Cadmium Exposure

Sunbelt Controls does not currently have any routine activities where exposure to Cadmium may occur.

The policy is meant to be an informative document to learn about potential exposures.

Should anyone suspect that they, or their co-workers, may be exposed during their course of employment must contact the Safety Department prior to starting the assignment.

Should operations where the action level of 2.5µg / cm^3 be found, the full written plan is to be implemented immediately.

1.0 Introduction

Cadmium is an extremely toxic metal commonly found in industrial workplaces, particularly where any ore is being processed or smelted. Due to its low Permissible Exposure Limit (PEL), overexposures may occur even in situations where trace quantities of cadmium are found in the parent ore or smelter dust. Several deaths from acute exposure have occurred among welders who have unsuspectingly welded on cadmium-containing alloys or working with silver solders. Cadmium is also found in industrial paints and may represent a hazard when sprayed. Operations involving the use of cadmium or where a dosage of Cadmium is received as a result of a related operation similarly pose a significant hazard. This poses a serious problem for exposed workers and their employer. This standard practice instruction establishes uniform requirements to ensure that procedures within this company to limit the spread of such hazards are implemented, evaluated, and that the proper hazard information is transmitted to all affected workers.

2.0 Policy

Sunbelt Controls will ensure that all potential cadmium exposure hazards within our facility(s) are evaluated and controlled. This standard practice instruction is intended to address comprehensively the issues of; evaluating and identifying potential sources of cadmium exposure, evaluating engineering controls, work practices, administrative controls, medical management, training, and establishing appropriate procedures.

3.0 Responsibility

The Risk Manager is solely responsible for all facets of this program and has full authority to make necessary decisions to ensure success of the program. The Risk Manager is the sole person authorized to amend these instructions and is authorized to halt any operation of Sunbelt Controls where there is danger of serious personal injury.

4.0 Definitions

Action Level – employee exposure, as an airborne concentration of cadmium of 2.5 micrograms per cubic meter of air (2.5 ug/m (3)), calculated as an 8-hour time-weighted average (TWA)

Cadmium – Cadmium is an extremely toxic metal commonly found in industrial workplaces, particularly where any ore is being processed or smelted. Due to its low Permissible Exposure Limit (PEL), overexposures may occur even in situations where trace quantities of cadmium are found in the parent ore or smelter dust. Cadmium is used extensively in electroplating, although the nature of the operation does not generally lead to overexposures. Several deaths from acute exposure have occurred among welders who have unsuspectingly welded on cadmium-containing alloys or working with silver solders. Cadmium is also found in industrial paints and may represent a hazard when sprayed. Operations involving removal of cadmium paints by scraping or blasting may similarly pose a significant hazard. Cadmium is also present in the manufacture of some types of batteries. Cadmium emits a characteristic brown fume (CdO) upon heating, which is relatively non-irritating, and thus does not alarm the exposed individual.

Permissible Exposure Limit (PEL) – the legally established time-weighted average (TWA) concentration or ceiling concentration of a contaminant that shall not be exceeded. The employer shall assure that no employee is exposed to an airborne concentration of cadmium in excess of five micrograms per cubic meter of air (5 ug/m(3)), calculated as an eight-hour time-weighted average exposure (TWA).

Employee Exposure – referring to the air cadmium level to which an employee is exposed means the exposure to airborne cadmium that would occur if the employee were not using respiratory protective equipment.

Final Medical Determination – is the written medical opinion of the employee's health status by the examining physician under paragraphs (l)(3)-(12) or, if multiple physician review under paragraph (l)(13) or the alternative physician determination under paragraph (l)(14) is invoked, it is the final, written medical finding, recommendation or determination that emerges from that process.

High-Efficiency Particulate Air [HEPA] Filter – a filter capable of trapping and retaining at least 99.97 percent of mono-dispersed particles of 0.3 micrometers in diameter

Regulated Area – an area demarcated by Sunbelt Controls where an employee's exposure to airborne concentrations of cadmium exceeds, or can reasonably be expected to exceed the permissible exposure limit (PEL).

5.0 Written Program Requirements

5.1 Written Program Review

Sunbelt Controls will review and evaluate this standard practice instruction in accordance with the following:

- on an annual basis
- when changes occur to governing regulatory sources that require revision
- when changes occur to related company procedures that require a revision
- when facility operational changes occur that require a revision
- when there is an accident or close-call that relates to this area of safety
- anytime the procedures fail

5.2 Supervisors of Sunbelt Controls will develop and maintain the following for each job where cadmium is emitted:

- A description of each job
- A list of machinery used in the job
- Types of materials processed
- Exposure controls that are in place
- Crew size (if applicable)
- Employee job responsibilities
- Operating procedures specific to the job
- Maintenance practices specific to the job
- Means to achieve compliance with a specific job

5.3 Means to Achieve Compliance – Each job where cadmium is emitted will have a written description of the specific means that will be employed to achieve compliance, including engineering plans and studies used to determine methods selected for controlling exposure to cadmium.

5.3.1 Technology – Any reports of the technology considered by this company to achieve compliance will be maintained as long as is appropriate.

5.3.2 Air Monitoring Data – Any air monitoring data which documents the source of cadmium emissions will be maintained.

5.3.3 Implementation Schedules – Data which supports the implementation of this program or equipment upgrades will be maintained as long as appropriate.

5.3.4 Administrative Controls – Job rotation will not be used as a means of reducing employees TWA exposure to cadmium.

5.4 Written Program Distribution – Effective implementation of this program requires support from all levels of management. This written program will be communicated in writing to all personnel that are affected by it and their representatives, if applicable. It encompasses the total workplace, regardless of the number of workers employed or the number of work shifts. It is designed to establish clear goals and objectives.

6.0 General Requirements

OSHA guidelines require that each employer who has employee(s) with potential occupational exposure to cadmium prepare an exposure determination. This exposure determination shall contain the following:

- A list of job classifications for all employees whose job classifications have occupational exposure
- A list of job classifications in which some employees have occupational exposure
- A list of all tasks and procedures or groups of closely related tasks and procedures in which occupational exposure occurs and that are performed by employees in job classifications listed in accordance with the provisions of the this standard practice instruction
- The schedule and method of implementation, methods of compliance, Communication of Hazards and record keeping required by Title 8 of the California Code of Regulations, Section 5194OSHA 29 CFR 1910.1025
- The procedure for the evaluation of circumstances surrounding incidents
- Methods of compliance

7.0 Exposure Monitoring

Jobs or areas having the potential for employee exposure to Cadmium at or above the action levels identified in Title 8 of the California Code of Regulations, Section 5207 OSHA 29 CFR 1910.1027 will be sampled to ensure no employee is exposed to hazardous levels of cadmium. Sampling will be done in accordance with the provisions of Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027.

7.1 Exposure Limits – Action Level (AL). 2.5 ug/m^3 (two and on half micrograms per cubic meter of air) the AL is the exposure level at which OSHA regulations take effect and the lower limit where an occupational health risk could occur. The AL is generally one-half of the PEL.

7.2 Exposure Limits – Permissible Exposure Limits (PEL). 5 ug/m3 (five micrograms per cubic meter of air) (TWA), PEL is a time-weighted average (TWA) or absolute value (usually prescribed by regulation) setting out the maximum permitted exposure to a hazardous chemical. This value is generally twice the PEL.

7.3 Determinations of Employee Exposure – Exposure determinations will be made from breathing zone air samples that reflect the monitored employee's regular, daily 8-hour TWA exposure to cadmium.

7.4 Eight-Hour TWA's – Eight-hour TWA exposures shall be determined for each employee on the basis of one or more personal breathing zone air samples reflecting full shift exposure on each shift, for each job classification, in each work area. Where several employees perform 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, a representative fraction of the employees may be sampled instead of all employees in order to meet this requirement. In representative sampling, the sample having the highest cadmium exposure will be used to determine employee protective measures.

7.5 Initial Monitoring – Eight-hour TWA exposures will be determined for each employee on the basis of one or more personal breathing zone air samples reflecting full shift exposure on each shift, for each job classification where cadmium is known or suspected to be present. Where objective data is present demonstrating that employee exposure to cadmium will not exceed the action level under the expected conditions of processing, use, or handling, this data may be relied upon instead of implementing initial monitoring.

7.6 Monitoring Frequency – If the initial monitoring or periodic monitoring reveals employee exposures to be at or above the action level, Sunbelt Controls shall monitor at a frequency and pattern needed to represent the levels of exposure of employees and where exposures are above the PEL to assure the adequacy of respiratory selection and the effectiveness of engineering and work practice controls. Such exposure monitoring shall be performed at least every six months. As a minimum, monitoring will continue semi-annually until the action levels are met.

7.7 Discontinuance of Monitoring – If the initial monitoring or the periodic monitoring indicates that employee exposures are below the action level and that result is confirmed by the results of another monitoring taken at least seven days later, the employer may discontinue the monitoring for those employees whose exposures are represented by such monitoring.

7.8 Additional Monitoring – Additional monitoring will be instituted whenever there has been a change in the raw materials, equipment, personnel, work practices, or finished products that may result in additional employees being exposed to cadmium at or above the action level or in employees already exposed to cadmium at or above the action level being exposed above the PEL, or whenever the employer has any reason to suspect that any other change might result in such further exposure.

7.9 Employee Notification of Monitoring Results – The employee will be notified within 15 working days after the receipt of the results of any monitoring. The employee will be notified either individually in writing or by posting the results in an appropriate location that is accessible to employees. Wherever monitoring results indicate that employee exposure exceeds the PEL, the notification will include in the written notice a statement that the PEL has been exceeded and a description of the corrective action being taken to reduce exposure to or below the PEL.

7.10 Observation of Monitoring – Employees will be afforded the opportunity to observe workplace monitoring for cadmium exposure.

7.10.1 Employee Observation – Affected employees or their designated representatives will be afforded an opportunity to observe any monitoring of employee exposure to cadmium.

7.10.2 Observation Procedures – When observation of monitoring requires entry into an area where the use of protective clothing or equipment is required, observers will be provided with clothing and equipment that complies with all applicable safety and health procedures.

8.0 Regulated Areas

8.1 Regulated areas will be established wherever an employee's exposure to airborne concentrations of cadmium is, or can reasonably be expected to be in excess of the permissible exposure limit (PEL).

8.1.1 **Demarcation –** Regulated areas will be demarcated from the rest of the workplace in any manner that adequately establishes and alerts employees of the boundaries of the regulated area.

8.1.2 **Access –** Access to regulated areas will be limited to authorized persons.

- **8.1.3** **Respiratory Protection –** Each person entering a regulated area shall be supplied with and required to use a respirator, selected in accordance with the provisions of this standard practice instruction and Title 8 of the California Code of Regulations, Section 5144, OSHA 29 CFR 1926.1127.

8.1.4 **Prohibited Activities –** Employees are not permitted to eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas, carry the products associated with these activities into regulated areas, or store such products in those areas.

9.0 Job Classification and Exposure Control

9.1 Job Classifications in Which All Employees in These Classifications Have Occupational Exposure:

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9.2 Job Classifications in Which Some Employees Have Occupational Exposure:

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10.0 Training

10.1 A training program will be implemented for all employees who are potentially exposed to cadmium. This company will assure employee participation in the program, and maintain a record of the contents of such program. All training must be documented including date, trainer and employee info. Records must be maintained 3 years.

10.1.1 **Types of Training** – Sunbelt Controls will determine whether training required for specific jobs will be conducted in a classroom or on-the-job. The degree of training provided shall be determined by the complexity of the job and the cadmium exposure hazards associated with the individual job.

10.1.2 **Initial Training** – prior to a job assignment, Sunbelt Controls shall provide training to ensure that the hazards associated with cadmium are understood by employees and that the knowledge, skills and personal protective equipment required are acquired by employees. The training shall as a minimum include the following:

- The health hazards associated with cadmium exposure
- The quantity, location, manner of use, release, and storage of cadmium in the workplace and the specific nature of operations that could result in exposure to cadmium, especially exposures above the PEL
- The engineering controls and work practices associated with the employee's job assignment
- The measures employees can take to protect themselves from exposure to cadmium, including modification of such habits as smoking and personal hygiene, and specific procedures the employer has implemented to protect employees from exposure to cadmium such as appropriate work practices, emergency procedures, and the provision of personal protective equipment.
- The purpose, proper selection, fitting, proper use, and limitations of respirators and protective clothing.
- The purpose and a description of Sunbelt Controls medical surveillance program
- The contents of Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027 and its appendices
- The employee's rights of access to records under Title 8 of the California Code of Regulations, Section 5194OSHA 29 CFR 1910.1020
- The specific nature of the operation which could result in exposure to cadmium above the action level
- The engineering controls and work practices associated with the employee's job assignment, including training of employees to follow relevant good work practices

10.1.3 Sunbelt Controls shall make readily available to all affected employees a copy of Title 8 of the California Code of Regulations, Section 5194 OSHA 29 CFR 1910.1027 and all other pertinent information upon request including the contents of any compliance plan in effect.

10.1.4 Retraining / Refresher Training – Scheduled refresher training will be conducted on an annual basis.

10.1.4.1 Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in personal protective equipment, equipment or processes that present a new hazard, when their work takes them into hazardous areas, or when there is a change in the cadmium safety procedures. Retraining will also be provided whenever a safety procedure fails resulting in a near-miss, illness, or injury.

10.1.4.2 Additional retraining shall also be conducted whenever a periodic inspection reveals, or whenever Sunbelt Controls has reason to believe, that there are deviations from or inadequacies in the employee's knowledge of known hazards, or use of equipment or procedures.

10.1.4.3 The retraining shall reestablish employee proficiency and introduce new equipment, or revised control methods and procedures, as necessary.

10.2 Certification – Sunbelt Controls shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain a synopsis of the training conducted, each employee's name, and dates of training.

11.0 Work Operations

11.1 Work operations at this facility in which cadmium may be encountered involve **(detail site-specific operations)**

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11.2 The equipment and materials used to accomplish work operations are those normally associated with _____ **(detail site-specific operations)**

11.3 Employee crew size will vary and employee job responsibilities will be that of their craft as stated in Sunbelt Controls policy manual. Specific additional responsibilities will be:

11.3.1 Superintendent / General Supervisor

- Monitors procedure to ensure compliance with this work practice and OSHA Title 8 of the California Code of Regulations, Section 520729 CFR 1910.1027

11.3.2 Supervisors

- Ensures that the initial determination for potential cadmium or toxic exposure has been accomplished before work begins
- Supervises the safe performance of work in accordance with this and other work practices and Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027
- Assigns jobs only to qualified employees

11.3.3 Employee

- Uses the protective and safety equipment as assigned and directed
- Abides by the requirements of this standard practice instruction
- Participates in the biological monitoring

11.3.4 Company Safety Director

- Coordinates the requirements of this program in accordance with the requirements of Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027

12.0 Medical Surveillance

The medical surveillance provisions of this standard practice instruction are intended to provide our employees with a comprehensive approach to prevention of cadmium-related disease. The primary purpose is to supplement the OSHA standard's primary mechanisms of disease and illness prevention, the elimination or reduction of airborne concentrations of cadmium and sources of ingestion, by facilitating the early detection of medical effects associated with exposure to cadmium.

Note to Employees: The medical surveillance section of Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR.1910.1027 is quite extensive. In the interest maintaining a concise, practical document for use by all employees and not duplicating large amounts of the regulation, it is not detailed in its entirety below. Employees interested in reading the section can reference the Regulation. A copy of the Regulation may be obtained by contacting the Safety Department @ **(818)** 291-6593.

12.1 All medical examinations and procedures will be performed by or under the supervision of a licensed physician and are to be provided without cost to employees at a reasonable time and place.

12.2 **Two Phases of Surveillance –** The medical surveillance provisions contemplate two phases of medical surveillance; one is initial medical surveillance, the other is a medical surveillance program.

12.2.1 Currently Exposed – Sunbelt Controls shall institute a medical surveillance program for all employees who are or may be exposed to cadmium at or above the action level unless it can be demonstrated that the employee is not, and will not be, exposed at or above the action level on 30 or more days per year (twelve consecutive months).

12.2.2 Previously Exposed – Sunbelt Controls shall institute a medical surveillance program for all employees who might previously have been exposed to cadmium at or above the action level, unless it has been demonstrated that the employee did not work with exposure to cadmium for an aggregated total of more than 60 months.

12.3 Medical Examinations

12.3.1 Initial Medical Examination – Sunbelt Controls shall provide an initial (pre-placement) examination to all employees covered by the medical surveillance program. The examination shall be provided to those employees within 30 days after initial assignment to a job with exposure to cadmium. The initial (pre-placement) medical examination shall include:

12.3.1.1 Medical and Work History – A detailed medical and work history, with emphasis on:

- **Past, present, and anticipated future exposure to cadmium**
- **Any history of renal, cardiovascular, respiratory, hematopoietic, reproductive, and / or musculo-skeletal system dysfunction**
- **Current usage of medication with potential nephrotoxic side-effects; and smoking history and current status; and Biological monitoring that includes the following tests:**
  - Cadmium in urine (CdU), standardized to grams of creatinine (g/Cr).
  - Beta-2 micro globulin in urine (B(2)-M), standardized to grams of creatinine (g/Cr), with pH specified, as described in Appendix D & F of Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027.
  - Cadmium in blood (CdB), standardized to liters of whole blood (lwb).

12.3.2 Recent Examinations – An initial examination is not required to be provided if adequate records show that the employee has been examined in accordance with the requirements of Title 8 of the California Code of Regulations, Section 5207 OSHA 29 CFR 1910.1027 within the past 12 months. In that case, such records shall be maintained as part of the employee's medical record and the prior exam shall be treated as if it were an initial examination for the purposes of this program.

12.3.3 Actions Triggered by Initial Biological Monitoring – If the results of the initial biological monitoring tests show the employee's CdU level to be at or below 3 ug/g Cr, B(2)-M level to be at or below 300 ug/g Cr and CdB level to be at or below 5 ug/lwb, then a follow up medical examination is necessary.

12.3.4 Follow-Up Medical Examinations

– **Currently Exposed Employees** – For currently exposed employees, who are subject to medical surveillance under Title 8 of the California Code of Regulations, Section 5207, OSHA 29 CFR 1910.1027, Sunbelt Controls shall

provide periodic medical surveillance in accordance with the requirements OSHA 29 CFR 1910.1027.

– **Previously Exposed Employees –** For previously exposed employees, who are subject to medical surveillance under Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027, Sunbelt Controls shall provide biological monitoring for CdU, B(2)-M, and CdB one year after the initial biological monitoring in accordance with OSHA 29 CFR 1910.1027.

12.3.5 Exceeding Recommended Levels at Initial Monitoring – For all employees who are subject to medical surveillance under Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027, if the results of the initial biological monitoring tests show the level of CdU to exceed 3 ug/g Cr, the level of B(2)-M to exceed 300 ug/g Cr, or the level of CdB to exceed 5 ug/lwb, Sunbelt Controls Sunbelt Controls shall:

- **Within 14-Days –** Within two weeks after receipt of biological monitoring results, reassess the employee's occupational exposure to cadmium as follows:
  - Reassess the employee's work practices and personal hygiene
  - Reevaluate the employee's respirator use, if any, and the respirator program
  - Review the hygiene facilities
  - Reevaluate the maintenance and effectiveness of the relevant engineering controls
  - Assess the employee's smoking history and status

- **Within 30-Days –** Within 30 days after the exposure reassessment, specified in Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027, take reasonable steps to correct any deficiencies found in the reassessment that may be responsible for the employee's excess exposure to cadmium

- **Within 90-Days –** Within 90 days after receipt of biological monitoring results, provide a full medical examination to the employee in accordance with the requirements of Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027. After completing the medical examination, the examining physician shall determine in a written medical opinion whether to medically remove the employee. If the physician determines that medical removal is not necessary, then until the employee's CdU level falls to or below 3 ug/g Cr, B(2)-M level falls to or below 300 ug/g Cr and CdB level falls to or below 5 ug/lwb, Sunbelt Controls shall:
  - Provide biological monitoring on a semi-annual basis
  - Provide annual medical examinations
  - Provide a full medical examination to the employee. After completing the medical examination, the examining physician shall determine in a written medical opinion whether to medically remove the employee. However, if the initial biological monitoring results and the biological

monitoring results obtained during the medical examination both show that:

- CdU exceeds 15 ug/g Cr; or CdB exceeds 15 ug/lwb; or B(2)-M exceeds 1500 ug/g Cr, and in addition CdU exceeds 3 ug/g Cr or CdB exceeds 5 ug/liter of whole blood, then the physician shall medically remove the employee from exposure to cadmium at or above the action level.
- If the second set of biological monitoring results obtained during the medical examination does not show that a mandatory removal trigger level has been exceeded, then the employee is not required to be removed by the mandatory provisions of this paragraph.

- If the employee is not required to be removed by the mandatory provisions of this paragraph or by the physician's determination, then until the employee's CdU level falls to or below 3 ug/g Cr, B(2)-M level falls to or below 300 ug/g Cr and CdB level falls to or below 5 ug/lwb, Sunbelt Controls shall:
  - Periodically reassess the employee's occupational exposure to cadmium
  - Provide biological monitoring on a quarterly basis
  - Provide semiannual medical examinations
  - For all employees to whom medical surveillance is provided, beginning on January 1, 1999 (see Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027)

12.3.6 Periodic Medical Surveillance – Periodic medical surveillance will be conducted in accordance with the requirements of Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1926.1127. After completing any periodic medical surveillance, the examining physician shall provide surveillance results and recommendations for health safety to the respective employee and to the Sunbelt Controls Safety Manager. Information gathered from the physician will be used to lower workplace cadmium exposures. No employees name or identifying information will be used in this process.

12.3.7 Emergency Examinations – Sunbelt Controls will provide a medical examination as soon as possible to any employee who may have been acutely exposed to cadmium because of an emergency. The examination shall include the requirements of Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1926.1127 with emphasis on the respiratory system, other organ systems considered appropriate by the examining physician and symptoms of acute overexposure to cadmium.

12.3.8 Termination of Employment Examination – At termination of employment, Sunbelt Controls will provide a medical examination in accordance with Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027.

Information Provided to the Physician – Sunbelt Controls will provide the following information to the examining physician:

- A copy of this standard and appendices
- 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

12.3.9 Physician's Written Medical Opinion – Sunbelt Controls will promptly obtain a written, medical opinion from the examining physician for each medical examination performed on each employee. This written opinion shall contain information as required by Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027.

12.3.10 Medical Removal Protection (MRP) – Sunbelt Controls will temporarily remove an employee from work where there is excess exposure to cadmium on each occasion that medical removal is required under Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027 and on each occasion that a physician determines in a written medical opinion that the employee should be removed from such exposure. The physician's determination may be based on biological monitoring results, inability to wear a respirator, evidence of illness, other signs or symptoms of cadmium-related dysfunction or disease, or any other reason deemed medically sufficient by the physician.

13.0 Ventilation Requirements

When ventilation is used to control exposure, measurements that demonstrate the effectiveness of the system in controlling exposure, such as capture velocity, duct velocity, or static pressure shall be made as necessary to maintain its effectiveness.

13.1 Change in Processes or Controls – Measurements of the system's effectiveness in controlling exposure shall be made as necessary within five working days of any change in production, process, or control that might result in a significant increase in employee exposure to cadmium.

13.2 Recirculation of Air – If air from exhaust ventilation is re-circulated into the workplace, the system shall have a high efficiency filter and be monitored to assure effectiveness.

13.3 Maintenance Requirements – Procedures shall be developed and implemented to minimize employee exposure to cadmium when maintenance of ventilation systems and changing of filters is being conducted.

14.0 Respiratory Protection

Respiratory protection surveys will be conducted in accordance with the Respiratory Protection Program and Title 8 of the California Code of Regulations, Section 5144OSHA 29 CFR 1910.134 to determine if, and which employees will be required to wear respiratory protection in the course

of their duties. Respirators are considered personal protective equipment (PPE) and will be used as a last choice in protecting employees from the hazardous effects of cadmium exposure.

14.1 Respirator Selection for Cadmium Exposure – Respirators will be selected based on Table 2 *(see below)* of Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027.

Table 1: Respiratory Protection for Cadmium

Airborne Concentration	*Required Respirator Type*
Less than 10 times the PEL	A half mask, air purifying equipped with a high-efficiency particulate air (HEPA) filter.
Up to 25 times the PEL	A powered air-purifying respirator (PAPR) with a loose-fitting hood or helmet equipped with a HEPA filter or a supplied-air respirator with a loose-fitting hood or helmet face piece operated in the continuous flow mode.
Up to 50 times the PEL	A full face piece air-purifying respirator equipped with a HEPA filter or a powered air-purifying respirator with a tight-fitting half mask equipped with a HEPA filter or a supplied-air respirator with a tight-fitting half mask operated in the continuous flow mode
Up to 250 times the PEL	A powered air-purifying respirator with a tight fitting full face piece equipped with a HEPA filter or a supplied-air respirator with a tight-fitting full face piece operated in the continuous flow mode.
Up to 1,000 times the PEL	A supplied air respirator with half mask or full face piece operated in the pressure demand or other positive pressure mode.
More than 1,000 times the PEL or unknown levels of concentration	A self-contained breathing apparatus with a full face piece operated in the pressure demand or other positive pressure mode, or a supplied-air respirator with a full face piece operated in the pressure demand or other positive pressure mode and equipped with an auxiliary escape type self-contained breathing apparatus operated in the pressure demand mode.
Fire Fighting	A self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode.

Source: Respiratory Decision Logic, NIOSH, 1987

14.2 Respirators Usage – Respirators must be used during the following activities/conditions:

- Periods necessary to install or implement engineering and work-practice controls when employee exposure levels exceed the PEL.
- Maintenance and repair activities, and brief or intermittent operations, for which employee exposures exceed the PEL and engineering and work-practice controls are not feasible or are not required.
- Activities in regulated areas specified in Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027.
- Work operations in which Sunbelt Controls has implemented all feasible engineering and work-practice controls and such controls are not sufficient to reduce employee exposures to or below the PEL.

- Work operations for which an employee is exposed to cadmium at or above the action level, and the employee requests a respirator.
- Work operations for which an employee is exposed to cadmium above the PEL and engineering controls are not required by Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027.
- Emergency situations where other controls are not effective. A written plan for dealing with emergency situations involving substantial releases of airborne cadmium will be developed for specific jobs or processes. The plan shall include provisions for the use of appropriate respirators and personal protective equipment. In addition, employees not essential to correcting the emergency situation shall be restricted from the area and normal operations halted in that area until the emergency is abated.

15.0 Protective Clothing and Personal Protective Equipment (PPE)

Where engineering controls and job hazard analyses do not eliminate all job hazards, employees will (where appropriate) wear Personal Protective Equipment (PPE).

These include items such as, caps, hair nets, face shields, safety goggles, glasses, hearing protection, foot guards, gloves etc. Supervisors will ensure that equipment selected will meet the following requirements:

- It will be appropriate for the particular hazard.
- It will be maintained in good condition.
- It will be properly stored when not in use, to prevent damage or loss.
- It will be kept clean, fully functional and sanitary.

15.2 Hazards associated with wear of protective clothing, PPE, personal clothing and jewelry. Protective clothing and PPE can present additional safety hazards. Supervisors will ensure workers wear appropriate clothing and PPE. These items will be worn so as not create additional hazards.

15.3 **Documentation** – PPE requirements will be documented on the "Protective Measures Determination form and properly filed.

15.4 **Provision and Use** – If an employee is exposed to airborne cadmium above the PEL or where skin or eye irritation is associated with cadmium exposure at any level, Sunbelt Controls shall provide at no cost to the employee, and assure that the employee uses, appropriate protective work clothing and equipment that prevents contamination of the employee and the employee's garments. Protective work clothing and equipment includes, but is not limited to:

15.4.1 Gloves, head coverings, and boots or foot coverings

15.4.2 Face shields, vented goggles, or other appropriate protective equipment that complies with safety requirements of cadmium exposure.

15.5 **Removal and Storage of Contaminated Equipment and Clothing** – Sunbelt Controls shall assure that employees remove all protective clothing and equipment contaminated with cadmium at the completion of the work shift and do so only in change rooms provided in

accordance with Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027.

15.5.1 Cross-Contamination – Job safety procedures will be developed to ensure that no employee takes cadmium-contaminated protective clothing or equipment from the workplace, except for employees authorized to do so for purposes of laundering, cleaning, maintaining, or disposing of cadmium contaminated protective clothing and equipment at an appropriate location or facility away from the workplace.

15.5.2 Dispersion of Cadmium Dust – Contaminated protective clothing and equipment, when removed for laundering, cleaning, maintenance, or disposal, will be placed and stored in sealed, impermeable bags or other closed, impermeable containers that are designed to prevent dispersion of cadmium dust.

15.5.3 Labeling of Contaminated Clothing or Equipment – Contaminated protective clothing and equipment that are to be removed from change rooms or the workplace for laundering, cleaning, maintenance or disposal will be labeled accordance with the requirements of Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027.

15.6 Cleaning, Replacement, and Disposal of Contaminated Equipment and Clothing – Protective clothing and equipment will be provided in a clean and dry condition as often as necessary to maintain its effectiveness, but in any event at least weekly.

15.6.1 Repair and Replacement of PPE – Repair and replacement of PPE will be accomplished as needed to maintain its effectiveness. When rips or tears are detected while an employee is working they shall be immediately mended, or the work suit shall be immediately replaced.

15.6.2 Unauthorized Removal of Cadmium from Clothing and Equipment – The removal of cadmium from protective clothing and equipment by blowing, shaking, or any other means that disperses cadmium into the air is strictly forbidden.

15.6.3 Cleaning of Contaminated Clothing or Equipment – Laundering of contaminated clothing or cleaning of contaminated equipment in the workplace will be accomplished in a manner that prevents the release of airborne cadmium in excess of the permissible exposure limits.

15.6.4 Notification of Cleaning Contractors – Any person or company who launders or cleans protective clothing or equipment contaminated with cadmium will be notified of the potentially harmful effects of exposure to cadmium and that the clothing and equipment should be laundered or cleaned in a manner sufficient to effectively prevent the release of airborne cadmium in excess of the PEL.

16.0 Hygiene Areas and Practices

For employees whose airborne exposure to cadmium is above the PEL, clean change rooms, hand washing facilities, showers, and lunchroom facilities that comply with Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.141 will be provided.

- **Change Rooms –** Change rooms will be equipped with separate storage facilities for street clothes and for protective clothing and equipment, which are designed to prevent dispersion of cadmium and contamination of the employee's street clothes.
- **Showers and Hand Washing Facilities –** Employees who are exposed to cadmium above the PEL will shower at the end of the work shift; employees whose airborne exposure to cadmium is above the PEL must wash their hands and faces prior to eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics.
- **Lunchroom Facilities –** Lunchroom facilities must be maintained free of cadmium, no employee in a lunchroom facility may be exposed at any time to cadmium at or above a concentration of 2.5 ug/m(3). Employees may not enter lunchroom facilities with protective work clothing or equipment unless surface cadmium has been removed from the clothing and equipment by HEPA vacuuming or some other method that removes cadmium dust without dispersing it.

16.1 Housekeeping

- All surfaces shall be maintained as free as practicable of accumulations of cadmium.
- All spills and sudden releases of material containing cadmium shall be cleaned up as soon as possible.
- Surfaces contaminated with cadmium shall, wherever possible, be cleaned by vacuuming or other methods that minimize the likelihood of cadmium becoming airborne.
- HEPA-filtered vacuuming equipment or equally effective filtration methods shall be used for vacuuming. The equipment shall be used and emptied in a manner that minimizes the reentry of cadmium into the workplace.
- Shoveling, dry or wet sweeping, and brushing may be used only where vacuuming or other methods that minimize the likelihood of cadmium becoming airborne have been tried and found not to be effective.
- Compressed air shall not be used to remove cadmium from any surface unless the compressed air is used in conjunction with a ventilation system designed to capture the dust cloud created by the compressed air.
- Waste, scrap, debris, bags, containers, personal protective equipment, and clothing contaminated with cadmium and consigned for disposal shall be collected and disposed of in sealed impermeable bags or other closed, impermeable containers. These bags and containers shall be labeled in accordance with Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027.

17.0 Communication of Cadmium Hazards to Employees

Sunbelt Controls will communicate the hazards concerning cadmium to all potentially exposed employees.

17.1 Employee Notification – The requirements of Hazard Communication Standard, Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1200, including but not limited to the requirements concerning warning signs and labels, material safety data sheets (SDS), and employee information and training will be used to meet this requirement.

17.2 Warning Signs – Warning signs will be provided and displayed in regulated areas. In addition, warning signs shall be posted at all approaches to regulated areas so that an employee may read the signs and take necessary protective steps before entering the area. Warning signs will bear the following information:

DANGER
CADMIUM
CANCER HAZARD
CAN CAUSE LUNG AND KIDNEY DISEASE
AUTHORIZED PERSONNEL ONLY
RESPIRATORS REQUIRED IN THIS AREA

17.3 Warning Labels – Shipping and storage containers containing cadmium, cadmium compounds, or cadmium contaminated clothing, equipment, waste, scrap, or debris shall bear appropriate warning labels; where feasible, installed cadmium products shall have a visible label or other indication that cadmium is present. Warning labels will bear the following information:

DANGER
CONTAINS CADMIUM
CANCER HAZARD
AVOID CREATING DUST
CAN CAUSE LUNG AND KIDNEY DISEASE

18.0 Recordkeeping Requirements. Sunbelt Controls will keep all records of exposure monitoring for airborne cadmium.

18.1 These records will include as a minimum the following:

- Name and job classification
- Details of sampling and the analytic technique used
- Results of sampling
- Type of respiratory protection being worn

18.2 Records of biological monitoring will include:

- Names of the employee
- The physician's written opinion
- A copy of the results of the examination

18.3 Records Retention – Sunbelt Controls shall assure that cadmium exposure related records are maintained for the duration of employment plus thirty (30) years, in accordance with , Title 8 of the California Code of Regulations, Section 5194OSHA 29 CFR 1910.1020.

18.3.1 Records will also be retained if the employee is temporarily removed from the job under the medical removal protection program. This record will include:

- The employee's name and social security number
- How the removal was or is being accomplished
- Dates of removal from work and return
- Details of how each removal was or is being accomplished
- Whether or not the removal was due to cadmium related exposure

18.3.2 Sunbelt Controls will keep each medical removal record for the duration of an employee's employment. For employees who request to see or copy environmental monitoring, or other pertinent records, they will be made available to the employee or to a representative that he or she authorizes.

18.4 Exposure Monitoring Records – Records of all air monitoring will be established and maintained for cadmium in the workplace. The record shall include at least the following information:

- The monitoring date, duration, and results in terms of an 8-hour TWA of each sample taken
- The name, social security number, and job classification of the employees monitored and of all other employees whose exposures the monitoring is intended to represent
- A description of the sampling and analytical methods used and evidence of their accuracy
- The type of respiratory protective device, if any, worn by the monitored employee
- Notations of any other conditions that might have affected the monitoring results

18.4.1 Records Maintenance – Records will be maintained for at least thirty (30) years, in accordance with , Title 8 of the California Code of Regulations, Section 5207 & 5194OSHA 29 CFR 1910.1027

18.5 Medical Surveillance Records – Sunbelt Controls shall establish and maintain an accurate record for each employee covered by medical surveillance under , Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027. Per OSHA Regulations, the record shall include at least the following information about the employee:

- Name, social security number, and description of the duties
- A copy of the physician's written opinions and an explanation sheet for biological monitoring results
- A copy of the medical history, and the results of any physical examination and all test results that are required to be provided by this section, including 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
- The employee's medical symptoms that might be related to exposure to cadmium
- A copy of the information provided to the physician as required by , Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027.

18.6 Records Training – Sunbelt Controls will certify that employees have been trained by preparing a certification record which includes the identity of the person trained, the signature of the employer or the person who conducted the training, and the date the training was completed. The certification records shall be prepared at the completion of training and shall be maintained on file for one (1) year beyond the date of training of that employee.

18.7 Records Availability – Records pertinent to the Cadmium Safety Program will be made available to authorized personnel as required by, Title 8 of the California Code of Regulations, Section 5207OSHA 29 CFR 1910.1027 and , Title 8 of the California Code of Regulations, Section 5194OSHA 29 CFR 1910.1020. Within 15 days after a request, Sunbelt Controls will make an employee's medical records available for examination and copying to the subject employee, to 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.

18.8 Transfer of Record(s) – Whenever Sunbelt Controls ceases to do business and there is no successor employer to receive and retain records for the prescribed period or Sunbelt Controls intends to dispose of any records required to be preserved for at least 30 years, Sunbelt Controls shall comply with the requirements concerning transfer of records set forth in Title 8 of the California Code of Regulations, Section 5207 & 5194OSHA 29 CFR 1910.1020.

19.0 Selection and Use of Safety Related Work Practices

Supervisors shall develop and ensure the use of standardized safety-related work practices to reduce and prevent illnesses and injuries resulting from exposure to cadmium. The specific safety-related work practices shall be consistent with the nature and extent of the associated hazards. Work practice controls will be implemented to reduce and maintain employee exposure to cadmium at or below the PEL, unless it can be demonstrated that such controls are not feasible. In this case, other methods will be used to ensure employee safety.

19.1 Respiratory Protection (as a last choice for achieving compliance) – Where engineering and work practice controls cannot reduce exposures to or below the PEL, Sunbelt Controls shall include in the written compliance program the use of appropriate respiratory protection to achieve compliance with the PEL.

19.2 Written Compliance Programs for Specific Operations – Written compliance programs shall include at least the following:

- A description of each operation in which cadmium is emitted; e.g., machinery used, material processed, controls in place, crew size, employee job responsibilities, operating procedures, and maintenance practices
- A description of the specific means that will be employed to achieve compliance, including engineering plans and studies used to determine methods selected for controlling exposure to cadmium, as well as, where necessary, the use of appropriate respiratory protection to achieve the PEL
- A report of the technology considered in meeting the PEL
- Air monitoring data that document(s) the sources of cadmium emissions

- A detailed schedule for implementation of the program, including documentation such as copies of purchase orders for equipment, construction contracts, etc
- A written plan for emergency situations

20.0 REFERENCES

Title 8 of the California Code of Regulations, Section 5207
Title 8 of the California Code of Regulations, Section 5194
OSHA 29 CFR 1910.1027 (Industrial)
OSHA 29 CFR 1926.63 (Construction)