



Hexavalent Chromium (Cr(VI))

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1 PURPOSE

The purpose of this program is to provide requirements and safeguards to ensure that no employees or contractors are exposed to Hexavalent Chromium {Cr(VI)} above the Permissible Exposure Level (PEL).

2 SCOPE

This program applies to all Phosphate Business Unit employees and contractors who are potentially exposed to the hazards of airborne Cr(VI) generated during tasks and work activities associated with:

- Hot Work
 - Stainless steel
 - Specialty alloys containing chrome
 - Chrome plated materials and
 - Chromium containing surface materials (i.e., primers, pigments)
- Installation, maintenance or demolition of refractory brick
- Woodworking with chromate-treated lumber
- Spray painting when using chromate or chromic oxide paints
- Abrasive blasting with grit containing Cr(VI) or blasted material dust (i.e., media, paint)

This program does not apply to:

- Objective data that demonstrates a material containing chromium or a specific process, operation, or activity cannot release dusts, fumes, or mists containing Cr(VI) at or above 0.5 $\mu\text{g}/\text{m}^3$ as an 8-hour time weighted average (TWA) under any expected conditions of use
- Exposures that occur in the application of pesticides regulated by the Environmental Protection Agency (EPA) or other Federal government agency
- Exposures to portland cement

3 APPENDICES


The following appendices are associated with this Program:

Appendix	Appendix Title
A	Definitions
B	Roles and Responsibilities

4 GENERAL REQUIREMENTS

4.1 For each workplace or work activity that may generate airborne Cr(VI), the 8-hour TWA exposure for each affected employee shall be determined using either a performance based option or an air monitoring option.

4.2 Initial personal monitoring shall be performed to determine the 8-hour TWA for each employee.

 **Note:** Instead of sampling each employee to determine initial monitoring, representative sampling may be conducted for employee(s) reasonably expected to have the highest Cr(VI) exposure potential.


4.3 Worker exposure shall be re-evaluated when:

- Production process changes (raw materials, equipment, etc.)
- Project personnel changes
- Work practices change
- Control methods change

4.4 A statistically significant number of personal breathing zone air samples shall be taken to accurately characterize full shift exposures:

- On each shift
- For each job classification
- In each work area

4.5 All tested employees shall be individually notified in writing of personal sampling results within 15 working days of receipt.

 **Note:** If the PEL has been exceeded, the corrective action to reduce the exposure to or below the PEL shall be included in the written notification.



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- 4.6 Performance Based Monitoring Option
- 4.6.1 The performance-based option shall be performed prior to the start of initial project work.
- 4.6.2 The performance-based option initial determination is made using any combination of the following:
- Air monitoring
 - Historical monitoring data
 - Objective data
- 4.7 Air monitoring exposure data shall include at least the following information:
- The date of measurement for each sample taken
 - The operation involving exposure to Cr(VI) that is being monitored
 - Sampling and analytical methods used and evidence of their accuracy
 - Number, duration, and the results of samples taken
 - Type of personal protective equipment, such as respirators worn
 - Employee name, employee id, and job classification of all employees represented by the monitoring, indicating which employees were actually monitored
- 4.8 Historical exposure monitoring data shall include at least the following information:
- The data that was collected using methods that meet the accuracy requirements above (+/- 25%)
 - The processes and work practices that were in use when the historical monitoring data was obtained are essentially the same as those to be used during the job for which exposure is being determined
 - The characteristics of the Cr(VI) containing material being handled when the historical monitoring data was obtained are the same as those on the job for which exposure is being determined
 - Environmental conditions prevailing when the historical monitoring data was obtained are the same as those on the job for which exposure is being determined
 - Other data relevant to the operations, materials, processing, or employee exposures covered by the exceptions as defined in the scope
- 4.9 Objective exposure data shall include at least the following information:
- The chromium containing material in question
 - The source of the objective data



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- The testing protocol and results of testing, or analysis of the material for the release of Cr(VI)
- A description of the process, operation, or activity and how the data supports the determination
- Other data relevant to the process, operation, activity, material, or employee exposures

4.10 Air Monitoring Option


4.10.1 Upon completion of initial monitoring, periodic monitoring frequency shall consist of the following:

Results	Frequency
Below Action Level (AL): < 2.5 ug/m³	No periodic monitoring required for workers represented by the initial monitoring
At or above the Action Level but at or below the PEL: ≥ 2.5 ug/m³ and ≤ 5.0 ug/m³	Monitor every six months
Above the PEL: > 5.0 ug/m³	Monitor every three months

4.10.2 Periodic air monitoring may be discontinued if:

- Current monitoring results are below the Action Level **AND**
- Results are confirmed to be below Action Level at least seven (7) days later

4.10.3 Affected employees or their representatives shall be provided an opportunity to observe air monitoring of employee exposure to Cr(VI).

 **Note:** The observer shall be provided with PPE and comply with all other applicable safety and health procedures.

4.10.4 Air monitoring and analysis methods must have an accuracy of +/- 25%.

4.10.5 Accuracy measurements shall be within 95% confidence level for airborne concentrations at or above the Action Level.

5 MEDICAL EXAMINATIONS

5.1 All medical examinations and procedures shall be performed by or under the supervision of a Physician or other Licensed Health Care Professional (PLHCP).



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- 5.2 Medical examinations shall be made available at no cost, and at a reasonable time and place, for all employees:
- Who are or may be occupationally exposed to Cr(VI) at or above the action level for 30 or more days a year
 - Experiencing signs or symptoms of adverse health effects associated with Cr(VI) exposure
- 5.3 The employer shall provide a medical examination to all affected workers when any of the following conditions occur:
- Within 30 days after initial assignment, unless the employee has received a Cr(VI) medical examination within the last 12 months
 - Annually
 - Within 30 days after a PLHCP's written medical opinion recommends an additional examination
 - Whenever an employee exhibits signs or symptoms of adverse health effects associated with Cr(VI) exposure
 - At termination of employment, unless last examination was less than 6 months prior to termination date
- 5.4 A medical examination shall consist of:
- Medical and work history
 - Physical examination of the skin and respiratory tract
 - Any additional tests deemed appropriate by the examining PLHCP
- 5.5 The employer shall ensure that the PLHCP is provided with:
- A copy of this program
 - A description of the employee's former, current, and anticipated duties
 - The employee's former, current, and anticipated levels of occupational exposure to Cr(VI)
 - A description of any Personal Protective Equipment (PPE) used or to be used by the employee, including when and for how long the employee has used that equipment
 - A copy of employee's medical history that is currently within control of employer
- 5.6 The employer shall obtain a written medical opinion from the PLHCP, within 30 days for each medical examination performed on each employee.
- 5.7 The written medical opinion will contain all of the following information:



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- 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)
 - 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
 - Any recommended limitations upon the employee's exposure to Cr(VI) or upon the use of personal protective equipment such as respirators
- 5.8 The PLHCP shall not reveal to the employer specific findings or diagnoses unrelated to occupational exposure to Cr(VI).
- 5.9 The employer shall provide a copy of the PLHCP's written medical opinion to the examined employee within two weeks after receiving it.
- 5.10 Medical records shall include the following information about the employee:
- Name and social security number
 - A copy of the PLHCP's written opinions
 - A copy of the information provided to the PLHCP as required by item 5.5 of this section

6 ENGINEERING AND WORK PRACTICE (E&WP) CONTROLS

- 6.1 E&WP controls shall be used to reduce and maintain employee exposure to Cr(VI) to or below the PEL unless it can be demonstrated that such controls are not feasible.
- 6.2 If a process or task does not result in any employee exposure to Cr(VI) above the PEL for 30 or more days per year (during 12 consecutive months), the requirement to implement E&WP Controls to achieve the PEL does not apply to that process or task.
- 6.3 Engineering controls shall include, but are not limited to:
- Local exhaust ventilation
 - General ventilation systems
 - Special enclosures and isolation devices
- 6.4 Work practices shall include, but are not limited to:
- Adjustments in the way a task is performed
 - Hygiene
 - Keeping containers closed
 - Maintaining and servicing equipment as recommended by the manufacturer

- Training
- Undertaking immediate and appropriate cleanup measures

6.5 If E&WP Controls are not sufficient to reduce employee exposure to or below the PEL, they shall be:

- Used to reduce employee exposure to the lowest levels achievable **AND**
- Supplemented using respiratory protection

6.6 Employees shall not be rotated to different jobs to achieve compliance with the PEL.

7 REGULATED AREA(S)


7.1 Regulated area(s) shall be established whenever exposure to airborne concentrations of Cr(VI) is, or can reasonably be expected to be, in excess of the PEL.

7.2 Regulated area(s) shall be separated or marked in a manner that adequately establishes and alerts employees of the boundaries of the regulated area.

7.3 Regulated area(s) shall be separated in a manner that controls access to the area.

7.4 The separation may be through utilization of:

- Gates
- Ropes
- Barricades
- Lines or other methods
- Warning signs with physical barriers (where feasible)


 **Note:** Signage with the following or similar wording shall read: “Hexavalent Chromium (Cr(VI)) Exposure - Carcinogenic Hazard”.

7.5 Access to Regulated area(s) shall be limited to:

- Persons authorized and required by work duties to be present in the Regulated area(s)
- Any designated representative of employees to observe monitoring procedures

8 HYGIENE PRACTICES

8.1 Where protective clothing and equipment is required, change rooms shall be provided.

 **Note:** Change rooms are only required when employees must change out of their normal attire (i.e. street clothes) to use Cr(VI) specific protective clothing and equipment.



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- 8.2 Change rooms shall be equipped with separate storage facilities for protective clothing and equipment and for street clothes.
- 8.3 Where skin contact with Cr (VI) occurs, washing facilities shall be provided.
- 8.4 Personnel who have skin contact with Cr(VI) shall wash their hands and face:
 - At the end of the work shift
 - Prior to eating, drinking, smoking, chewing tobacco or gum, applying cosmetics
 - Using the restroom
- 8.5 Eating and drinking areas provided must be maintained as free as practicable of Cr(VI) whenever workers are allowed to consume food or beverages at a worksite where Cr(VI) is present.
- 8.6 Personnel may not enter eating and drinking areas with protective work clothing or equipment unless surface Cr(VI) has been removed from the clothing.
- 8.7 Employees shall not eat, drink, smoke, chew tobacco or gum, or apply cosmetics:
 - In Regulated area(s)
 - In areas where skin or eye contact with Cr(VI) occurs


9 HOUSEKEEPING

- 9.1 All surfaces are maintained as free as practicable of accumulations of Cr(VI).
- 9.2 All spills and releases of Cr(VI) containing material shall be cleaned up promptly.
- 9.3 Surfaces contaminated with Cr(VI) shall be cleaned by HEPA-filter vacuuming or other methods that minimize the likelihood of exposure.
- 9.4 Dry shoveling, dry sweeping and dry brushing may be used only where HEPA-filtered vacuuming or other exposure minimizing methods have been tried and found ineffective.
- 9.5 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
 - No alternative method is feasible
- 9.6 Cleaning equipment shall be handled in a manner that minimizes the reentry of Cr(VI) into the workplace.
- 9.7 Waste, scrap, debris, and any materials contaminated with Cr(VI) and consigned for disposal shall be:
 - Collected and disposed of in sealed, impermeable bags, recommend double lined, or other closed, impermeable containers



- Labeled in accordance with the requirements of the Phosphates Hazard Communication program

 **Reference:** *EHSS-Phos Program Hazard Communication*

 **Note:** The label shall include the following or similar wording “DO NOT OPEN: Hexavalent Chromium (Cr(VI)) Exposure - Carcinogenic Hazard.”

10 CONTRACTORS


- 10.1 Contractors performing work that exposes employees to Cr(VI) shall develop a Hexavalent Chromium program and provide Mosaic with a copy before project work commences.
- 10.2 Contractors shall coordinate with the Mosaic’s point of contact to review potential employee exposures to Cr(VI) and the plan to maintain exposures below either the action level or PEL.
- 10.3 Contractors shall determine exposure risks to Cr(VI) by using either the performance based option or the air monitoring option.
- 10.4 Contractors shall perform their work in a manner that minimizes the exposure to Cr(VI) by:
 - Implementing Regulated area(s)
 - Implementing Engineering and Work Practice (E&WP) Controls
 - Identifying and using of appropriate PPE
 - Using proper hygiene practices
 - Practicing good housekeeping


11 PERSONAL PROTECTIVE EQUIPMENT (PPE)


- 11.1 If skin or eye contact with Cr(VI) is present or is likely to be present, PPE shall include:
 - Protective coveralls (flame resistant is required for hot work)
 - Protective gloves
 - Protective eyewear
 - Boots / booties
- 11.2 Employees shall remove all PPE contaminated with Cr(VI) at the end of the work shift or at the completion of their tasks involving Cr(VI) exposure, whichever comes first.
- 11.3 Contaminated PPE shall not be removed from the workplace except by personnel whose job it is to clean, maintain, or dispose of such clothing or equipment.

11.4 Contaminated PPE removed for laundering, cleaning, maintenance, or disposal, shall be stored and transported in sealed impermeable bags or other closed impermeable containers.

11.5 Double lined impermeable bags or other closed, impermeable containers with contaminated PPE shall be labeled in accordance with the requirements of Phosphates Hazard Communication program.

 **Reference:** EHSS-Phos Program Hazard Communication

 **Note:** The label shall include the following or similar wording “DO NOT OPEN: Hexavalent Chromium (Cr(VI)) Exposure - Carcinogenic Hazard”.

 **Note:** If the sealed bag will be disposed of, add the words “DO NOT OPEN”.

11.6 Use of a HEPA vacuum on the outside of the bag is recommended, followed by wiping bag surfaces down with a wet cloth or disposable towel.

11.7 All required PPE shall be cleaned, repaired and replaced as needed to maintain its effectiveness.


11.8 Cr(VI) shall not be removed from PPE by blowing, shaking, or any other means that disperses Cr(VI) into the air or onto an employee's body.

11.9 Any person who launders or cleans PPE contaminated with Cr(VI) shall be informed of the following:

- The potentially harmful effects of exposure to Cr(VI)
- That the clothing and equipment should be laundered or cleaned in a manner that minimizes skin or eye contact with Cr(VI) and effectively prevents the release of airborne Cr(VI) in excess of the PEL

11.10 Respiratory protection shall be provided to each employee:

- While implementing E&WP controls
- Where E&WP controls are not feasible, sufficient, or implemented

 **Note:** Respirators required for mitigating Hexavalent Chromium exposure, and their fit testing, care and cleaning are identified in the Phosphates Respiratory Protection program

 **Reference:** *EHSS-Phos Program Respiratory Protection*



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12 TRAINING

12.1 Training

12.1.1 Work group supervisor is responsible for ensuring that training is provided to affected employees.

12.1.2 The following table outlines the training required for this program:

Audience	Training Elements / Topics	Frequency	Method
Maintenance employees	<ul style="list-style-type: none"> Work Activities involving Cr(VI) Hazards of Cr(VI) Mitigating controls for Cr(VI) 	Initial	Instructor Led Training (ILT) or Computer Based Training (CBT)

12.2 Retraining

12.2.1 In addition, an employee shall receive additional training (or retraining) if any of the following conditions exist

- Program requirements change
- Changes in the workplace render previous training obsolete
- Inadequacies in the employee’s knowledge is of concern

12.3 Training records


12.3.1 Training records shall be maintained by Phosphates Learning Management System (LMS).

12.3.2 Training records shall be maintained as per the Mosaic Record Control policy.

 **Reference: Mosaic Document and Record Control Policy**

13 SELF-ASSESSMENT REQUIREMENTS

13.1 Site self-assessment shall be conducted in accordance with the MMS requirements.

 **Note:** Recommend any changes to the Mosaic EHS PMO via the PMO Change Request form

14 PROGRAM REVIEW

14.1 Phosphates EHS team will review this program every seven (7) years and update as required.



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15 RECORD RETENTION

- 15.1 Exposure data shall be accurately maintained for 30 years and access made available to the affected employee or their representative.
- 15.2 Refer to the Mosaic Record Control policy for further information.

 **Reference: *Mosaic Document and Record Control Policy***

16 REFERENCES

References (Number and title)
OSHA 29 CFR 1910.1026 – Chromium (VI)
OSHA 29 CFR 1926.1126 – Chromium (VI)
EHSS-Phos Program – Respiratory Protection
EHSS-Phos Program – Hazard Communication
Mosaic Document and Record Control Policy

17 REVISION LOG

Rev. No.	Rev. Date	Revised By	Reason for Revision
0			Initial release
1	12/09/2015	Director, EHS	Program review cycle
2	12/31/2019	PMO – D. Hart	Program review cycle
No revision	5/15/2024	IH/PMO	Move the 7 year review cycle date