HEXAVALENT CHROMIUM EMPLOYEE TRAINING

This easy-to-use Leader's Guide is provided to assist in conducting a successful presentation. Featured are:

INTRODUCTION: A brief description of the program and the subject that it addresses.

PROGRAM OUTLINE: Summarizes the program content. If the program outline is discussed before the video is presented, the entire program will be more meaningful and successful.

PREPARING FOR AND CONDUCTING THE PRESENTATION: These sections will help you set up the training environment, help you relate the program to site-specific incidents, and provide program objectives for focusing your presentation.

REVIEW QUESTIONS AND ANSWERS: Questions may be copied and given to participants to document how well they understood the information that was presented. Answers to the review questions are provided separately.

INTRODUCTION

Hexavalent chromium is essential to a number of industrial applications: chromate pigments are used in dyes, ink and plastics, chromic acid is used in chrome plating and chromates are used to prevent corrosion in paints and other coatings. While these compounds can be very beneficial, they can also be harmful or lethal to those employees exposed to them. This program discusses the safe work practices these workers must follow to avoid exposures to this hazardous substance.

Topics include characteristics and properties of hexavalent chromium, effects of exposures, engineering and work practice controls, medical surveillance, the respiratory protection program, protective clothing and equipment, proper housekeeping and responding to exposures.

PROGRAM OUTLINE

CHARACTERISTICS & PROPERTIES OF HEXAVALENT CHROMIUM

• Chromium is an element which may have various valence states. A valence state refers to how many electrons are available to bond with other elements and compounds.

• Hexavalent chromium compounds are almost always man-made and are used in a variety of industries. Some of the prominent uses of hexavalent chromium in industry include chromate pigments in dyes, inks, and plastics, chrome-plating in which chromium metal is deposited on a surface using chromic acid and chromates used to prevent corrosion in paints, primers and other coatings.

• In addition, hexavalent chromium can also be found as a byproduct of industrial processes and maintenance operations.

• In fact, OSHA estimates that 48 percent of all workers affected by hexavalent chromium will be welders. Welders can be exposed to chromium 6 when fumes are released while welding stainless steels, chromium alloys and chrome-coated metal.

• Particles may also be released during smelting of ferro-chromium ore and trace amounts may also be found in portland cement.

• Chromium 6 compounds are essential in many industrial applications; however they can be harmful or lethal to those employees who are exposed to them. This is why it's so important to understand the hazards, routes of entry and exposure symptoms of hexavalent chromium.

EFFECTS OF INHALATION

• There are several ways chromium 6 can enter our bodies; these are called "routes of entry".

• Inhalation is the primary route of entry. Employees can inhale dusts, mists and fumes containing chromium 6 while performing tasks such as welding on stainless steel or applying paints and coatings containing chromates.

• Repeated or prolonged exposure to the inhalation of hexavalent chromium can lead to harmful health effects including bronchitis, pneumonia, asthma, and lung cancer.

• Some symptoms of inhalation exposure to chromium 6 include a runny nose, sneezing, coughing, itching and a burning sensation.

• Chronic exposure may also produce sores in the nose, nosebleeds and in severe cases a perforation of the wall separating the nasal passages.

EFFECTS OF SKIN EXPOSURES

• Direct skin contact with hexavalent chromium can lead to a variety of ailments.

• Some employees who come in contact with hexavalent chromium may develop an allergic reaction known as allergic contact dermatitis. When an employee becomes allergic, brief skin contact causes swelling and a red, itchy rash; allergic contact dermatitis becomes longer-lasting and more severe with repeated skin exposure.

• Direct skin contact with chromatic substances can also lead to skin ulcers. These are small crusted skin sores that heal slowly and leave scars. These are commonly referred to as “chrome holes.”

OTHER EXPOSURES

• Direct eye contact with chromate dust or chromic acid can cause permanent eye damage.

• Dust particles of chromium can contaminate clothing, hands, food and other items and lead to ingestion by employees.

• Damage to the liver, kidneys and gastrointestinal system has been experienced by individuals who have ingested high levels of hexavalent chromium.

• Some symptoms of chromium 6 ingestion include severe abdominal pain, vomiting and hemorrhaging.

OSHA’S HEXAVALENT CHROMIUM STANDARD

• To prevent workers from suffering one or more of these ailments, OSHA has established regulations to protect workers from the hazards of hexavalent chromium. Your organization has incorporated the OSHA regulation into its safety and health program.

• Your employer will train you on the contents of OSHA’s Hexavalent Chromium Standard applicable to your work and a copy of the standard will be made readily available for your review at no cost.

ENGINEERING & WORK PRACTICE CONTROLS

• Your employer will implement controls to limit exposures when there is an average exposure of five micrograms of chromium 6 per cubic meter of air over the course of any eight-hour work shift. The five microgram per cubic meter measurement is known as the permissible exposure limit, or PEL.

• To protect workers, exposure to hexavalent chromium must be reduced to the permissible exposure limit or below. Engineering and work practice controls are the primary means used to reduce exposure.

• Examples of engineering controls include substituting a less toxic material for chromium 6.

• Changing a process to reduce exposure is another example. For example, TIG welding on stainless steel reduces exposure compared to traditional stick welding.

• Also, isolating the source of exposure with barriers and reducing the hazard with ventilation and exhaust systems are examples of engineering controls.

• If engineering and work practice controls do not sufficiently reduce exposure, then appropriate respirators must be used to further reduce employee exposure to the permissible exposure limit or below.

EXPOSURE ASSESSMENTS

• When levels of hexavalent chromium cannot be reduced below 2.5 micrograms per cubic meter of air averaged over an 8-hour work shift, your employer will establish a program of exposure assessments. This 2.5 microgram per cubic meter measurement is known as the action level.

• Exposure assessments use air sampling and measurements to determine an employee's exposure to chromium 6. The purpose of the exposure assessment is to ensure that employee exposure levels do not exceed the permissible exposure limit.

• When changes occur in the workplace that may affect exposure levels, such as the introduction of new materials, additional exposure assessments will be performed.

• You will be notified if your exposure to hexavalent chromium is determined to be above the permissible exposure limit and informed of the actions being taken to reduce your exposure to the PEL or below.

MEDICAL SURVEILLANCE

• When the action level is reached, a program of medical surveillance is implemented. Medical surveillance is the process by which an employee is examined to a) determine if he or she can be exposed to chromium 6 without experiencing adverse health effects; b) identify chromium 6 related adverse health effects, so appropriate intervention measures can be taken; and c) determine the employee's fitness to use personal protective equipment such as respirators.

• These tests, which must be conducted by a physician or other licensed health care professional, will be provided to employees who are exposed at or above the action level for 30 days or more per year, experiencing signs or symptoms of adverse health effects associated with hexavalent chromium or involved in significant and unexpected exposures.

• The medical exam will consist of a medical work history that focuses on your past, present and anticipated future exposure to chromium 6 and any health problems that could be compounded by exposure.

• You will undergo an examination of your skin and respiratory tract as well as any additional tests the health care professional deems appropriate.

• After the exam, a written medical opinion will be issued within 30 days to your employer. This written opinion will include whether you have a medical condition which places you at increased risk of impaired health from further exposure to chromium 6; any medical conditions related to chromium 6 exposure that require further evaluation or treatment; and, any recommended limitations that should be placed on your exposure to chromium 6 or any limitations in the use of a respirator or other PPE.

• The written medical opinion, by law, will not reveal to your employer specific findings or diagnoses unrelated to occupational exposure to chromium 6.

• You will be provided with a written copy of the opinion within two weeks of it being received by your employer; however, the health care professional will also explain the results to you in person.

THE RESPIRATORY PROTECTION PROGRAM

- When airborne concentrations of chromium cannot consistently be reduced below the permissible exposure limit, respiratory protection will be necessary.

- When this is the case, your employer will implement a respiratory protection program which establishes procedures for the proper selection and use of respirators in the workplace.

- Part of the respiratory protection program requires employees receive a medical evaluation to ensure they are physically able to use a respirator and undergo a series of fit testing procedures to ensure a proper fit.

- The company will provide you with a respirator that will protect you against airborne chromium exposures. You will receive training in the proper use, storage and maintenance of the respirator.

PROTECTIVE CLOTHING & EQUIPMENT

- You will also be supplied with protective clothing and equipment if skin or eye contact with hexavalent chromium is likely.

- Be sure you know precisely what protection is needed for each job task you perform and be sure you wear it. Simple tasks may only require gloves for adequate protection while others may require a higher level of protection.

- If you must change out of your street clothes to use protective clothing and equipment, you are required to do so in a change room. Change rooms must have separate storage facilities for street and work clothing to prevent contamination of employees' street clothes.

- You are only required to use the change room if you have to remove your street clothes. If you can wear gloves, aprons or other equipment effectively over your street clothes, putting them on in a change room is not necessary.

SAFE REMOVAL OF CONTAMINATED CLOTHING

- After coming in contact with chromium while performing a job task, don't attempt to blow or shake it off of your equipment or clothing. This can disperse it into the air or onto your body.

- Your employer has set aside a specific area for you to remove contaminated clothing. Make sure to place contaminated items in the lockers or containers designated by your company.

- After removing your clothing, you should go to an approved washing facility to cleanse any areas where skin contact has occurred. Make sure to thoroughly wash your hands and face.

- If you have a break room or other area at the facility where food and beverages are consumed, remove any contaminated clothing and decontaminate yourself before entering these areas.

REGULATED AREAS

- OSHA's industrial regulation for chromium 6, 1910.1026, requires that "regulated areas" be established when an employee's exposure to chromium 6 is expected to be above the permissible exposure limit.

- Your employer will mark these areas with signs, barricades or other methods. Make sure you know how your company designates these areas.

- Do not drink, eat, smoke or apply cosmetics in regulated areas. If fact, do not even bring food, drinks, cigarettes or similar items into these areas at all; they can easily become contaminated.

- Only authorized persons wearing required protective equipment are permitted to enter regulated areas.

IMPORTANCE OF PROPER HOUSEKEEPING

- When dealing with chromium 6, proper housekeeping is critical to minimize exposure.

- Chromium 6 that settles on ledges, equipment, floors and other surfaces should be removed as soon as possible to prevent it from becoming airborne and to minimize the risk of skin contact.

- Clean surfaces contaminated with Chromium 6 with a HEPA-filtered vacuum or by wet sweeping or wet scrubbing.

- Dry brushing, sweeping and using compressed air are usually prohibited because they disperse chromium into the air.

RESPONDING TO EXPOSURES

- Despite our best efforts, Chromium 6 may come in contact with our skin or eyes. It's important to know what to do if this occurs.

- If hexavalent chromium comes into contact with the skin, go to an approved washing facility to cleanse any areas where skin contact has occurred.

- When there is substantial contact, the area should be washed with mild soap and water.

- If chromium 6 contacts your eyes, get to an eyewash station as soon as possible and flush your eyes for at least 15 minutes with a steady stream of water.

- You will need a prompt examination by a physician after flushing your eyes to determine the need for additional treatment.

PREPARE FOR THE SAFETY MEETING
Review each section of this Leader's Guide as well as the videotape. Here are a few suggestions for using the program:

Make everyone aware of the importance the company places on health and safety and how each person must be an active member of the safety team.

Introduce the videotape program. Play the videotape without interruption. Review the program content by presenting the information in the program outline.

Copy the review questions included in this Leader's Guide and ask each participant to complete them.

Copy the attendance record as needed and have each participant sign the form. Maintain the attendance record and each participant's test paper as written documentation of the training performed.

Here are some suggestions for preparing your Videotape equipment and the room or area you use:

Check the room or area for quietness, adequate ventilation and temperature, lighting and unobstructed access.

Check the seating arrangement and the audiovisual equipment to ensure that all participants will be able to see and hear the videotape program.

CONDUCTING THE PRESENTATION
Begin the meeting by welcoming the participants. Introduce yourself and give each person the opportunity to become acquainted if there are new people joining the training session.

Explain that the primary purpose of the program is to show viewers the safety precautions they must take to prevent exposures to hexavalent chromium.

Introduce the videotape program. Play the videotape without interruption. Review the program content by presenting the information in the program outline. Lead discussions about job tasks and environments at your facility that could encounter hexavalent chromium and what employees must do to prevent exposures. Use the review questions to check how well the program participants understood the information.

After watching the videotape program, the viewer will be able to identify the following:

- The effects of exposures to hexavalent chromium;
- The purpose of exposure assessments and medical surveillance;
- The importance of wearing respiratory protection and other protective clothing and equipment;
- The safe removal of contaminated clothing;
- The importance of proper housekeeping when dealing with hexavalent chromium;
- Proper response to exposures to hexavalent chromium.

HEXAVALENT CHROMIUM EMPLOYEE TRAINING
REVIEW QUIZ

Name_____Date_____

The following questions are provided to check how well you understand the information presented during this program.

1. What is the primary route of entry for hexavalent chromium?

a. eye contact
b. inhalation
c. skin contact

2. What is the permissible exposure limit (PEL) for hexavalent chromium?

a. 1 microgram per cubic meter
b. 2.5 micrograms per cubic meter
c. 5 micrograms per cubic meter

3. Using TIG welding rather than stick welding is an example of a(n) _____ for chromium 6.

a. engineering control
b. work practice control
c. exposure assessment

4. When airborne concentrations of chromium cannot consistently be reduced below the permissible exposure limit (PEL), respiratory protection is required.

a. true
b. false

5. You should use compressed air to blow any hexavalent chromium particles off of your clothes after your shift.

a. true
b. false

6. Which of the following is not a recommended way to clean up surfaces contaminated with chromium 6?

a. using a HEPA-filtered vacuum
b. wet sweeping
c. dry sweeping

7. Who is required to use a change room to put on protective clothing and equipment?

a. employees who must change out of their street clothes to put on protective clothing and equipment
b. employees who can put protective clothing and equipment on over their street clothes
c. all employees

ANSWERS TO THE REVIEW QUESTIONS

1. b
2. c
3. a
4. a
5. b
6. c
7. a