Advice & Counsel

Frank Altmayer, MSF, AESF Fellow
Scientific Control Labs, Inc.
3158 Kolin Ave.
Chicago, IL 60623-4889
E-mail: faltmayer@sclweb.com

OSHA Finalizes Cr^{+6} PEL, Now What?

Dear Advice & Counsel,

Every year you give a speech at our local AESF branch and update us on what regulations may come down the pike, and each year you indicate that OSHA is planning on finalizing the new maximum worker exposure TWA (PEL) from the existing 52 $\mu g/m^3$ to some ungodly low number in the near future. We all break out in a sweat and can't sleep for weeks. Then you leave and another year goes by and you repeat the same statement the following year. Are you not crying wolf a few too many times?

Signed,
Chic N. Little

Dear Ms. Little,

It appears that the sky has finally fallen. OSHA "finalized" the hexavalent chromium PEL at a level of 5 $\mu g/m^3$ on February 28, 2006. They also finalized an action level of 2.5 $\mu g/m^3$.

These PEL levels are five times higher than they originally proposed, but of course are more than 10 times lower than the existing numbers and are much lower than just about every industrialized nation on this planet. Even so, public interest groups (Public Citizen, aka Ralph Nader and the Atomic Energy Workers Union) are outraged that (in their mind) OSHA was so lenient. They have filed suit to force OSHA to revert to their original proposal (or lower). Industry has also sued. The outcome of the lawsuits is anybody's guess.

Under the finalized regulations, the compliance deadlines are:

1. Companies with 20 or more employees: November 27, 2006.
2. Companies with less than 20 employees: May 30, 2007.

If modification, installation or replacement of engineering controls are required for compliance, the deadline for completing them is May 31, 2010 (however, respirator protection will be required up to the compliance deadline).

You can get a copy of the preamble and regulation (287 pages) by logging onto www.osha.gov. We will not cover the detailed requirements at this time, but we can begin to discuss measures that can be taken now to avoid major headaches after the compliance deadlines have passed.

1. Initial Exposure Determination

Each facility needs to know where they stand in relation to the regulation. This data will be useful, no matter what the outcome of the lawsuits. Initial exposure monitoring can be done by hiring a professional, or you can do it yourself by using personal sampling pumps that some labs loan out. Be sure that you follow the instructions for conducting the sampling carefully (OSHA Method 215 must be followed). Those same labs will then quantitate your sample and send you a report. The regulation requires you to monitor the exposure on each and every employee exposed to hexavalent chromium. This can be a daunting (and may be an expensive) task.

Sampling must be conducted in the "personal breathing zone" of the employee in order to establish the exposure level (see "Advice & Counsel" article on Do-it-Yourself Sampling for basic sampling information, April 2005 *P&SF*, page 34). We suggest you begin by sampling the employees that you suspect have the highest exposures first. These employees are typically those that occupy the space at or near a hexavalent chromium plating tank while it is in operation.

Under the regulation, employees (or their representatives) have the right to witness any exposure monitoring. If such observation requires protective equipment, it must be supplied by the employer.

If you are in a state that has its own state-equivalent of OSHA (California), be sure to consult the state regulations for compliance with same. If state and Federal regulations conflict, usually the more stringent provision applies.

Based upon the initial exposure monitoring results:

A. If the Exposure is Below 2.5$\mu g/m^3$

If the exposure is below the action level, exposure monitoring of that employee may be discontinued. This does not mean that you can ignore all other provisions of the regulation, however. You may still need to comply with "Hazard Communication," training and certain hygiene requirements.

B. If the Exposure is above 2.5$\mu g/m^3$

If the exposure is at or above the action level, it may be a good idea to review all equipment issues and working procedures to determine what measures can reduce the exposure level. Possible causes of high readings include:

(a) Poor ventilation of the process
i. Push Pull ventilation can produce fugitive emissions when hardware on top of the tank blocks the push air or the pull air
ii. Low capture velocity fails to capture the mist
iii. Too high a capture velocity creates turbulence on top of process tank

iv. Fractured plastic hood leaks emissions
v. Clogged slots in hood impairs capture of emissions
vi. Missing or damaged baffles on hoods
vii. Cross-drafts caused by doors opened by employees for comfort during hot days

(b) Use of Air Agitation
i. Plating tanks, dummy tanks, drag-out rinse tanks running rinse tanks and final hot water rinse tanks may be air agitated, but not ventilated or ventilated poorly. Consider replacing air with eductors or alternate non-misting methods of agitation. Ventilate any hexavalent chromium containing process tank that is air agitated.
ii. Wastewater treatment tanks for treating hexavalent chromium are not ventilated, or are ventilated poorly and are air agitated.

(c) Air Balance
i. Consult with a ventilation expert to optimize make-up air and balance it with ventilation capture rates.

(d) Use of Spray Rinses/Spray Stations
i. Use spray rinsing only when the process is ventilated.
ii. Eliminate spray rinsing over the top of the tank, if mist is not captured effectively
iii. Maintenance personnel should not use sprays to clean hardware on top of chromium plating tanks (use sponges or other absorbent methods)

(e) Work Habits
Study the work habits of all affected employees and identify habits that may impact exposure levels. Then devise methods of changing those habits. Some things to look for are:
i. Removing parts in a manner that causes splashing
ii. Placing the face near emissions
iii. Spraying water onto surfaces contaminated with chromium
iv. Adding dusty forms of chromic acid instead of liquid concentrates
v. Compressed air drying of parts (without a means of capturing the mist) containing trapped chromic acid
vi. If un-racking of parts subjects rackers to chromic acid exposures from trapped solution in crevices of damaged rack coatings its time for a rack overhaul program
vii. Observe any maintenance operation on process systems involving chromic acid to identify exposure routes, so that you can devise methods of reduction of exposure

2. Other Things to Consider Doing Now

A. You are going to need to identify a doctor/medical facility who is willing to become very familiar with the detailed requirements of the medical examination requirements, and who is willing to provide you with a report containing all the detailed information present in the regulation. The doctor or medical facility must be able to send you a report on any medical exam in a timely manner (within 30 days of the exam).
You need to make arrangements with the doctor/medical facility in advance, even if you are in compliance with the PEL, as if there is an emergency exposure to hexavalent chromium (a spill, for example) you only have 30 days to get your employees examined. Not every doctor/ medical facility is going to be willing to jump through these hoops.

B. Now is the time to determine how you will comply with the numerous hygiene requirements.
(a) How will contaminated clothing be handled, laundered, packaged and labeled?
(b) How will street clothes be kept separate and uncontaminated from work clothes?
(c) What instructions will employees be given if they are allowed to take their contaminated work clothes home?
(d) How will washing and eating facilities be modified to eliminate possible contamination with hexavalent chromium?
(e) How will you prevent contaminated clothing from being worn while eating?
(f) You will need to identify employees who smoke, chew gum, chew tobacco, or apply cosmetics during work with hexavalent chromium containing processes/chemicals. Those employees will need to be instructed that under this new OSHA regulation, they can no longer conduct these habits, nor can they carry the applicable products on their person or store them in areas where hexavalent chromium exposure has been identified (eat and drink bans should already be in effect). Enforcement of this requirement is going to be extremely problematic, but you will need to find a way. Perhaps the signing of a pledge by the employee will remove some of your liability. If you are a union shop, start negotiations on this work rule change as soon as possible.

3. Workplace Changes

The work area where the PEL is exceeded must be identified (labeled) as a regulated area and exposure boundaries must be established. These areas are to have limited access by employees (signage may not be enough. Consider new walls, fences, etc.).

4. Work Practice Controls

Rotating employees to different jobs to achieve compliance is specifically prohibited by the regulation. If any of your employees have duties that are rotated as a normal part of their present employment, be sure to document this via a job description before the regulation takes effect, as an inspector may conclude you are in violation by rotating your employees.

A viable work practice control example would be changing the speed at which a worker handles a rack of parts or the removal of a barrel load from a chromate tank to minimize splashing.

5. Engineering Controls

You have until May 31, 2010, to finish engineering controls that are to be used to obtain compliance. If compliance can not be achieved with such controls, they must still be employed to achieve as low an exposure as possible. While the engineering controls are in progress, facilities that are above the PEL will need to employ a respirator program, and will need to employ work practice control so that exposure levels are lowered as much as possible during the time allowed for the implementation of engineering controls.

An example of an engineering control is the overhaul of an exhaust/scrubbing system on a process tank, or the elimination of air agitation from processes containing hexavalent chromium. Other possibilities include relocation of the racking operation away from the plating line, or installation of plastic curtains.

6. Hazard Communication Training

If your HAZ-COM training program does not include verification (testing) of the employees to confirm that they have adequate knowledge of the regulation and the medical surveillance program at the present time, you will need to make this modification to your program before the deadline for compliance.

Continued on page 48

areas. He also explained that, despite the significant performance of copper alloys in this study, the survivability of MRSA on all metals at lower temperatures (39°F / 4°C) is much greater, indicating that heightened hygiene is particularly imperative in those environments.

Keevil added that the antimicrobial effects of copper have been well documented. He cited recent studies on *E. coli* O157 and *Listeria monocytogenes* on copper alloy surfaces that show similar dramatic results, reducing viability of those pathogens from several weeks on stainless steel to only a matter of hours on copper alloys.

The MRSA study is co-funded by the International Copper Association and Copper Development Association Inc., New York, and managed by CDA.

Dr. Harold Michels, CDA vice president of technical services, said the study clearly shows that "the use of stainless steel in hospital environments for work surfaces and door furniture is potentially exacerbating an already critical situation with regards to MRSA transmission and infection." Michels stressed the desirability for the health care industry to evaluate and to begin using copper alloy hardware and surfaces, especially in high human-contact areas.

A copy of the study report, "The Antimicrobial Effect of Copper and Copper-based Alloys on Methicillin Resistant *Staphylococcus aureus*," may be obtained by contacting CDA.

Answers to I.Q. Quiz #417

1. (Partial list) corrosion protection, filler, electrical conductivity, reinforcement, appearance (other than color, *e.g.,* metallic flakes), UV stability.

2. A vehicle, also referred to as a binder, is the agent that promotes the adhesion of pigment particles to the substrate and to one another.

3. Monomers, with molecular weights of from 10 to 100.

4. The molecular weight of short-chain polymers generally ranges from 100 to 1,000. They are usually viscous liquids.

5. They contain virtually no solvent that could be considered a volatile organic compound (VOC)

Enviro Tech International Acquires Baron-Blakeslee

Enviro Tech International, Inc., Melrose Park, IL, a provider of proprietary n-Propyl Bromide cleaning solvents, has acquired Baron-Blakeslee from Thermal Equipment Corporation, Torrance, CA. Baron-Blakeslee has been making degreasing equipment for more than 50 years.

The Baron-Blakeslee line of vapor degreasers will be manufactured at the Enviro Tech International facility in Illinois.

Surface Technology Launches Environmentally Friendly EN Coatings

Surface Technology, Inc. (STI), has launched a full line of proprietary electroless nickel (EN) coatings that are free of lead, cadmium or any other heavy metal.

More than 20 years ago, the company offered a medium phosphorous electroless nickel alloy free of lead, cadmium and heavy metal. STI has now applied the same technology to offer versions of all its coatings free of heavy metals. The company says the coatings are formulated to conform to regulations, such as End-of-Life Vehicle (ELV), Restriction of Hazardous Substance (RoHS) and Waste of Electrical and Electronic Equipment (WEEE).

Advice & Counsel

Continued from page 25

7. Substitution

This may be a real good time to look again at trivalent based process chemistries.

To Our Readers

A number of readers pointed out an error in my article on RoHS and ELV bans. The following is an example:

Dear Advice & Counsel,

I was reading your article on the RoHS … There was a mistake on the RoHS Point C. Any of the banned materials can be intentionally added as long as the amounts in the deposit are below the limits. In fact, ELV took out the intentionally added phrase to match the RoHS. There are a number of legislations out, or coming out, though (*i.e.* JIG 101), that not only set the limit in the deposit, but also ban any intentionally added materials whatsoever. Hope this helps.

Take care,
Rich Bellemare, OMG-Fidelity

My thanks to all of you who caught this error, which was based on outdated information. For the time being, the "intentionally added" provisions are no longer present, but as Mr. Bellemare points out, may be re-instated through other regulations in the future. ***P&SF***