Hexavalent Chromium and Other Toxic Metals

Exposure Control Program

Overview

Purpose

This program provides requirements for work practices which will minimize exposure to the following toxic metals.

Hexavalent Chromium, Beryllium, Cadmium, Manganese,

Arsenic - *refer to HSS 411 - Arsenic Exposure Prevention Procedure*

Lead – refer to FS 485 and HSP-698330– *Lead Exposure Prevention Program and Inorganic Lead Policy Statement*

Scope

This procedure applies to all Los Angeles Refinery employees and contractors who have the potential for toxic metals exposure.

Records Retention

Printed copies of this document should not be retained more than 12 months. Any revision to this document will be retained a maximum of 10 years following the revision.

Table of Contents

1.0 References

1.1 Refining References

The table below lists the Refining references used with this document.

Number	Description
FS 905 & HSP-614280	Exposure Assessment Program Industrial Hygiene Monitoring Program
HSS-305	Hazard Communication Program
HSS-306	Respiratory Protection Plan
HSS-501	Personal Protective Equipment Program
HSS-630	Hot Work
H08	Safe Work Permit form for Attended Hot Work

1.2 Industry References

The table below lists the industry references used with this document.

Number	Description
HLT-2001	Industrial Hygiene Program (Exposure Assessment Methodology – EXAM)
HLT-2017	MPC Toxic Metals Exposure Control Program

1.3 Regulatory References

The table below lists the regulatory references used with this document.

Number	Description
Title 8, CCR Section 5206 & 1532.2	Chromium (VI)
Title 29, CFR Section 1910	Chromium (VI)
Title 8, CCR Section 5205	Beryllium
Title 29, CFR 1910.1024	Beryllium
Title 8, CCR Section 5207	Cadmium
Title 29, CFR 1910.1027	Cadmium
Title 8, CCR Section 5194	Hazard Communication
Title 29, CFR 1910.1200	Hazard Communication
Title 8, CCR 5155 - Table AC-1	Permissible Limits (PELs)

2.0 Terms

The following terms are used in this document:

Action Level (AL) – Personnel exposure, without regard to the use of respirators, to an airborne concentration of the following metals,

averaged over an 8-hour period. Typically, Cal/OSHA sets the AL at 50% of the PEL.
NOTE: There is no AL for Manganese set by Cal/OSHA.

Substance	Cal/OSHA TWA AL
Beryllium	0.0001 mg/m3
Cadmium	0.0025 mg/m3
Hexavalent Chromium	0.0025 mg/m3
Manganese	N/A

Beryllium (Be) – This includes Beryllium in all forms, compounds, and mixtures. For MPC operations, the most likely sources of Beryllium are contaminants in abrasive blasting agents and exotic metals.

Cadmium (Cd) – This includes Cadmium and Cadmium compounds, in all forms. For MPC operations, the most likely sources of Cadmium are in some catalysts and paint coatings.

Hexavalent Chromium – Chromium (VI), Cr(VI), or Cr-6 - Chromium with a valence of positive 6 in any form and any compound. Chromium (VI) can be generated during hot work on stainless steel, on chromium containing alloys, paints/primer or paint that contains chromium compounds.

Ceiling limit – Maximum concentration of an airborne contaminant which an employee maybe exposed at any time.

EXAM (MPC Exposure Assessment Methodology) – A comprehensive strategy for the qualitative and quantitative assessment, statistical analysis, addition of controls, and reassessment of occupational exposure risks.

HEPA – (**High Efficiency Particulate Air)** – A filter that is at least 99.97 percent efficient in removing particles 0.3 micrometers in diameter.

Manganese (Mn) – This includes all valence states and manganese compounds. For MPC operations, the most likely sources of Manganese are welding and grinding operations.

MPC Occupational Exposure Limits (OEL) – Marathon's internal OELs that includes OSHA/Cal/OSHA PELS, ALs and ceiling limits. Below are the chemicals pertaining to this standard and their respective OELs:

Substance	MPC TWA OEL	CAL OSHA TWA PEL	MPC Ceiling OEL	CAL OSHA Ceiling PEL STEL
Beryllium	0.00005 mg/m^3	0.0002 mg/m^3	0.002 mg/m^3 (STEL)	0.025 mg/m^3 0.002 mg/m^3 (STEL)
Cadmium	0.005 mg/m^3	0.005 mg/m^3	N/A	N/A
Hexavalent Chromium	0.005 mg/m^3	0.005 mg/m^3	N/A	0.1 mg/m3
Manganese	0.2 mg/m^3	0.2 mg/m^3	5 mg/m^3	3 mg/m^3 (STEL)

Permissible Exposure Limit (PEL) – an 8-hour time weighted average (TWA) airborne exposure limit to a contaminant.

Regulated Areas – Work areas where employee exposures may exceed the PEL for a Toxic Metal, or where no previous data exists to indicate levels are less than the PEL.

Short Term Exposure Limit (STEL) – Concentration of a substance as determined over a sampling period of 15 minutes.

Time Weighed Average (TWA) – Concentration of a substance averaged over a set period, typically 8 hours.

Toxic Metals – For the purposes of this standard, "Toxic Metals" include Beryllium, Cadmium, Hexavalent Chromium, and Manganese.

3.0 Roles and Responsibilities

The table below describes the roles and responsibilities related to this document.

Roles	Responsibilities
Occupational Health Group	• Administrating and implementing this standard. • Identifying potential toxic metal exposures utilizing MPC EXAM process as referenced in HLT-2001. • Conducting personal exposure monitoring to assess personnel exposure to toxic metals during jobs where an exposure to airborne concentrations of the toxic metals is, or can reasonably be expected to be, more than the PEL. This will be conducted to ensure proper PPE and respiratory protection is being worn during the job. • Notifying the Medical Department of a monitoring result that triggers medical surveillance. • Communicating exposure monitoring results to personnel. • Communicating to personnel the health hazards associated with toxic metals and establishing requirements for safe work practices and use of appropriate PPE. • Obtaining and verifying contractor records regards to training on toxic metals, monitoring, and medical surveillance. • Maintaining Occupational Health survey records and employee exposure monitoring. • Conducting a periodic review of this program.
Safety Department	• The Safety Department will be responsible for identifying and notifying the Occupational Health group about jobs that may be an exposure concern. • These jobs can be identified via the permitting process.
Maintenance	• Reviewing/evaluating job scopes to determine if jobs may result in potential toxic metals

(Operations Maintenance Coordinators/Maintenance Supervisors/Contract Personnel)	exposure (refer to Appendix "B" for list of chromium-containing metal alloys). • Determining if work practice controls are needed when performing and/or permitting work per this procedure and the Respiratory Protection Procedure. • Notifying the Occupational Health group if job scope may be an exposure concern such as hot work on stainless steel, and metal alloys containing high toxic metals. • Ensuring safe work practices and personal protective equipment (PPE) identified by this procedure are followed. • Contractors only: Providing the Occupational Health Group records regarding toxic metals prevention procedure, training, monitoring, and medical surveillance.
Inspection	• Investigating alternatives on materials containing toxic metals to minimize the extent of toxic metals-containing materials used, without compromising quality or integrity of operations.
Environmental/ Waste Management	• Disposing spent toxic metals that comply with appropriate regulatory requirements.
Medical Department	• The Medical Department will be responsible for implementing a medical surveillance program for employees who have the potential to be exposed to toxic metals in excess of allowable limits, or upon employee request.

4.0 Procedure

4.1 Safe Work Practices

a. Maintenance, contractors, and other personnel affiliated with types of work that may potentially generate Hexavalent chromium and other airborne toxic metals shall be trained in the hazards of the toxic metals' exposure and safe work practices.

b. Utilize proper ventilation as an engineering control to minimize employee exposure to toxic metals using:

- Local exhaust ventilation (preferred choice)
- General ventilation

c. Utilize "wet methods" during tasks to reduce exposure to toxic metals dust.

d. Adhere with decontamination procedures set in Section 4.3.

4.2 Personal Protective Equipment (PPE)

a. General PPE

When grinding, welding, or cutting on carbon steel or stainless steel (chromium-containing alloy metals), adhere to respiratory protection requirements listed in the Respiratory Protection Program and Safe Work Permit form H08 for Attended Hot Work.

Respiratory protection is also required for safety watches and helpers stationed within ten (10) feet from a welder either in open air or in the Maintenance Shops.

When performing abrasive blasting or catalyst dumping/loading activities, adhere to respiratory protection requirements listed in Appendix A of HSS 306 Respiratory Protection Program.

b. Confined Space PPE

Following are the minimum PPE requirements for grinding, welding, or cutting on stainless steel, alloy metals, or chromate-containing paint in a confined space. These requirements also apply to safety watches and helpers stationed within ten (10) feet from the employee conducting hot work.

- FR disposable coveralls shall be worn over general FRC.
- Respiratory protection listed in the Respiratory Protection Program.

c. Specialty Job PPE

Following are the minimum PPE requirements for specialty jobs performed by contractors such as thermal metal spray applications in a confined space. These requirements also apply to safety watches and helpers stationed within ten (10) feet from the contractor performing this task:

- FR disposable coveralls shall be worn over general FRC.
- Welding gloves
- Supplied Air respiratory protection

4.3 Decontamination

a. A designated change area adjacent to the work area to prevent contamination of other areas in the unit is encouraged.

b. Perform basic decontamination of the area, equipment, and PPE with the use of a HEPA vacuum to remove chromium dust. Compressed air shall not be used to remove dust.

c. Properly dispose of contaminated disposable garments in a labeled bag prior to leaving a job site during break, lunch, completion of task, or at the end of shift.

d. Wipe down respirators and other reusable PPE after use and store in an impermeable bag. Properly dispose of filters and disposable respirators.

e. Personal hygiene ensures that the dust on the face, body, and clothes is removed to minimize the risk of inadvertently ingesting chromium while eating, drinking, or smoking; carrying chromium dust to other parts of the unit; or taking it into your home.

- Do not store or consume food, beverages and tobacco products in areas that may result in hexavalent chromium contamination.
- Wash Hands and Face with Soap and Water or Towelettes —Wash before eating, smoking, drinking, or applying cosmetics, and at the finish of the job.
- Shower—Shower on the job if necessary.

5.0 Health and Safety

5.1 Regulated Area

a. A "Regulated Area" shall be established wherever an employee's exposure to airborne concentrations of hexavalent chromium and other toxic metals is, or can reasonably be expected to be, in excess of the PEL.

b. Access to the "Regulated Area" will be limited to personnel authorized by the employer and required by work duties to be present in the regulated area. Warning signs will be posted and/or barricade tape around the work area.

c. See "Appendix C" for specific Warning signs.

5.2 Exposure Monitoring

a. The Occupational Health Group has conducted personal exposure monitoring to assess employee exposures to hexavalent chromium during jobs where hexavalent chromium is being generated to determine and verify level of PPE and respiratory protection.

b. Additional monitoring will be conducted periodically and revisions made if results warrant.

5.3 Medical Surveillance

a. Medical surveillance is offered to employees who are potentially exposed to hexavalent chromium and other toxic metals under the following conditions:

- Exposed to toxic metals concentrations at or above the AL for 30 or more days a year. (**Note:** Based on monitoring results on alloy hot work, no MPC employees meet this condition).
- Shows signs or symptoms of the adverse health effects associated with toxic metals exposure.
- Exposed to toxic metals in an emergency.
- Employee requests for medical surveillance.

b. Additional monitoring and emergency medical treatment must be conducted for employees that developed signs or symptoms of adverse health effects associated with exposure to toxic metals.

5.4 Training

a. All personnel (employees and contractors) with potential exposure to hazardous levels of any toxic metal compounds must complete training on awareness by reviewing this procedure and completing training prior to accomplishing their assigned tasks.

b. Contractors must provide a toxic metals procedure upon request by MPC personnel. The program must contain the following elements:

- Training of personnel on hazards of toxic metals
- Safe work practices and controls
- Respiratory protection program
- Designations of persons in charge of work that may generate airborne toxic metals

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5.5 Record Keeping and Reporting

a. Exposure monitoring data will be maintained by the Occupational Health Group.

b. Training records will be maintained by the Learning & Development Department and affected Contractors.

c. Medical Surveillance records will be maintained by the Medical Department and affected Contractors.

d. All records associated with this Standard and the implementation of this Standard shall be maintained in accordance with Marathon Petroleum Corporation Enterprise Records and Information Management Policy (MPC6003).

6.0 Appendices

Appendix "A" – Health Hazards

Beryllium	Cancer Lung toxin (Acute and Chronic Beryllium disease) Beryllium sensitization Skin sensitization Skin, eye, and respiratory tract irritation
Cadmium	Flu-like symptoms (chills, fever, muscle pain) Cancer Lung toxin Kidney toxin
Hexavalent Chromium	Cancer Eye irritation or damage to the nose, throat, and lungs Skin sensitization
Manganese	Lung toxin Liver toxin Kidney toxin Neurotoxin

Appendix "B" - Chromium Content of Metal Alloys

Material Name	Approximate Percentage of Chromium
1-1/4 Cr-1/2 Mo	1.25%
2-1/4 Cr-1 Mo	2.25%
5Cr-1/2 Mo	5%
9 Cr-1 Mo	9%
300 Stainless Steel	18%
304 / 304L / 304H Stainless Steel	18-20%
316 / 316L / 316H Stainless Steel	16-18%
321 / 321H Stainless Steel	17-19%
410 Stainless Steel	11.5-13.5%
Alloy 20	19-21%
Hastelloy	5-22.25%
Inconel	13-29.5%

Appendix "C" – Regulated Area Warning Signs

Hexavalent Chromium	**DANGER** **HEXAVALENT CHROMIUM** **CANCER HAZARD** **AUTHORIZED PERSONNEL ONLY** **RESPIRATOR REQUIRED**

Beryllium	**DANGER** **REGULATED AREA** **BERYLLIUM** **MAY CAUSE CANCER** **CAUSES DAMAGE TO LUNGS** **AUTHORIZED PERSONNEL ONLY** **WEAR RESPIRATORY PROTECTION AND** **PERSONAL PROTECTIVE CLOTHING**

Cadmium	**DANGER** **CADMIUM** **MAY CAUSE CANCER** **CAUSES DAMAGE TO LUNGS AND KIDNEYS** **WEAR RESPIRATORY PROTECTION IN THIS AREA** **AUTHORIZED PERSONNEL ONLY**

Note: There is no requirement for a manganese warning sign.

Revision History

Document Revision History

Complete the following table for each document revision.

Rev. No.	Description of Change	Author	Approved By	Rev. Date	Effective Date
01	Update HSS-403 Hexavalent Chromium to incorporate other toxic metals (beryllium, cadmium, and manganese) to align with corporate standard. Remove all Tesoro references and replace with MPC.	Gemma Cortes-Fernandez	Sharon Callahan	11/18/2021	