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CAPT Tim Radtke, CIH
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CAPT Radtke:

I have enclosed a report of exposure assessments for Castillo de San Marcos and Fort Matanzas National Monuments 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 25-26 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/DoIeA4TR.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.

I would like to thank the facility for accommodating my visit with little advanced notice. Access to important processes was limited, however. In particular, an opportunity to characterize and evaluate extensive masonry program processes was lost.

Please do not hesitate to contact me if you have any questions.

Sincerely,

David P. Bleicher, CIH

Enclosures: Castillo de San Marcos and Fort Matanzas National Monuments Occupational Exposure Assessment

Castillo de San Marcos National Monument
Fort Matanzas National Monument
Occupational Exposure Assessment and Medical Surveillance Inclusion
For
Department of Interior, Safety Council/Office of Health and Safety
On-site: 25-26 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 exposures¹.

An on-site visit to Castillo de San Marcos and Fort Matanzas National Monuments was conducted on 25-26 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 each facility (Attachments A through D). 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.

¹ Bullock, Wm.H. and J.S.Ignacio, Eds. 2006. A Strategy for Assessing and Managing Occupational Exposures, 3rd. AIHA Press, Fairfax.

Reading the Report.

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
31 August 2010

- Attachment A: Castillo de San Marcos Task-Agent Exposure Profile Detail Report
- Attachment B: Castillo de San Marcos Health Risk and Further Information Gathering Priorities Report
- Attachment C: Ft Matanzas Task-Agent Exposure Profile Detail Report
- Attachment D: Ft Matanzas Health Risk and Further Information Gathering Priorities Report

Task-Agent Exposure Profile Detail Report

Castillo de San Marcos

Interpretation Division

Process: *Historic Weapons Demonstration*

Historic weapon (cannon) demonstrations occur typically on Friday, Saturday, and Sunday each week with 5 to 6 demonstrations per day for a total of 15 to 18 cannon rounds fired per day from a reproduction long spanish 6 pounder. Charges consist of 7 oz powder loads. Musket demonstration typically occurs on Mondays. Sixty nine or 75 caliber muskets (brown bess, spanish fusile, for example) are fired. Two rounds are fired by 4-5 demonstrators in a full line volley fire. Three demonstrations may occur per day. Demonstrations are conducted by volunteers.

Operating Conditions:

Task: Clean Cannons

Frequency: Weekly

Cannons are cleaned with water using a bucket and a gun ladle to fill the gun. The bore is sponged and then rinsed. It is allowed to dry over night before applying oil (reported as mineral oil).

Duration: <1/2 hour

Controls:

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: 0 Certain

Risk/Control Priority: 4

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: Extremely hot and humid conditions were observed during historic weapons demonstrations. Metabolic heat generation is characterized as low. Heavy wool period clothing is worn during demonstrations. Demonstrations are of less than 30 minutes. Air conditioned office/ready room is available. Ice pack vests are available. Heat index is monitored and programs may be abbreviated during high heat stress conditions. Work-rest cycle and air conditioning will reduce risk of heat strain.

Medical Surveillance Justifiable no

Triggered or Critical Exposure no

Reference:

Task: Clean Muskets

Frequency: Weekly

Musket cleaning is demonstrated. Hot water ammended with isopropanol, murphy's oil soap and hydrogen peroxide is used as the cleaning agent. First, the vent is plugged with a tooth pick. Then the ammended water is poured into the barrel, plugged with a finger and agitated; then repeated. Next, the bore is cleaned with a patch moistened with the cleaning solution. Task requires approximately 10 minutes.

Duration: <1/2 hour

Controls:

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: 0 Certain

Risk/Control Priority: 4

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: Extremely hot and humid conditions were observed during historic weapons demonstrations. Metabolic heat generation for this task is very low and duration is approximately 10 minutes. Air conditioned office/ready room is available. Ice pack vests are available. Heat index is monitored and programs may be abbreviated during high heat stress conditions. Work-rest cycle and air conditioning will reduce risk of heat strain.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

Task: Demonstrate Cannon Fire

Frequency: 2 - 3 days/wk

Historic weapon (cannon) demonstrations occur typically on Friday, Saturday, and Sunday each week with 5 to 6 demonstrations per day for a total of 15 to 18 cannon rounds fired per day from a reproduction long spanish 6 pounder. Charges consist of 7 oz powder loads.

Duration: <1/2 hour

Controls:

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: Engineering Controls in Place

FIG Priority: 4

Discussion: Extremely hot and humid conditions were observed during historic weapons demonstrations. Metabolic heat generation is characterized as low. Heavy wool period clothing is worn during demonstrations. Demonstrations are of less than 30 minutes. Air conditioned office/ready room is available. Ice pack vests are available. Heat index is monitored and programs may be abbreviated during high heat stress conditions. Work-rest cycle and air conditioning will reduce risk of heat strain.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Noise

OEL: 140 dB

Exposure Estimate: 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: NPS study of impulse noise exposure during historic weapons demonstration showed most weapons exceeded 140 dB at the shooter's ear (one or both ears). All weapons studied were below US MIL Std thresholds, most were below Canadian Military Std for 20 rounds. Weapons used during this task were not included in the study.

Medical Surveillance Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1010.95

Task: Demonstrate Musket Fire

Frequency: Weekly

Musket demonstrations are conducted typically on the South Green, but may also be conducted in the moat and dry moat. Musket demonstration typically occurs on Mondays. Sixty nine or 75 caliber muskets (brown bess, spanish fusile, for example) are fired. Two rounds are fired by 4-5 demonstrators in full line volley fire. Three demonstrations may occur per day. Demonstrations are conducted by volunteers.

Duration: <1/2 hour

Controls:

Recommendation:

AGENT Heat

OEL:

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

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

Uncertainty: 1 Uncertain Risk/Control Priority: 8

Basis: Engineering Controls in Place FIG Priority: 8

Discussion: Extremely hot and humid conditions were observed during historic weapons demonstrations. Metabolic heat generation is characterized as low. Heavy wool period clothing is worn during demonstrations. Demonstrations are less than 30 minutes. Air conditioned office/ready room is available. Ice pack vests are available. Heat index is monitored and programs may be abbreviated during high heat stress conditions. Work-rest cycle and air conditioning will reduce risk of heat strain.

Medical Surveillance Justifiable no

Triggered or Critical Exposure no

Reference:

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: 1 Uncertain Risk/Control Priority: 12
 Basis: Available Literature FIG Priority: 12

Discussion: NPS study of impulse noise exposure during historic weapons demonstration showed most weapons exceeded 140 dB at the shooter's ear (one or both ears). All weapons studied were below US MIL Std thresholds, most were below Canadian Military Std for 20 rounds. Weapons used during this task were not included in the study.

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

AGENT Particulates, NOS

OEL: 5 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: Demonstrators are exposed to smoke from burning black powder (nitrate, sulfur, and carbon combustion products) for very short durations. OEL is not expected to be exceeded during multiple repetitions of this task.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Ultraviolet radiation

OEL:
 Exposure Estimate: 0 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: Demonstrators wear period clothing that covers the body and shades the head, except for face and hands. Sunscreen is available and reportedly used. Period sun glasses are worn by many demonstrators.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

Task: Maintain Gun Carriages.

Frequency: Bi-Annually

A 50/50 mixture of boiled linseed oil and turpentine is applied by brush to carriages and gun deck. Task is completed every 6 months or as needed and may require 1/2 a day.

Duration: 1 - 4 hours

Controls:

Recommendation:

AGENT Linseed oil

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: Low volatility and health risk associated with this agent creates a low exposure risk.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Turpentine

OEL: 20 ppm

Exposure Estimate: ppm

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: 1 Uncertain

Risk/Control Priority: 6

Basis: Qualitative Judgement

FIG Priority: 6

Discussion: OEL not expected to be exceeded based on agent's low vapor pressure and the task is conducted in open areas with good natural ventilation. Quantity of agent used was not determined.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

Task: Make Cannon Rounds

Frequency: Weekly

This task requires 2-3 workers. Aluminum foil tubes are rolled in the ready room, then transferred to the magazine. At the prep station, one person handles the powder, another the wadding, and a third seals the round with tape and marks it. Enough rounds are made at a time for a weekend's demonstrations (18 rounds). The total process requires approximately one hour, with about 1/2 hour spent in the magazine. Each charge requires 7 oz powder.

Duration: 1/2 - 1 hour

Controls:

Strick adherence to NPS historic weapons program protocols.

Recommendation:**AGENT** Black powder

OEL: 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: Greatest risk is detonation. Primary component is sodium nitrate or potassium nitrate. Black powder (DuPont Goex) poses negligible exposure risk through inhalation, skin and eye contact, or ingestion.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

Task: Make Cartridges

Frequency: Weekly

Duration: 1/2 - 1 hour

Musket cartridge casings are made of recycled xerox paper which is rolled and end sealed. Powder is measured with brass scoops. Load is typically 60 grains but may be up to a maximum 120 grains. A French Fold is used to secure the load. Enough cartridges are made for 120 days of demonstrations. Special events may require manufacture of 900 rounds over two days. Production line can produce up to 400 rounds in 1 to 1 1/2 hours.

Controls:

Non-sparking tools are used.

Recommendation:

AGENT	Black powder	OEL:	mg/m3
Exposure Estimate:	0 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:	Greatest risk is detonation. Primary component is sodium nitrate or potassium nitrate. Black powder (DuPont Goex) poses negligible exposure risk through inhalation, skin and eye contact, or ingestion.		
Medical Surveillance		Justifiable	no
		Triggered or Critical Exposure	no
		Reference:	

Health Risk and Further Information Gathering Priorities

Castillo de San Marcos

Division, Shop, Project	Process	Task	Agent	Exposure Category	Justified Medical Surveillance	Triggered Surveillance	Health Risk Priority	FIG Priority
Interpretation Division	Historic Weapons Demonstration	Demonstrate Musket Fire	Noise	Unacceptable	yes	yes	12	12
Interpretation Division	Historic Weapons Demonstration	Demonstrate Cannon Fire	Noise	Unacceptable	yes	yes	12	0
Interpretation Division	Historic Weapons Demonstration	Demonstrate Musket Fire	Heat	Acceptable	no	no	8	8
Interpretation Division	Historic Weapons Demonstration	Maintain Gun Carriages.	Turpentine	Acceptable	no	no	6	6
Interpretation Division	Historic Weapons Demonstration	Demonstrate Cannon Fire	Heat	Acceptable	no	no	4	4
Interpretation Division	Historic Weapons Demonstration	Clean Cannons	Heat	Acceptable	no	no	4	0
Interpretation Division	Historic Weapons Demonstration	Clean Muskets	Heat	Acceptable	no	no	4	0
Interpretation Division	Historic Weapons Demonstration	Demonstrate Musket Fire	Ultraviolet radiation	Acceptable	no	no	3	3
Interpretation Division	Historic Weapons Demonstration	Demonstrate Musket Fire	Particulates, NOS	Acceptable	no	no	1	1
Interpretation Division	Historic Weapons Demonstration	Maintain Gun Carriages.	Linseed oil	Acceptable	no	no	1	0
Interpretation Division	Historic Weapons Demonstration	Make Cannon Rounds	Black powder	Acceptable	no	no	0	0
Interpretation Division	Historic Weapons Demonstration	Make Cartridges	Black powder	Acceptable	no	no	0	0

Task-Agent Exposure Profile Detail Report

Fort Matanzas

Boat Operation

Process: Boat Operation

A boat is operated to ferry visitors to the island and Fort. Ferry operates on an hourly schedule. One to two trips per day will be made by an employee. In addition a utility boat may be operated.

Operating Conditions:

Task: Operate Ferry Boat

Frequency: Daily

A boat is operated to ferry visitors to the island and Fort. Ferry operates on an hourly schedule. One to two trips per day may be made by an operator. In addition a utility boat may be operated.

Duration: 1 - 4 hours

Controls:

Recommendation:

AGENT Carbon Monoxide

OEL: 25 ppm

Exposure Estimate: ppm

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

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 4

Basis: Qualitative Judgement

FIG Priority: 4

Discussion: OEL is TLV-TWA and is not expected to be exceeded based on the limited duration of operation. Realtime CO exposure monitoring conducted at other NPS facilities in similar situations shows potential for high instantaneous levels greater than the NIOSH Ceiling limit of 200 ppm. The occurrence of these peak levels was variable and highly dependant on operation of the vessel and relative wind direction.

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: 0 Certain

Risk/Control Priority: 3

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: Ferry boat is equipped with Honda 4 stroke engines. These engines will typically produced sound levels less than 85 dBA under moderate operational conditions. Operator distance from the engine and limited duration of exposure are expected to result in exposure below the OEL. Utility boat motor configuration and operation were not evaluated.

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

Exotic Vegetation Management

Process: Exotic Vegetation Management

Manual methods are used to control the majority of species of concern. Cogen Grass requires more aggressive methods such as spot application with Glyphosate herbicide.

Operating Conditions:

Task: Apply Herbicide

Apply Glyphosate herbicide as a spot spray to weeds using 1 gallon pump sprayer. Typically, one gallon of mixed spray is used per spray event.

Frequency: Bi-Annually

Duration: 1 - 4 hours

Controls:

Care is reportedly taken to avoid drift.

Recommendation:

AGENT Glyphosate

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: A working mix of 1.5 % Roundup product is used. Most likely route of exposure is skin and eye contact resulting in irritant effects. Exposure to negligible quantities of diluted product will result in low risk of contact effects. Short term inhalation exposure is not expected to produce significant health effects of concern. Nitrile gloves provide hand barrier protection.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

Task: Manual Weed Control

Exotic, invasive plants are hand pulled or may be dug using short handled tools.

Frequency: Monthly

Duration: 1 - 4 hours

Controls:

Recommendation:

Consider application of ACGIH WBGT threshold values for management of heat stress and prevention of heat strain.

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: Extremely hot and humid conditions were observed. Metabolic heat generation is characterized as low to moderate and task duration is less than 4 hours per day.

Medical Surveillance Justifiable no
Triggered or Critical Exposure no
Reference:

AGENT Poisonous plantsOEL: Exposure Estimate: Health 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: Exposure to Stinging Nettle was reported. Direct contact with this plant can result in pain and irritation. Leather gloves are used during this task.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

AGENT Ultraviolet radiationOEL: 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: Environmental exposure risk is high. Actual exposure will be a function of worker use of sun block, sun glasses, duration of unprotected exposure, and uniform and accessories worn. Adequate barrier protections are provided.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

Task: Mix and Load Herbicide

Frequency: Bi-Annually

Glyphosate herbicide is mixed and loaded into a one gallon sprayer. Product is measured directly into a calibrated sprayer with a funnel, then filled to desired volume with water. Task is conducted outside pesticide storage locker at Casitllo de San Marcos facility, then transported to Ft Matansas worksite in the bed of a pickup truck.

Duration: Incidental

Controls:

Recommendation:

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: A working mixture of 1.5 % Roundup product is made. 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. Appropriate barrier protections including eye and skin protection are used for this task.

Medical Surveillance Justifiable no
 Triggered or Critical Exposure no
 Reference:

Health Risk and Further Information Gathering Priorities

Fort Matanzas

Division, Shop, Project	Process	Task	Agent	Exposure Category	Justified Medical Surveillance	Triggered Surveillance	Health Risk Priority	FIG Priority
Boat Operation	Boat Operation	Operate Ferry Boat	Carbon Monoxide	Acceptable	no	no	4	4
Exotic Vegetation Management	Exotic Vegetation Management	Manual Weed Control	Heat	Acceptable	no	no	4	4
Exotic Vegetation Management	Exotic Vegetation Management	Manual Weed Control	Ultraviolet radiation	Acceptable	no	no	3	3
Boat Operation	Boat Operation	Operate Ferry Boat	Noise	Acceptable	no	yes	3	0
Exotic Vegetation Management	Exotic Vegetation Management	Manual Weed Control	Poisonous plants	Acceptable	no	no	1	1
Exotic Vegetation Management	Exotic Vegetation Management	Apply Herbicide	Glyphosate	Acceptable	no	no	1	0
Exotic Vegetation Management	Exotic Vegetation Management	Mix and Load Herbicide	Glyphosate	Acceptable	no	no	1	0