HEXAVALENT CHROMIUM

SUBPART A - SCOPE

This standard applies to all occupational exposures to Hexavalent Chromium (Cr(VI) with limited exceptions. Cr(VI) is present in many different compounds that have a variety of industrial uses. Examples of major industrial uses include but are not limited to the following:

- Chromate pigments in dyes
- Paints
- Inks
- Plastics

In addition, Cr(VI) can be found in the chromates added as anticorrosive agents to paints, primers, and other surface coatings; and chromic acid electroplated onto metal parts to provide a decorative or protective coating.

Examples of Cr(VI) compounds include:

- Ammonium dichromate
- Calcium chromate
- Chromium trioxide or chromium acid
- Lead chromate
- Potassium dichromate
- Potassium chromate
- Sodium chromate
- Strontium chromate
- Zinc chromate

Cr(VI) can also be formed when conducting “Hot Work” such as welding on stainless steel, melting chromium meal, or heating refractory bricks in a kiln. In these situations the chromium is not originally Hexavalent, but the high temperatures involved in the process result in oxidation that converts the chromium to a Hexavalent state.

An exemption from the standards is provided for employers who objective data that can demonstrate that a material containing chromium or specific process, operation, or activity involving chromium cannot release dusts, fumes, or mists of Cr(VI) in concentrations at or above 0.5 micrograms per cubic meter of air (0.5 g/m3) as an 8 hour time weighted average (TWA).

SUBPART B - DEFINITIONS

Action Level – Is defined as an airborne concentration of 2.5 micrograms of Cr(VI) per cubic meter of air (2.5 µg/m3 Cr(VI)) calculated as an 8 hour TWA. Exposures at or above the action level trigger certain requirements for exposures monitoring and medical surveillance.

Chromium (VI) [Hexavalent chromium or Cr(VI)] – Chromium with a valence of positive six, in any form or chemical compound in which it occurs. This term includes Cr(VI) in all states of matter, in any solution or mixture, even if it is encapsulated by another substance.

Emergency – Any occurrence that results, or is likely to result in an uncontrolled release of Cr (VI). Such an occurrence may be the result of equipment failure, rupture of containers, or failure of control equipment. The release must be unexpected and significant to be considered an emergency. If the release can be controlled by employees or maintenance personnel it is not considered an emergency.

Employee exposure – An exposure to Cr(VI) that would occur if the employee is not wearing a respirator.

Historical monitoring data – Data from Cr(VI) exposure monitoring conducted prior to May 30, 2006 (the effective date of this Cr(VI) standard). The data must have been obtained during work operations conducted under normal workplace conditions that closely resemble the processes, types of material, control methods, work practices, and environmental conditions.

Objective data – Information other than employee monitoring, that demonstrates the expected employee exposure to Cr(VI) associated with a particular product or material or specific process, operation, or activity. This includes but is not limited to air monitoring data from industry wide surveys, data collected by a trade association, or calculations based on composition or chemical and physical properties of a material.

Regulated area – An area demarcated by BBGCI where and employee's exposure to airborne particulates of concentrations of Cr(VI)

exceeds, or can reasonably be expected to exceed the Permissible Exposure Level (PEL).

SUBPART C - EXPOSURE MONITORING

BBGCI will ensure that employees will not be exposed in excess of the permissible exposure level (PEL) of 5 micrograms per cubic meter of air as an 8-hour Time Weighted Average (TWA).

Prior to the performance of any type of construction work where employees may be potentially exposed to Hexavalent Chromium [Cr(VI)], BBGC shall establish the applicability of this standard by determining whether Cr(VI) is present in the workplace and whether there is the possibility that employee exposures will be at or above the action level. BBGCI shall designate a competent person who shall make this determination.

Investigation and material testing techniques shall be used, as appropriate, in the determination. The investigation shall include a review of relevant plans, past reports, material safety data sheets, and other available records, and consultations with the property owner and discussions with appropriate individuals and agencies.

The standard allows for either two options of monitoring: scheduled monitoring or a performance-oriented option.

Scheduled Monitoring

If scheduled monitoring is chosen, BBGCI will conduct initial exposure monitoring to determine employee exposure to Cr(VI). This monitoring is performed by sampling the air within the employee's breathing zone. Monitoring must represent the employee's time-weighted average exposure to airborne Cr(VI) over an 8-hour workday.

BBGCI will accurately describe the exposure to Cr(VI) for each employee. In some cases, this will entail monitoring all exposed employees. In other cases, this will involve monitoring a "representative" few employees. Representative exposure sampling is permitted when a number of employees perform essentially the same job under the same conditions. Monitoring must accurately characterize exposures on each shift, for each job classification, and in each work area.

Periodic Monitoring

Depend on the results of initial monitoring. If the initial monitoring indicates that employee exposures are below the action level, no further monitoring is required unless changes in the workplace take place that results in new or additional exposures.

If the initial monitoring reveals employee exposures to be at or above the action level but at or below the PEL, BBGCI must perform periodic monitoring at least every six months.

If the initial monitoring reveals employee exposures to be above the PEL of 5 micrograms per cubic meter of air, BBGCI must perform periodic monitoring at least every three months. In addition, appropriate action will be taken to remove the employee from the exposure or provide adequate engineering or administrative controls.

If periodic monitoring results indicate that employee exposures have fallen below the action level, and those results are confirmed by consecutive measurements taken at least seven days apart, BBGCI may discontinue monitoring for those employees whose exposures are represented by such monitoring.

Similarly, after initial monitoring shows exposures above the PEL, if periodic measurements indicate that exposures are at or below the PEL but are at or above the action level, BBGCI may reduce the frequency of the monitoring to at least every six months.

Performance-oriented Monitoring

The performance-oriented option allows BBGCI to determine the 8-hour TWA exposure for each employee on the basis of any combination of air monitoring data (i.e., data obtained from initial and periodic Cr(VI) monitoring), historical monitoring data, or objective data sufficient to accurately characterize employee exposure to Cr(VI).

If BBGCI elects to follow this option, the exposure determination must be performed prior to the time the work operation commences and must provide the same degree of assurance that employee exposures have been correctly characterized as air monitoring would. BBGCI is expected to re-evaluate employee exposures when there is any change in the production process, raw materials, equipment, personnel, work practices, or control methods that may result in new or additional exposures to Cr(VI).

Additional Monitoring

BBGCI must perform additional monitoring if workplace changes occur that may result in new or additional exposures to Cr(VI). These changes include alterations in the production process, raw materials, equipment, personnel, work practices, or control methods used in the workplace. An example could be:

- A welder moving from an open, outdoor location to an enclosed or confined space. Even though the task performed and materials used may remain constant, the changed environment could reasonably be expected to result in higher exposures to Cr(VI).

In these special situations, OSHA requires additional monitoring that whenever there is any reason to believe that a change has occurred which may result in new or additional exposures to Cr(VI).

Additional monitoring may not be required simply because a change has been made in the workplace, if the change is not reasonably expected to result in

new or increased (additional) exposures to Cr(VI) then addition monitoring may not be warranted.

SUBPART D - EMPLOYEE NOTIFICATION OF MONITORING RESULTS

BBGCI must comply with certain requirements regarding employee notification of the results of the exposure determination, accuracy of measurement methods, and observation of monitoring.

BBGCI must notify each affected employee if the exposure determination indicates that their exposure to Cr(VI) exceeds the PEL. "Affected employees" are all employees considered to be exposed above the PEL, including those employees who are not actually subject to personal monitoring, but who are represented by an employee who is sampled. Affected employees also include employees whose exposures have been deemed to be above the PEL on the basis of historical or objective data.

BBGCI must either notify each affected employee in writing or post the determination results in an appropriate location accessible to all affected employees (e.g., a bulletin board accessible to all employees). In addition, the written notification must describe the corrective action(s) being taken by the employer to reduce the employee's exposure to or below the PEL (e.g., use of respirators or the engineering controls that will be implemented).

In general industry, the employer must notify employees within 15 working days from when monitoring results are received (or when the exposure determination is made for those following the performance-oriented option).

In construction and shipyards, employers must notify each affected employee as soon as possible but not more than 5 working days later. A shorter time period for notification is mandated in construction and shipyards because of the often short duration of operations and employment for these sectors.

SUBPART E - ACCURACY OF MEASUREMENT

BBGCI may use any method as long as it meets certain accuracy requirements. Many laboratories presently have methods to measure Cr(VI) at the action level with at least the required degree of accuracy. An acceptable method of monitoring and analysis is OSHA method ID215, which is an analytical method used by OSHA to measure Cr(VI) exposures.

SUBPART F - OBSERVATION OF MONITORING

BBGCI will provide affected employees or their designated representatives an opportunity to observe any monitoring for exposure to Cr(VI) required by this standard. When observation of monitoring requires entry into an area where the use of protective clothing or equipment is required, BBGCI will provide the observer with these items, and assure that the observer uses them and complies with all other safety and health procedures.

SUBPART G - REGULATED AREAS

BBGCI shall establish a regulated area wherever an employee's exposure to airborne concentrations of Cr(VI) is, or can reasonably be expected to be in excess of the permissible exposure limit (PEL). In addition, BBGCI will limit Cr(VI) exposure to as few employees as possible by marking areas where employee exposure is likely to exceed the PEL and limit access to these areas to authorized persons.

SUBPART H - DEMARCATION

Regulated areas shall be demarcated from the rest of the workplace in any manner that adequately establishes and alerts employees of the boundaries of the regulated area, (warning signs, barricades, lines, textured flooring, etc). This includes employees who are or may be incidentally in the regulated areas, and

that protects persons outside the area from exposure to airborne concentrations of Cr(VI) excess of the PEL.

SUBPART I - ACCESS

BBGCI will limit access to regulated areas. The only individuals allowed access to a regulated area will be:

- Persons authorized by BBGCI that is required by work duties to be present in the regulated area (this may include maintenance and repair personnel, management, quality control engineers, or other personnel if job duties require their presence in the regulated area).
- Any person entering the area as a designated representative of the employee to observe Cr(VI) exposure monitoring.
- Any person authorized by the *Occupational Safety and Health Act* or regulations issued under it to be in a regulated area (e.g., OSHA enforcement personnel).

SUBPART J - EMERGENCY SITUATIONS

BBGCI shall develop and implement a written plan for dealing with emergency situations involving substantial releases of Cr(VI). The plan shall include provisions for the use of appropriate respirators and personal protective equipment. In addition, employees' not essential to correcting or responding to the emergency situation shall be restricted from the area and normal operations halted in that area until the emergency is abated.

SUBPART K - METHODS OF COMPLIANCE

Compliance Hierarchy

BBGCI will use engineering and work practice controls as the primary means to reduce and maintain employee exposures to Cr(VI) at or below the PEL.

Engineering Controls

- Substitution, using a less toxic material instead of Cr(VI), or substituting a process that results in lower exposures for another type of process that results in higher exposures.
- Isolation, enclosing the source of exposure, or placing a barrier between employees and the source of exposure.
- Ventilation
  - Using local exhaust systems that capture airborne Cr(VI) near its source and removing it from the workplace.
  - Using general ventilation that dilutes Cr(VI) concentrations by circulating large quantities of air.

Note:

Using a local exhaust system is generally preferred to dilution ventilation because it provides a cleaner and healthier work environment.

Work Practice Controls

Work practice controls can involve adjustments in the way a task is performed. Usually, work practice controls complement engineering controls in providing employee protection. For example, periodic inspection and maintenance of control equipment such as ventilation systems is an important work practice control. Frequently, equipment which is in disrepair will not perform normally. If equipment is routinely inspected, maintained, and repaired or replaced before failure is likely, there is less chance that hazardous exposures will occur.

Scheduling Controls

Cr(VI) exposures can also be controlled by scheduling operations with the highest exposures at a time when the fewest employees are present. For example, routine cleanup operations that involve Cr(VI) releases might be performed at night or at times when the usual employee population is not present.

Wherever engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, BBGCI shall implement such controls to reduce exposures to the lowest levels achievable (PPE). BBGCI shall supplement such controls with respiratory protection that complies with the requirements of this section and the PEL.

Note:

BBGCI shall not use employee rotation as a method of compliance.

SUBPART L - PERSONAL PROTECTIVE EQUIPMENT (PPE)

When engineering and work practice controls cannot reduce employee exposure to Cr(VI) to within the PEL, BBGCI will provide employees with respirators.

Respirators will be required during:

- Periods necessary to install or implement feasible engineering and work practice controls.
- Operations, such as maintenance and repair activities, for which engineering and work practice controls, are not feasible.
- Operations for which BBGCI has implemented all feasible engineering and work practice controls and such controls are not sufficient to reduce exposures to or below the PEL.
- Operations where employees are exposed above the PEL for fewer than 30 days per year, and BBGCI has elected not to implement engineering and work practice controls to achieve the PEL.
- Emergencies such as uncontrolled releases of Cr(VI) that result in significant and unexpected exposures.

Where respiratory protection use is required, BBGCI will establish a respiratory protection program in accordance with OSHA's Respiratory Protection standard (29 CFR 1910.134).

For more information on Respiratory Protection, refer to BBGCI's Respiratory Protection Policy and Procedure.

Protective Clothing

BBGCI must provide appropriate protective clothing and equipment wherever skin or eye contact with Cr(VI) is likely to be present. BBGCI must also ensure that employees use the clothing and equipment provided, and follow a number of specified practices to ensure that protective clothing and equipment is used and handled in a manner that is protective of employee health.

In order to provide appropriate protective work clothing and equipment, BBGCI has identified those areas where a hazard is present or is likely to be present from skin or eye contact with Cr(VI). Protective work clothing and equipment is only that clothing and equipment that serves to protect employees from Cr(VI) hazards. Other clothing, work uniforms, tools or other apparatus that do not serve to protect employees from Cr(VI) hazards are not considered protective clothing and equipment under the standards.

Examples of protective clothing can include but is not limited too:

- Gloves
- Aprons
- Coveralls
- Foot coverings
- Goggles

All specialized PPE will be provided by BBGCI at no cost to the employee. In addition, where protective clothing and equipment is required, BBGCI will ensure that it is used in the workplace.

SUBPART M - REMOVAL AND STORAGE

BBGCI shall assure that employees remove all protective clothing and equipment contaminated with Hexavalent chromium [Cr(VI)] at the completion of the work shift and do so only in change rooms provided.

BBGCI shall assure that no employee takes Cr(VI)-contaminated protective clothing or equipment from the workplace, except for employees authorized to do so for purposes of laundering, cleaning, maintaining, or disposing of Cr(VI)-contaminated protective clothing and equipment at an appropriate location or facility away from the workplace.

BBGCI shall assure that contaminated protective clothing and equipment, when removed for laundering, cleaning, maintenance, or disposal, is placed and stored in sealed, impermeable bags or other closed, impermeable containers that are designed to prevent dispersion of Cr(VI) dust.

BBGCI shall assure that containers of contaminated protective clothing and equipment that are to be taken out of the change rooms or the workplace for laundering, cleaning, maintenance or disposal shall bear labels.

Cleaning, Replacement, and Disposal

BBGCI shall provide the protective clothing and equipment required by this section in a clean and dry condition as often as necessary to maintain its effectiveness, but in any event at least weekly. BBGCI is responsible for cleaning and laundering the protective clothing and equipment required by this paragraph to maintain its effectiveness and is also responsible for disposing of such clothing and equipment.

BBGCI also is responsible for repairing or replacing required protective clothing and equipment as needed to maintain its effectiveness. When rips or tears are detected while an employee is working they shall be immediately mended, or the work suit shall be immediately replaced.

BBGCI shall prohibit the removal of Cr(VI) from protective clothing and equipment by blowing, shaking, or any other means that disperses Cr(VI) into the air.

BBGCI shall assure that any laundering of contaminated clothing or cleaning of contaminated equipment in the workplace is done in a manner that prevents the release of airborne Cr(VI) in excess of the permissible exposure limit.

BBGCI shall inform any person who launders or cleans protective clothing or equipment contaminated with Cr(VI) of the potentially harmful effects of exposure to Cr(VI), and that the clothing and equipment should be laundered or cleaned in a manner to effectively prevent the release of airborne Cr(VI) in excess of the PEL.

SUBPART N - HYGIENE AREAS AND PRACTICES

For employees whose airborne exposure to Cr(VI) is above the PEL, BBGCI shall provide clean change rooms, hand washing facilities, showers, and lunchroom facilities that comply with 29 CFR 1910.1026

Change rooms

BBGCI shall assure that change rooms are equipped with separate storage facilities for street clothes and for protective clothing and equipment, which are designed to prevent dispersion of Cr(VI) and contamination of the employee's street clothes.

Showers and Hand Washing Facilities

- BBGCI shall assure that employees whose airborne exposure to Cr(VI) is above the PEL shower during the end of the work shift.

- BBGCI shall assure that employees who are exposed to Cr(VI) above the PEL wash their hands and faces prior to eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics.

Lunchroom Facilities

- BBGCI shall assure that the lunchroom facilities are readily accessible to employees, that tables for eating are maintained free of Hexavalent chromium [Cr(VI)], and that no employee in a lunchroom facility is exposed at any time to Cr (VI) at or above the action level.

- BBGCI shall assure that employees do not enter lunchroom facilities with protective work clothing or equipment unless surface cadmium has been removed from the clothing and equipment by HEPA vacuuming or some other method that removes cadmium dust without dispersing it.

SUBPART O - HOUSEKEEPING

All surfaces shall be maintained as free as practicable of accumulations of hexavalent chromium.

All spills and sudden releases of material containing Cr(VI) shall be cleaned up as soon as possible.

Surfaces contaminated with Cr(VI) shall, wherever possible, be cleaned by vacuuming or other methods that minimize the likelihood of Cr(VI) becoming airborne.

HEPA-filtered vacuuming equipment or equally effective filtration methods shall be used for vacuuming. The equipment shall be used and emptied in a manner that minimizes the re-entry of Cr(VI) into the workplace.

Shoveling, dry or wet sweeping, and brushing may be used only where vacuuming or other methods that minimize the likelihood of Cr(VI) becoming airborne have been tried and found not to be effective.

Compressed air shall not be used to remove Cr(VI) 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.

Waste, scrap, debris, bags, containers, personal protective equipment, and clothing contaminated with Cr(VI) and consigned for disposal shall be collected

and disposed of in sealed impermeable bags or other closed, impermeable containers. These bags and containers shall be labeled in accordance with this section.

SUBPART P - MEDICAL SURVEILLANCE

The intent of medical surveillance is to:

- Help determine, where reasonably possible, if an individual can be exposed to the Cr(VI) in his or her workplace without experiencing adverse health effects.
- To identify Cr(VI)-related adverse health effects when they do occur so that appropriate intervention measures can be taken.
- Determine an employee's fitness to use personal protective equipment such as respirators.

All medical examinations and procedures required by the standards must be performed by or under the supervision of a physician or other licensed health care professional (PLHCP).

Medical surveillances will be provided at no cost to the employee, and at a reasonable time and place. In addition, the employee will be paid for time spent taking medical examinations, including travel time.

Employees Provided Medical Surveillance

Medical surveillance must be provided to employees who are:

- Exposed to Cr(VI) at or above the action level (2.5 µg/m3 Cr(VI) as an 8-hour time-weighted average) for 30 or more days a year.
- Experiencing signs or symptoms of the adverse health effects associated with Cr(VI) exposure:

- Blistering lesions
- Redness or itchiness of exposed skin
- Shortness of breath or wheezing that worsens at work
- Nosebleeds
- A whistling sound while inhaling or exhaling

- Exposed in an emergency (i.e., an uncontrolled release of Cr(VI) that results in significant and unexpected exposures.)

Frequency of Medical Examinations

Medical examinations must be provided:

- Within 30 days after initial assignment to a job involving Cr(VI) exposure, unless the employee has received an examination that meets the requirements of the standard within the last 12 months.
- Annually.
- Within 30 days after a Physician or Licensed Health Care Professional's written medical opinion recommends an additional examination.
- Whenever an employee shows signs or symptoms of the adverse health effects associated with Cr(VI) exposure.
- Within 30 days after exposure during an emergency which results in an uncontrolled release of Cr(VI).
- At the termination of employment, unless the last examination provided was less than six months prior to the date of termination.

Contents of the Examination

The medical examination consists of:

- A medical and work history which focuses on: the employee's past, present, and anticipated future exposure to Cr(VI); any history of respiratory system dysfunction; any history of asthma, dermatitis, skin ulceration, or nasal septum perforation; and smoking status and history.
- A physical examination of the skin and respiratory tract.

- Any additional tests that the examining PLHCP considers to be appropriate for that individual.

Information Provided to the PLHCP

BBGCI must ensure that the PLHCP has a copy of the Cr(VI) standard, and must provide the PLHCP with:

- A description of the affected employee's former, current, and anticipated duties as they relate to Cr(VI) exposure.
- Information on the employee's former, current, and anticipated Cr(VI) exposure levels.
- 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.
- Information from records of employment-related medical examinations previously provided to the affected employee.

SUBPART Q - THE WRITTEN MEDICAL OPINION

BBGCI must obtain a written medical opinion from the PLHCP for each medical examination performed. The written medical opinion must be obtained within 30 days of the examination, and must contain:

- 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 Cr(VI).

- Any recommended limitations on the employee's exposure to Cr(VI) or on the use of personal protective equipment such as respirators.
- A statement that the PLHCP has explained to the employee the results of the medical examination, including any medical conditions related to Cr(VI) exposure that require further evaluation or treatment, and any special provisions for use of protective clothing or equipment.

The PLHCP must not reveal to BBGCI any specific findings or diagnoses that are not related to workplace Cr(VI) exposure. BBGCI is required to provide a copy of the written medical opinion to the examined employee within two weeks after receiving it.

SUBPART R - TRAINING

To protect against illnesses and injuries from Cr(VI) exposures, BBGCI will provide initial training prior to assignment to employees to help them recognize the hazards associated with exposure to Cr(VI) and understand the measures they can take to protect themselves.

In addition, BBGCI will ensure that the training provided is understandable and sufficient to ensure that employees exposed to Cr(VI) can demonstrate knowledge of:

- The requirements of the Cr(VI) standard.
- The medical surveillance program required by the standard, including recognition of the signs and symptoms of adverse health effects that may result from Cr(VI) exposure.
- Location, manner of use, and how Cr(VI) is released in the workplace.
- Engineering controls.
- Work practice controls.
  - Purpose, proper selection, fitting, and proper use and limitations of respirators and clothing.
- Emergency procedures.
- Measures that the employee can take to protect themselves from exposure.

BBGCI must also make a copy of the Cr(VI) standard available without cost to all affected employees.

The Hazard Communication standard (29 CFR 1910.1200) establishes requirements that BBGCI must provide to employees. This information is provided through comprehensive chemical hazard communication programs that include material safety data sheets (MSDS's), labels, and employee training.

BBGCI must follow the requirements of the Hazard Communication standard with regard to employees exposed to Cr(VI).

The training will be provided as often as is necessary to ensure that employees are aware of the Cr(VI) hazards in their workplace and understand the protective measures available to them.

All training will be documented and kept on file.

SUBPART S - RECORD KEEPING

Accurate records can demonstrate compliance with the standard, and can assist in diagnosing, and identifying workplace-related illnesses. Therefore, BBGCI is required to maintain records of employee Cr(VI) exposures (including air monitoring data, historical monitoring data, and objective data) as well as records of medical surveillance provided under the standard.

Revision Date: __11-5-14_____

Approved By: _Joe Berry & Safety Committee_