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1.0 INTRODUCTION

1.1 Purpose

HSS-403 provides requirements for work practices which will minimize employee exposure to airborne hexavalent chromium.

1.2 Scope

This standard covers personnel within Los Angeles Refinery who are involved in work activities that can create the potential for hexavalent chromium exposure.

2.0 REFERENCES

Applicable requirements in the latest edition (or the edition indicated) of the Respiratory Protection Procedure, shall be considered an integral part of this Practice. Additional references are listed below. Short titles will be used herein when appropriate.

2.1 Tesoro Procedures and Standards

- Tesoro Safety & Health Guidance Document TSHG-012, Health Precautions for Welding, Grinding and Torch Cutting

- LAR Carson F/S 960, Respiratory Protection
- LAR Wilmington SAF-047, Precautionary Measures for Welding & Cutting Operations

2.2 Government Regulations

- Title 8, California Code of Regulations, Section 5206 Chromium (VI) and 1532.2 Chromium (VI)
- Title 29, Code of Federal Regulations, Section 1910.1026, Chromium (VI).

3.0 DEFINITIONS

The following additional definitions are applicable to this Standard.

Table 1 Definitions

Term	Description
Owner	Tesoro
Parent Document	The Specification, Practice, or Industry Standard used as the basis for the process being defined.
TRS	Tesoro Refining Standard
TES	Tesoro Engineering Standard
Action Level (AL)	An 8-hour time-weighted average concentration of 2.5 micrograms of hexavalent chromium per cubic meter of air (2.5 ug/m3) as set by the California Division of Occupational Safety & Health (Cal/OSHA). The AL for a 10 hour shift is 2.0 ug/m3 and the AL for a 12 hour shift is 1.5 ug/m3.
Contract Competent Person	A person who oversees a company's hexavalent chromium program compliance efforts during work performed.
Hexavalent Chromium – Chromium (VI), Cr(VI), or Cr-6	Chromium with a valence of positive 6 in any form and any compound. Chromium (VI) is carcinogenic and can be generated during hot work on stainless steel, alloys, or paint that contains chromium compounds.
Permissible Exposure Limit (PEL)	During a work day, no employee shall be exposed to airborne hexavalent chromium in excess of an 8-hour time-weighted average concentration of 5.0 micrograms/per cubic meter of air (5.0ug/m3) as set by Cal/OSHA. The PEL for a 10 hour shift is 4.0 ug/m3 and the PEL for a 12 hour shift is 3.0 ug/m3.

4.0 RESPONSIBILITIES

4.1 Occupational Health Group

a. Conducting personal exposure monitoring to assess personnel exposure to hexavalent chromium during jobs where an exposure to airborne concentrations of hexavalent chromium is, or can reasonably be expected to be, in excess of the PEL. This will be conducted to ensure proper PPE and respiratory protection is being worn during the job.

b. Notifying the Medical Department of a monitoring result that triggers medical surveillance.

c. Communicating exposure monitoring results to personnel.

d. Communicating to personnel the health hazards associated with hexavalent chromium, and establishing requirements for safe work practices and use of appropriate PPE.

e. Obtaining and verifying contractor records in regard to hexavalent chromium training, monitoring, and medical surveillance.

4.2 Safety Department

a. The Safety Department will be responsible for identifying and notifying the Occupational Health group about jobs that may be an exposure concern.

b. These jobs can be identified via the permitting process.

4.3 Maintenance

(Operations Maintenance Coordinators/Maintenance Supervisors/Contract Personnel)

a. Reviewing/evaluating job scopes to determine if jobs may result in potential hexavalent chromium exposure (refer to Appendix B for list of chromium-containing metal alloys).

b. Determining if work practice controls are needed when performing and/or permitting work per this procedure and the Respiratory Protection Procedure.

c. Notifying the Occupational Health group if job scope may be an exposure concern (hot work on stainless steel or high chromium-containing metal alloys - see Appendix B).

d. Ensuring safe work practices and personal protective equipment (PPE) identified by this procedure are followed.

e. Ensuring that personnel involved with jobs where exposure to airborne concentrations of hexavalent chromium is anticipated complete awareness training on the hazards of hexavalent chromium exposure and medical surveillance (if necessary).

f. Contractors only: Providing the Occupational Health Group records in regard to hexavalent chromium prevention procedure, training, monitoring, and medical surveillance.

4.4 Medical Department

a. The Medical Department will be responsible for implementing a medical surveillance program for employees who have the potential to be exposed to hexavalent chromium in excess of allowable limits, or upon employee request.

5.0 PROCEDURE

5.1 Safe Work Practices

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

b. Utilize proper ventilation as an engineering control to minimize employee exposure to hexavalent chromium using:

- Local exhaust ventilation (preferred choice)
- General ventilation

c. Utilize "wet methods" during tasks in order to reduce exposure to hexavalent chromium dust.

d. Adhere with decontamination procedures set in Section 5.3.

5.2 Personal Protective Equipment (PPE)

a. General PPE

When grinding, welding, or cutting on stainless steel or chromium-containing alloy metals, adhere to respiratory protection requirements listed in the Respiratory Protection Program.

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.

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

5.3 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.

6.0 HEALTH AND SAFETY

6.1 Regulated Area

a. A "Regulated Area" shall be established wherever an employee's exposure to airborne concentrations of hexavalent chromium 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. The warning will read:

DANGER

HEXAVALENT CHROMIUM

CANCER HAZARD

AUTHORIZED PERSONNEL ONLY

RESPIRATOR REQUIRED

Figure 1 Regulated Area Warning Sign

6.2 Exposure Monitoring

a. The Occupational Health Group and contractor Health & Safety personnel has conducted personal exposure monitoring to assess employee exposures to hexavalent chromium during jobs where hexavalent chromium is being generated in order to determine and verify proper PPE and respiratory protection.

b. Results of the monitoring indicate the controls in this procedure shall be maintained.

6.3 Medical Surveillance

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

- Exposed to hexavalent chromium concentrations at or above the AL for 30 or more days a year. (Note: Based on monitoring results and frequency of stainless steel/alloy hot work, no employees meet this condition).
- Shows signs or symptoms of the adverse health effects associated with hexavalent chromium exposure.

- Exposed to hexavalent chromium in an emergency.
- Employee requests hexavalent chromium medical surveillance.

b. Medical surveillance, which measures the amount of chromium converted to hexavalent chromium in the body either in urine, blood, or hair, will be conducted via periodic tests, work-up, and evaluation.

c. At this time, medical surveillance is offered on a voluntary basis as there is a limited amount of stainless steel or chromium-containing hot work performed by employees. Exposure monitoring results from these jobs indicate that employees are not currently being exposed to concentrations at or above the Action Level for 30 or more days a year.

6.4 Training

a. All personnel (employees and contractors) with potential exposure to Hexavalent Chromium must complete training on Hexavalent Chromium awareness by reviewing this procedure and completing training prior to accomplishing their assigned tasks.

b. Contractors must provide a hexavalent chromium procedure upon request by Los Angeles Refinery personnel. The program must contain the following elements:

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

6.5 Auditing

a. The Occupational Health Group will review this program as needed to update changes in regulations or work practices. As exposure monitoring is conducted for the jobs where airborne hexavalent chromium may be generated, this information will be incorporated into the program.

6.6 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.

7.0 APPENDIX

APPENDIX A

Table 2 Hexavalent Chromium Characteristics

Hexavalent Chromium has the following physical characteristics:

Molecular Formula	**Cr(VI)**
Specific Gravity	**7.14 (Air = 1)**
Flammability	**Not Flammable**
Ignition Temperature	**698°F (as dust)**
Explosive Range	**Not combustible in solid form**

The high temperatures during "hot work" processes such as welding or cutting on stainless steel or chromium-containing metal alloys may result in oxidation that converts chromium into a hexavalent state.

Inhalation of hexavalent chromium can cause irritation or damage to the nose, throat, and lungs. Long term inhalation of hexavalent chromium can result in lung, nasal, or sinus cancer. Ingestion of hexavalent chromium can also cause irritation or ulcers in the stomach and intestines. Skin contact with hexavalent chromium may result in skin irritation, corrosion, ulcers, sensitization, and allergic contact dermatitis.

APPENDIX B

Table 3 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%