of operations, many pieces of powered equipment are operated. These may including chain saws, string trimmers, mowers, brush hogs, ATVs, boat motors, tractors, and leaf blowers.

Operating Conditions:

Task: Operate Powered Equipment

Frequency:

During the course of operations, many pieces of powered equipment are operated. These may including chain saws, string trimmers, mowers, brush hogs, ATVs, boat motors, tractors, and leaf blowers. Duration and frequency are highly variable.

Duration:

Controls:

PPE for chain saw use includes hard hat with screen and muffs and chaps; Hearing protection, gloves, and safety or sun glasses was reportedly used during operation of string trimmers.

Recommendation:

AGENT Noise

OEL: 85 dBA

Exposure Estimate: dBA

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Unacceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 12

Basis: Existing Quantitative Data

FIG Priority: 12

Discussion: Sound level data for similar equipment and jobs show unacceptable exposure to hazardous noise.

Medical Surveillance

Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1010.95

Process: Herbicide Application

Herbicides are mixed, loaded, and applied to rights of way, around facilities, gates, culverts, and signs, using pressure sprayers. Glyphosate (Rodeo and generic) and Endothal (Aquathol) are used to treat aquatic weeds in ponds. Several vehicle types with different tank volumes and power sources are used.

Operating Conditions:

Mixing is conducted outside the pesticide storage shed.

Task: Apply Herbicide

Frequency:

Herbicides are applied while riding equipment such as a Kubota tractor or an ATV. Sprayer is operated from the driver's seat. Application is broadcast with boom or applied as a directed spot spray. Duration and frequency are variable and seasonal. Material is applied as a coarse spray at 10-40 psi.

Duration: 4 - 8 hours

Controls:

Recommendation:

AGENT EndothalOEL: Exposure Estimate: Health Effects Rating: Irreversible health effects of concernExposure Rating: (<10% OEL; 95th %tile <0.1 OEL)Exposure Category: Uncertainty: UncertainRisk/Control Priority:

Basis: Qualitative Judgement

FIG Priority:

Discussion: Inhalation and skin contact are the primary routes of exposure. Agent is reported to be slightly toxic via skin absorption and inhalation based on animal studies. It is non-irritating to the skin, but may cause irreversible eye damage.

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 including eye and skin protection are assumed for this task.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Noise

OEL: 85 dBA

Exposure Estimate: dBAHealth Effects Rating: Irreversible health effects of concernExposure Rating: (10-50% OEL; 95th %tile 0.1-0.5 OEL)Exposure Category: Uncertainty: UncertainRisk/Control Priority:

Basis: Qualitative Judgement

FIG Priority:

Discussion: Sound level and dosimetry data are not available for equipment and task. Potential hazardous noise sources include the tractor and a gas powered pump.

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

Task: Mix and Load Herbicide, Pressure Sprayer

Frequency: Daily

Duration: <1/2 hour

Herbicides are mixed and loaded into a variety of application equipment. The three hundred gallon tank requires approximately 45 minutes to fill. Chemical is added when tank 1/2 full. For smaller tanks, product and surfactant are added before any water. Herbicide product is measured with measuring cup from either 2.5 gallon containers or 30 gallon drums fitted with a spigot. At times empty 2.5 gallon jugs will be used to transfer from the 30 gallon drum, and then carried to larger equipment. Task is seasonal, occurring in the spring.

Controls:

Recommendation:

Consider use of splash goggles or face shield when mixing, loading, or transferring herbicide to protect from accidental splash. This may be of particular importance while working with endothal which has been reported as able to cause irreversible eye damage.

AGENT Endothal

OEL:

Exposure Estimate:

Health Effects Rating: Irreversible health effects of concern

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

Exposure Category:

Uncertainty: Uncertain

Risk/Control Priority:

Basis: Qualitative Judgement

FIG Priority:

Discussion: Inhalation and skin contact are the primary routes of exposure. Agent is reported to be slightly toxic via skin absorption and inhalation based on animal studies. It is non-irritating to the skin, but may cause irreversible eye damage.

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 skin and eye contact, resulting in irritant effects. Short term inhalation exposure is not expected to produce significant health effects of concern. Barrier protections including eye and skin protection are used during this task.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

Process: Woodworking

General woodworking is conducted using floor mounted and portable power tools. Higher activity is reported in the spring. Equipment includes planer, radial arm saw, table saw, edger, drill press, band saw, compound miter, and sander. Projects may include fabrication of bird nesting structures, cabinets, etc. Materials include cypress, pine, salt treated lumber, some copper compound treated lumber, and treated plywood.

Operating Conditions:

Work is conducted in the shop. An available portable local exhaust ventilation system is seldom used.

Task: Cut CCA lumber

Frequency:

Copper, chromium and arsenic treated lumber is reportedly used in current projects to build flash boards as part of water control structures (see related process). Work is typically conducted in the fall to replace boards and in spring when building water control structures. Wood is not sanded or planed. Use is reportedly being replaced by osmotically treated (salt and copper) lumber.

Duration: 1/2 - 1 hour

Controls:

Recommendation:

AGENT Arsenic, Inorganic

OEL: 10 ug/m3

Exposure Estimate: ug/m3

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 3

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: OEL is TLV and is low. However, based on the duration and frequency of reported use, and because woodworking methods used are limited to coarse cuts, OEL is not expected to be exceeded during this task. (Note: MSDS is specimen from another manufacturer.)

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	yes
	Reference:	29 CFR 1910.1018

AGENT Chromium III, Inorganic

OEL: 0.5 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: OEL is TLV. Based on the duration and frequency of reported use, and because woodworking methods used are limited to coarse cuts, OEL is not expected to be exceeded during this task. (Note: MSDS is specimen from another manufacturer.)

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

Task: Operate Powered Woodworking Tools

Frequency:

General woodworking is conducted using floor mounted and portable power tools. Higher activity is reported in the spring. Equipment includes planer, radial arm saw, table saw, edger, drill press, band saw, compound miter, and sander. Projects may include fabrication of bird nesting structures, cabinets, etc. During the seasonal period, frequency is variable. Project duration may range from a few minutes to all day. Muffs used on planer. Respirator worn when operating planer and sanding.

Duration:

Controls:

Recommendation:

AGENT Noise

OEL: 85 dBA

Exposure Estimate: 0 dBA

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Unacceptable

Uncertainty: 0 Certain

Risk/Control Priority: 12

Basis: Existing Quantitative Data

FIG Priority: 0

Discussion: Sound level data for similar equipment and woodworking projects show unacceptable exposure to hazardous noise.

Medical Surveillance

Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1010.95

Morgan Break National Wildlife Refuge**Process:** Chemical Control of Kudzu

Kudzu is controlled using a combination of chemical and mechanical methods. The process typically involves broadcast application of Transline herbicide. Alternatively, vines may be cut and stumps sprayed with herbicide.

Operating Conditions:

Mixing and spraying is conducted outdoors. Process is conducted seasonally during summer under conditions of high temperature and high humidity.

Task: Apply Herbicide using High Volume Sprayer

Frequency: Annually

Herbicide is applied from a truck mounted high volume sprayer at 10-15 psi as a broadcast application on vegetation and in trees. Application of up to 300 gallons of mixed herbicide typically requires three consecutive days. Application requires an employee to walk beside pump or sit on the rig.

Duration: 1 - 4 hours

Controls:

Spray is directed down wind. Applications are made during low wind conditions to avoid drift to non-target areas.

Recommendation:**AGENT** Clopyralid

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: OEL is TWA set by manufacturer. Skin absorption reported as an important route of entry. Material is a mild irritant. Barrier protection is limited to gloves. Inhalation and dermal exposure to mist may occur over task duration of 1-4 hours. Reported attention to wind speed and direction will limit exposure to incidental.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

AGENT Isopropanol

OEL: 400 ppm

Exposure Estimate: 0 ppm

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

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: OEL is PEL. Exposure is not expected to exceed the OEL based on quantity agent and duration of task.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

Task: Apply Herbicide, Spot Treat

Frequency: Daily

Transline herbicide is applied as a spot treatment of stumps after vines have been mechanically cut. A manual hand-pumped 1 quart sprayer is used to apply to run off.

Duration: 1 - 4 hours

Controls:

Recommendation:

AGENT Clopyralid

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: OEL is TWA set by manufacturer. Skin absorption reported as an important route of entry. Material is a mild irritant. Barrier protection is limited to gloves. Short duration handling of concentrated material presents a spill or splash hazard.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

Task: Mix and Load Herbicide, Manual Hand Sprayer

Frequency: Daily

Transline herbicide is mixed and loaded in one quart manual hand-pumped sprayers. Pesticide is poured directly into the sprayer from the 2.5 gallon concentrate container using a funnel. Sprayer is filled to half full with concentrate, then the remainder is filled with water to achieve a 50:50 mixture. One quart of mixed herbicide is typically used in one day. Task is repeated daily for up to one week in order to complete an annual treatment project.

Duration: <1/2 hour

Controls:

Recommendation:

AGENT Clopyralid

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: OEL is TWA set by manufacturer. Skin absorption reported as an important route of entry. Material is a mild irritant. Barrier protections limited to gloves. Short duration handling of concentrated material presents a spill or splash hazard.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Isopropanol

OEL: 500 ppm

Exposure Estimate: ppm

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

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: OEL is NIOSH STEL. Quantity of agent and duration of exposure will result in negligible exposure risk except in the event of a spill.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

Task: Mix and Load High Volume Sprayer

Frequency: Annually

Mix and load 300 gallon trailer mounted spray tank. Transline product is purchased in 2 1/2 gallon containers and is mixed at a rate of approximately 1 qt per 25 gallons. The tank is filled to 3/4 full, then herbicide is measured and poured into the tank. The tank is then topped off with remaining water. The tank has an agitator that may be running while mixing. One tank may be used over several days. Annual spray projects may be conducted over a three day period. Alternatively, herbicide will be mixed in smaller quantities in the 25 gallon ATV mounted tank.

Duration: 1/2 - 1 hour

Controls:

none

Recommendation:

AGENT Clopyralid

OEL: 10 mg/m3

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

Basis: Qualitative Judgement

FIG Priority:

Discussion: OEL is TWA set by manufacturer. Skin absorption reported as an important route of entry. Material is a mild irritant. Barrier protections limited to gloves. Short duration handling of concentrated material presents a spill or splash hazard.

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

AGENT IsopropanolOEL: ppmExposure Estimate: ppmHealth Effects Rating: Severe, reversible health effects of concernExposure Rating: (10-50% OEL; 95th %tile 0.1-0.5 OEL)Exposure Category: Uncertainty: CertainRisk/Control Priority:

Basis: Qualitative Judgement

FIG Priority:

Discussion: OEL is NIOSH STEL. Elevated concentration may occur during mixing but is not expected to exceed the OEL.

Medical Surveillance	Justifiable	no
	Triggered or Critical Exposure	no
	Reference:	

Health Risk and Further Information Gathering Priorities

Theodore Roosevelt National Wildlife Refuge Complex

Division, Shop, Project	Process	Task	Agent	Exposure Category	Justified Medical Surveillance	Triggered Surveillance	Health Risk Priority	FIG Priority
Maintenance	Dozer Operation	Operate Dozer	Noise	Unacceptable	yes	yes	12	12
Maintenance	General Operations	Operate Powered Equipment	Noise	Unacceptable	yes	yes	12	12
Maintenance	Woodworking	Operate Powered Woodworking Tools	Noise	Unacceptable	yes	yes	12	0
Law Enforcement	Weapons Qualifiction	Weapons Qualification	Noise	Unacceptable	yes	yes	12	0
Maintenance	Herbicide Application	Apply Herbicide	Noise	Acceptable	no	yes	6	6
Law Enforcement	Weapons Qualifiction	Weapons Qualification	Lead	Acceptable	no	yes	6	0
Maintenance	Dozer Operation	Operate Dozer	Heat	Acceptable	no	no	4	4
Morgan Break National Wildlife Refuge	Chemical Control of Kudzu	Mix and Load High Volume Sprayer	Isopropanol	Acceptable	no	no	4	0
Maintenance	Herbicide Application	Apply Herbicide	Endothal	Acceptable	no	no	3	3
Law Enforcement	Emergency Medical Service	Provide First Aid and CPR	Bloodborne Pathogens	Acceptable	no	yes	3	3
Maintenance	Apply Insecticide	Apply Insecticide, Bait	Cyhalothrine	Acceptable	no	no	3	3
Maintenance	Herbicide Application	Mix and Load Herbicide, Pressure Sprayer	Endothal	Acceptable	no	no	3	3
Maintenance	Woodworking	Cut CCA lumber	Arsenic, Inorganic	Acceptable	no	yes	3	0
Maintenance	Fabrication of Water Control Structures	Cut Rolled Steel Pipe using Oxy-Acetylene Torch	Welding fume, NOS	Acceptable	no	no	2	2
Maintenance	Fabrication of Water Control Structures	Weld Steel	Welding fume, NOS	Acceptable	no	no	2	2
Maintenance	Dozer Operation	Operate Dozer	Stinging Insects	Uncertain	yes	no	2	2
Maintenance	Drinking Water Chlorination	Mix and Load Sodium Hypochlorite Solution	Sodium Hypochlorite	Acceptable	no	no	2	2
Maintenance	Woodworking	Cut CCA lumber	Chromium III, Inorganic	Acceptable	no	no	2	0
Morgan Break National Wildlife Refuge	Chemical Control of Kudzu	Apply Herbicide using High Volume Sprayer	Isopropanol	Acceptable	no	no	2	0
Forest Management	Tree Marking	Mark Trees	Methanol	Acceptable	no	no	2	0
Morgan Break National Wildlife Refuge	Chemical Control of Kudzu	Mix and Load Herbicide, Manual Hand Sprayer	Isopropanol	Acceptable	no	no	2	0
Morgan Break National Wildlife Refuge	Chemical Control of Kudzu	Mix and Load High Volume Sprayer	Clopyralid	Acceptable	no	no	1	1

Division, Shop, Project	Process	Task	Agent	Exposure Category	Justified Medical Surveillance	Triggered Surveillance	Health Risk Priority	FIG Priority
Maintenance	Fabrication of Water Control Structures	Remove Asphalt from Pipe	Asphalt Fume	Uncertain	yes	no	1	1
Morgan Break National Wildlife Refuge	Chemical Control of Kudzu	Apply Herbicide using High Volume Sprayer	Clopyralid	Acceptable	no	no	1	1
Forest Management	Tree Marking	Mark Trees	Stoddard solvent	Acceptable	no	no	1	0
Maintenance	Herbicide Application	Mix and Load Herbicide, Pressure Sprayer	Glyphosate	Acceptable	no	no	1	0
Morgan Break National Wildlife Refuge	Chemical Control of Kudzu	Apply Herbicide, Spot Treat	Clopyralid	Acceptable	no	no	1	0
Morgan Break National Wildlife Refuge	Chemical Control of Kudzu	Mix and Load Herbicide, Manual Hand Sprayer	Clopyralid	Acceptable	no	no	1	0
Maintenance	Herbicide Application	Apply Herbicide	Glyphosate	Acceptable	no	no	1	0