



Department of the Air Force
HQ AEDC (AFMC)
Arnold AFB, TN 37389

Safety, Health, and Environmental Standard

Title: Hexavalent Chromium, Chrome VI

Standard No.: E20

Effective Date: 06/24/2010

The provisions and requirements of this standard are mandatory for use by all personnel engaged in work tasks necessary to fulfill the AEDC mission. Please contact your safety, industrial health and/or environmental representative for clarification or questions regarding this standard.

Approved:

Contractor/ATA Director
Safety and Health Group

Air Force Functional Chief



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HEXA VALENT CHROMIUM

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Safety, Health, and Environmental Standard

HEXAVALENT CHROMIUM

1.0 INTRODUCTION/SCOPE/APPLICABILITY

- 1.1 Introduction** – This standard is intended to implement Federal Occupational Health and Safety (OSHA) 1910.1026 Chromium (VI) Standard and Air Force Hexavalent Chromium regulations.
- 1.2 Scope** – This standard provides requirements and responsibilities for procurement, use, handling, and disposal of materials capable of creating a hexavalent chromium exposure. This standard also includes requirements for activities in areas where exposure to hexavalent chromium or heavy metals is possible such as during welding, cutting, or burning of heavy metal containing materials.
- 1.3 Applicability** – This standard applies to all AEDC personnel, including Air Force, Navy, US Army Corps of Engineers, and contractors (including subcontractors) performing work at the Tennessee location and all remote locations assigned to AEDC and to operations conducted by AEDC personnel or contractors outside the confines of Arnold AFB involving potential exposure to hexavalent chromium at or above the action of 2.5 ug/m³ as determined by air monitoring, historical air monitoring data or objective data which accurately characterizes the employee exposure risk.

2.0 BASIC HAZARDS/HUMAN FACTORS

- 2.1** The American Conference of Governmental Industrial Hygienists (ACGIH) lists hexavalent chromium as a confirmed human carcinogen. The primary health hazards from hexavalent chromium result from the inhalation of airborne material and direct skin contact. Employees may develop allergies to hexavalent chromium. The inhalation of chromate compounds can cause asthma-like symptoms such as wheezing and shortness of breath. Repeated or prolonged exposure can cause sores to develop in the nose and result in nosebleeds. Severe cases can cause the nasal septum to become perforated. Employees who breathe hexavalent chromium at high levels may experience irritation or damage to the nose, throat and lungs and possibly lung cancer.
- 2.2** Direct bodily contact with high concentrations of hexavalent chromium may irritate or cause damage to the skin and eyes. Some employees can develop an allergic reaction called *allergic contact dermatitis*. Brief contact with intact skin surfaces can cause swelling and a red itchy rash to develop. Contact with non-intact skin can lead to chrome ulcers. For more information concerning the health effects see the Annex, Substance Data Sheet for Occupational Exposure to Hexavalent Chromium.

3.0 DEFINITIONS

Action Level – Refers to an 8-hour time-weighted air concentration of contaminant that workers may be exposed to without respiratory protection. When exposures exceed the action level, air monitoring, worker training, and medical surveillance programs are required. The current action level for hexavalent chromium is 2.5 micrograms per cubic meter of air. When air exposures are below the action level, special work practices may not be required to protect worker health. However, special work practices may be necessary to prevent contamination of work clothes, shoes, etc. Special disposal procedures may also be required.

Dispensary Operating Contractor – The contractor responsible for the daily operations of the Dispensary.

High Efficiency Particulate Air Filter (HEPA Filter) – A filter that is at least 99.97% efficient at removing particles down to 0.3 microns in diameter or larger.

HEPA Equipped Tooling – Specialized tooling equipped with a device for the purpose of capturing and filtering debris through a vacuum equipped with a HEPA filter.

Hexavalent Chromium – Chromium (VI), Cr (VI) – Chromium with a valence of positive six, in any form and in any compound. Sources of exposure at AEDC include welding, grinding or cutting stainless steel and other materials containing hexavalent chromium. Certain paint pigments and coatings may also contain hexavalent chromium. This information may be obtained by reviewing the chemical material safety data sheet.

Lead and Heavy Metal Containing Materials (LHM) – Any material containing any quantity of lead, hexavalent chromium or other heavy metal that has a permissible exposure level established by the Occupational Safety and Health Administration (OSHA) or that is considered a potential hazardous waste by the Environmental Protection Agency (EPA). The EPA is concerned with any heavy metal containing material that, when analyzed by the Total Characteristic Leachate Procedure (TCLP), yields a leachate at or above 5 parts per million (ppm). Therefore, LHM is regulated by both OSHA and EPA. Lead and heavy metal materials presently include lead, mercury, cadmium, chromium, silver, barium, and arsenic.

Lead and Heavy Metal Operation and Management Plan – The management plan that provides the documentation for all heavy metal management efforts and the mechanisms for overseeing the entire facility lead and heavy metal management program. This plan assigns responsibilities, establishes inspection and abatement teams, and provides abatement procedures and personal protection instructions.

Heavy Metal Related Work – This applies to any welding or torch cutting of metals or painted metals where the paint is suspected to contain hexavalent chromium or other heavy metals. This also applies to the removal of painted walls, doors, door facings, windows and casings, cable repair involving lead, soldering, melting of lead, or any other activity where lead or heavy metals are involved.

Operating Contractor – The contractor directly accountable to the Air Force for the AEDC mission.

Outside Contractor/Subcontractor – An organization employed by a contractor or the Air Force to do construction, maintenance, repair or other work at AEDC. There is no relationship, control or supervision of the subcontractor's employees by AEDC contractors.

Permissible Exposure Limit (PEL) – Refers to an 8-hour time-weighted air concentration of contaminant to which workers may not be exposed without respiratory protection. The current PEL for hexavalent chromium is 5.0 micrograms per cubic meter of air.

Physician or other Licensed Health Care Professional (PLHCP) – An individual whose legally permitted scope of practice allows him or her to independently provide or be delegated the responsibility to provide some or all of the particular health care services as required by OSHA Chromium (VI) Standard 1910.1026.

Prohibited Activities – Torch burning, cutting, or welding of surfaces coated with LHM material. Sanding, sawing, or scraping of painted surfaces or the cleanup of LHM debris without the use of proper protective equipment, HEPA filtered vacuum equipment, or other procedures.

Regulated Area – An area, demarcated by the employer, where an employee's exposure to airborne hexavalent chromium can be reasonably expected.

Stainless Steel – A group of corrosion resisting steels containing a minimum 10% chromium and in which varying amounts of nickel, molybdenum, titanium, niobium as well as other elements may be present.

4.0 REQUIREMENTS/RESPONSIBILITIES

4.1 General Requirements – The annex to this standard contains specific information on how to comply with the requirements set forth in this Safety, Health, and Environmental (SHE) Standard.

4.1.1 Operations that have the potential to produce exposures to hexavalent chromium at or above the action level of 2.5 ug/m³ require written documentation which shall be reviewed by the Operating Contractor Safety and Health Group/Industrial Hygiene. This includes emergency maintenance and repair operations that can be reasonably anticipated such as repair work on materials capable of producing hexavalent chromium exposures at or above the action level of 2.5 ug/m³ such as high chromium content paint, coatings and stainless steel. Only properly trained workers shall conduct any heavy metal related work.

4.1.2 Documentation outlining necessary precautions taken during all phases of work shall be prepared by the job supervisor or, in the case of a subcontractor, by the subcontractor. The documentation shall outline the appropriate measures to be taken to control exposure to hexavalent chromium and LHM in accordance with OSHA, EPA, Tennessee Department of Environment and Conservation, and other AEDC requirements.

This documentation may become an integral part of the job safety analysis. (See SHE Standard A10, Job Safety Analysis.)

- 4.1.3 The Operating Contractor Safety and Health Group/Industrial Hygiene shall also be contacted before large scale, specialized or extensive work involving hexavalent chromium is begun to determine if air sampling is necessary and to evaluate other aspects of the job as required by OSHA and the EPA.

4.2 Regulated Areas

The work areas shall be demarcated from the rest of the workplace in a manner that adequately establishes and alerts employees of the boundaries of the regulated area. Entry to the area shall be restricted with ropes and/or barriers in accordance with AEDC SHE Standard B3 Control of Hazardous Areas. Access shall be limited to those employees performing work tasks in the area, designated representatives of employees for the purpose of exercising the right to observe monitoring procedures and those persons authorized under the OSHA Act to be in a regulated area.

4.3 Personal Protection

The protection measures outlined in OSHA Standards 1926.1126 and 1910.1026 shall be used for operations that may generate airborne hexavalent chromium or other heavy metals. Additional information is provided in the annex.

4.4 High Efficiency Particulate Air (HEPA)-Filtered Vacuum Cleaner

A HEPA-equipped vacuum cleaner must be used when vacuuming materials suspected of containing hexavalent chromium or heavy metal dust and debris. To facilitate the care and use of government-owned HEPA filtered vacuums, a Form GC-82, Safety Information (Tag) shall be affixed to each vacuum indicating the date of the last HEPA filter change, date of each use, and the number of hours used. The date when internal bags or filters were replaced shall be indicated.

4.5 HEPA-Equipped Tooling

HEPA-equipped tooling must be used to grind or mechanically alter materials capable of releasing hexavalent chromium or other heavy metals.

4.6 Waste Disposal

Materials containing hexavalent chromium or other heavy metals may be hazardous waste. Procedures established in AEDC SHE Standard E18, Chemical and Petroleum Products Waste Management, shall be followed to determine if the material shall be disposed of as hazardous waste.

4.7 Disasters

Following any disaster, efforts shall be made to identify materials which may contain hexavalent chromium or other heavy metals in the disaster area. Appropriate action shall be taken to prevent exposure and to ensure proper decontamination and disposal of these materials or to prevent contamination of other materials.

4.8 RESPONSIBILITIES

4.8.1 Operating Contractor Organizational Unit:

- 4.8.1.1 Ensure new chemical materials containing or having the potential to create hexavalent chromium or other heavy metals, especially paint and coatings are handled in accordance with the AEDC SHE Standard E6, Hazardous Materials Management.
- 4.8.1.2 Consult the Safety and Health Group/Industrial Hygiene for assistance in identifying materials which may contain hexavalent chromium or other heavy metal materials.
- 4.8.1.3 Prepare a written documentation outlining necessary precautions before starting any job that involves possible exposure to hexavalent chromium or other heavy metal materials. This documentation shall include a contingency for any predicted emergency repair work and shall be made available for use by repair personnel. Incorporate this documentation into the Job Safety Analysis (JSA).
- 4.8.1.4 Ensure that work done by subcontractors is consistent with this standard and is in compliance with State, Federal, and AEDC regulations. Work shall be monitored by contractor representatives to ensure compliance with the approved work plan.

NOTE: Operating contractor project monitors shall ensure that outside subcontractors submit work plans to the Safety and Health Group/Industrial Hygiene for approval before work involving hexavalent chromium or other heavy metal containing material begins.

- 4.8.1.5 Inform employees who work with hexavalent chromium of its hazards, control methods, and the applicable parts of this standard and ensure that such employees receive annual training in accordance with OSHA Standard 1926.1126.
- 4.8.1.6 As appropriate, ensure that employees working with hexavalent chromium and other heavy metals receive physicals, worker training, and respirator training and fit-testing before conducting any heavy metal work. Physicals, training and fit-testing are required annually.
- 4.8.1.7 Provide respiratory protection and local exhaust ventilation. Use proper work practices during jobs involving hexavalent chromium and other heavy metals. Ensure that employees involved in work with possible exposure to hexavalent chromium and other heavy metal materials over the respective PEL as determined by personnel air monitoring results receive respirator fit-testing annually.
- 4.8.1.8 Restrict access to areas where exposure to hexavalent chromium and other heavy metal materials may occur and post signs at all approaches in accordance with the warning found in this standard.
- 4.8.1.9 Utilize disposable coveralls, booties, and head covers during work involving hexavalent chromium and other heavy metal materials as appropriate.
- 4.8.1.10 Ensure that workers using HEPA vacuums are properly trained in the care and use of such equipment.
- 4.8.1.11 Monitor closely all work involving hexavalent chromium and heavy metal conducted by AEDC personnel or outside subcontractor as appropriate to prevent prohibited activities as outlined in the definition section from occurring. Subcontractors shall be monitored before, during, and following hexavalent chromium and heavy metal materials work to ensure that all work plans, safety, health, and environmental concerns, and all terms and conditions of the contracts are strictly followed.

4.8.2 Operating Contractor Safety and Health Group/Industrial Hygiene:

- 4.8.2.1 Review written documentation for hexavalent chromium and other heavy metal materials work.
- 4.8.2.2 Assist the Contractor Organizational Unit and the Air Force with the monitoring of hexavalent chromium and other heavy metal work.
- 4.8.2.3 Provide general guidance to organizational units involved in hexavalent chromium and heavy metal work.
- 4.8.2.4 Maintain the Lead and Heavy Metal Operation and Management Plan.
- 4.8.2.5 Ensure protective measures are in place when potential exposures to hexavalent chromium may meet or exceed the Action Level of 2.5 micrograms per cubic meter of air.
- 4.8.2.6 Conduct air sampling to determine employee exposure to hexavalent chromium and other heavy metals.
- 4.8.2.7 Provide written notification to employees who have been monitored for exposure to hexavalent chromium. If exposures meet or exceed the Permissible Exposure Limit (PEL) of 5 micrograms per cubic meter of air, notification must occur within fifteen working days.
- 4.8.2.8 Provide annual training to AEDC employees involved in heavy metals work on the hazards of hexavalent chromium as required in the OSHA Standard 1926.1126.

4.8.3 Operating Contractor Hazardous Waste Operations Group:

Provide general and disposal guidance concerning hazardous waste issues.

4.8.4 Operating Contractor Roads and Grounds Group:

Dispose of materials containing hexavalent chromium or other heavy metals in accordance with AEDC SHE Standard E18.

4.8.5 Dispensary Operating Contractor:

- 4.8.5.1 For Operating Contractor employees, provide a Physician or other Licensed Health Care Professional (PLHCP) to conduct pre-assignment, periodic, and termination physical examinations for AEDC employees whose work may involve exposure to hexavalent chromium above the action level.

4.8.5.2 For Operating Contractor employees, provide copies of medical evaluations and other relative documentation to the employee.

4.8.6 Outside/Subcontractors:

4.8.7.1 Provide a written health and safety plan for work involving hexavalent chromium or other heavy metals.

4.8.7.2 Abide by all State and Federal regulations and AEDC requirements as outlined in the SHE Standards.

5.0 TRAINING

5.1 Operating Contractor Training:

All contractor personnel shall receive training on hexavalent chromium prior to working with materials containing or capable of producing hexavalent chromium exposures at or above the action level of 2.5 ug/m³.

5.2 Subcontractors/Users/Non-AEDC Personnel:

All personnel in this category shall provide written certification through the Operating Contractor Project Manager to the Operating Contractor Safety and Health Group that their employees have received training on hexavalent chromium prior to working with materials containing or capable of producing hexavalent chromium exposures at or above the action level of 2.5 ug/m³.

6.0 REFERENCES

- 6.1 AEDC SHE Standard A10, Job Safety Analysis
- 6.2 AEDC SHE Standard B3, Control of Hazardous Areas Using Safety Signs, Tags, and Barricades
- 6.3 AEDC SHE Standard E6, Hazardous Material Management
- 6.4 AEDC SHE Standard E18, Chemical and Petroleum Products Waste Management
- 6.5 AEDC SHE Standard F4, Respiratory Protection
- 6.6 AEDC Lead and Heavy Metal Management and Operations Plans
- 6.7 29 CFR 1926.1126 Hexavalent Chromium (Construction)
- 6.8 29 CFR 1910.1026 Hexavalent Chromium (General Industrial)
- 6.9 29 CFR 1910.134 Respiratory Protection

7.0 ANNEX

Substance Data Sheet for Occupational Exposure to Hexavalent Chromium

ANNEX

**SUBSTANCE DATA SHEET FOR
OCCUPATIONAL EXPOSURE TO HEXAVALENT CHROMIUM**

I. SUBSTANCE IDENTIFICATION

- A. SUBSTANCE:** Hexavalent chromium is a heavy metal. It is defined as chromium with a valence of positive six, Chrome (VI) in any form and in any compound. The American Conference of Governmental Industrial Hygienists lists hexavalent chromium as a confirmed human carcinogen.
- B. COMPOUNDS COVERED BY THE STANDARD:** Hexavalent chromium, chrome (VI) and Cr (VI) may be found in pigments in certain inks, primers, paints and dyes. It is present in stainless steel and a variety of other grades of steel. Hexavalent chromium may also be present as an impurity in such materials as Portland cement.
- C. USES:** Hexavalent chromium may be found in pigments in certain inks, primers, paints and dyes. It is present in stainless steel and a variety of other grades of steel. Hexavalent chromium may also be present as an impurity in such materials as Portland cement.
- D. SOURCES OF EXPOSURE:** Employees may be exposed to hexavalent chromium by inhaling or direct skin contact with dusts or fumes during welding, cutting or grinding on materials containing chromium compounds. Exposure is also possible during removal of paints containing chrome compounds. Some activities such as chrome plating may produce exposure risks in the form of mists containing hexavalent chromium. In addition, there are construction related activities where exposure to hexavalent chromium may occur, including transportation, disposal, storage, or containment of dust or materials containing hexavalent chromium on construction sites, and maintenance operations associated with construction activities.
- E. PERMISSIBLE EXPOSURE LIMIT:** The permissible exposure limit (PEL) set by the standard is 5 micrograms of hexavalent chromium per cubic meter of air (5 ug/m^3), averaged over an 8-hour workday.
- F. ACTION LEVEL:** The interim final standard establishes an action level of 2.5 micrograms of hexavalent chromium per cubic meter of air (2.5 ug/m^3), averaged over an 8-hour workday. The action level triggers several ancillary provisions of the standard such as exposure monitoring, medical surveillance, and training.

II. HEALTH DATA

- A. WAYS IN WHICH HEXAVALENT CHROMIUM CAN HARM EMPLOYEES**
- (1) Exposure to hexavalent chromium in the workplace can cause irritation or damage to the eyes, nose, throat, lungs and skin and may result in lung cancer in extreme cases. For most people, breathing small amounts of hexavalent chromium does not cause respiratory tract irritation.
 - (2) Direct eye contact with chromium containing dusts can cause permanent eye damage.
 - (3) Damage to the respiratory tract is caused by breathing in large amounts of hexavalent chromium over an extended period of time. Initial symptoms may include runny nose, sneezing, coughing, and an itching or burning sensation. Prolonged exposure may cause nose bleeds. Repeated exposure may perforate the nasal septum, the wall separating the nasal passages. Some employees may develop allergies to hexavalent chromium resulting in symptoms such as wheezing and shortness of breath.
 - (4) Some employees may develop skin allergies or contact dermatitis when exposed to hexavalent chromium. If a skin allergy develops, brief skin contact with hexavalent chromium can cause swelling and a red itchy rash that becomes crusty and thickened with prolonged exposure. Non-allergenic reactions may also cause irritation from direct skin contact. Exposure to non-intact skin can cause "chrome ulcers," small crusted sores with a round border that heal slowly and leave scars.
- B. EXPOSURE DETERMINATION**
- (1) **General:** Each employer who has a workplace or work operation covered by this section shall determine the 8-hour TWA exposure for each employee exposed to hexavalent chromium.
 - (2) **Scheduled Monitoring Option:**
 - a. The employer shall perform initial monitoring to determine the 8-hour TWA exposure for each employee on the basis of a sufficient number of personal breathing zone air samples to accurately characterize full shift exposure on each shift, for each job classification, in each work area. Where

an employer does representative sampling instead of sampling all employees in order to meet this requirement, the employer shall sample the employee(s) expected to have the highest hexavalent chromium exposures.

- b. If initial monitoring indicates that employee exposures are below the action level, the employer may discontinue monitoring for those employees whose exposures are represented by such monitoring.
 - c. If monitoring reveals employee exposures to be at or above the action level, the employer shall perform periodic monitoring at least every six months.
 - d. If monitoring reveals employee exposures to be above the PEL, the employer shall perform periodic monitoring at least every three months. If periodic monitoring indicates that employee exposures are below the action level, and the result is confirmed by the result of another monitoring taken at least seven days later, the employer may discontinue the monitoring for those employees whose exposures are represented by such monitoring.
 - e. The employer shall perform additional monitoring when there has been any change in the production process, raw materials, equipment, personnel, work practices, or control methods that may result in new or additional exposures to hexavalent chromium, or when the employer has any reason to believe that new or additional exposures have occurred.
- (3) **Performance Monitoring Option:** The employer shall determine the 8-hour TWA exposure for each employee on the basis of any combination of air monitoring data, historical monitoring data, or objective data sufficient to accurately characterize employee exposure to hexavalent chromium.
- (4) **Employee Notification of Determination Results:**
- a. Where the exposure determination indicates that employee exposure exceeds the PEL, within 15 working days the employer shall either post the results in an appropriate location accessible to all affected employees or shall notify each affected employee individually in writing of the results
 - b. Whenever exposure determination indicates that employee exposure is above the PEL, the employer shall describe in the written notification the corrective action being taken to reduce employee exposure to or below the PEL.
- (5) **Accuracy of Measurement:** Where the exposure determination indicates that employee exposure exceeds the PEL, within 15 working days the employer shall either post the results in an appropriate location that is accessible to all affected employees or shall notify each affected employee individually in writing of the results.

C. METHODS OF COMPLIANCE

(1) Engineering and Work Practice Controls:

- a. The employer shall use engineering and work practice controls to reduce and maintain employee exposure to hexavalent chromium to or below the PEL unless the employer can demonstrate that such controls are not feasible. Wherever feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, the employer shall use them to reduce employee exposure to the lowest levels achievable, and shall supplement them by the use of respiratory protection.
- b. Where the employer can demonstrate that a process or task does not result in any employee exposure to hexavalent chromium above the PEL for 30 or more days per year (12 consecutive months), the requirement to implement engineering and work practice controls to achieve the PEL does not apply to that process or task.
- c. The employer shall not rotate employees to different jobs to achieve compliance with the PEL.

(2) Respiratory Protection Program:

Where respirator use is required by this section, the employer shall institute a respiratory protection program in accordance with § 1910.134, which covers each employee required to use a respirator. The employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respiratory protection is required during the following:

- a. Periods necessary to install or implement feasible engineering and work practice controls.
- b. Work operations, such as maintenance and repair activities, for which engineering and work practice controls are not feasible.

- c. Work operations for which an employer has implemented all feasible engineering and work practice controls and such controls are not sufficient to reduce exposures to or below the PEL.
- d. Work operations where employees are exposed above the PEL for fewer than 30 days per year and the employer has elected not to implement engineering and work practice controls to achieve the PEL.
- e. During emergency situations.

D. PROTECTIVE WORK CLOTHING AND EQUIPMENT

- (1) **Provision and Use:** Where a hazard is present or is likely to be present from skin or eye contact with hexavalent chromium, the employer shall provide appropriate personal protective clothing and equipment at no cost to employees, and shall ensure that employees use such clothing and equipment.
- (2) **Removal and Storage:**
 - a. The employer shall ensure that employees remove all protective clothing and equipment contaminated with hexavalent chromium at the end of the work shift or at the completion of their tasks involving hexavalent chromium exposure, whichever comes first.
 - b. The employer shall ensure that no employee removes hexavalent chromium-contaminated protective clothing or equipment from the workplace, except for those employees whose job it is to launder, clean, maintain, or dispose of such clothing or equipment.
 - c. When contaminated protective clothing or equipment is removed for laundering, cleaning, maintenance, or disposal, the employer shall ensure that it is stored and transported in sealed, impermeable bags or other closed, impermeable containers.
 - d. Bags or containers of contaminated protective clothing or equipment that are removed from change rooms for laundering, cleaning, maintenance, or disposal shall be labeled in accordance with the requirements of the Hazard Communication Standard, 29 CFR 1910.1200.
- (3) **Cleaning and Replacement:**
 - a. The employer shall clean, launder, repair and replace all protective clothing and equipment required by this section as needed to maintain its effectiveness
 - b. The employer shall prohibit the removal of hexavalent chromium from protective clothing and equipment by blowing, shaking, or any other means that disperses hexavalent chromium into the air or onto an employee's body
 - c. The employer shall inform any person who launders or cleans protective clothing or equipment contaminated with hexavalent chromium of the potentially harmful effects of exposure to hexavalent chromium and that the clothing and equipment should be laundered or cleaned in a manner that minimizes skin or eye contact with hexavalent chromium and effectively prevents the release of airborne hexavalent chromium in excess of the PEL.
- (4) **Hygiene Areas and Practices:**
 - a. **General:** Where protective clothing and equipment is required, the employer shall provide change rooms in conformance with 29 CFR 1910.141. Where skin contact with hexavalent chromium occurs, the employer shall provide washing facilities in conformance with 29 CFR 1910.141. Eating and drinking areas provided by the employer shall also be in conformance with § 1910.141.
 - b. **Change Rooms:** The employer shall assure that change rooms are equipped with separate storage facilities for protective clothing and equipment and for street clothes, and that these facilities prevent cross-contamination.
 - c. **Washing Facilities:** The employer shall provide readily accessible washing facilities capable of removing hexavalent chromium from the skin, and shall ensure that affected employees use these facilities when necessary. The employer shall ensure that employees who have skin contact with hexavalent chromium 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.
 - d. **Eating and Drinking Areas:** Whenever the employer allows employees to consume food or beverages at a worksite where hexavalent chromium is present, the employer shall ensure eating and drinking areas and surfaces are maintained as free as practicable of hexavalent chromium. The employer shall ensure employees do not enter eating and drinking areas with protective work clothing or equipment unless surface hexavalent chromium has been removed from the clothing and equipment by methods that do not disperse hexavalent chromium into the air or onto an employee's body.

- e. Prohibited Activities:** The employer shall ensure employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas, or in areas where skin or eye contact with hexavalent chromium occurs; or carry the products associated with these activities, or store such products in these areas.
- (5) Housekeeping:**
- The employer shall ensure that all surfaces are maintained as free as practicable of accumulations of hexavalent chromium.
 - The employer shall ensure that all spills and releases of hexavalent chromium containing material are cleaned up promptly.
- (6) Cleaning Methods:**
- The employer shall ensure that surfaces contaminated with hexavalent chromium are cleaned by HEPA-filter vacuuming or other methods that minimize the likelihood of exposure to hexavalent chromium.
 - Dry shoveling, dry sweeping and dry brushing may be used only where HEPA-filtered vacuuming or other methods that minimize the likelihood of exposure to hexavalent chromium have been tried and found not to be effective.
 - The employer shall not allow compressed air to be used to remove hexavalent chromium from any surface unless:
 - The compressed air is used in conjunction with a ventilation system designed to capture the dust cloud created by the compressed air.
 - or
 - No alternative method is feasible.
 - The employer shall ensure that cleaning equipment is handled in a manner that minimizes the reentry of hexavalent chromium into the workplace.
- (7) Disposal:**
- Waste, scrap, debris, and any other materials contaminated with hexavalent chromium and consigned for disposal shall be collected and disposed of in sealed, impermeable bags or other closed, impermeable containers.
 - Bags or containers of waste, scrap, debris, and any other materials contaminated with hexavalent chromium that are consigned for disposal shall be labeled in accordance with the requirements of the Hazard Communication Standard, 29 CFR 1910.1200.
- (8) Medical Surveillance:**
- a. General:** The employer shall make medical surveillance available at no cost to the employee, and at a reasonable time and place, for all employees:
- Who are or may be occupationally exposed to hexavalent chromium at or above the action level for 30 or more days a year.
 - Experiencing signs or symptoms of the adverse health effects associated with hexavalent chromium exposure.
 - Exposed in an emergency.
 - The employer shall assure that all medical examinations and procedures required by this section are performed by or under the supervision of a PLHCP.
- b. Frequency:** The employer shall provide a medical examination:
- Within 30 days after initial assignment, unless the employee has received a hexavalent chromium related medical examination that meets the requirements of this paragraph within the last twelve months.
 - Annually.
 - Within 30 days after a PLHCP's written medical opinion recommends an additional examination.
 - Whenever an employee shows signs or symptoms of the adverse health effects associated with hexavalent chromium exposure.
 - Within 30 days after exposure during an emergency which results in an uncontrolled release of hexavalent chromium.

- vi. At the termination of employment, unless the last examination that satisfied the requirements of Section K, Medical Surveillance of the OSHA 1910.1026 hexavalent chromium Standard was less than six months prior to the date of termination.
 - c. **Contents of Examination:** A medical examination consists of the following:
 - i. medical and work history, with emphasis on: Past, present, and anticipated future exposure to hexavalent chromium; any history of respiratory system dysfunction; any history of asthma, dermatitis, skin ulceration, or nasal septum perforation; and smoking status and history.
 - ii. physical examination of the skin and respiratory tract.
 - iii. Any additional tests deemed appropriate by the examining PLHCP.
 - d. **Required Information:** The employer shall ensure that the examining PLHCP has a copy of this standard, and shall provide the following information:
 - i. A description of the affected employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to hexavalent chromium.
 - ii. The employee's former, current, and anticipated levels of occupational exposure to hexavalent chromium.
 - iii. A description of any personal protective equipment used or to be used by the employee, including when and for how long the employee has used that equipment.
 - iv. Information from records of employment-related medical examinations previously provided to the affected employee, currently within the control of the employer.
 - e. **PLHCP's Written Medical Opinion:** The employer shall obtain a written medical opinion from the PLHCP, within 30 days for each medical examination performed on each employee, which contains the following:
 - i. The PLHCP's opinion as to whether the employee has any detected medical condition(s) that would place the employee at increased risk of material impairment to health from further exposure to hexavalent chromium.
 - ii. Any recommended limitations upon the employee's exposure to hexavalent chromium or upon the use of personal protective equipment such as respirators.
 - iii. A statement that the PLHCP has explained to the employee the results of the medical examination, including any medical conditions related to hexavalent chromium exposure that require further evaluation or treatment, and any special provisions for use of protective clothing or equipment.
 - iv. The PLHCP shall not reveal to the employer specific findings or diagnoses unrelated to occupational exposure to hexavalent chromium.
 - v. The employer shall provide a copy of the PLHCP's written medical opinion to the examined employee within two weeks after receiving it.
- (9) **Communication of Hexavalent Chromium Hazards to Employees:** In addition to requirements of the Hazard Communication Standard, 29 CFR 1910.1200, employers shall comply with the following requirements to ensure that each employee can demonstrate knowledge of at least the following:
- a. The contents of this section.
 - b. The purpose and a description of the medical surveillance program required.
 - c. The employer shall make a copy of this section readily available without cost to all affected employees.
- (10) **Recordkeeping:**
- a. **Air Monitoring Data:**
 - i. The employer shall maintain an accurate record of all air monitoring conducted to comply with the requirements of this section.
 - ii. This record shall include at least the following information:
 - 1. Sample date and time.
 - 2. The operation involving exposure to hexavalent chromium that is being monitored.
 - 3. Sampling and analytical methods used and evidence of their accuracy.
 - 4. Number, duration, and the results of samples taken.
 - 5. Type of personal protective equipment, such as respirators.
 - 6. Name, social security number, and job classification of all employees represented by the monitoring, indicating which employees were actually monitored.

7. The employer shall ensure that exposure records are maintained and made available in accordance with 29 CFR 1910.1020.

b. Historical Monitoring Data:

- i. Where the employer has relied on historical monitoring data to determine exposure to hexavalent chromium, the employer shall establish and maintain an accurate record of the historical monitoring data relied upon.
- ii. The record shall include information that reflects the following conditions:
 1. The processes and work practices that were in use when the historical monitoring data were obtained are essentially the same as those to be used during the job for which exposure is being determined.
 2. The characteristics of the hexavalent chromium containing material being handled when the historical monitoring data were obtained are the same as those on the job for which exposure is being determined.
 3. Environmental conditions prevailing when the historical monitoring data were obtained are the same as those on the job for which exposure is being determined; and other data relevant to the operations, materials, processing, or employee exposures covered by the exception.
 4. The employer shall ensure that historical exposure records are maintained and made available in accordance with 29 CFR 1910.1020.

c. Objective Data: This record shall include at least the following information:

- i. The chromium containing material in question.
- ii. The source of the objective data.
- iii. The testing protocol and results of testing, or analysis of the material for the release of hexavalent chromium.
- iv. A description of the process, operation, or activity and how the data support the determination; and other data relevant to the process, operation, activity, material, or employee exposures.
- v. The employer shall ensure that objective data are maintained and made available in accordance with 29 CFR 1910.1020.

d. Medical Surveillance: The record shall include the following information about the employee:

- i. Name and social security number.
- ii. A copy of the PLHCP's written opinions.
- iii. A copy of the information provided to the PLHCP by the employer.
- iv. The employer shall ensure that medical records are maintained and made available in accordance with 29 CFR 1910.1020.

- (11) Reporting Signs and Symptoms of Health Problems:** Employees should immediately notify their employer upon developing signs or symptoms associated with hexavalent chromium exposure or if they desire medical advice concerning the effects of current or past exposure. Employees should also notify their employer if they have difficulty breathing during a respirator fit test or while wearing a respirator. In each of these cases, the employer must make available to the employee appropriate medical examinations or consultations. These must be provided at no cost to the employee and at a reasonable time and place. The standard contains a procedure whereby the employee can obtain a second opinion by a physician of his or her choice if the employer selected the initial physician.