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1 November 2010

CAPT Tim Radtke, CIH
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CAPT Radtke:

I have enclosed a report of exposure assessments for the Hydrologic Instrumentation Facility 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 21 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/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.

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

Sincerely,

David P. Bleicher, CIH

Enclosure: Hydrologic Instrumentation Facility Occupational Exposure Assessment

Hydrologic Instrumentation Facility
Occupational Exposure Assessment and Medical Surveillance Inclusion
For
Department of Interior, Safety Council/Office of Health and Safety
On-site: 21 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 exposures[1].

An on-site visit to the Hydrologic Instrumentation Facility was conducted on 21 April 2010 by David P. Bleicher, CIH to characterized 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 categorized 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
1 November 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

Hydrologic Instrumentation Facility

Field Services Section, Engineering Support Unit, Electronics Shop, Repair Unit

Process: *Clean Instrument Cables*

Instrument cables that are received from the field are cleaned to remove soil, scale, and organisms such as barnacles.

Operating Conditions:

Work is conducted at a sink in the general shop area.

Task: Clean Cables

Frequency: Weekly

Duration: 1/2 - 1 hour

Cables are soaked in "Lime-Away" for 30 minutes then rinsed in tap water.

Controls:

Recommendation:

AGENT Phosphoric acid

OEL: 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 PEL. Product is 30% phosphoric acid in solution. Greatest risk of exposure is due to corrosive effects as the result of direct contact with the skin or eyes, especially with concentrated product. Glove use was reported. Protection of eyes from splash was limited to safety glasses.

Medical Surveillance

Justifiable: no

Triggered or Critical Exposure: no

Reference:

Process: *Repair Electronic Instrumentation*

Repair electronic test equipment and prepare cables.

Operating Conditions:

Work is conducted at bench work stations. Ventilation is primarily dependent on the building HVAC system. Local exhaust ventilation is available at the workstation for soldering work.

Task: De-soldering

Frequency: Daily

Duration: <1/2 hour

Electronic components are removed from circuit boards during repair. Soldering iron set to 680 F.

Controls:

Local exhaust ventilation at the bench with hood approximately 6 inches from work .

Recommendation:

AGENT Lead

OEL: 50 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 PEL. The frequency and duration of the task results in negligible exposure potential to lead and to other task related and generated compounds such as colophony (pine resin) and hydrochloric acid.

Medical Surveillance

Justifiable: no

Triggered or Critical Exposure: yes

Reference: 29 CFR 1910.1025

Task: Remove (De-solder) Beryllium Containing Transistors

Frequency: Single Event

Duration: Incidental

Solder is heated to remove beryllium-containing transistors from circuit boards Beryllium was used as a heat resistant coating on some transistors. The component is then packaged in plastic. There is no direct handling of component. Incidental release may occur if the component is broken in the process of removal. The task reportedly no longer occurs.

Controls:

Work is conducted under local exhaust ventilation at the bench with the hood approximately 6 inches from work.

Recommendation:

AGENT Beryllium

OEL: 0.5

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: Engineering Controls in Place

FIG Priority: 0

Discussion: OEL is REL-C. Task reportedly no longer occurs. When conducted, this task was of negligible duration and frequency, only rarely resulting in potentially very low level release of agent when transistors were broken, which is expected to have been controlled by existing local exhaust ventilation.

Medical Surveillance

Justifiable: no

Triggered or Critical Exposure: no

Reference:

Task: Solder Cleaning

Frequency: Daily

Duration: <1/2 hour

Apply "Flux Off Rosin" aerosol, then use brush to clean. Short spray bursts are used after every soldering job. Total use duration of actual application over a shift may be 5 minutes. Flux Off product contains hexanes, ethanol, isopropyl alcohol.

Controls:

Product may, or not, be applied under exhaust ventillation which is equiped with only particulate filtration.

Recommendation:

AGENT Ethanol

OEL: 1000 ppm

Exposure Estimate: ppm

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

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: OEL is TLV-STEL. OEL is not expected to be exceeded based on limited quantity of agent used.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

AGENT Hexane, isomers

OEL: 510 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 REL-STEL. Small quantities of product used throughout the work shift are not expected to exceed the OEL.

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 REL-STEL. Base on quantity of agent used, the OEL is not expected to be exceeded.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

Task: Soldering

Frequency: Daily

Duration: 1/2 - 1 hour

Electronic components are attached to circuit boards using a lead-tin solder. Soldering iron temperature set at 680 F. Solder used is Litton "44" Rosin flux cored which contains 63% Pb, 37% tin, and also contains silver and antimony. Task also includes surface soldering processes.

Controls:

Local exhaust ventilation is available at the bench. Hood is positioned approximately 6 inches from work .

Recommendation:

AGENT Colophony

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: Engineering Controls in Place

FIG Priority: 0

Discussion: Agent is the principle flux used in commercial solders. It contains 90% pine resin with the remaining 10% composed or stilbine derivatives and hydrocarbons. Agent is known to cause allergic reactions (colophony allergy) and bronchial asthma. Frequency and duration of task and existing engineering controls are expected to result in negligible exposure.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

AGENT Hydrogen chloride

OEL: 2 ppm

Exposure Estimate: ppm

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

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

Exposure Category: Acceptable

Uncertainty: 0 Certain

Risk/Control Priority: 2

Basis: Engineering Controls in Place

FIG Priority: 0

Discussion: OEL is TLV-C. Hydrochloric acid is a potent mucosal irritant and may cause reflex bronchoconstriction. Negligible exposure is anticipated based of frequency and duration of task and existing engineering controls.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

AGENT Lead

OEL: 50 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: Engineering Controls in Place

FIG Priority: 0

Discussion: OEL is PEL. Frequency and duration of the task results in negligible airborne exposure potential to lead. Local exhaust ventilation is in place. Low risk of dermal exposure may result from handling solder and components and contact with Pb on work surfaces.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure yes

Reference: 29 CFR 1910.1025

Field Services Section, Engineering Support, Machine Shop

Process: *Instrument Modification, Fabrication, or Repair*

General machining processes. Requirements and projects vary. Work is non-production and often consists of single, one-off fabrication projects and prototype development.

Operating Conditions:

Machine shop is located within the main building and relies on the building's HVAC system for general dilution ventilation. Local exhaust ventilation in the adjacent welding shop and paint shop are used to enhance general dilution of the machining areas.

Task: Mill Aluminum

Frequency:

Duration: 1 - 4 hours

Operate milling machine, lathe, and drill press. Cutting oils are applied manually when drilling and tapping or cutting threads in aluminum. Frequency is project based and variable.

Controls:

Recommendation:

AGENT Noise

OEL: 85 dBA

Exposure Estimate: dBA

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Uncertain

Uncertainty: 1 Uncertain

Risk/Control Priority: 12

Basis: Qualitative Judgement

FIG Priority: 12

Discussion: Sound level and dosimetry data were not available for this task. There is a presumption of hazardous noise generated during this task and use of hearing protectors is reported.

Medical Surveillance

Justifiable: yes

Triggered or Critical Exposure: yes

Reference: 29 CFR 1010.95

AGENT Oil mist, mineral

OEL: 5 mg/m3

Exposure Estimate: mg/m3

Health Effects Rating: 1 Reversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 1

Basis: Qualitative Judgement

FIG Priority: 1

Discussion: OEL is PEL. OEL is not expected to be exceeded during this task.

Medical Surveillance

Justifiable: no

Triggered or Critical Exposure: no

Reference:

Task: Milling Stainless Steel

Frequency: Bi-Annually

Duration: 1 - 4 hours

A lathe and 2 milling machines are used to fabricate parts in stainless steel. The machines have recirculating water-based coolant supplied to the work. Cutting oils are applied for tapping, drilling and similar operations. Task is conducted infrequently (about twice in a year).

Controls:

Recommendation:

AGENT Noise

OEL: 85 dBA

Exposure Estimate: dBA

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Uncertain

Uncertainty: 1 Uncertain

Risk/Control Priority: 12

Basis: Qualitative Judgement

FIG Priority: 12

Discussion: Sound level and dosimetry data were not available for this task. There is a presumption of hazardous noise generated during this task and use of hearing protectors is reported.

Medical Surveillance

Justifiable: yes

Triggered or Critical Exposure: yes

Reference: 29 CFR 1010.95

AGENT Oil mist, mineral

OEL: 5 mg/m3

Exposure Estimate: mg/m3

Health Effects Rating: 1 Reversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 1

Basis: Qualitative Judgement

FIG Priority: 1

Discussion: OEL is PEL. Exposure to oil mist during drilling and tapping is expected to be negligible.

Medical Surveillance

Justifiable: no

Triggered or Critical Exposure: no

Reference:

Task: Operate Bead Blaster

Frequency: Monthly

Duration: <1/2 hour

Operate bead blaster to clean surfaces of parts to remove old paint and prepare surfaces for refinishing. Blasting is contained within a glove box enclosure. Task is conducted infrequently.

Controls:

The glove box is fitted with an external particulate extractor, presumed to be a centrifugal or cyclone type and bag filter which is loosely connected by duct to the glove box enclosure. Discharge from the ventilation system is into the shop and general building area.

Recommendation:

AGENT Particulates, NOC/R

OEL: 5 mg/m3

Exposure Estimate: mg/m3

Health Effects Rating: 1 Reversible health effects of concern

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

Exposure Category: Uncertain

Uncertainty: 1 Uncertain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 2

Discussion: OEL is PEL for respirable fraction. OEL is not expected to be exceeded during the short duration of the task. However, an unknown concentration of fine particulates that may not be captured by the cyclone and bag filter system may be released into shop and building areas. These may include any of the components of the coating material being removed.

Medical Surveillance

Justifiable: yes

Triggered or Critical Exposure: no

Reference:

Task: Weld Aluminum

Frequency: Quarterly

Duration: <1/2 hour

Weld aluminum using TIG process and 4043 and 5356 metal rods.

Controls:

An overhead exhaust fan operates in the welding shop. There is a recirculating, filtered local exhaust system available but reportedly not used.

Recommendation:

AGENT Aluminum

OEL: 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 TLV. Task is conducted for a short duration and is not expected to result in exposure exceeding the OEL.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

Task: Weld Stainless Steel

Frequency: Quarterly

Duration: <1/2 hour

Weld stainless steel using TIG process and 308 and 316 metal rod.

Controls:

An overhead exhaust fan operates in the welding shop. There is a recirculating, filtered local exhaust system available but reportedly not used.

Recommendation:

AGENT Chromium VI

OEL: 5 ug/m3

Exposure Estimate: ug/m3

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

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

Exposure Category: Uncertain

Uncertainty: 2 Highly Uncertain

Risk/Control Priority: 16

Basis: Qualitative Judgement

FIG Priority: 32

Discussion: OEL is PEL. Another applicable OEL is REL (1 ug/m3). Local exhaust system is reportedly not used during this task. Ceiling exhaust fan is not expected to control agent as it is generated, but rather, may help to draw agent through worker's breathing zone. Short duration of task limits exposure. Exposure data are not available for this task.

Medical Surveillance

Justifiable yes

Triggered or Critical Exposure yes

Reference: 29 CFR 1910.1026

AGENT Nickel, Elemental

OEL: 1 mg/m3

Exposure Estimate: mg/m3

Health Effects Rating: 3 Irreversible health effects of concern

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

Exposure Category: Uncertain

Uncertainty: 1 Uncertain

Risk/Control Priority: 9

Basis: Qualitative Judgement

FIG Priority: 9

Discussion: OEL is PEL. Local exhaust system is reportedly not used during this task. Ceiling exhaust fan is not expected to control agent as it is generated, but rather, may help to draw agent through worker's breathing zone. Short duration of task limits exposure. Exposure data are not available for this task.

Medical Surveillance

Justifiable yes

Triggered or Critical Exposure no

Reference:

Field Services Section, Warehouse

Process: *Shipping and Receiving*

Instrumentation is received at the warehouse. Instruments may be rental, new or used and may received for calibration, repair, or cleaning.

Operating Conditions:

Typical warehouse.

Task: Dispense Meter Oil

Frequency: Bi-Annually

Duration: 1 - 4 hours

Meter oil is transferred from a 55 gallon drum fitted with a valve into plastic bottles ranging in size from 1 oz to 0.5 pt. Fifty containers may be filled at a time.

Controls:

Recommendation:

AGENT Petroleum Distillate

OEL: 1800 ppm

Exposure Estimate: ppm

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: Agent is CAS 64742-6 hydrotreated light naphthenic distillate, petroleum. OEL is REL-STEL for petroleum distillate. OEL is not expected to be exceeded.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

Task: Equipment Disinfection

Frequency: Daily

Duration: 1/2 - 1 hour

All equipment that has been submerged or soiled and all cables are treated with disinfectant solution containing 0.02% parachlorometaxylenol. Product is transferred from gallon containers into a 2 gal hand pump sprayer. Equipment is placed in a tub, sprayed, scrubbed with a brush, and then allowed to dry before it is returned to the warehouse.

Controls:

Recommendation:

AGENT Parachlorometaxylenol

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: Agent has little systemic toxicity and is a mild irritant in concentrate form. Task requires low concentration solution. Exposure via inhalation, ingestion, or contact is not expected to result in health effects of concern.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

Task: Forklift Battery Maintenance

Frequency: Monthly

Duration: <1/2 hour

Forklift batteries are checked monthly. Task may require replenishment of electrolyte.

Controls:

Recommendation:

AGENT Sulfuric acid

OEL: 0.2 mg/m3

Exposure Estimate: mg/m3

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: Battery type and electrolyte composition were not reported, but presumed to be lead acid with sulfuric acid electrolyte. OEL is TLV. Some splash reportedly may occur. Greatest risk is due direct contact with the agent as a result of spill or splash. Hand protection was reported. Eye protection is limited to safety glasses.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

Task: Use Instapak Quick Packaging

Frequency: Daily

Duration: 1/2 - 1 hour

Sealed Air Instapak Quick foam packaging is used in packaging instruments for shipment. Approximately 40 packs are used each day.

Controls:

Recommendation:

AGENT Methylene bisphenyl isocyanate

OEL: 0.02 ppm

Exposure Estimate: 0 ppm

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

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 4

Basis: Engineering Controls in Place

FIG Priority: 4

Discussion: OEL is OSHA Ceiling. Product contains polymeric and monomeric forms of the agent. Packaging effectively isolates the worker from the agent during mixing use. Uncertainty is due to potential for accidental release from packaging. Only one accidental release has been reported.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

Testing Section

Process: *Painting Equipment*

New or repaired cast aluminum or bronze sediment sampling equipment is coated.

Operating Conditions:

Task: Apply Aerosol Coating

Frequency: Bi-Monthly

Duration: 1/2 - 1 hour

Aerosol "Plasti-Dip" coating is applied to cast aluminum or bronze sediment sampling equipment in 4 coats.

Controls:

Work is conducted in a paint booth during winter and outdoors during summer.

Recommendation:

AGENT Hexane, isomers

OEL: 150 ppm

Exposure Estimate: ppm

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

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

Exposure Category:

Uncertainty: 1 Uncertain

Risk/Control Priority: 6

Basis:

FIG Priority: 6

Discussion: OEL is REL-STEL. Product contains 16-19% hexane. Uncertainty is due to effectiveness of natural and mechanical ventilation and quantities used within 1/2 to 1 hour period. Several product components have similar activity on the same target organs.

Medical Surveillance

Justifiable yes

Triggered or Critical Exposure no

Reference:

AGENT Methyl ethyl ketone

OEL: 300 ppm

Exposure Estimate: ppm

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

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 6

Basis: Qualitative Judgement

FIG Priority: 6

Discussion: OEL is TLV-STEL. Product contains 3-7% MEK. Uncertainty is due to effectiveness of natural and mechanical ventilation and quantities used within 1/2 to 1 hour period. Several product components have similar activity on the same target organs.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

AGENT Toluene

OEL: 300 ppm

Exposure Estimate: ppm

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

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 6

Basis: Qualitative Judgement

FIG Priority: 6

Discussion: OEL is OSHA Ceiling. Product contains 13-16% agent. Uncertainty is due to effectiveness of natural and mechanical ventilation and quantities used within 1/2 to 1 hour period. Several product components have similar activity on the same target organs.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

AGENT VM&P Naphtha

OEL: 350 ppm

Exposure Estimate: ppm

Health Effects Rating: 1 Reversible health effects of concern

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 3

Basis: Qualitative Judgement

FIG Priority: 3

Discussion: OEL is REL. Product contains 32-38% agent. Uncertainty is due to effectiveness of natural and mechanical ventilation and quantities used within 1/2 to 1 hour period. Several product components have similar activity on the same target organs.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

Task: Surface Preparation

Frequency: Bi-Monthly

Duration: <1/2 hour

Prepare cast aluminum or bronze sediment samplers by hand wiping with a rag moistened with toluene or paint thinner. Task requires approximately 5 minutes.

Controls:

Work is conducted in a paint booth during winter and outdoors during summer.

Recommendation:

AGENT Toluene

OEL: 300 ppm

Exposure Estimate: ppm

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

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 2

Discussion: OEL is OSHA Ceiling. Uncertainty is due to quantity of agent used during short duration task. Gloves are expected to provide adequate protection from skin exposure during this task.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

AGENT Xylenes

OEL: 150 ppm

Exposure Estimate: ppm

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

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

Exposure Category: Acceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 2

Discussion: OEL is TLV-STEL. Paint thinner product was xylenes. Gloves are expected to provide adequate protection from skin exposure during this task. Uncertainty is due to quantity used during short duration task.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

Testing Section, Water Quality

Process: *Cleaning Water Quality Test Instruments*

Instruments received for calibration are cleaned using an ultrasonic cleaner loaded with a potassium hydroxide solution. The solution is delivered and the system is maintained by a contractor (Safety-Kleen).

Operating Conditions:

Task: Cleaning

Frequency: Daily

Duration: 1 - 4 hours

Instruments are immersed in a potassium hydroxide solution in an ultrasonic cleaning tank and allowed to soak 2 - 8 hrs after which they are transferred to a sink where they are scrubbed as needed and rinsed in tap water. Lyme-Away product may be used in addition remove calcium build up. Use of Techspray flux remover was also reported (MSDS not available).

Controls:

Recommendation:

AGENT Phosphoric acid

OEL: 1 mg/m3

Exposure Estimate: mg/m3

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

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

Exposure Category: Unacceptable

Uncertainty: 1 Uncertain

Risk/Control Priority: 8

Basis: Qualitative Judgement

FIG Priority: 8

Discussion: OEL is PEL. Product is 30% phosphoric acid in solution. Greatest risk of exposure is due to corrosive effects as a result of direct contact with the skin or eyes, especially with concentrated product. Exposure rating and category are based on lack of reported use of barrier protection during this task.

Medical Surveillance

Justifiable yes

Triggered or Critical Exposure no

Reference:

AGENT Potassium hydroxide

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: 0 Certain

Risk/Control Priority: 2

Basis: Qualitative Judgement

FIG Priority: 0

Discussion: OEL is TLV-C. Agent is corrosive on contact with skin and mucosal tissue. Direct contact is limited. Use of barrier protections was not reported for this task.

Medical Surveillance

Justifiable no

Triggered or Critical Exposure no

Reference:

Health Risk and Further Information Gathering Priorities

Hydrologic Instrumentation Facility

Division, Shop, Project	Process	Task	Agent	Exposure Catagory	Justified Medical Surveillance	Triggered Surveillance	Health Risk Priority	FIG Priority
Field Services Section, Engineering Support, Machine Shop	Instrument Modification, Fabrication, or Repair	Weld Stainless Steel	Chromium VI	Uncertain	yes	yes	16	32
Field Services Section, Engineering Support, Machine Shop	Instrument Modification, Fabrication, or Repair	Milling Stainless Steel	Noise	Uncertain	yes	yes	12	12
Field Services Section, Engineering Support, Machine Shop	Instrument Modification, Fabrication, or Repair	Mill Aluminum	Noise	Uncertain	yes	yes	12	12
Field Services Section, Engineering Support, Machine Shop	Instrument Modification, Fabrication, or Repair	Weld Stainless Steel	Nickel, Elemental	Uncertain	yes	no	9	9
Testing Section, Water Quality	Cleaning Water Quality Test Instruments	Cleaning	Phosphoric acid	Unacceptable	yes	no	8	8
Testing Section	Painting Equipment	Apply Aerosol Coating	Methyl ethyl ketone	Acceptable	no	no	6	6
Testing Section	Painting Equipment	Apply Aerosol Coating	Hexane, isomers		yes	no	6	6
Testing Section	Painting Equipment	Apply Aerosol Coating	Toluene	Acceptable	no	no	6	6
Field Services Section, Warehouse	Shipping and Receiving	Forklift Battery Maintenance	Sulfuric acid	Acceptable	no	no	4	4
Field Services Section, Warehouse	Shipping and Receiving	Use Instapak Quick Packaging	Methylene bisphenyl isocyanate	Acceptable	no	no	4	4
Field Services Section, Engineering Support Unit, Electronics Shop, Repair Unit	Repair Electronic Instrumentation	Remove (De-solder) Beryllium Containing Transistors	Beryllium	Acceptable	no	no	4	0
Testing Section	Painting Equipment	Apply Aerosol Coating	VM&P Naphtha	Acceptable	no	no	3	3
Field Services Section, Engineering Support Unit, Electronics Shop, Repair Unit	Repair Electronic Instrumentation	Soldering	Lead	Acceptable	no	yes	3	0
Field Services Section, Engineering Support Unit, Electronics Shop, Repair Unit	Repair Electronic Instrumentation	De-soldering	Lead	Acceptable	no	yes	3	0
Testing Section	Painting Equipment	Surface Preparation	Toluene	Acceptable	no	no	2	2
Testing Section	Painting Equipment	Surface Preparation	Xylenes	Acceptable	no	no	2	2
Field Services Section, Engineering Support, Machine Shop	Instrument Modification, Fabrication, or Repair	Operate Bead Blaster	Particulates, NOC/R	Uncertain	yes	no	2	2

Division, Shop, Project	Process	Task	Agent	Exposure Catagory	Justified Medical Surveillance	Triggered Surveillance	Health Risk Priority	FIG Priority
Field Services Section, Engineering Support, Machine Shop	Instrument Modification, Fabrication, or Repair	Weld Aluminum	Aluminum	Acceptable	no	no	2	2
Field Services Section, Engineering Support Unit, Electronics Shop, Repair Unit	Clean Instrument Cables	Clean Cables	Phosphoric acid	Acceptable	no	no	2	2
Testing Section, Water Quality	Cleaning Water Quality Test Instruments	Cleaning	Potassium hydroxide	Acceptable	no	no	2	0
Field Services Section, Engineering Support Unit, Electronics Shop, Repair Unit	Repair Electronic Instrumentation	Soldering	Hydrogen chloride	Acceptable	no	no	2	0
Field Services Section, Engineering Support Unit, Electronics Shop, Repair Unit	Repair Electronic Instrumentation	Solder Cleaning	Hexane, isomers	Acceptable	no	no	2	0
Field Services Section, Engineering Support Unit, Electronics Shop, Repair Unit	Repair Electronic Instrumentation	Solder Cleaning	Ethanol	Acceptable	no	no	2	0
Field Services Section, Engineering Support Unit, Electronics Shop, Repair Unit	Repair Electronic Instrumentation	Solder Cleaning	Isopropanol	Acceptable	no	no	2	0
Field Services Section, Engineering Support, Machine Shop	Instrument Modification, Fabrication, or Repair	Mill Aluminum	Oil mist, mineral	Acceptable	no	no	1	1
Field Services Section, Engineering Support, Machine Shop	Instrument Modification, Fabrication, or Repair	Milling Stainless Steel	Oil mist, mineral	Acceptable	no	no	1	1
Field Services Section, Engineering Support Unit, Electronics Shop, Repair Unit	Repair Electronic Instrumentation	Soldering	Colophony	Acceptable	no	no	1	0
Field Services Section, Warehouse	Shipping and Receiving	Dispense Meter Oil	Petroleum Distillate	Acceptable	no	no	0	0
Field Services Section, Warehouse	Shipping and Receiving	Equipment Disinfection	Parachlorometaxylenol	Acceptable	no	no	0	0