HEXAVALENT CHROMIUM EXPOSURE PROGRAM

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HEXAVALENT CHROMIUM EXPOSURE PROGRAM

I. INTRODUCTION
   a. Hexavalent Chromium (Cr(VI)) is a heavy metal component of stainless steel. Stainless steel is widely used in industrial processes because of its resistance to corrosion.
   b. The fume from welding processes may contain compounds of chromium, including hexavalent chromium, and of nickel.
   c. The composition of the base metals, the welding materials used, and the welding processes affect the specific compounds and concentrations found in the welding fume.

II. WHERE CAN HEXAVALENT CHROMIUM BE FOUND?
   a. Hexavalent chromium compounds have varied uses in industry and are often used for their anti-corrosive properties in metal coatings, protective paints, dyes and pigments.
   b. Hexavalent Chromium can also be formed when performing “hot work” such as welding on stainless steel, melting chromium metal or heating refractory bricks in kilns.
   c. Hexavalent chromium is also present in some pesticides, in particular chromated copper arsenate (CCA), which has been used as a wood preservative.
      i. The U.S. Environmental Protection Agency (EPA) banned the use of CCA products to pressure treat wood that is intended for most residential settings effective Jan. 1, 2004, due to concerns over arsenic poisoning.
   d. The major concern in the mechanical construction industry is the potential for overexposure from fumes created by welding or plasma cutting on stainless steel pipe and ducts, dust from grinding on stainless steel and from skin exposure. In most applications, engineering controls such as using localized exhaust ventilation and good welding work practices will mitigate the chances of overexposure. Respiratory protection will be required when adequate ventilation is not achievable.

III. POLICY
   a. It shall be the policy of The Hillis Group, LLC to implement the various requirements of the Chromium Exposure Regulation as required by the U.S. Department of Labor, Occupational Safety and Health Administration §1910.1026.
   b. This Chromium Exposure Plan applies to all construction work where an employee may be occupationally exposed to chromium. All work related to construction, alteration or repair is included.
   c. Under this plan, construction is to include, but not limited to the following:
      i. Fumes from welding processes.

IV. RESPONSIBILITIES
   a. Employer
      i. In administering the Hexavalent Chromium Awareness Program, The Hillis Group, LLC will:
         1. Monitor the overall effectiveness of the program.
         2. Provide personal protective equipment as needed.
         3. Provide training to affected employees and supervisors.
         4. Provide technical assistance as needed.
         5. Preview and update the program on at least an annual basis, or as needed.

   b. Safety Manager
      i. The Safety Manager must assure that:
         1. The procedures described in this program are followed.
2. Employees are properly trained and equipped to perform their duties safely.
3. All required inspections, tests, and recordkeeping functions have been performed.

c. Employees
i. All employees, including contractor personnel, must comply with the requirements of this program.
ii. Employees are responsible for reporting hazardous practices or situations to The Hillis Group, LLC management, as well as reporting incidents that cause injury to themselves or other employees to The Safety Manager.

V. TRAINING
a. The Hillis group, LLC will provide the requisite training to ensure that our employees acquire an understanding of the kinds of monitoring, testing, and protective measures required by OSHA’s Hexavalent Chromium regulations.
   i. These standards are designed to protect anyone who could be exposed from suffering serious health consequences.
b. All employees who have a reasonable potential for exposure to Hexavalent Chromium above the OSHA PEL shall receive training.
c. The training shall be performed prior to initial assignment and shall be repeated annually.
d. The training shall include:
   i. the content of the standard;
   ii. the sources and types of exposure in their workplace;
   iii. personal protective equipment use;
   iv. health hazards of Hexavalent Chromium;
   v. respirator use;
   vi. medical surveillance; and
   vii. the appropriate engineering controls and work practices.
e. Documentation will be kept in the employee’s safety training file.

VI. REGULATED AREAS
a. The hexavalent chromium standard for general industry, 29 CFR 1910.1026, requires the employer to establish a regulated area wherever a worker’s exposure to airborne concentrations of Cr(VI) is, or can be reasonably expected to be, above the PEL.
b. The Cr(VI) standards for construction and shipyards do not include this requirement due to the practical difficulties expected in establishing regulated areas for operations in these sectors.
c. Employers are required to distinguish the regulated area from the rest of the workplace in a manner that adequately establishes and alerts workers to the boundaries of the regulated area.
   i. The standard does not specify how employers must identify the regulated area.
      1. Warning signs, gates, ropes, barricades, lines, textured flooring or other methods may be appropriate.
   ii. Whatever method is selected, it must effectively warn workers who are not authorized to not enter the area.
d. Authorized personnel are those employees whose job duties require them to be in the area and may include maintenance personnel, managers and quality control engineers.
   i. In addition, designated worker representatives may enter the regulated area to observe exposure monitoring.
e. All people who enter the regulated area must use proper protective equipment, including respirators when appropriate.
VII. HEALTH EFFECTS OF OVER-EXPOSURE TO FUMES CONTAINING CHROMIUM AND NICKEL
   a. Depending upon the level of exposure, Hexavalent Chromium can irritate the nose, throat and lungs, leading to nasal ulcers, lung cancer, and can cause skin rashes, skin ulcers and permanent eye damage.
   b. Stainless Steel contains nickel and chromium. Nickel can cause asthma. Nickel and Chromium can cause cancer.
      i. Chromium cancer may not show up for 10 to 40 years. Similar to the effects produced by fumes from other metals. It can cause symptoms such as runny nose, sneezing, coughing, sores in nose and on skin, nausea, headaches, dizziness, and respiratory irritation.
   c. Some persons may develop sensitivity to chromium or nickel which can result in dermatitis or skin rash.
      i. Prolonged skin contact can result in dermatitis and skin ulcers.
      ii. Some workers develop an allergic sensitization to chromium.
      iii. In sensitized workers, contact with even small amounts can cause a serious skin rash.
      iv. Kidney damage has been linked to high dermal exposures.
   d. Chromium can irritate the nose, throat, and lungs.
      i. Repeated or prolonged exposure can damage the mucous membranes of the nasal passages and result in ulcers. In severe cases, exposure causes perforation of the septum (the wall separating the nasal passages).
   e. Direct eye contact with chromic acid or chromate dusts can cause permanent eye damage.

VIII. EXPOSURE LIMITS
   a. The U.S. Department of Labor establishes maximum limits of exposure to chromium for all workers covered, including a Permissible Exposure Limit and Action Level.
   b. The Permissible Exposure Limit, or PEL sets the maximum exposure limit for workers to chromium. The exposure limits for Hexavalent Chromium are as follows:
      i. .5 micrograms per cubic meter (μg/m³) of air – When airborne concentrations are at or below this level, the standard is not applicable.
      ii. 2.5 micrograms per cubic meter (μg/m³) of air – When airborne concentrations are at or above 2.5 micrograms per cubic meter (μg/m³) of air (this is the Action Level), but under 5 micrograms per cubic meter (μg/m³) of air, employers are required to implement certain measures to protect workers from over exposure.
      iii. 5 micrograms per cubic meter (μg/m³) of air – Airborne concentrations above this level require compliance with more comprehensive requirements of the standard.

IX. EXPOSURE MONITORING AND CONTROL
   a. The Hillis Group, LLC must ensure that no employee is exposed to an airborne concentration of hexavalent chromium in excess of the PEL (5 micrograms per cubic meter of air as an 8-hour TWA).
   b. This determination must be made without regard to the use of personal protective equipment, such as respiratory protection.
   c. The Hillis Group, LLC cannot apply the level of protection that the respirator can provide to determine whether an employee is overexposed to hexavalent chromium present in the air.
   d. The hexavalent chromium standards also set an action level, which is equal to one-half the permissible exposure limit.
   e. Exposure of employees at or above the action level triggers certain other requirements of the hexavalent chromium standard even though employees are not exposed above the PEL.
X. COMPLIANCE PROGRAM
   a. Prior to each job where employee exposure exceeds the PEL, The Hillis Group, LLC will establish:
      i. A program to reduce employee exposure to the PEL or below. The compliance program will provide the following: A description of each activity in which chromium is emitted.
      ii. Specific plans to achieve engineering and work practice controls when the exposure level exceeds the PEL for more than 30 days per year.
      iii. Information on the technology considered meeting the PEL.
      iv. Air monitoring data that document the source of chromium emissions.
      v. A work practice program including regulations for the use of protective work clothing, equipment, air monitoring, housekeeping and hygiene guidelines.
   b. An employee should report to their foreman and The Hillis Group, LLC Safety Manager if they feel:
      i. They have been exposed to at or above safe levels
      ii. Experience symptoms of exposure
      iii. Are exposed to an emergency situation of an uncontrolled release

XI. ENGINEERING CONTROLS
   a. Ventilation such as local exhaust systems that capture airborne Cr(VI) near its source and remove it from the workplace
   b. Local exhaust or shop fans to extract fumes from work areas
   c. Dust collection systems with Hepa filters
   d. Substitute less toxic material or a process that results in lower exposures for a process that causes higher exposures
   e. Isolation such as placing a barrier between employees and source of exposure

XII. SAFE WORK PRACTICE CONTROLS
   a. Safe work practices require maintenance of separate hygiene facilities (change rooms, showers, hand wash facilities and lunch areas), and require proper housekeeping practices.

XIII. HOW TO PROTECT AGAINST OVER-EXPOSURE
   a. Use enough ventilation or exhaust at the arc or both to keep fumes and gases from your breathing zone and general area.
   b. Use localized exhaust ventilation to remove fumes and gases at their source in still air. Keep the exhaust trunk / hood as close to the fume source as possible in order to keep fumes and gases from your breathing zone.
   c. Use air blowers to draw fumes away from you and your immediate work area.
   d. If ventilation is questionable, use air sampling to determine the need for corrective measures.
   e. OSHA says you must remove all paint and solvents before welding or torch cutting.
      i. Follow written instructions.
      ii. Make sure all residues are removed.
   f. Use the safest welding method for the job.
      i. Stick welding makes much less fume than flux core welding.
      ii. Tig welding reduces Cr(VI) emissions by 90%.
   g. Use welding rods that produce a low fume. 90% of the fume can come from the rod. Larger diameter rods produce much higher emissions than electrodes of smaller diameter. Welding guns that extract fumes can capture 95% of the fume.
   h. In a confined space, follow all the OSHA confined space rules – like air monitoring, not storing torches in the space, and ventilation.
   i. Do not breathe fumes and gases. Keep your head out of the smoke plume.
j. Use proper Protective Protection Equipment.
k. Position your welding hood so that fumes will not rise up under it and into your breathing zone.
l. If the ventilation is not adequate, such as confined spaces, respiratory protection is required.
m. When respiratory protection is required, be sure that you have the required training and proper respirator before starting work.
n. Implement good housekeeping procedures. Keep area as free as practicable of accumulations of chromium dust and buildup.
o. Vacuums with Hepa filters should be used to keep dust emissions at a minimum.
p. Do not blow dust from clothing with air hose. Doing so can embed the dust particles into your skin and eyes and expose others to airborne particles.
q. Wash hands and face at the end of every shift and before eating, drinking, smoking, chewing gum, applying cosmetics or using the bathroom.
r. Never eat or drink in areas where Hexavalent Chromium may come in contact with your food, skin or eyes.
s. Keep exposure as low as possible.

XIV. PROTECTIVE CLOTHING AND EQUIPMENT
a. The Hillis Group, LLC will provide and ensure the proper use of personal protective equipment where employees are exposed to chromium above the PEL.
b. PPE will be provided at no cost to the employee.
c. Wear long-sleeved shirt, welding jacket or welding sleeves
d. Wear long pants
e. Tyvek suits if necessary
f. Wear welding gloves
g. Wear safety glasses or goggles
h. Wear a face shield over eye protection when grinding
i. Wear a welding helmet over eye protection when welding
j. Wear appropriate respirator when needed

XV. RESPIRATORS
a. When engineering and administrative controls do not reduce hazards below the OSHA’s permissible exposure level (PEL), employees must wear respirators.
b. The Hillis Group, LLC will provide respiratory protection for the employee at no cost (THG_0010 PPE), and will ensure that the respirator is used when:
   i. Employee exposure to chromium exceeds the PEL.
   ii. The employee requests a respirator.

XVI. HOUSEKEEPING
a. The Cr(VI) standard for general industry also includes housekeeping measures. Similar requirements were not included in the construction and shipyard standards due to expected difficulties in complying with these requirements in those industry sectors.
b. Proper housekeeping focuses on sources of exposure to Cr(VI) that engineering controls are not designed to address such as surface contamination, which can lead to skin contact.
c. Therefore, employers are responsible to ensure that all environmental work surfaces are kept as free as practicable of accumulations of Cr(VI)-containing materials.
d. Accordingly, any spills and releases of Cr(VI)-containing materials in the workplace must be promptly cleaned up and disposed in accordance with environmental regulations for hazardous waste disposal.
XVII. MEDICAL SURVEILLANCE

a. Medical surveillance serves several purposes when considering worker exposure to Cr(VI).
   i. It allows physicians or other healthcare professionals to determine if an individual can be exposed to Cr(VI) at their workplace without experiencing adverse health effects.
   ii. It permits appropriate intervention to be taken when Cr(VI)-related adverse health effects are identified in an individual.
   iii. Finally, it determines an employee’s fitness to use personal protective equipment, in particular, respirators.

b. The Hillis Group, LLC will provide a medical surveillance program for all employees:
   i. Who are exposed or who may be exposed to Cr(VI) at concentrations at or above the action level (as an 8-hour TWA) for 30 or more days per year; or
   ii. Experiencing signs and symptoms of adverse health effects associated with Cr(VI) exposures; or
   iii. Exposed in an emergency situation (i.e., any occurrence resulting in a uncontrolled release of Cr(VI) that is not an incidental release that can be controlled by workers in the immediate area or by maintenance personnel).

c. Some signs and symptoms of adverse health effects that are associated with exposure to Cr(VI)?
   i. These include blistering lesions,
   ii. redness or itchiness of exposed skin,
   iii. shortness of breath or wheezing that worsens at work,
   iv. nosebleeds, and
   v. a whistling sound while inhaling or exhaling.

d. A licensed physician must perform or supervise all medical examinations and procedures, provided at no cost to employees and at a reasonable time and place.
   i. If employees must travel away from the worksite, the employer must pay them for the time spent undergoing medical examinations, including travel time.

e. Frequency of Medical Examinations
   i. Employers must make medical examinations and consultations available to employees:
      1. Prior to employee assignment to an area where negative-pressure respirators are worn,
      2. Within 30 working days after assignment to a job involving exposure to Cr(VI) at any level;
      3. At least annually thereafter;
      4. Within 30 days after a physician or licensed healthcare professional (PLHCP) issues a written medical opinion that recommends additional examination(s);
      5. Whenever a worker shows signs or symptoms of adverse health effects associated with exposure to Cr(VI);
      6. Within 30 days following exposure during an emergency involving an uncontrolled release of Cr(VI);
      7. At the termination of employment unless the last examination provided was less than six months prior to the date of termination.
      8. If the employee was examined within the past 12 months and that examination meets the criteria of the standard,
a. The Cr(VI) standards include requirements for change rooms, washing facilities, and eating and drinking areas when protective clothing and equipment are required to minimize exposure to Cr(VI). These requirements are:
   i. **Change rooms** are required only when workers must change out of street clothes to use protective clothing and equipment.
      1. Change rooms required by the Cr(VI) standards for general industry must conform to the requirements of 29 CFR 1910.141, whereas those specified in the Cr(VI) standard for construction must conform to the requirements of 29 CFR 1926.51.
      2. In addition, they must be effective in preventing Cr(VI) contamination of street clothes, and be equipped with separate storage facilities for protective clothing and equipment and for street clothes.
         a. This is intended to limit exposures after the work shift ends and avoid conveying Cr(VI) contamination to the workers’ cars and homes.
   ii. **Washing facilities** must be provided and must be readily accessible and capable of removing Cr(VI) from the skin.
       1. Washing facilities must comply with the sanitation requirements in 29 CFR 1910.141 (for general industry), 29 CFR 1926.51 (for construction).
   iii. The Hillis Group, LLC will ensure that affected workers use these facilities when necessary.
       1. This includes making sure that workers who have skin contact with Cr(VI) wash their hands and faces at the end of the work shift and prior to eating, drinking, smoking, chewing tobacco or gum, applying cosmetics, or using the toilet.
   iv. Eating and drinking areas and surfaces must conform with 29 CFR 1910.141 (for general industry), and 29 CFR 1926.51 (for construction) and be maintained as free as practicable of Cr(VI) whenever employers allow workers to consume food or beverages at a worksite where Cr(VI) is present.
   v. The Hillis group, LLC employees and contractors are not to enter eating and drinking areas wearing protective clothing or equipment unless the protective clothing or equipment is properly cleaned beforehand.
   vi. Any method for removing surface Cr(VI) contamination from clothing and equipment may be used as long as it does not disperse the dust into the air or onto the worker’s body.

XIX. **RECORDKEEPING**

a. *Employers need to maintain records regarding occupational exposure to hexavalent chromium?*

b. Accurate records can verify employer compliance with the Cr(VI) standard and can assist in diagnosing and identifying workplace related illnesses.

c. The Hillis Group, LLC will maintain records of:
   i. worker Cr(VI) exposures (including air monitoring, data, historical monitoring data and objective data) and
   ii. medical surveillance records.

d. **Air Monitoring Data**
   i. The Hillis group, LLC will keep records of all employee exposure monitoring used to comply with the standard for 30 years. The record must indicate:
      1. The date of measurement for each sample taken;
      2. The operation involving exposure to Cr(VI) that was monitored;
      3. Sampling and analytical methods used and evidence of their accuracy;
4. The number, duration and results of samples taken;
5. The type of protective devices used (e.g., type of respirators worn); and
6. The name, Social Security number and job classification of all workers represented by the monitoring and specifying which employees were actually monitored.
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History

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