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Section I

Introduction

Introduction

The purpose of this safety policy and procedure(s) is to establish a program to prevent absorption, inhalation, or ingestion of harmful quantities of cadmium by Hilscher-Clarke Electric Co. employees.

Cadmium (CAS 7440-43-9) is a naturally occurring element in the earth's crust. Pure cadmium is a soft silver-white metal, but this form is not common in the environment. Cadmium is most often found in a combination with other elements, such as oxygen (cadmium oxide), chlorine (cadmium chloride), or sulfur (cadmium sulfate, cadmium sulfide). These compounds are solids that may dissolve in water, but do not evaporate or disappear from the environment. All soils, crude oil, and rocks, including coal and mineral fertilizers, have some cadmium in them. Cadmium is often found as part of small particles present in air. You cannot tell by smell or taste that cadmium is present in air or water, because it does not have any definite odor or taste.

Most cadmium found in the United States is a soft, bluish metal or grayish powder obtained as a by-product from the treatment of copper, zinc, lead, and iron ores. 35% of cadmium is used for metal plating, 25% for nickel-cadmium and other batteries, 20% for pigments, 15% for plastic stabilizers, and 5% for other uses (i.e., pesticides, alloys, and chemical reagents and/or intermediates).

Cadmium and its compounds are stable, with high melting points and low volatility. In water, they range from quite soluble (cadmium chloride), to practically insoluble (cadmium oxide). Cadmium is a flammable powder, and it produces toxic fumes when it burns.

Cadmium overexposure adversely affects numerous body systems and causes forms of health impairment and disease.

This safety policy and procedure provides guidelines to protect Hilscher-Clarke's employees from the immediate and long-term effects of cadmium. It includes requirements for training, exposure assessment, and methods of compliance. Requirements are presented for Personal Protective Equipment (PPE), housekeeping, and hygiene facilities. It also presents provisions for medical surveillance, medical protection, signs, recordkeeping and observation and monitoring.

This document also details areas of responsibility for the President, Safety Manager, Supervisory Personnel, Qualified Persons, and Employees.

Operations at Hilscher-Clarke's worksites that may include exposure to Cadmium include, but are not limited to:

- Cutting, brazing, grinding, or welding on surfaces that are painted with cadmium-containing paints;
- Cadmium is found in some industrial paints and may represent a hazard when spray applied;
- Transporting, storing, and disposing of cadmium or cadmium-containing materials on Hilscher-Clarke's work site.

Introduction (cont.)

Other potential sources of exposure to cadmium include, but are not limited to:

- Cutting, brazing, grinding, or welding on surfaces that are painted with cadmium-containing paints. At the high temperatures reached in these operations, metals often form metal fumes, which have different health effects and exposure standards than the original metal or metal compound and require specialized controls.

Hilscher-Clarke will evaluate their worksites for the presence of cadmium fumes and dust, which may be generated during the above stated work procedures. These results will be used to determine the appropriate Engineering, Administrative and Personal Protective Equipment controls.

Hilscher-Clarke has created this safety policy and procedures to provide guidelines for safely working with cadmium. It includes provisions for training, Personal Protective Equipment (PPE) guidelines, Employee Monitoring, Medical Surveillance Program, Hygiene Facilities, Housekeeping and general safety related work practices. Additionally, it presents examples of labels, signs, and marking requirements.

Because every person on a Hilscher-Clarke, site has a potential for being exposed to cadmium in the performance of their duties, Hilscher-Clarke employees, subcontractors, supplemental labor employees and visitors must follow the procedures outlined in this supplement when performing or being exposed to cadmium work.

These safety policies and procedures have been established in accordance with Occupational Safety and Health Administration (OSHA) standards for General Industry 29 CFR 1910.1027 and OSHA standards for the Construction Industry 29 CFR 1926.63.

Policy

Because it is the policy of Hilscher-Clarke to provide a place of employment that is free from recognized hazards that cause or are likely to cause death or serious physical harm to employees or the public, employee, subcontractors, and supplemental labor employees will not...

...perform any cadmium related job activity without the proper training and proper Personal Protective Equipment (PPE).

Where cadmium hazards exist that cannot be eliminated, then additional engineering practices, administrative practices, safe work practices, Personal Protective Equipment (PPE), and proper training regarding cadmium in construction will be implemented. These measures will be implemented to minimize those hazards to ensure the safety of employees *and the public*.

It is the responsibility of each Employee (regardless of status) to ensure implementation of Hilscher-Clarke's safety policy and procedure on cadmium safety. It is also the responsibility of each Hilscher-Clarke employee to report immediately any unsafe act or condition to his or her Supervisor or the Safety Manager.

Specific responsibilities are found in Section II (General Program Management).

Section III
General Program
Management

Specific Responsibilities

The President is responsible for:

- ❑ Providing prompt assistance to the Safety Manager, Supervisory Personnel, Contractors and others as necessary on any matter concerning this safety policy and procedure. The President will develop, or secure, the required training.
- ❑ Additionally, the President will provide consultative and audit assistance to ensure effective implementation of this safety policy and procedure.
- ❑ The President may delegate the responsibility of various aspects of the Cadmium Safety Program to a Qualified Organization. However, the President's ultimate responsibility for his/her aspects of the program cannot be delegated.

The Safety Manager is responsible for:

- ❑ Ensuring that ANSI approved PPE and supplies are available to protect employees from cadmium exposure. Also, they will obtain and coordinate the required training for Affected Employees. He will designate Competent Persons for those work activities affected by this safety policy and procedure.
- ❑ Ensure compliance with this safety policy and procedure through the auditing process (as outlined in Hilscher-Clarke's written Disciplinary Program/Safety Policy Statement).
- ❑ Provide training, expertise, and guidance to Qualified Persons to perform cadmium exposure assessments. Also, the Safety Manager may appoint and/or designate certain individuals to be Qualified Persons.
- ❑ Hilscher-Clarke will prepare and maintain an Employee Education and Training Record (*see Appendix E*) upon completion of training and any retraining. These documents will include, but not be limited to;
 - Names or other identities of employees trained;
 - Signature of the person receiving the training;
 - Date of the training;
 - Date of retraining;
 - Specific topics addressed during the training session;
 - Specific topic(s) addressed during the retraining session;
 - Signature of the person, or company, conducting the training;
 - Signature of the person, or company, conducting the retraining.
- ❑ Making the written Cadmium Safety Plan and any applicable PSM Plans/Documents available to employees, OSHA & NIOSH representatives
- ❑ Retention and, if applicable, distribution, of all medical records for the specific time periods outlined in this plan.
- ❑ The original document will be kept with the employee's records at Hilscher-Clarke's main office and a copy of this training record will be kept in the "Safety File" at the work site, as appropriate.

Supervisory Personnel

- ❑ The Supervisor will ensure that no cadmium-related task/operation is performed without the appropriate controls being in place as prescribed in this safety policy and procedure. He/She will also assist "Competent" and "Qualified" persons as requested in the performance of their duties.
- ❑ With the approval of the Safety Manager, the appropriate Supervisor may delegate the responsibility of various aspects of the Cadmium Safety Program to a Qualified Organization. However, the Supervisor's ultimate responsibility for his/her aspects of the program cannot be delegated.

Specific Responsibilities (cont.)

Competent Person

- ❑ Competent Person(s) will be responsible for identifying existing and potential cadmium hazards in the workplace. They will also be responsible for, and have complete authority to, take prompt corrective measures to eliminate or control cadmium hazards.
- ❑ The designated Competent Person must be able to:
 - Determine, prior to beginning a job, whether cadmium is present in the workplace.
 - Establish regulated areas and ensure that access to and from those areas is limited to “authorized” employees.
 - Ensure the adequacy of any employee exposure-monitoring required by the standard.
 - Ensure that all employees exposed to airborne cadmium levels above the PEL wear the appropriate PPE (personal protective equipment) and are trained to use appropriate methods to control cadmium exposure.
 - Ensure that proper hygiene facilities are provided and that workers are trained to use these facilities.
 - Ensure that required engineering controls are implemented, maintained in proper operating condition, and function properly.
- ❑ With the approval of the Safety Manager, the Competent Person may delegate the responsibility of various aspects of the Cadmium Safety Program to a Qualified Organization. However, the Competent Person’s ultimate responsibility for his/her aspects of the program cannot be delegated.

Qualified Person

- ❑ Qualified Person(s) shall be responsible for conducting cadmium exposure assessments in accordance with this safety policy and procedure and established exposure assessment protocols.
- ❑ With the approval of the Safety Manager, the Qualified Person may delegate the responsibility of various aspects of the Cadmium Safety Program to a Qualified Organization. However, the Qualified Person’s ultimate responsibility for his/her aspects of the program cannot be delegated.

Employees

- ❑ Complying with all applicable guidelines contained in this safety policy and procedure.
- ❑ Report any unsafe act associated with this safety policy and procedure to their immediate supervisor.
- ❑ Employees who are assigned PPE are to keep them available and in good working order at all times and to have them replaced when they become worn or unsafe.

General Personnel

- ❑ Personnel employed by Hilscher-Clarke, and all contractors and subcontractors working at any and all construction sites operated by Hilscher-Clarke, are required to comply with the procedures and work practices outlined in this Cadmium Safety Plan. The Safety Manager is responsible for ensuring that said individuals/organizations, operating under the supervision of the Safety Manager and/or Supervisor, are informed of and adhere to Hilscher-Clarke’s Cadmium Safety Program.

Training For Outside Personnel

- ❑ Outside personnel will be trained as a Hilscher-Clarke Authorized Employee or will be provided with a Hilscher-Clarke Authorized Employee escort to assist in the correct procedures of the outside service personnel’s Cadmium Safety Plan.

Section III

Terms &

Definitions

Terms & Definitions

This section provides applicable definitions, establishes general provisions and identifies responsibilities required by Hilscher-Clarke's safety policy and procedure on "Cadmium in the Work Place".

ACGIH – American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

Authorized Person – Any person authorized, by Hilscher-Clarke, and required by work duties to be present in regulated areas.

Carcinogen – A substance that causes cancer.

CAS Number – Number assigned by the Chemical Abstracts Service to identify a specific chemical.

Combustible Substance – A solid, liquid, or gas that will burn.

Construction Industry Work – All work involving cadmium. This includes all building and building-related equipment maintenance and repair activities, demolition, remodeling, or new construction.

Corrosive Substance – A gas, liquid, or solid that causes irreversible damage to human tissue or containers.

Competent Person - A Person designated by the employer to act on the employer's behalf that is capable of identifying existing and potential cadmium hazards in the workplace and the proper methods to control them in order to protect workers, and has the authority necessary to take prompt corrective measures to eliminate or control such hazards.

DOT – Department of Transportation. Federal agency that regulates the transportation of chemicals.

EPA – Environmental Protection Agency. Federal agency responsible for regulating environmental hazards.

Fetus – An unborn human or animal.

Flammable Substance – A solid, liquid, vapor, or gas that will ignite easily and burn rapidly.

Flash Point – The temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HEPA – High-Efficiency Particulate Air Filter: A filter capable of trapping and retaining at least 99.97 % of mono-dispersed particles of 0.3 micrometers in diameter.

HHAG – Human Health Assessment Group of the federal EPA.

IARC – International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

Miscible Substance – A liquid or gas that will evenly dissolve in another.

Mg/m³ – Milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

NCI – National Cancer Institute. A federal agency that determines the cancer-causing potential of chemicals.

NFPA – National Fire Protection Agency. Classifies substances according to their fire and explosion hazard.

NIOSH – National Institute for Occupational Safety and Health. Tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP – National Toxicology Program. Tests chemicals and reviews evidence for cancer.

Terms & Definitions (cont.)

OSHA – Occupational Safety and Health Administration. Adopts and enforces health and safety standards.

ppm – Parts of a substance per million parts of air. It is a measure of concentration by volume in air.

Qualified Person – Person who has training and experience in air monitoring, exposure assessment, and workplace evaluations.

Reactive Substance – A solid, liquid or gas that releases energy under certain conditions.

Regulated Area – An area clearly marked and posted, where an employee's exposure to

airborne concentrations of cadmium exceeds, or can reasonably be expected to exceed the permissible exposure limit (PEL).

Teratogen – Substance that causes birth defects by damaging the fetus.

TLV – Threshold Limit Value. Workplace exposure limit recommended by ACGIH.

Vapor Pressure – A measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

Section IV
General Policies
&
Procedures

1.0 Health Effects

- 1.1 Acute Health Effects** – The following acute (short-term) health effects may occur immediately or shortly after exposure to Cadmium:
- A flu-like illness with chills, headache, aching and/or fever.
 - High exposure to Cadmium may cause nausea, salivation, vomiting, abdominal cramps and diarrhea.
 - Breathing Cadmium can irritate the lungs causing coughing and/or shortness of breath. Higher exposures can cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.
- 1.2 Chronic Health Effects** – The following chronic (long-term) health effects can occur at some time after exposure to Cadmium and can last for months or years.
- 1.2.1 Cancer Hazard:** Cadmium is a *probable carcinogen* in humans. There is some evidence that it causes prostate and kidney cancer in humans and it has been shown to cause lung and testes cancer in animals. Many scientists believe there is no safe level of exposure to a carcinogen.
- 1.2.2 Reproductive Hazard:** Cadmium is a *probable teratogen* in humans. Cadmium may damage the testes (male reproductive glands) and may affect the female reproductive cycle.
- 1.2.3 Other Long-Term Effects:**
- Cadmium can irritate the lungs. Repeated exposure may cause bronchitis to develop with cough, phlegm, and/or shortness of breath.
 - Repeated low exposures can cause permanent kidney damage, which can lead to kidney stones.
 - Long term exposure can cause anemia, loss of sense of smell, fatigue and/or yellow staining of teeth.
 - Liver damage.
- 1.3 A physician should be contacted** if anyone develops any signs or symptoms and suspects that they are caused by exposure to Cadmium.

2.0 Workplace Exposure Limits

2.1 OSHA:

2.1.1 The legal airborne permissible exposure limit (PEL) is $0.005\text{mg}/\text{m}^3$ for Cadmium *dust or fume* averaged over an 8-hour workshift.

2.1.2 OSHA has recognized that some processes in certain industries may be unable to achieve the $0.005\text{ mg}/\text{m}^3$ limit through engineering and work practices. These industries must follow SECALs (separate engineering control air limits) of either 0.015 or $0.05\text{ mg}/\text{m}^3$.

2.2 NIOSH:

2.2.1 Recommends that exposure to occupational carcinogens be limited to the lowest feasible concentration.

2.3 ACGIH:

2.3.1 The recommended airborne exposure limit is $0.01\text{ mg}/\text{m}^3$ for *elemental* Cadmium and $0.002\text{ mg}/\text{m}^3$ for Cadmium *compounds (respirable fraction)*, averaged over an 8-hour workshift.

2.4 Cadmium is a **probable carcinogen** in humans. There may be **no** safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.

3.0 Training

All Cadmium Worker Training will be obtained at an accredited provider.

All levels of employees with potential job-related cadmium exposure and Competent Persons must be trained in:

- ❑ Health effects and Cadmium hazards.
- ❑ Sources of Cadmium exposure.
- ❑ Employee protection.
- ❑ Cadmium spill response & disposal.
- ❑ Acceptable work practices to reduce Cadmium exposure.
- ❑ Medical surveillance.
- ❑ Employee rights under this safety policy and procedure and the OSHA Standard on Cadmium in Construction.

Employees and Competent Persons will be trained prior to their initial job or reassignment. Additionally, refresher training shall be provided annually.

Competent Persons shall receive training to conduct exposure assessments. This training shall include, as a minimum:

- ❑ Air sample flow calibration.
- ❑ Sample train set-ups.
- ❑ Analytical procedures.
- ❑ Air monitoring protocols.
- ❑ OSHA reference methods.
- ❑ Exposure calculations.
- ❑ Exposure data statistical analysis.

Competent Persons shall receive training upon initial assignment. Subsequent training shall be at the discretion of the Safety Manager. Refresher training shall be provided annually.

4.0 Initial Exposure Assessment

4.1 Initial Exposure Assessment

If cadmium may be present in any operation, then an initial exposure assessment must be made to determine whether an employee's exposure exceeds the action level (0.005 mg/m³ averaged over an 8 hour day).

4.1.1 Reasons for believing that cadmium is present include:

- Any information, observations or calculation that would indicate employee exposure to cadmium (i.e., MSDSs, past reports, relevant plans).
- Any previous measurements of airborne cadmium.
- Any employee complaints or symptoms that may be attributable to cadmium exposure.

4.1.2 This initial assessment will document the exposure an employee would have without the use of a respirator.

5.0 Monitoring & Measurement Procedures

- 5.1** Employee Exposures below the action level require no further monitoring.
- 5.2 Multiple Employees:**
- 5.2.1** When you have several employees performing the same job tasks, in the same job classification, on the same shift, in the same work area, and the length, duration, and level of cadmium exposures are similar, the Competent Person may sample a representative fraction of the employees instead of all employees.
- The Competent Person shall sample the employee(s) expected to have the highest cadmium exposures.
- 5.3 Eight-Hour Exposure Evaluation** – Measurements to determine employee exposure are best taken so that the average eight-hour exposure is based on a single eight-hour sample or on two four-hour samples. Several short-time interval samples (up to 30 minutes) may also be used to determine the average exposure level.
- 5.3.1** Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee).
- 5.4 Ceiling Evaluation** – Measurements to determine employee-ceiling exposure are best taken during periods of maximum expected airborne concentrations of cadmium dust and/or fumes.
- 5.4.1** Each measurement should consist of a fifteen (15) minute sample or series of consecutive samples totaling fifteen (15) minutes in the employees breathing zone (air that would most nearly represent that inhaled by the employee).
- 5.4.2** A minimum of three (3) measurements should be taken on one work shift and the highest of all measurements taken is an estimate of the employee's exposure.
- 5.5 Method:**
- 5.5.1 Cadmium Dust** – Sampling and analysis may be performed by collection of cadmium dust on a filter. The filter will then be sent to a qualified lab for analysis.
- 5.5.2 Cadmium Fumes** – Sampling and analysis may be performed by collection of cadmium fume on a cellulose membrane filter. The filter will then be sent to a qualified lab for analysis.
- 5.5.3** Within 5 working days after completion of the exposure assessment, the affected employee(s) must be notified, in writing, of the exposure results. If the results indicate that the representative employee exposure without regard to respirators is at or above the PEL, the notice should so state and include a description of the corrective action to be taken to reduce exposure below that level.
- 5.6** For those cadmium-related tasks/operations that presume cadmium exposures above the PEL, interim protection must be provided to employees until an employee assessment is completed. Interim protection measures include:
- Appropriate respiratory protection.
 - Appropriate Personal Protective Equipment (PPE) and clothing.
 - Change areas.
 - Hand washing facilities.
 - Biological monitoring.
 - Training.

6.0 Exposure Controls

- 6.1** Three types of controls are used to mitigate exposure to cadmium: engineering controls, administrative controls, and personal protective equipment. Of these, engineering controls are the most preferred method.
- 6.2 Engineering Controls** – Cadmium work that is known to result in exposure above the PEL, or activities such as those that require a Cadmium Compliance Program (Appendix C) will typically require the following engineering and administrative controls:
- 6.2.1** Use of HEPA-filtered exhaust systems at the source of the fumes or, if this is not feasible, within the general work area.
 - 6.2.2** Materials containing cadmium shall not be applied by spray methods, if exposures are above the PEL, unless employees are protected with certain specified respirators (as outlined in Hilscher-Clarke’s Respiratory Protection Program) and measures are taken to limit overspray and prevent contamination of adjacent areas.
 - 6.2.3** Establishment of a regulated area that will keep unprotected employees out and prevent the spread of cadmium dust beyond the boundaries of the area. For work inside buildings, this will involve erection of critical barriers over ventilation system vents, doors, open areas, and other possible points of penetration. Further, it may be necessary to arrange the ventilation system to place the work area under negative pressure relative to the surrounding areas. The cognizant Supervisor shall specify the necessary controls.
 - 6.2.4** Use of exhausted power tools with HEPA filters.
- 6.3 Administrative Controls** – A current Cadmium Compliance Program (see appendix C). A Cadmium Compliance Program is required, but not limited to, the following activities:
- 6.3.1** Wrecking, demolishing, and salvaging structures where cadmium or cadmium-containing materials are present; cutting, brazing, grinding, or welding on surfaces that are painted with cadmium-containing paints; and transporting, storing and disposing of cadmium or cadmium-containing materials on the site or location where construction activities are performed. (Exposure of 10 times the PEL for these operations shall be assumed unless data indicates otherwise.)
 - 6.3.2** Performing activities where cadmium-containing paints, coatings, or cadmium-containing alloys are disturbed by abrasive blasting, welding, cutting, brazing and grinding where the material contains *any* cadmium. (Exposure of 50 times the PEL shall be assumed for these operations unless data indicates otherwise.)
 - 6.3.3** Performing other operations that may result in exposure above the PEL.
 - 6.3.4** When performing these tasks employees shall be provided with suitable respiratory protection (as outlined in Hilscher-Clarke’s Respiratory Protection Program), protective clothing, change areas, hand-washing facilities, biological monitoring, and training.
- 6.4 Subcontract Work** – Cadmium work conducted by subcontractors (other than supplemental labor) requires prior submission of a Cadmium Compliance Program that incorporates all the elements specified in 29 CFR 1910.1027 and 29 CFR 1926.63, and all related appendices. Contractors are also required to perform cadmium-disrupting work in accordance with the practices and procedures as outlined in this plan. The Cadmium Compliance Program shall be submitted to the Safety Manager for approval before beginning work that disturbs cadmium.

7.0 Respiratory Protection

- 7.1 Respirators must be used when the concentration of cadmium is at or above the PEL after engineering and workpractice controls have not been sufficient to reduce exposures.
- 7.2 Respirators shall be selected by the Safety Manager in conformance with Hilscher-Clarke's and OSHA requirements. Fit testing for respirators must be conducted within 6 months prior to any cadmium related work.
- 7.3 Where the potential exists for exposure over 0.002 mg/m^3 , employees will use a MSHA/NIOSH approved supplied-air respirator with a full-face piece operated in a pressure-demand or other positive-pressure mode.
 - 7.3.1 For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- 7.4 Exposure to 9 mg/m^3 is immediately dangerous to life and health. If the possibility of exposure above 9 mg/m^3 exists, a MSHA/NIOSH approved self-contained breathing apparatus with a full-face piece operated in a pressure-demand or other positive-pressure mode must be used.
- 7.5 If requested by the employee, a powered air-purifying respirator must be provided in lieu of a negative pressure respirator.
- 7.6 Refer to Hilscher-Clarke's Respiratory Protection Program for additional details on the basic requirement for selection, use, cleaning, and maintenance of respirators.
- 7.7 Respirators, like all PPE furnished in relationship to this safety policy and procedure, are furnished at no cost to the employee.

8.0 Protective Clothing & Equipment

- 8.1** Appropriate protective clothing and equipment must be provided to employees who are exposed to cadmium above the PEL without regard to the use of a respirator. This clothing and equipment will be furnished at no cost to the employee.
- 8.2** Protective clothing and equipment is necessary to protect employees from transporting cadmium from work to home. Appropriate protective clothing and equipment includes, but is not limited to:
- 8.2.1 Coveralls** or similar full bodywork clothing – Employees may be issued reusable work coveralls in lieu of disposable coveralls. These coveralls shall not be worn home as an alternative to disposable coveralls. Coveralls shall be laundered by Hilscher-Clarke (or the subcontractor for subcontracted work) and provided to employees at least weekly, or daily, if exposure levels exceed 0.005 mg/m^3 , and employees with skin and eye irritation from cadmium. Reusable clothing must comply with the requirements in 29 CFR 1926.62(g)(2).
 - 8.2.2 Gloves** – That meet ANSI Standards.
 - 8.2.3 Hats or Hoods** (i.e. tyveck hoods) – That meet ANSI Standards.
 - 8.2.4 Shoes or Disposable Shoe Coverlets** – That meet ANSI Standards.
 - 8.2.5 Eye Protection** – That meet ANSI Standards:
 - Wear impact resistant eye protection with side shields or goggles.
 - Wear a face shield along with goggles.
- 8.3** Protective clothing and equipment is required to be removed in an approved and designated change area.
- 8.4** The contaminated protective clothing that is to be cleaned, laundered, or disposed of is to be placed in a closed labeled container (see section 9.0 for labeling requirements) in the change area.
- 8.4.1** Contaminated work clothes should never be taken home. Family members could become exposed.
- 8.5** Anyone who cleans, handles, or launders protective clothing or equipment contaminated with cadmium, must be informed of the potentially harmful effects of cadmium (see appendix D).

9.0 Housekeeping

- 9.1 All surfaces should be maintained as free as practical of cadmium dust accumulation. Vacuuming these surfaces with high-efficiency particulate air (HEPA) filters is the preferred method of housekeeping.
- 9.2 HEPA filters must be emptied in a manner that minimizes cadmium dust reentry into the workplace.
- 9.3 Use a vacuum or a wet method to reduce dust during clean up. **Do Not Dry Sweep.**
- 9.4 Promptly place waste, scrap, debris, bags, containers, equipment, and clothing contaminated with cadmium, and consigned for disposal, in sealed impermeable bags (or other closed impermeable containers). Do not allow them to accumulate in the workspace.
 - 9.4.1 These bags and containers must be clearly and visibly labeled as follows:

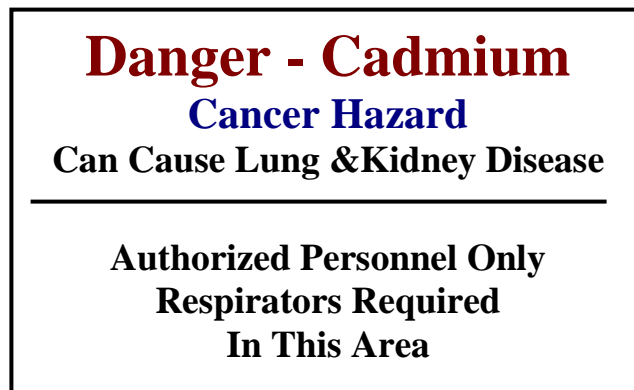


10.0 Hygiene Facilities

- 10.0** Hygiene facilities must be provided to ensure employee compliance with basic hygiene practices. For employees who have exposure greater than the PEL, the following are required:
- 10.1.1 Shower Facilities.** Have shower facilities in the area if the airborne levels are greater than the PEL. Showers used for cadmium work must be decontaminated before they can be used by other Hilscher-Clarke employees. Portable shower units may be used for required decontamination activities.
- Employees exposed to cadmium, above the PEL, must shower at the end of the workshift.
- 10.1.2 Clean Areas for Changing Clothes.** Designate change rooms where employees can segregate street clothes from clothing used for cadmium work operations that generate airborne cadmium levels exceeding the PEL.
- 10.1.3 Eating Areas** (apart from contaminated areas). Designate separate food storage, preparation areas, and eating areas to avoid the possibility of ingesting cadmium. *No cadmium work shall be performed in these designated areas.*
- The level of cadmium in lunch areas must be below 0.002 mg/m³.
 - Before entering the lunch area, employees must remove their protective clothing and wash their face and hands.
- 10.1.4 Hand Washing Facilities.** For all employees who perform cadmium-related tasks/operations (regardless of cadmium level), hand-washing facilities must be provided. Employees will be instructed to wash their hands and face before eating, drinking, using tobacco products, applying cosmetics or using the toilet.
- 10.2** Employees are prohibited from smoking, eating, and applying cosmetics in areas where the PEL is exceeded. Additionally no tobacco products, food items, or cosmetics are to be kept in work areas where employees are exposed to cadmium above the PEL.
- 10.3 Eye Wash Stations.** Where there is any possibility that employee's eyes may be exposed to cadmium dust, an eyewash station will be provided within the immediate work area for emergency use.

11.0 Regulated Areas

- 11.1** Whenever it can be reasonably anticipated, that Hilscher-Clarke employees, will be exposed to cadmium in excess of the PEL, Hilscher-Clarke will establish a regulated area alerting employees to the hazard. This regulated area is required to be:
- 11.1.1** Set apart from the rest of the workplace in a way that establishes and alerts employees to the area and its hazards.
 - 11.1.2** Is entered only by Authorized Personnel.
 - 11.1.3** Is entered only by employees using proper respirators.
- 11.2** All employees, upon entering a regulated area, must refrain from eating, drinking, smoking, chewing tobacco or gum, and applying cosmetics. Neither shall employees, carry, store, or use products associated with these activities in these areas.
- 11.2** Warning signs bearing the following information will be posted at all approaches to regulated areas:



The signs shall be well illuminated and kept clean, so that they are easily visible to employees and visitors.

- 11.3** The following activities are to be considered and evaluated, for the establishment of, regulated areas on Hilscher-Clarke worksites:
- Electrical grounding with cadmium welding.
 - Cutting, brazing, burning, grinding, or welding on surfaces that are painted with cadmium-containing paints.
 - Electrical work using cadmium-coated conduits.
 - Using cadmium-containing paints.
 - Cutting and welding cadmium-plated steel.
 - Brazing or welding with cadmium alloys.
 - Fusing of reinforced steel by cadmium welding.
 - Maintaining or retrofitting cadmium-coated equipment.
 - Wrecking and demolishing where cadmium is present.

12.0 Medical Surveillance Program

12.1 The purpose of medical surveillance is to prevent cadmium-related disease. Although controls may be in place to prevent overexposure to cadmium, control systems may fail and/or hygiene and respirator programs may be inadequate. Therefore, a medical program with periodic surveillance will help detect those failures.

12.2 Medical Testing is to be provided to employees (prior to assignment) who will be working in an area where the airborne concentration of cadmium exceeds the action level at any time. This initial medical testing will consist of an initial medical examination which will include, but not be limited to:

- A careful history of past and present symptoms (See appendix A).
- Blood test for Cadmium (levels should be **less than 5 micrograms per liter** of whole blood).
- Urine test for Cadmium (levels should be **Less than 3 micrograms per liter** of urine).
- Urine test for Beta-2-microglobulin to detect kidney damage.
- Urinalysis (UA)
- Lung function tests.
- Liver function tests.
- Complete blood count.
- Consider chest x-ray after acute overexposure.
- Medical test that look for damage already done **are not** a substitute for controlling exposure.

12.3 Hilscher-Clarke will supply the following information to the examining physician:

- A copy of OSHA Standard 29 CFR 1926.1127 (Cadmium) and all appendices.
- Occupational Health History Interview (See Appendix A).
- A description of the affected employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to cadmium.
- The employee's former, current, and anticipated future levels of occupational exposure to cadmium.
- A description of any personal protective equipment, including respirators, used or to be used by the employee, including when and for how long the employee has used that equipment.
- Relevant results of previous biological monitoring and medical examinations.

12.4 Biological Monitoring Results

12.3.1 The employee will receive a "Biological Monitoring & Medical Examination Results" notice from the attending physician (see Appendix F).

12.3.2 The results of the biological monitoring from the initial medical exam, and any subsequent exams, will determine the employee's "Biological Monitoring Result Category" (see Table 1 on page 26).

12.0 Medical Surveillance Program (cont.)

Table 1: Employee Medical Exam Categorization For Cadmium Exposure

Biological Marker	Biological Monitoring Result Categories		
	A	B	C
Cadmium in urine (CdU) (ug/g creatinine)	≤ 3	>3 and ≤ 7	> 7
B (2) – microglobulin [B (2) – M] (ug/g creatine)	≤ 300	> 300 and ≤ 750	>750*
Cadmium In Blood (CdB) (ug/liter whole blood)	≤ 5	>5 and ≤ 10	> 10

* If an employee's B(2) –M levels are above 750 ug/g creatinine, in order for mandatory medical removal to be required (See Table 2), either the employee's CdU level must also be >3 creatinine or CdB level must also be >5 ug/liter whole blood.

12.3.3 An employee is assigned *Category A*, if monitoring results for all three Biological Markers, fall at or below the levels indicated in the table for category A.

12.3.4 An employee is assigned *Category B*, if any monitoring result for any of the three biological markers fall within the range of levels indicated in the table listed for category B, providing no result exceeds the levels listed for category B.

12.3.5 An employee is assigned *Category C*, if any monitoring result for any of the three biological markers are above the levels listed for category C.

12.4 Once the employee's "Biological Monitoring Result Category" has been determined, follow-up exams will be based on the criteria outlined in Table 2.

Table 2: Employee Medical Monitoring Requirements – Based on the employee's classification in Table 1.

Required Actions (Based on Employee's Classification as Outlined in Table 1)	Biological Monitoring Result Category		
	A	B	C
Biological Monitoring			
Annual	X		
Semi-Annual		X	
Quarterly			X
Medical Examination			
Biennial	X		
Annual		X	
Semi-Annual			X
Within 90 Days		X	X
Assess Within 2 Weeks			
Excess Cadmium Exposure		X	X
Work Practices		X	X
Personal Hygiene		X	X
Respirator Usage		X	X
Smoking History		X	X
Hygiene Facilities		X	X
Engineering Controls		X	X
Correct Within 30 Days		X	X
Periodically Assess Exposures			X

12.0 Medical Surveillance Program (cont.)

Table 2 (cont.)

Table 2: Employee Medical Monitoring Requirements – Based on the employee’s classification in Table 1.

Required Actions (Based on Employee’s Classification as Outlined in Table 1)	Biological Monitoring Result Category		
	A	B	C
Other			
Discretionary Medical Removal		X	X
Mandatory Medical Removal			X*

* If an employee’s B(2) –M levels are above 750 ug/g creatinine, in order for mandatory medical removal to be required (See Table 2), either the employee’s CdU level must also be >3 creatinine or CdB level must also be >5 ug/liter whole blood.

12.5 Hilscher-Clarke will remove employees from jobs with exposure to cadmium, at or above the action level, on each occasion that a physician determines in a written medical opinion, that the employee should be removed from cadmium exposure. Or in cases where the employee’s biological monitoring results are so high as to require ***Mandatory Medical Removal***.

12.6 The physician may determine the need for ***Mandatory Medical Removal*** based on:

- Biological Monitoring Results
- Evidence of Illness
- Inability to wear a respirator.
- Signs or symptoms of cadmium-related dysfunction or disease, or any other reason deemed medically sufficient.

12.7 Mandatory Medical Removal – Where an employee is temporarily medically removed from a job for reasons related to cadmium exposure, Hilscher-Clarke will remove the employee from any job where exposure is at or above the action level and must provide “Medical Removal Benefits,” such as; normal earnings, seniority, and employee rights for a maximum of 18 months.

12.7.1 When the “Medical Removal” is due to the employee’s inability to wear a respirator, the removal need only be from jobs with exposure to cadmium above the PEL.

13.0 Recordkeeping

13.1 Recordkeeping - Three sets of records may be required based upon the severity of the exposure.

These include:

- Exposure Monitoring Records;
- Medical Surveillance Records;
- Medical Removal Protection Records.

13.2 All Exposure Monitoring Records for cadmium must be retained. These records must include:

13.2.1 Monitoring date and shift (i.e., time of sampling).

13.2.2 Details of the sampling (i.e. duration of the sampling, air volume, etc.) and analytical techniques used and evidence of their accuracy.

13.2.3 Type of respiratory protective device, if any, worn by the monitored employee and by any other employee whose exposure the monitoring result is intended to represent.

13.2.4 Results in terms of an 8 hour TWA of each sample taken, and if cadmium is not detected, the detection level utilized.

13.2.5 Explanation of any conditions present that might have affected the monitoring results.

13.2.6 The name, social security number, and job classification of all employees monitored and of all other employees whose exposures the monitoring result is intended to represent, including where applicable, a description of how it was determined that the employee's monitoring result could be taken to represent other employee's exposures.

13.2.7 These exposure monitoring records are to be retained for 30 years.

13.2.8 Hilscher-Clarke will provide a copy of the results of an employee's air monitoring to an industry trade association and to the employee's union, if any, or if either of such associations or unions do not exist, to another comparable organization that is competent to maintain such records and is reasonably accessible to employers and employees in the industry.

13.3 Medical Surveillance Records – These records must also be retained and must be kept confidential. These records shall include, at a minimum:

13.3.1 Employee's name, social security number, and description of duties.

13.3.2 A copy of the physician's written opinions and of the explanation sheets for biological monitoring results.

13.3.3 A copy of the medical history (see Appendix A), and the results of any physical examination and all test results that are required to be provided by this policy and procedure (i.e., biological tests, X-rays, pulmonary function tests, etc.), or that have been obtained to further evaluate any condition that might be related to cadmium exposure.

13.3.4 Any symptomology the employee is experiencing that could be related to exposure to cadmium.

13.3.5 Information provided to the physician at the time of the exam (see Section 12.3 of this policy and procedure).

13.3.6 Copy of the result of the examination.

13.3.7 These medical surveillance records must be retained for the duration of employment plus 30 years in accordance with 29 CFR 1910.20.

13.0 Recordkeeping (cont.)

13.3.8 At the employee's request, Hilscher-Clarke will promptly provide a copy of the employee's medical record, or update as appropriate, to a medical doctor or a union specified by the employee.

13.4 Training Records – Hilscher-Clarke will certify that employees have been trained by preparing a certification record (see appendix E) for each employee trained. The training records shall be maintained on file for 1 year beyond the date of training and/or retraining.

13.5 Availability – Within 15 days following a valid request, Hilscher-Clarke will make an employee's medical records (as required to be kept by this policy and procedure) available for examination and copying to the subject employee, designated representatives, to anyone having the specific written consent of the subject employee, and after the employee's death or incapacitation, to the employee's family members.

14.0 Observation of Monitoring

14.1 Employees, or their designated representatives, may observe cadmium monitoring procedures at their worksite. Employees, or their designated representatives, who observe the cadmium air monitoring are entitled to an explanation of the measurement procedure and to record the results that are obtained. Employee, or their designated representatives, must be provided with appropriate personal protective equipment during the cadmium monitoring.

15.0 Mixed Exposures

- 15.1** Cigarette smoke contains some cadmium. Because it is so hard for the body to eliminate cadmium, it tends to build up in the body. Any workplace exposure adds to these levels.
- 15.2** Smoking cigarettes near cadmium increases release of toxic fumes. Also, because cadmium can cause emphysema, lung effects may be greater in smokers.
- 15.3** Fish, plants and animals pick up cadmium from the environment and consequently their cadmium exposure is passed onto humans through the food chain. The highest levels are in shellfish, liver, and kidney meats.

16.0 Handling & Storage

- 16.1** Prior to working with cadmium, and cadmium contaminated materials, all employees will be trained on its proper handling and storage.
- 16.2** A regulated, marked area will be established where cadmium, or cadmium contaminated materials, are handled, used, or stored as required by the OSHA Standard: 1910.1027.
- 16.2.1** These regulated areas will be clearly marked as outlined in section 11.0 of this policy and procedure.
- 16.3** Cadmium powder and metal must be stored to avoid contact with Potassium, Hydrazoic Acid, and Oxidizing Agents (i.e., Perchlorates, Peroxides, Permanganates, Chlorates, Nitrates, Chlorine, Bromine, and Fluorine) since violent reactions occur.
- 16.4** Cadmium may react with strong acids (i.e., Hydrochloric, Sulfuric, and Nitric) to release flammable Hydrogen gas.
- 16.5** Cadmium powder is not compatible with Sulfur, Selenium, Tellurium, Ammonium Nitrate, and Zinc.
- 16.6** Store in tightly closed containers in a cool, well-ventilated area away from air.
- 16.7** Sources of ignition, such as smoking and open flames, are prohibited where cadmium, in any form, is used, handled or stored.
- 16.8** Pure cadmium powder is to be stored under Nitrogen.

17.0 Spill and Disposal Procedures

- 17.1** Persons not wearing Respiratory Protection (see section 7.0 of this policy and procedure) and Protective Clothing and Equipment (see section 8.0) of this policy and procedure) will be restricted from areas of releases until cleanup has been completed.
- 17.2** If potentially hazardous amounts of cadmium fume are inadvertently released, ventilate the area of the release to disperse the fume.
- 17.3** If cadmium dust is released in hazardous concentrations, the following steps should be taken:
- Remove all ignition sources.
 - Ventilate area of release.
 - Collect released material in the most convenient and safe manner for reclamation or for disposal in sealed containers in a secured sanitary landfill. This information can be obtained from the Department of Environmental Protection (DEP) or the regional office of the Federal Environmental Protection Agency (EPA).
- 17.4** Waste disposal method:
- Cadmium dust may be disposed of in sealed containers in a secured sanitary landfill.

18.0 Emergency Information

18.1 Cadmium:

DOT Number UN-2570	CAS Number 7440-43-9
Hazard Rating	NFPA
Flammability	Not Rated
Reactivity	Not Rated Reactivity
Carcinogen Flammable In Powder Form Toxic Fumes Are Produced In Fire Containers May Explode In Fire	

18.2 Fire Hazards:

18.2.1 Cadmium is a noncombustible solid but finely divided cadmium powder is flammable.

18.2.2 Use dry chemical or CO₂ extinguishers for cadmium powder.

18.2.3 Fire may restart after it has been extinguished.

18.2.4 Toxic fumes are produced in a fire.

18.2.5 Containers may explode in fire.

18.2.6 If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

18.3 If cadmium powder is spilled, take the following steps:

18.3.1 Evacuate persons not wearing protective equipment from area of spill until clean-up is complete. And air monitoring shows levels below the PEL.

18.3.2 Remove all ignition sources.

18.3.3 Collect powdered material in the most convenient and safe manner and deposit in sealed containers.

18.3.4 Ventilate and wash area after clean-up is complete.

18.3.5 It may be necessary to contain and dispose of cadmium as a Hazardous Waste. Contact the Department of Environmental Protection (DEP) or the regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

18.3.6 If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

18.3.7 For large spills and fires, immediately evacuate the area and call the fire department.

18.4 First Aid:

18.4.1 Eye Contact – Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids. Seek medical attention immediately.

18.4.2 Skin Contact – Remove contaminated clothing. Wash contaminated skin with soap and water.

18.0 Emergency Information (cont.)

18.4.3 Breathing:

- Remove the person from exposure.
- Begin rescue breathing (using universal precautions) if breathing has stopped and CPR of heart action has stopped.
- Transfer promptly to a medical facility.
- Medical observation is recommended for 24 to 48 hours after breathing overexposure, as pulmonary edema may be delayed.

18.4.4 Poison Information – In Ohio for poison information contact Children’s Hospital Medical Center of Akron at 1-800-872-5111.

18.5 Physical Data:

18.5.1 Vapor Pressure – 0 mm Hg at 68°F (20°C).

18.5.2 Water Solubility – Insoluble

18.6 Other Commonly Used Names:

18.6.1 Chemical Name – Cadmium

18.6.2 Other Names – C.I. 77180; Colloidal Cadmium

**Appendix A:
Occupational Health History Interview With Reference To Cadmium Exposure**

(To be read by employee and signed prior to the interview.)

(Place on Company Letterhead)

(Insert Date)

Please answer the questions you will be asked as completely and carefully as you can. These questions are asked of everyone who works with cadmium. You will also be asked to give blood and urine samples. The doctor will give Hilscher-Clarke a written opinion on whether you are physically capable of working with cadmium. Legally, the doctor cannot share personal information you may tell him/her with us.

The following information is considered strictly confidential. The results of the tests will go to you, your doctor and Hilscher-Clarke. You will also receive an information sheet explaining the results of any biological monitoring or physical examinations performed.

If you are just being hired, the results of this interview and examination will be used to:

1. Establish your health status and see if working with cadmium might be expected to cause you unusual problems.
2. Determine your health status today and see if there are changes over time.
3. See if you can wear a respirator safely.

If you are not a new hire, OSHA says that everyone who works with cadmium can have periodic medical examinations performed by a doctor. The reasons for this are:

- If there are changes in your health, either because of cadmium or some other reason, to find them early.
- To prevent kidney damage.

I have read these directions and understand them.

Employee Signature

Date

Witness Signature

Date

Appendix A: Occupational Health History Interview With Reference To Cadmium Exposure

Hilscher-Clarke Electric Co.

			Date
Last Name	First Name, Middle Initial	SS #	D.O.B.
Blood Pressure	Pulse Rate	Type of Preplacement Exam: <input type="checkbox"/> Periodic <input type="checkbox"/> Termination <input type="checkbox"/> Initial <input type="checkbox"/> Other _____	
Job Title	How long have you worked at the job? <input type="checkbox"/> Not Yet Hired <input type="checkbox"/> Number of Months _____ <input type="checkbox"/> Number of Years _____		
Job Duties, etc.			
Have you ever been told by a doctor that you had bronchitis? <input type="checkbox"/> Yes <input type="checkbox"/> No		If yes, how long ago? _____ Number of months _____ Number of years	
Have you ever been told by a doctor that you had other lung problems? <input type="checkbox"/> Yes <input type="checkbox"/> No. If yes, please describe the type of lung problems and when you had these problems.			
In the past year have you had a cough? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, did you cough up sputum? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, how long did the cough with sputum production last? <input type="checkbox"/> Less Than 3 Months <input type="checkbox"/> 3 Months or Longer	
If yes, for how many years have you had episodes of cough with sputum production lasting this long? <input type="checkbox"/> Less Than One <input type="checkbox"/> 1 year <input type="checkbox"/> 2 years <input type="checkbox"/> 3 years <input type="checkbox"/> Longer than 3 years; approximately how many? _____ years			
Have you ever smoked cigarettes? <input type="checkbox"/> Yes <input type="checkbox"/> No	Do you now smoke cigarettes? <input type="checkbox"/> Yes <input type="checkbox"/> No	If you smoke, or have smoked cigarettes, for how many years did you smoke? <input type="checkbox"/> Less than 1 year _____ No. of years	
What is or was the greatest number of packs per day that you have smoked? _____ No. of packs		If you quit smoking cigarettes, how many years ago did you quit? <input type="checkbox"/> Less than 1 year _____ No. of years	
How many packs a day do you now smoke? _____ Number of packs per day		Have you ever been told by a doctor that you have a kidney or urinary tract disease or disorder? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Have you ever had any of these disorders? Kidney Stones <input type="checkbox"/> Yes <input type="checkbox"/> No Protein in Urine <input type="checkbox"/> Yes <input type="checkbox"/> No Blood in Urine <input type="checkbox"/> Yes <input type="checkbox"/> No Difficulty in Urinating <input type="checkbox"/> Yes <input type="checkbox"/> No Other Kidney/Urinary Disorders <input type="checkbox"/> Yes <input type="checkbox"/> No		Please describe problems, age, treatment, and follow up for any kidney or urinary problems you have had:	
Have you ever been told by a doctor, or other health care provider, who took your blood pressure that your blood pressure was high? <input type="checkbox"/> Yes <input type="checkbox"/> No		Please list any blood pressure or medications and describe how long you have been taking each one:	
Have you been advised to take any blood pressure medication? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Are you presently taking any other medication? <input type="checkbox"/> Yes <input type="checkbox"/> No (See column to the right.)			
Have you ever been told by a doctor that you have diabetes? (sugar in your blood or urine) <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, do you presently see a doctor about your diabetes? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, how do you control your blood sugar? <input type="checkbox"/> Diet alone. <input type="checkbox"/> Diet plus some oral medicine. <input type="checkbox"/> Diet plus insulin (injection).	

Appendix A (cont.): Occupational Health History Interview With Reference To Cadmium Exp.

Have you ever been told by a doctor that you had: Anemia <input type="checkbox"/> Yes <input type="checkbox"/> No A low blood count <input type="checkbox"/> Yes <input type="checkbox"/> No	Do you presently feel that you tire or run out of energy sooner than normal or sooner than other people your age? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, for how long have you felt that you tire easily? <input type="checkbox"/> Less than one year _____ Number of years
Have you given blood within the last year? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, how many times have you given blood in the last year? _____ Times	How long ago was the last time you gave blood? <input type="checkbox"/> Less than 1 month _____ Number of months
Within the last year have you had any injuries with heavy bleeding? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, how long ago? <input type="checkbox"/> Less than 1 month _____ Number of months Describe:	
Have you recently had any surgery? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, please describe:	
Have you seen any blood lately in your stool or after a bowel movement? <input type="checkbox"/> Yes <input type="checkbox"/> No	Have you ever had a test for blood in your stool? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, did the test show any blood in the stool? <input type="checkbox"/> Yes <input type="checkbox"/> No
What further evaluation and treatment were done?		
Have you ever been told by a doctor that you have asthma? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, are you presently taking any medication for asthma? Mark all that apply? <input type="checkbox"/> Shots <input type="checkbox"/> Pills <input type="checkbox"/> Inhaler	
Have you ever had a heart attack? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, how long ago? _____ No. of years _____ No. of months	Have you ever had pains in your chest? <input type="checkbox"/> Yes <input type="checkbox"/> No
If yes, please describe when it usually happened and how long (i.e., while resting, working, exercising, etc...)		
Have you ever had a thyroid problem? <input type="checkbox"/> Yes <input type="checkbox"/> No	Have you ever had a seizure or fits? <input type="checkbox"/> Yes <input type="checkbox"/> No	Have you ever had a stroke? <input type="checkbox"/> Yes <input type="checkbox"/> No
Do you now have a claustrophobia, meaning fear of crowded or closed in spaces that would make it hard for you to wear a respirator? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Have you or your partner had a problem conceiving a child? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, specify: <input type="checkbox"/> Self <input type="checkbox"/> Present Mate <input type="checkbox"/> Previous Mate	Have you or your partner consulted a physician for a fertility or other reproductive problem? <input type="checkbox"/> Yes <input type="checkbox"/> No
If yes, specify who consulted the physician: <input type="checkbox"/> Self <input type="checkbox"/> Spouse/Partner <input type="checkbox"/> Self and Spouse/Partner		If yes, specify diagnosis made:
Have you or your partner ever conceived a child resulting in a miscarriage, still birth or child with a birth defect? <input type="checkbox"/> Yes <input type="checkbox"/> No		If yes, specify: <input type="checkbox"/> Miscarriage <input type="checkbox"/> Still Birth <input type="checkbox"/> Birth Defect
If outcome was a birth defect, please specify type:		
Was this outcome a result of a pregnancy of: <input type="checkbox"/> Yours with present spouse/partner <input type="checkbox"/> Yours with a previous spouse/partner		

Appendix A (cont.): Occupational Health History Interview With Reference To Cadmium Exp.

Did the timing of any abnormal pregnancy outcome coincide with present employment? <input type="checkbox"/> Yes <input type="checkbox"/> No		List dates of occurrences:
What is the occupation of your spouse/partner?		
For Women Only		
Do you have menstrual periods? <input type="checkbox"/> Yes <input type="checkbox"/> No	Have you had menstrual irregularities? <input type="checkbox"/> Yes <input type="checkbox"/> No	If yes, specify type:
If yes, what was the approximate date this problem began? _____	Approximate date the problem stopped? _____	
For Men Only		
Have you ever been diagnosed by a physician as having prostate gland problems? <input type="checkbox"/> Yes <input type="checkbox"/> No		
If yes, please describe type of problem(s) and what was done to evaluate and treat the problem(s): 		

Employee Signature

Appendix B: Summary of Control Practices

Control Practice	Exposure Below 0.005 mg/m ³ (AL)	Exposure Above 0.005 mg/m ³ (PEL)
Determination of the Presence of Cadmium	X	X
Competent Person		X
Exposure Monitoring & Associated Recordkeeping	X	X
Mechanical Ventilation		X
Local Exhaust Ventilation		X
Enclosures/Containment Systems		X
HEPA Vacuums		X
Written Compliance Program		X
Warning Signs		X
Worker Training	X	X
Notification of Other Employees	X	X
Respiratory Protection		X
Protective Clothing/Gloves/Shoe cover		X
Handwashing Facilities Including Showers	X	X
Change Areas with Storage Facilities		X
Decontamination Facilities With Showers		X
Eating Areas and Facilities		X
Biological Monitoring and Associated Recordkeeping		X
Medical Examinations and Associated Recordkeeping		X
Medical Removal Protection	X	X

Appendix C: Model Cadmium Compliance Plan
This Plan is to be Site Specific & is to be updated (at a minimum) every 6 months.

Cadmium, Compliance Plan

For _____

Compliance Plan Date: _____

Location/Construction Site _____

Division/Unit _____

Plan Submitted by _____ **Title** _____

This plan should be updated (at a minimum) every six (6) months.

This Cadmium Compliance Plan contains the following:

- Cadmium-Emitting activities covered by this plan.
- Equipment used, material involved, controls in place, crew size, employee job responsibilities, operating procedures, maintenance practices, means used to achieve compliance, plans and studies used to determine compliance and technology considered to meet the PEL for each of the activities covered by this plan.
- Air monitoring data.
- Compliance plan implementation schedule.
- Work practice requirements.
- Hygiene facilities and practices.
- Administrative controls.
- Contractor arrangements.

Appendix C: Model Cadmium Compliance Plan
page two

Cadmium-Emitting Activities Covered by this Plan

(Check the appropriate box(es) for the Cadmium-Emitting activities covered by this plan.)

<input checked="" type="checkbox"/>	Activity Number	Description
	1	Open abrasive blasting.
	2	Open abrasive blasting in full containment.
	3	Vacuum blasting.
	4	Welding, cutting, and burning.
	5	Cadmium burning.
	6	Spray painting with cadmium-containing paints.
	7	Grinding.
	8	Removal and replacement of building components.
	9	Manual demolition of building components.
	10	Heat gun use.
	11	Chemical stripping.
	12	Encapsulation.
	13	Power tool use, non-vacuum shrouded.
	14	Power tool use, vacuum shrouded.
	15	Soldering and brazing.
	16	Plating.
	17	Transporting cadmium-containing materials.
	18	Storing cadmium-containing materials.
	19.	Misc. enclosure movement.
	20.	Misc. cadmium abatement.
	21.	Other (describe):
	22.	Other (describe):

**Appendix C: Model Cadmium Compliance Plan
page four**

For each of the previously checked activities, list the required information.

Activity No.	Employee Job Responsibilities

Appendix C: Model Cadmium Compliance Plan
page five

For each of the previously checked activities, list the required information.

Activity No.	Operating Procedures

Appendix C: Model Cadmium Compliance Plan
page seven

For each of the previously checked activities, list the required information.

Activity No.	Specific Means That Will Be Used To Achieve Compliance

Appendix C: Model Cadmium Compliance Plan
page eight

If engineering controls are required, list the engineering plans and studies used to determine the cadmium control methods for each cadmium-emitting activity.

Activity No.	Document/Author or Contributors

Air Monitoring Data

For the cadmium-emitting activities covered by this compliance plan, list results of air monitoring data that documents the source of cadmium emissions.

Activity No.	Air Monitoring Data Cadmium Emissions Results (mg/m ³)	Date of Collection

Work Practice Requirements

Protective Work Clothing and Equipment

- If employees clothing has any possibility of being contaminated with cadmium dust.
- If the employees clothing has had any possibility of being contaminated with cadmium dust, the clothing should be placed in closed and labeled containers for storage until it can be discarded or until provision is made for the removal of cadmium dust from the clothing. If the clothing is to be laundered or otherwise cleaned to remove the cadmium dust, the person performing the operation should be informed of cadmium dust's hazardous properties.
- Appropriate work clothing can include, but is not limited to:
 - Coveralls or similar full-body clothing
 - Gloves
 - Hats
 - Shoes or disposable shoe coverlets
 - Face shields or vented goggles – Employees will be provided with and are required to use dust-resistant safety goggles where there is any possibility of cadmium dust contacting the eyes.
- If employees' exposure to airborne cadmium is at greater than 0.005 mg/m³, clean and dry clothing must be provided daily.

Work Procedures

- The following procedures should be observed prior to beginning work:
 - Change into work clothing and shoe covers in the clean section of the designated changing areas.
 - Use work garments and appropriate protective gear, including respirators, before entering the work area.
 - Store any clothing not worn under protective clothing in the designated changing area.
- Employees should follow these procedures upon leaving the work area:
 - HEPA vacuum heavily contaminated protective work clothing while it is still being worn. At no time may cadmium be removed from protective clothing by any means that result in uncontrolled dispersal of cadmium into the air.
 - Remove disposable shoe covers and dispose.
 - Remove the protective clothing and gear in the dirty area of the designated changing area.
 - Remove protective coveralls by carefully rolling down the garment to reduce exposure to dust.
 - Remove respirators last.
 - Wash hands and face.

Work Practice Requirements (cont.)

Work Procedures (continued)

- Employees should follow these procedures upon finishing work for the day (in addition to procedures described above):
 - Where applicable, place disposal coveralls and shoe covers with the abatement waste.
 - Contaminated clothing that is to be cleaned, laundered or disposed of must be placed in closed and labeled containers in the change room.
 - Clean protective gear, including respirators, according to standard procedures.
 - Wash hands and face again. Take a shower and wash hair.

Housekeeping

- All surfaces shall be maintained as free as practicable of accumulations of cadmium dust. Vacuuming is the preferred method of meeting this requirement.
- Dry or wet sweeping, shoveling, or brushing may not be used except where vacuuming or other equally effective methods have been tried and do not work.
- Vacuums must be equipped with a high-efficiency particulate air (HEPA) filter and emptied in a manner that minimizes the reentry of cadmium into the workplace.

Hygiene Facilities and Practices

Change Areas

- Clean change areas shall be provided for employees whose exposure to cadmium is above the PEL.
- These areas shall be equipped with separate storage facilities for:
 - Protective work clothing and equipment; and
 - Street clothes.
- Employees will not leave the worksite wearing any protective clothing or equipment that was required to be worn during the work shift.

Showers

- Shower facilities shall be provided for use by employees whose exposure to airborne cadmium is above the PEL.
- Employees must shower at the end of the work shift. Showers will have an adequate supply of cleaning agents and towels for use by affected employees.

Hygiene Facilities and Practices (continued)

Eating Areas

- ❑ Lunchroom facilities, or eating areas, shall be provided for employees whose exposure to airborne cadmium is above the PEL, without regard to the use of respirators. Those facilities or eating areas must be as free as practicable from cadmium contamination and be readily accessible to employees.
- ❑ Employees must not enter lunchroom facilities or eating areas with protective work clothing or equipment.
- ❑ Employees must not enter lunchroom facilities or eating areas without washing their face and hands.

Hand Washing Facilities

- ❑ Adequate hand washing facilities, including soap and towels, will be provided for use by employees exposed to any level of cadmium. Where showers are not provided, the employees must wash their hands and face at the end of the workshift.
- ❑ Employees exposed above the PEL, without regard to the use of a respirator, must wash their hands and face prior to eating, drinking, smoking, applying cosmetics or using the toilet.

Mechanical Ventilation

- ❑ The mechanical performance of the ventilation system used to control cadmium exposure will be evaluated as necessary to maintain its effectiveness.

Contractor Arrangements

- ❑ Describe the arrangements that have been made with contractors on this job site to ensure that all employees are informed about the potential exposure to cadmium.

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to Cadmium:

- Cadmium can cause a flu-like illness with chills, headache, aching and/or fever.
- High exposure to cadmium may cause nausea, salivation, vomiting, abdominal cramps and diarrhea.
- Breathing cadmium can irritate the lungs causing coughing and/or shortness of breath. Higher exposures can cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to cadmium and can last for months or years:

- Cancer Hazard:
 - Cadmium is a probable carcinogen in humans. There is some evidence that it causes prostate and kidney cancer in humans and it has been shown to cause lung and testes cancer in animals.
 - Many scientists believe there is no safe level of exposure to a carcinogen.
- Reproductive Hazard:
 - Cadmium is a probable teratogen in humans.
 - Cadmium may damage the testes (male reproductive glands) and may affect the female reproductive cycle.
- Other Long-Term Effects
 - Cadmium can irritate the lungs. Repeated exposure may cause bronchitis to develop with cough, phlegm, and/or shortness of breath.
 - Repeated low exposure can cause permanent kidney damage that can lead to kidney stones.
 - Long term exposure can cause anemia, loss of sense of smell, fatigue and/or yellow staining of teeth.
 - Cadmium can damage the liver.

Appendix F – Biological Monitoring & Medical Examination Results Form

(To Be Printed On Physician's Letterhead)

(Insert Date)

Last Name	First Name, Middle Initial	SS #	D.O.B.
Testing Date	Type of Preplacement Exam: <input type="checkbox"/> Periodic <input type="checkbox"/> Termination <input type="checkbox"/> Initial <input type="checkbox"/> Other _____		
Cadmium in Urine _____ ug/g Cr		Normal Level: <input type="checkbox"/> 3 ug/g Cr	
Cadmium in Blood _____ ug/lwb		Normal Level: <input type="checkbox"/> 5 ug/lwb	
Beta-2-microglobulin in Urine _____ ug/g CR		Normal Level: <input type="checkbox"/> 300 ug/g Cr	
Physical Examination Results: _____ N/A _____ Satisfactory _____ Unsatisfactory <i>(If physical examination results are unsatisfactory, you will need to see the physician again.)</i>			
Physician's Review of Pulmonary Function: _____ N/A _____ Satisfactory _____ Unsatisfactory			
Your next biological monitoring or medical examination is scheduled for:			
Physician Signature	Physician Name (please print)	Date	