

CALIFORNIA

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Construction Health and Safety Technologist – CHST	0
Industrial Hygienist in Training - IHIT	0
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Occupational Health and Safety Technologist – OHST	0
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Terms**References**

Industrial Hygiene	14
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Certified Industrial Hygienist - CIH	21
Certified Associate Industrial Hygienist	0
Construction Health and Safety Technologist – CHST	0
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BUSINESS AND PROFESSIONS CODE – BPC

DIVISION 3. PROFESSIONS AND VOCATIONS GENERALLY

[5000. - 9998.8.]

CHAPTER 9. Contractors [7000. - 7191.]

ARTICLE 11. Asbestos Consultants [7180. - 7189.7.]

7184.

A person shall qualify as a certified asbestos consultant by meeting all of the following requirements:

(a) Having any one of the following:

(1) One year of asbestos-related experience, and a bachelor of science degree in engineering, architecture, **industrial hygiene**, construction management, or a related biological or physical science.

(2) Two years of asbestos-related experience, and a bachelor's degree.

(3) Three years of asbestos-related experience, and an associate of arts degree in engineering, architecture, **industrial hygiene**, construction management, or a related biological or physical science.

(4) Four years of asbestos-related experience and a high school diploma or its equivalent.

(b) Possession of a valid federal Asbestos Hazard Emergency Response Act (Subchapter II (commencing with Section 2641) of Chapter 53 of Title 15 of the United States Code) certificate for the type of work being performed, or its equivalent, as determined by the division.

(c) Demonstration of proficiency by achieving a passing score as determined by the division on an examination approved or administered by the division including, but not limited to, the following subjects:

(1) Physical characteristics of asbestos.

(2) Health effects of asbestos.

(3) Federal Occupational Safety and Health Administration, Division of Occupational Safety and Health, Environmental Protection Agency, air quality management districts, and State Department of Health Services regulatory requirements, including protective clothing, respiratory protection, exposure limits, personal hygiene, medical monitoring, disposal, and general industry safety hazards.

(4) State-of-the-art asbestos abatement and control work procedures. The division shall define and incorporate into the certification standards the term “state-of-the-art” for purposes of this article, in the regulations required by subdivision (b) of Section 9021.5 of the Labor Code.

(5) Federal Asbestos Hazard Emergency Response Act training information and procedures for inspectors, management planners, and supervisors, as provided for under Subchapter II (commencing with Section 2641) of Chapter 53 of Title 15 of the United States Code, or the equivalent, as determined by the division.

(6) Information concerning **industrial hygiene** sampling methodology, including asbestos sampling and analysis techniques and recordkeeping.

(Added by Stats. 1990, Ch. 1255, Sec. 1.)

7185.

A person shall qualify as a certified site surveillance technician by meeting all of the following requirements:

(a) Having six months of asbestos-related experience under the supervision of an asbestos consultant.

(b) Possession of a high school diploma or equivalent.

(c) Possession of a valid federal Asbestos Hazard Emergency Response Act (Subchapter II (commencing with Section 2641) of Chapter 53 of Title 15 of the United States Code) certificate for the type of work being performed, or its equivalent, as determined by the division.

(d) Demonstration of proficiency by achieving a passing score, as determined by the division, on an examination approved or administered by the division covering the following subjects:

(1) Physical characteristics of asbestos.

(2) Health effects of asbestos.

(3) Federal Occupational Safety and Health Administration, Division of Occupational Safety and Health, Environmental Protection Agency, air quality management districts, and State Department of Health Services regulatory requirements, including protective clothing, respiratory protection, exposure limits, personal hygiene, medical monitoring, and general industry safety hazards.

(4) State-of-the-art asbestos abatement and control work procedures.

(5) **Industrial hygiene** sampling methodology, including sampling techniques and recordkeeping.

(Added by Stats. 1990, Ch. 1255, Sec. 1.)

7189.7.

(a) Nothing in this article shall be construed to require agencies of the state to contract with asbestos consultants or site surveillance technicians who are not employees of the state as long as employees of the state who are assigned to perform the activities described in Sections 7181 and 7182 have been certified by the division pursuant to the regulations required by subdivision (b) of Section 9021.5 of the Labor Code. Where feasible, the state shall assign a state civil service classification of **associate industrial hygienist** or senior **industrial hygienist** to carry out asbestos consultation activities as described in Section 7181 for state-owned and leased buildings. The individuals in the classification assigned shall be certified as required in this article before performing these activities.

(b) Nothing in this article shall be construed to require attorneys who provide legal advice on asbestos-related matters to building owners or operators to be certified by the division pursuant to the regulations required by subdivision (b) of Section 9021.5 of the Labor Code.

(Added by Stats. 1990, Ch. 1255, Sec. 1.)

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DIVISION 8. SPECIAL BUSINESS REGULATIONS [18400. - 22948.7.]

CHAPTER 7. Industrial Hygienist Definition and Registration Act [20700. - 20705.]

ARTICLE 1. General Provisions [20700. - 20700.]

20700.

As used in this chapter:

(a) **“Industrial hygiene”** means the science and art devoted to the anticipation, recognition, evaluation, and control of environmental factors or stresses which may cause sickness, impaired health and well-being, or significant discomfort and inefficiency among workers or among the citizens of a community.

(b) **“Certified industrial hygienist (CIH)”** means a person who has met the education, experience, and examination requirements of an **industrial hygiene** certification organization.

(c) **“Industrial hygiene certification organization”** means a professional organization of **certified industrial hygienists** that has been established to improve the practice and educational standards of the profession of **industrial hygiene** through a certification process, by certifying **industrial hygienists** through an examination administered by the certification organization. The organization shall have the certifying examinations evaluated by a national testing service and shall maintain certification criteria that are at least the equivalent of the **American Board of Industrial Hygiene**.

(Added by Stats. 1993, Ch. 1021, Sec. 1. Effective January 1, 1994.)

20701.

A **certified industrial hygienist** may obtain a stamp from an **industrial hygiene** certification organization, which shall include a number that uniquely identifies and bears the name of that **certified industrial hygienist**. The stamp certifies that the **industrial hygienist** has successfully passed an **industrial hygiene** examination and met the certification maintenance requirements required and approved by the **industrial hygiene** certification organization .

(Added by Stats. 1993, Ch. 1021, Sec. 1. Effective January 1, 1994.)

20702.

All reports, opinions, or official documents prepared for submission to an employer, government agency, or other consumer by any **certified industrial hygienist** shall be affixed by a stamp, as specified in Section 20701, and signed by that **certified industrial hygienist**.

(Added by Stats. 1993, Ch. 1021, Sec. 1. Effective January 1, 1994.)

20703.

No entity of state or local government shall by rule or otherwise regulate the practice of **industrial hygiene** by any **certified industrial hygienist**, except where authorized by state statute to regulate a specific activity that may include the practice of **industrial hygiene**.

(Added by Stats. 1993, Ch. 1021, Sec. 1. Effective January 1, 1994.)

20704.

It is an unfair business practice for any person to represent themselves as a **“certified industrial hygienist” or a “CIH”** unless they comply with the requirements of this chapter.

(Added by Stats. 1993, Ch. 1021, Sec. 1. Effective January 1, 1994.)

20705.

This act shall not prohibit:

(a) Any person legally regulated in this state under any other licensing act or regulation from engaging in the activities permitted under his or her license, provided he or she does not represent himself or herself as a **certified industrial hygienist or CIH**.

(b) Professional experience or apprenticeship performed in order to meet certification requirements in this chapter.

(c) The practice of a student pursuing a course of professional education under the terms of this chapter, if these activities and services constitute a part of the student’s supervised course of study.

(Added by Stats. 1993, Ch. 1021, Sec. 1. Effective January 1, 1994.)

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HEALTH AND SAFETY CODE – HSC

DIVISION 20. MISCELLANEOUS HEALTH AND SAFETY PROVISIONS [24000. - 26204.]

(Division 20 enacted by Stats. 1939, Ch. 60.)

CHAPTER 6.9.1. Methamphetamine Contaminated Property Cleanup Act of 2005 [25400.10. - 25400.47.]

(Chapter 6.9.1 added by Stats. 2005, Ch. 570, Sec. 1.)

ARTICLE 6. Requirements for Property Assessment and Cleanup [25400.35. - 25400.40.]

(Article 6 added by Stats. 2005, Ch. 570, Sec. 1.)

25400.38.

The PSA work plan and PSA report shall be signed and notarized by the contractor responsible for the completion of the preliminary site assessment and by a **certified industrial hygienist** for sufficiency and completeness.

(Added by Stats. 2005, Ch. 570, Sec. 1. Effective January 1, 2006.)

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HEALTH AND SAFETY CODE – HSC

DIVISION 20. MISCELLANEOUS HEALTH AND SAFETY PROVISIONS [24000. - 26204.]

(Division 20 enacted by Stats. 1939, Ch. 60.)

CHAPTER 18. Toxic Mold [26100. - 26157.]

(Chapter 18 added by Stats. 2001, Ch. 584, Sec. 2.)

ARTICLE 1. General Provisions [26100. - 26107.]

(Article 1 added by Stats. 2001, Ch. 584, Sec. 2.)

26101.

For purposes of this chapter, the following definitions apply:

(a) “Affect” means to cause a condition by the presence of mold in the dwelling unit, building, appurtenant structure, common wall, heating system, or ventilating and air-conditioning system that affects the indoor air quality of a dwelling unit or building.

(b) “Authoritative bodies” means any recognized national or international entities with expertise on public health, mold identification and remediation, or environmental health, including, but not limited to, other states, the United States Environmental Protection Agency, the World Health Organization, the American Conference of Governmental Industrial Hygienists, the New York City Department of Health, the Centers for Disease Control and Prevention, and the American Industrial Hygiene Association.

(c) “Certified Industrial Hygienist” means a person who has met the education, experience, and examination requirements of an industrial hygiene certification organization as defined in Section 20700 of the Business and Professions Code.

(d) “Code enforcement officer” means a local official responsible for enforcing housing codes and maintaining public safety in buildings using an interdepartmental approach at the local government level.

(e) “Department” means the State Department of Health Services, designated as the lead agency in the adoption of permissible exposure limits to mold in indoor environments, mold identification and remediation efforts, and the development of guidelines for the determination of what constitutes mold infestation.

(f) “Indoor environments” means the affected dwelling unit or affected commercial or industrial building.

(g) “Mold” means any form of multicellular fungi that live on plant or animal matter and in indoor environments. Types of mold include, but are not limited to, Cladosporium,

Penicillium, Alternaria, Aspergillus, Fuarim, Trichoderma, Memnoniella, Mucor, and Stachybotrys chartarum, often found in water-damaged building materials.

(h) “Person” means an individual, corporation, company, association, partnership, limited liability company, municipality, public utility, or other public body or institution.

(i) “Public health officer” means a local health officer appointed pursuant to Section 101000 or a local comprehensive health agency designated by the board of supervisors pursuant to Section 101275 to carry out the drinking water program.

(Added by Stats. 2001, Ch. 584, Sec. 2. Effective January 1, 2002.)

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HEALTH AND SAFETY CODE – HSC

DIVISION 103. DISEASE PREVENTION AND HEALTH PROMOTION [104100. - 106036.]

(Division 103 added by Stats. 1995, Ch. 415, Sec. 5.)

PART 5. ENVIRONMENTAL AND OCCUPATIONAL EPIDEMIOLOGY [105150. - 105459.]

(Part 5 added by Stats. 1995, Ch. 415, Sec. 5.)

CHAPTER 5. Childhood Lead Poisoning Prevention [105275. - 105310.]

(Chapter 5 added by Stats. 1995, Ch. 415, Sec. 5.)

105291.

In addition to any other providers determined to be eligible by the department to provide environmental investigation services as a part of case management services under this chapter, a qualified **certified industrial hygienist** or other qualified professional who is certified by the department as an inspector/assessor shall be eligible to provide those services and those services shall be funded under the Childhood Lead Poisoning Prevention Program pursuant to this chapter.

(Added by Stats. 2001, Ch. 524, Sec. 1. Effective January 1, 2002.)

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DIVISION 104. ENVIRONMENTAL HEALTH [106500. - 119405.]

(Division 104 added by Stats. 1995, Ch. 415, Sec. 6.)

PART 14. MEDICAL WASTE [117600. - 118360.]

(Part 14 added by Stats. 1995, Ch. 415, Sec. 6.)

CHAPTER 2. Definitions [117625. - 117780.]

(Chapter 2 added by Stats. 1995, Ch. 415, Sec. 6.)

117672.

“Industrial Hygienist” means a person who has met the educational requirements of an **industrial hygiene** certification organization, as defined in subdivision (c) of Section 20700 of the Business and Professions Code, and who has had at least one year in the comprehensive practice of **industrial hygiene**, as defined in subdivision (a) of Section 20700 of the Business and Professions Code.

(Added by Stats. 1997, Ch. 732, Sec. 2. Effective January 1, 1998.)

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HEALTH AND SAFETY CODE – HSC

DIVISION 104. ENVIRONMENTAL HEALTH [106500. - 119405.]

(Division 104 added by Stats. 1995, Ch. 415, Sec. 6.)

PART 14. MEDICAL WASTE [117600. - 118360.]

(Part 14 added by Stats. 1995, Ch. 415, Sec. 6.)

CHAPTER 9.5. Trauma Scene Waste Management [118321. - 118321.6.]

(Chapter 9.5 added by Stats. 1997, Ch. 732, Sec. 12.)

118321.6.

(a) This chapter does not limit or abridge the jurisdiction of the Division of Occupational Safety and Health of the Department of Industrial Relations.

(b) This chapter does not prohibit a business from employing or contracting with a person to provide cleanup or consultative services, including those services provided by an **industrial hygienist**, with respect to trauma scene waste if those services are incidental to the principal course and scope of services provided by the person.

(Added by Stats. 1997, Ch. 732, Sec. 12. Effective January 1, 1998.)

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LABOR CODE – LAB

DIVISION 5. SAFETY IN EMPLOYMENT [6300. - 9104.]

(Division 5 enacted by Stats. 1937, Ch. 90.)

PART 1. OCCUPATIONAL SAFETY AND HEALTH [6300. - 6719.]

(Heading of Part 1 amended by Stats. 1973, Ch. 993.)

CHAPTER 3. Responsibilities and Duties of Employers and Employees [6400. - 6413.5.]

(Chapter 3 repealed and added by Stats. 1973, Ch. 993.)

6401.7.

(a) Every employer shall establish, implement, and maintain an effective injury prevention program. The program shall be written, except as provided in subdivision (e), and shall include, but not be limited to, the following elements:

- (1) Identification of the person or persons responsible for implementing the program.
- (2) The employer's system for identifying and evaluating workplace hazards, including scheduled periodic inspections to identify unsafe conditions and work practices.
- (3) The employer's methods and procedures for correcting unsafe or unhealthy conditions and work practices in a timely manner.
- (4) An occupational health and safety training program designed to instruct employees in general safe and healthy work practices and to provide specific instruction with respect to hazards specific to each employee's job assignment.
- (5) The employer's system for communicating with employees on occupational health and safety matters, including provisions designed to encourage employees to inform the employer of hazards at the worksite without fear of reprisal.
- (6) The employer's system for ensuring that employees comply with safe and healthy work practices, which may include disciplinary action.

(b) The employer shall correct unsafe and unhealthy conditions and work practices in a timely manner based on the severity of the hazard.

(c) The employer shall train all employees when the training program is first established, all new employees, and all employees given a new job assignment, and shall train

employees whenever new substances, processes, procedures, or equipment are introduced to the workplace and represent a new hazard, and whenever the employer receives notification of a new or previously unrecognized hazard. An employer in the construction industry who is required to be licensed under Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code may use employee training provided to the employer's employees under a construction industry occupational safety and health training program approved by the division to comply with the requirements of subdivision (a) relating to employee training, and shall only be required to provide training on hazards specific to an employee's job duties.

(d) The employer shall keep appropriate records of steps taken to implement and maintain the program. An employer in the construction industry who is required to be licensed under Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code may use records relating to employee training provided to the employer in connection with an occupational safety and health training program approved by the division to comply with this subdivision, and shall only be required to keep records of those steps taken to implement and maintain the program with respect to hazards specific to an employee's job duties.

(e) (1) The standards board shall adopt a standard setting forth the employer's duties under this section, on or before January 1, 1991, consistent with the requirements specified in subdivisions (a), (b), (c), and (d). The standards board, in adopting the standard, shall include substantial compliance criteria for use in evaluating an employer's injury prevention program. The board may adopt less stringent criteria for employers with few employees and for employers in industries with insignificant occupational safety or health hazards.

(2) Notwithstanding subdivision (a), for employers with fewer than 20 employees who are in industries that are not on a designated list of high hazard industries and who have a workers' compensation experience modification rate of 1.1 or less, and for any employers with fewer than 20 employees who are in industries that are on a designated list of low hazard industries, the board shall adopt a standard setting forth the employer's duties under this section consistent with the requirements specified in subdivisions (a), (b), and (c), except that the standard shall only require written documentation to the extent of documenting the person or persons responsible for implementing the program pursuant to paragraph (1) of subdivision (a), keeping a record of periodic inspections pursuant to paragraph (2) of subdivision (a), and keeping a record of employee training pursuant to paragraph (4) of subdivision (a). To any extent beyond the specifications of this subdivision, the standard shall not require the employer to keep the records specified in subdivision (d).

(3) (A) The division shall establish a list of high hazard industries using the methods prescribed in Section 6314.1 for identifying and targeting employers in high hazard industries. For purposes of this subdivision, the "designated list of high hazard industries" shall be the list established pursuant to this paragraph.

(B) For the purpose of implementing this subdivision, the Department of Industrial Relations shall periodically review, and as necessary revise, the list.

(4) For the purpose of implementing this subdivision, the Department of Industrial Relations shall also establish a list of low hazard industries, and shall periodically review, and as necessary revise, that list.

(f) The standard adopted pursuant to subdivision (e) shall specifically permit employer and employee occupational safety and health committees to be included in the employer's injury prevention program. The board shall establish criteria for use in evaluating employer and employee occupational safety and health committees. The criteria shall include minimum duties, including the following:

(1) Review of the employer's periodic, scheduled worksite inspections; investigation of causes of incidents resulting in injury, illness, or exposure to hazardous substances; and investigation of any alleged hazardous condition brought to the attention of any committee member. When determined necessary by the committee, the committee may conduct its own inspections and investigations.

(2) (A) Upon request from the division, verification of abatement action taken by the employer as specified in division citations.

(B) If an employer's occupational safety and health committee meets the criteria established by the board, it shall be presumed to be in substantial compliance with paragraph (5) of subdivision (a).

(g) The division shall adopt regulations specifying the procedures for selecting employee representatives for employer-employee occupational health and safety committees when these procedures are not specified in an applicable collective bargaining agreement. No employee or employee organization shall be held liable for any act or omission in connection with a health and safety committee.

(h) The employer's injury prevention program, as required by this section, shall cover all of the employer's employees and all other workers who the employer controls or directs and directly supervises on the job to the extent these workers are exposed to worksite and job assignment specific hazards. Nothing in this subdivision shall affect the obligations of a contractor or other employer that controls or directs and directly supervises its own employees on the job.

(i) When a contractor supplies its employee to a state agency employer on a temporary basis, the state agency employer may assess a fee upon the contractor to reimburse the state agency for the additional costs, if any, of including the contract employee within the state agency's injury prevention program.

(j) (1) The division shall prepare a Model Injury and Illness Prevention Program for Non-High-Hazard Employment, and shall make copies of the model program prepared pursuant to this subdivision available to employers, upon request, for posting in the workplace. An employer who adopts and implements the model program prepared by the division pursuant to this paragraph in good faith shall not be assessed a civil penalty for the first citation for a violation of this section issued after the employer's adoption and implementation of the model program.

(2) For purposes of this subdivision, the division shall establish a list of non-high-hazard industries in California. These industries, identified by their Standard Industrial Classification Codes, as published by the United States Office of Management and Budget in the Manual of Standard Industrial Classification Codes, 1987 Edition, are apparel and accessory stores (Code 56), eating and drinking places (Code 58), miscellaneous retail (Code 59), finance, insurance, and real estate (Codes 60–67), personal services (Code 72), business services (Code 73), motion pictures (Code 78) except motion picture production and allied services (Code 781), legal services (Code 81), educational services (Code 82), social services (Code 83), museums, art galleries, and botanical and zoological gardens (Code 84), membership organizations (Code 86), engineering, accounting, research, management, and related services (Code 87), private households (Code 88), and miscellaneous services (Code 89). To further identify industries that may be included on the list, the division shall also consider data from a rating organization, as defined in Section 11750.1 of the Insurance Code, and all other appropriate information. The list shall be established by June 30, 1994, and shall be reviewed, and as necessary revised, biennially.

(3) The division shall prepare a Model Injury and Illness Prevention Program for Employers in Industries with Intermittent Employment, and shall determine which industries have historically utilized seasonal or intermittent employees. An employer in an industry determined by the division to have historically utilized seasonal or intermittent employees shall be deemed to have complied with the requirements of subdivision (a) with respect to a written injury prevention program if the employer adopts the model program prepared by the division pursuant to this paragraph and complies with any instructions relating thereto.

(k) With respect to any county, city, city and county, or district, or any public or quasi-public corporation or public agency therein, including any public entity, other than a state agency, that is a member of, or created by, a joint powers agreement, subdivision (d) shall not apply.

(l) Every workers' compensation insurer shall conduct a review, including a written report as specified below, of the injury and illness prevention program (IIPP) of each of its insureds with an experience modification of 2.0 or greater within six months of the commencement of the initial insurance policy term. The review shall determine whether the insured has implemented all of the required components of the IIPP, and evaluate their effectiveness. The training component of the IIPP shall be evaluated to determine whether training is provided to line employees, supervisors, and upper level management, and effectively imparts the information and skills each of these groups needs to ensure that all of the insured's specific health and safety issues are fully addressed by the insured. The reviewer shall prepare a detailed written report specifying the findings of the review and all recommended changes deemed necessary to make the IIPP effective. The reviewer shall be or work under the direction of a licensed California professional engineer, **certified safety professional**, or a **certified industrial hygienist**.
(Amended by Stats. 2012, Ch. 46, Sec. 108. Effective June 27, 2012.)

CALIFORNIA STATUTES

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LABOR CODE – LAB

DIVISION 5. SAFETY IN EMPLOYMENT [6300. - 9104.]

(Division 5 enacted by Stats. 1937, Ch. 90.)

PART 1. OCCUPATIONAL SAFETY AND HEALTH [6300. - 6719.]

(Heading of Part 1 amended by Stats. 1973, Ch. 993.)

CHAPTER 4. Penalties [6423. - 6436.]

(Chapter 4 repealed and added by Stats. 1973, Ch. 993.)

6432.

(a) There shall be a rebuttable presumption that a “serious violation” exists in a place of employment if the division demonstrates that there is a realistic possibility that death or serious physical harm could result from the actual hazard created by the violation. The demonstration of a violation by the division is not sufficient by itself to establish that the violation is serious. The actual hazard may consist of, among other things:

(1) A serious exposure exceeding an established permissible exposure limit.

(2) The existence in the place of employment of one or more unsafe or unhealthful practices, means, methods, operations, or processes that have been adopted or are in use.

(b) (1) Before issuing a citation alleging that a violation is serious, the division shall make a reasonable attempt to determine and consider, among other things, all of the following:

(A) Training for employees and supervisors relevant to preventing employee exposure to the hazard or to similar hazards.

(B) Procedures for discovering, controlling access to, and correcting the hazard or similar hazards.

(C) Supervision of employees exposed or potentially exposed to the hazard.

(D) Procedures for communicating to employees about the employer’s health and safety rules and programs.

(E) Information that the employer wishes to provide, at any time before citations are issued, including, any of the following:

(i) The employer's explanation of the circumstances surrounding the alleged violative events.

(ii) Why the employer believes a serious violation does not exist.

(iii) Why the employer believes its actions related to the alleged violative events were reasonable and responsible so as to rebut, pursuant to subdivision (c), any presumption established pursuant to subdivision (a).

(iv) Any other information that the employer wishes to provide.

(2) The division shall satisfy its requirement to determine and consider the facts specified in paragraph (1) if, not less than 15 days prior to issuing a citation for a serious violation, the division delivers to the employer a standardized form containing the alleged violation descriptions ("AVD") it intends to cite as serious and clearly soliciting the information specified in this subdivision. The director shall prescribe the form for the alleged violation descriptions and solicitation of information. Any forms issued pursuant to this section shall be exempt from the rulemaking provisions of the Administrative Procedure Act (Chapter 3.5 (commencing with Section 11340) of Part 1 of Division 3 of Title 2 of the Government Code).

(c) If the division establishes a presumption pursuant to subdivision (a) that a violation is serious, the employer may rebut the presumption and establish that a violation is not serious by demonstrating that the employer did not know and could not, with the exercise of reasonable diligence, have known of the presence of the violation. The employer may accomplish this by demonstrating both of the following:

(1) The employer took all the steps a reasonable and responsible employer in like circumstances should be expected to take, before the violation occurred, to anticipate and prevent the violation, taking into consideration the severity of the harm that could be expected to occur and the likelihood of that harm occurring in connection with the work activity during which the violation occurred. Factors relevant to this determination include, but are not limited to, those listed in subdivision (b).

(2) The employer took effective action to eliminate employee exposure to the hazard created by the violation as soon as the violation was discovered.

(d) If the employer does not provide information in response to a division inquiry made pursuant to subdivision (b), the employer shall not be barred from presenting that information at the hearing and no negative inference shall be drawn. The employer may offer different information at the hearing than what was provided to the division and may explain any inconsistency, but the trier of fact may draw a negative inference from the prior inconsistent factual information. The trier of fact may also draw a negative inference from factual information offered at the hearing by the division that is inconsistent with factual information provided to the employer pursuant to subdivision (b), or from a failure by the division to provide the form setting forth the descriptions of the alleged violation and soliciting information pursuant to subdivision (b).

(e) “Serious physical harm,” as used in this part, means any injury or illness, specific or cumulative, occurring in the place of employment or in connection with any employment, that results in any of the following:

(1) Inpatient hospitalization for purposes other than medical observation.

(2) The loss of any member of the body.

(3) Any serious degree of permanent disfigurement.

(4) Impairment sufficient to cause a part of the body or the function of an organ to become permanently and significantly reduced in efficiency on or off the job, including, but not limited to, depending on the severity, second-degree or worse burns, crushing injuries including internal injuries even though skin surface may be intact, respiratory illnesses, or broken bones.

(f) Serious physical harm may be caused by a single, repetitive practice, means, method, operation, or process.

(g) A division safety engineer or **industrial hygienist** who can demonstrate, at the time of the hearing, that his or her division-mandated training is current shall be deemed competent to offer testimony to establish each element of a serious violation, and may offer evidence on the custom and practice of injury and illness prevention in the workplace that is relevant to the issue of whether the violation is a serious violation. *(Repealed and added by Stats. 2010, Ch. 692, Sec. 2. Effective January 1, 2011.)*

CALIFORNIA STATUTES

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LABOR CODE – LAB

DIVISION 5. SAFETY IN EMPLOYMENT [6300. - 9104.]

(Division 5 enacted by Stats. 1937, Ch. 90.)

PART 9. TUNNEL AND MINE SAFETY [7950. - 8004.]

(Part 9 added by Stats. 1972, Ch. 1430.)

CHAPTER 1. Tunnels and Mines [7950. - 7964.5.]

(Chapter 1 added by Stats. 1972, Ch. 1430.)

7954.

To assist the unit of safety engineers in determining the safety of tunnel construction and mine operation, the division shall make available at least one **industrial hygiene** engineer and one chemist. A laboratory for analysis of dust, gas, vapors, soil, or other materials shall be available to members of this unit. Contracts to provide for geological and other services may be signed by the division whenever it is necessary to assure safety for employees engaged in mining or tunnel work.

(Added by Stats. 1972, Ch. 1430.)

CALIFORNIA STATUTES

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LABOR CODE – LAB

DIVISION 5. SAFETY IN EMPLOYMENT [6300. - 9104.]

(Division 5 enacted by Stats. 1937, Ch. 90.)

PART 9. TUNNEL AND MINE SAFETY [7950. - 8004.]

(Part 9 added by Stats. 1972, Ch. 1430.)

CHAPTER 2. Gassy and Extrahazardous Tunnels [7965. - 7985.]

(Chapter 2 added by Stats. 1972, Ch. 1430.)

7979.

In tunnels or underground mines classified extrahazardous, sufficient air shall be supplied to maintain an atmosphere of all of the following conditions:

- (a) Not less than 19 percent oxygen.
- (b) Not more than 0.5 percent carbon dioxide.
- (c) Not more than 5 parts per million nitrogen dioxide.
- (d) No petroleum vapors or other toxic gases in concentrations exceeding the threshold limit values established annually by the **American Conference of Governmental Industrial Hygienists.**

(Added by Stats. 1972, Ch. 1430.)

CALIFORNIA STATUTES

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LABOR CODE – LAB

DIVISION 5. SAFETY IN EMPLOYMENT [6300. - 9104.]

(Division 5 enacted by Stats. 1937, Ch. 90.)

PART 10. USE OF CARCINOGENS [9000. - 9061.]

(Part 10 added by Stats. 1985, Ch. 947, Sec. 2.)

CHAPTER 3. Standards and Administration [9020. - 9022.]

(Chapter 3 added by Stats. 1985, Ch. 947, Sec. 2.)

9021.5.

(a) Not later than January 1, 1987, the Division of Occupational Safety and Health shall propose a regulation concerning asbestos-related work, as defined in Section 6501.8, to the Occupational Safety and Health Standards Board for review and adoption so as to protect most effectively the health and safety of employees. The regulation shall also include, but not be limited to, specific work practices and specific requirements for certification of all employees engaged in asbestos-related work.

(b) (1) Not later than July 1, 1991, the Division of Occupational Safety and Health shall propose regulations for the certification of asbestos consultants and site surveillance technicians to the Occupational Safety and Health Standards Board for consideration and action. By January 1, 1992, the board shall adopt regulations regarding certification. The regulations shall address and encompass procedures to determine the requirements for the certification provided for by Article 11 (commencing with Section 7180) of Chapter 9 of Division 3 of the Business and Professions Code. The division shall prepare and administer an examination to determine qualifications for certification pursuant to subdivision (b) of Section 7184 and subdivision (c) of Section 7185 of the Business and Professions Code. The examination shall be administered on a periodic, regularly scheduled basis.

(2) The division may, in lieu of preparing and administering its own certification examination, approve one or more public or private institutions which offer programs in asbestos abatement training to prepare and administer the examination described in subdivision (b) of Section 7184 and subdivision (c) of Section 7185 of the Business and Professions Code. However, the division shall not approve any institution, organization, individual, or other entity for administering a certification examination if that institution, organization, individual or other entity engages, for compensation, in any aspect of asbestos abatement work. For purposes of developing or approving a certification examination pursuant to this section, the division shall consult with an advisory committee of individuals who have academic and professional experience in asbestos

abatement work, including a **certified industrial hygienist**, representatives of asbestos abatement workers, and asbestos abatement contractors.

(c) This section does not exempt any employer from complying with the Hazardous Substances Information and Training Act (Chapter 2.5 (commencing with Section 6360) of Part 1 of Division 5 of this code) and regulations adopted thereunder, nor does it exempt any employer from complying with Section 5208 of Title 8 of the California Administrative Code. For products not requiring contractor certification pursuant to subdivision (a) of Section 7058.5 of the Business and Professions Code, training and certification of employees shall be done by the employer.

CALIFORNIA REGULATIONS

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TITLE 2. ADMINISTRATION

DIVISION 2. FINANCIAL OPERATIONS

CHAPTER 3. DEPARTMENT OF GENERAL SERVICES

SUBCHAPTER 1. DEPARTMENT OF GENERAL SERVICES – CONFLICT OF INTEREST CODE

Appendix A

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CSA III (7446)	9
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Associate <u>Industrial Hygienist</u> (3856)	9
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CALIFORNIA REGULATIONS

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TITLE 3. FOOD AND AGRICULTURE

DIVISION 6. PESTICIDES AND PEST CONTROL OPERATIONS

CHAPTER 1. PESTICIDE REGULATORY PROGRAM

ARTICLE 1. DEFINITIONS FOR DIVISION 6

§ 6000. Definitions.

“Agricultural commodity,” means an unprocessed product of farms, ranches, nurseries and forests (except livestock, poultry and fish). Agricultural commodities include fruits and vegetables; grains, such as wheat, barley, oats, rye, triticale, rice, corn and sorghum; legumes, such as field beans and peas; animal feed and forage crops; rangeland and pasture; seed crops; fiber crops such as cotton; oil crops such as safflower, sunflower, corn and cottonseed; trees grown for lumber and wood products; nursery stock grown commercially; Christmas trees; ornamentals and cut flowers; and turn grown commercially for sod.

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“Respirator program administrator” is a person who is qualified by appropriate training or experience that is commensurate with the complexity of the respiratory protection program, and demonstrates knowledge necessary to administer a respiratory protection program. Such training or experience includes, but is not limited to, reading and understanding either the American National Standard for Respiratory Protection Publication (ANSI Z88.2), or the U.S. Department of Labor's “Small Entity Compliance Guide for the Revised Respiratory Protection Standard”; or taken specific course work on developing a respiratory protection program from a college or a respirator manufacturer's authorized representative; or is an **American Board of Industrial Hygiene Certified Industrial Hygienist**.

“Restricted entry interval” (REI) means the period of time after a field is treated with a pesticide during which restrictions on entry are in effect to protect persons from potential exposure to hazardous levels of residues. An REI may be found on pesticide product labeling or in regulation.

CALIFORNIA REGULATIONS

[HTTP://GOVERNMENT.WESTLAW.COM/LINKEDSLICE/SEARCH/DEFAULT.ASP?TEMPINFO=WORD&RS=GVT1.0&VR=2.0&SP=CCR-1000](http://government.westlaw.com/linkedslice/search/default.asp?tempinfo=word&rs=gvt1.0&vr=2.0&sp=CCR-1000)

TITLE 4. BUSINESS REGULATIONS

DIVISION 11. CALIFORNIA POLLUTION CONTROL FINANCING AUTHORITY

ARTICLE 6. ENVIRONMENTAL ASSESSMENT

§ 8060. Environmental Assessment.

A. SCOPE OF APPLICANT'S "REASONABLE INQUIRY"

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4. Building Materials & Components

(a) Were any of the structures on the Subject Property constructed, remodeled, or renovated between the years of 1920 and 1980? Yes No If yes, please describe the construction, remodeling or renovation:

(b) Do any of the structures or improvements on the Subject Property contain asbestos materials (whether incorporated in structures or stored on site) such as ceiling tiles, flooring, insulation, furnace protection, fireproofing materials, duct tape, etc.?

Yes No Do not know

If yes, please describe (including age, condition and location):

(c) Has an asbestos expert or industrial hygienist inspected the Subject Property?

Yes No

If yes, attach the report as Attachment G.

(d) Are there any transformers, capacitors or other electrical equipment in use or stored on site?

Yes No Do not know

CALIFORNIA REGULATIONS

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS CHAPTER 4. DIVISION OF INDUSTRIAL SAFETY SUBCHAPTER 4. CONSTRUCTION SAFETY ORDERS ARTICLE 4. DUSTS, FUMES, MISTS, VAPORS, AND GASES

§ 1529. Asbestos

(a) Scope and application.

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(b) Definitions.

“Aggressive-method” means removal or disturbance of building material by sanding, abrading, grinding or other method that breaks, crumbles, or disintegrates intact ACM.

“Amended water” means water to which surfactant (wetting agent) has been added to increase the ability of the liquid to penetrate ACM.

“Asbestos” includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that has been chemically treated and/or altered. For purposes of this standard, “asbestos” includes PACM, as defined below.

“Asbestos-containing material (ACM)”, means any material containing more than one percent asbestos.

“Assistant Secretary” means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

“Authorized person” means any person authorized by the employer and required by work duties to be present in regulated areas.

“Building/facility owner” is the legal entity, including a lessee, which exercises control over management and record keeping functions relating to a building and/or facility in which activities covered by this standard take place.

“Certified Industrial Hygienist (CIH)” means one certified in the practice of industrial hygiene by the American Board of Industrial Hygiene.

“Chief” means the Chief of the Division of Occupational Safety and Health, P.O. Box 420603, San Francisco, CA 94142.

“Class I asbestos work” means activities involving the removal of TSI and surfacing ACM and PACM.

“Class II asbestos work” means activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

“Class III asbestos work” means repair and maintenance operations, where “ACM”, including TSI and surfacing ACM and PACM, is likely to be disturbed.

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“Glovebag” means an impervious plastic bag-like enclosure affixed around not more than a 60 x 60 inch asbestos-containing material, with glove-like appendages through which material and tools may be handled.

“High-efficiency particulate air (HEPA) filter” means a filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter.

“Homogeneous area” means an area of surfacing material or thermal system insulation that is uniform in color and texture.

“Industrial hygienist” means a professional qualified by education, training, and experience to anticipate, recognize, evaluate and develop controls for occupational health hazards.

“Intact” means that the ACM has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix.

“Modification” for purposes of subsection (g)(6), means a changed or altered procedure, material or component of a control system, which replaces a procedure, material or component of a required system. Omitting a procedure or component, or reducing or

diminishing the stringency or strength of a material or component of the control system is not a “modification” for purposes of subsection (g)(6) of this section.

.....

(B) An employer or owner may demonstrate that PACM does not contain more than 1% asbestos by the following:

1. Having completed an inspection conducted pursuant to the requirements of AHERA (40 CFR Part 763, Subpart E) which demonstrates that the material is not ACM or;
2. Performing tests of the material containing PACM which demonstrate that no ACM is present in the material. Such tests shall include analysis of bulk samples collected in the manner described in 40 CFR 763.86. The tests, evaluation and sample collection shall be conducted by an accredited inspector or by a **CIH**. Analysis of samples shall be performed by persons or laboratories with proficiency demonstrated by current successful participation in a nationally recognized testing program such as the National Voluntary Laboratory Accreditation Program (NVLAP) or the National Institute for Standards and Technology (NIST) or the **Round Robin for bulk samples administered by the American Industrial Hygiene Association (AIHA)** or an equivalent nationally-recognized round robin testing program.

(C) The employer and/or building owner may demonstrate that flooring material including associated mastic and backing does not contain asbestos, by a determination of an **industrial hygienist** based upon recognized analytical techniques showing that the material is not ACM.

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APPENDIX A

OSHA Reference Method Mandatory

This mandatory appendix specifies the procedure for analyzing air samples for asbestos and specifies quality control procedures that must be implemented by laboratories performing the analysis. The sampling and analytical methods described below represent the elements of the available monitoring methods (such as appendix B to this section, the most current version of the OSHA method ID-60, or the most current version of the NIOSH 7400 method) which OSHA considers to be essential to achieve adequate employee exposure monitoring while allowing employers to use methods that are already established within their organizations. All employers who are required to conduct air monitoring under subsection (f) of this section are required to utilize analytical

laboratories that use this procedure, or an equivalent method, for collecting and analyzing samples.

Sampling and Analytical Procedure

1. The sampling medium for air samples shall be mixed cellulose ester filter membranes. These shall be designated by the manufacturer as suitable for asbestos counting. See below for rejection of blanks.
2. The preferred collection device shall be the 25-mm diameter cassette with an open-faced 50-mm extension cowl. The 37-mm cassette may be used if necessary but only if written justification for the need to use the 37-mm filter cassette accompanies the sample results in the employee's exposure monitoring record. Do not reuse or reload cassettes for asbestos sample collection.
3. An air flow rate between 0.5 liter/min and 2.5 liters/min shall be selected for the 25-mm cassette. If the 37-mm cassette is used, an air flow rate between 1 liter/min and 2.5 liters/min shall be selected.
4. Where possible, a sufficient air volume for each air sample shall be collected to yield between 100 and 1,300 fibers per square millimeter on the membrane filter. If a filter darkens in appearance or if loose dust is seen on the filter, a second sample shall be started.
5. Ship the samples in a rigid container with sufficient packing material to prevent dislodging the collected fibers. Packing material that has a high electrostatic charge on its surface (e.g., expanded polystyrene) cannot be used because such material can cause loss of fibers to the sides of the cassette.
6. Calibrate each personal sampling pump before and after use with a representative filter cassette installed between the pump and the calibration devices.
7. Personal samples shall be taken in the "breathing zone" of the employee (i.e., attached to or near the collar or lapel near the worker's face).

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Quality Control Procedures

1. Intra-laboratory program. Each laboratory and/or each company with more than one microscopist counting slides shall establish a statistically designed quality assurance program involving blind recounts and comparisons between microscopists to monitor the variability of counting by each microscopist and between microscopists. In a company with more than one laboratory, the program shall include all laboratories and shall also evaluate the laboratory-to-laboratory variability.

2. a. Interlaboratory program. Each laboratory analyzing asbestos samples for compliance determination shall implement an interlaboratory quality assurance program that as a minimum includes participation of at least two other independent laboratories. Each laboratory shall participate in round robin testing at least once every 6 months with at least all the other laboratories in its interlaboratory quality assurance group. Each laboratory shall submit slides typical of its own work load for use in this program. The round robin shall be designed and results analyzed using appropriate statistical methodology.

b. All laboratories should participate in a national sample testing scheme such as the **Proficiency Analytical Testing Program (PAT), the Asbestos Registry sponsored by the American Industrial Hygiene Association (AIHA).**

3. All individuals performing asbestos analysis must have taken the NIOSH course for sampling and evaluating airborne asbestos dust or an equivalent course.

4. When the use of different microscopes contributes to differences between counters and laboratories, the effect of the different microscopes shall be evaluated and the microscopes shall be replaced, as necessary.

5. Current results of these quality assurance programs shall be posted in each laboratory to keep the microscopists informed.

Part II. New Fit Test Protocols

A. Any person may submit to OSHA an application for approval of a new fit test protocol. If the application meets the following criteria, OSHA will initiate a rulemaking proceeding under section 6(b)(7) of the OSH Act to determine whether to list the new protocol as an approved protocol in this Appendix A.

B. The application must include a detailed description of the proposed new fit test protocol. This application must be supported by either:

1. A test report prepared by an independent government research laboratory (e.g., Lawrence Livermore National Laboratory, Los Alamos National Laboratory, the National Institute for Standards and Technology) stating that the laboratory has tested the protocol and had found it to be accurate and reliable; or

2. An article that has been published in a peer-reviewed **industrial hygiene** journal describing the protocol and explaining how test data support the protocol's accuracy and reliability.

C. If OSHA determines that additional information is required before the Agency commences a rulemaking proceeding under this section, OSHA will so notify the applicant and afford the applicant the opportunity to submit the supplemental

information. Initiation of a rulemaking proceeding will be deferred until OSHA has received and evaluated the supplemental information. Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Appendix B.

Sampling and Analysis (Non-mandatory)

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6.3.1. Acetone (HPLC grade).

6.3.2. Triacetin (glycerol triacetate).

6.3.3. Lacquer or nail polish.

6.4. Standard Preparation

A way to prepare standard asbestos samples of known concentration has not been developed. It is possible to prepare replicate samples of nearly equal concentration. This has been performed through the PAT program. These asbestos samples are distributed by the **AIHA to participating laboratories.**

Since only about one-fourth of a 25-mm sample membrane is required for an asbestos count, any PAT sample can serve as a “standard” for replicate counting.

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Appendix B.

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7.3. Recount Calculations

As mentioned in step 13 of Section 6.6.2., a “blind recount” of 10% of the slides is performed. In all cases, differences will be observed between the first and second counts of the same filter wedge. Most of these differences will be due to chance alone, that is, due to the random variability (precision) of the count method. Statistical recount criteria enables one to decide whether observed differences can be explained due to chance alone or are probably due to systematic differences between analysts, microscopes, or other biasing factors.

The following recount criterion is for a pair of counts that estimate AC in fibers/cc. The criterion is given at the type-I error level. That is, there is 5% maximum risk that we will reject a pair of counts for the reason that one might be biased, when the large observed difference is really due to chance.

Reject a pair of counts if:

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Where:

AC(1) = lower estimated airborne fiber concentration AC(2) = higher estimated airborne fiber concentration AC(avg) = average of the two concentration estimates CV(FB) = CV for the average of the two concentration estimates

If a pair of counts are rejected by this criterion then, recount the rest of the filters in the submitted set. Apply the test and reject any other pairs failing the test. Rejection shall include a memo to the **industrial hygienist** stating that the sample failed a statistical test for homogeneity and the true air concentration may be significantly different than the reported value.

7.4. Reporting Results

Report results to the **industrial hygienist** as fibers/cc. Use two significant figures. If multiple analyses are performed on a sample, an average of the results is to be reported unless any of the results can be rejected for cause.

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS

CHAPTER 4. DIVISION OF INDUSTRIAL SAFETY

SUBCHAPTER 7. GENERAL INDUSTRY SAFETY ORDERS

ARTICLE 109. HAZARDOUS SUBSTANCES AND PROCESSES

APPENDIX A

Diacetyl Sampling and Analytical Protocol (Mandatory)

This appendix establishes requirements for sampling protocols and the procedure for taking and analyzing air samples for diacetyl including quality control procedures that must be implemented by the person conducting the sampling and by the laboratories performing the analysis. All employers who are required to conduct air monitoring under subsection (c) of this section are required to utilize analytical laboratories that use this procedure, or an equivalent method, for collecting and analyzing samples.

(a) Sampling Protocols.

(1) Personal Samples

(A) 8-hour time-weighted average. Due to the limited sampling time for the OSHA Method, eight-hour time-weighted average (TWA) exposure estimates must be constructed for each employee. Collect sequential samples as recommended by the OSHA Method or an equivalent method for periods no longer than 180 minutes per sample to cover the full work-shift of the employee. For an eight-hour work shift, this will include the collection of a minimum of three dual-tube samples for each employee unless the full duration of the employee's exposure to diacetyl or diacetyl-containing flavorings or food products is less than the full work shift. Cleaning and sanitizing activities must be sampled separately from production processes.

.....

(b) Sampling Procedure.

(C) Each set of samples taken will include 10% field blanks or a minimum of one field blank, whichever is greater. These blanks must come from the same lot as the tubes used for sample collection. Handle the blank sample in the same manner as the other samples except draw no air through it. A set consists of any sample or group of samples for which an evaluation for this standard must be made. Any samples represented by a field blank having an excess of the limit of detection (LOD) of the method being used shall be rejected, and additional sampling conducted to represent that exposure.

(c) Analytical Procedures.

1) All samples shall be analyzed by a laboratory accredited in accordance with the program of the American Association for Laboratory Accreditation, the **American Industrial Hygiene Association (AIHA) → Laboratory Accreditation Programs**, LLC or other International Laboratory Accreditation Cooperation mutual recognition signatory.

(2) The laboratory shall analyze all samples using the OSHA Method or an equivalent method.

(3) Each sampling tube shall be analyzed separately, and the results recorded. For each sampling tube, the employer shall ensure that the record includes the date, time, location and identity of the process being sampled, the name and employee identifier of the employee being sampled, the employee's job classification, the specific job duties of the employee, and the mass collected from the tube. The records for each dual-tube sample shall include the measured air concentration from the dual-tube samples, the method RQL for the sample, field evidence of its accuracy, including ambient temperature and humidity, and any comments from the analytical laboratory pertaining to the accuracy of the sample. The record for short term exposure samples shall also identify the specific activity being sampled.

(4) All laboratories as part of their accreditation shall participate in an appropriate national sample testing scheme such as the **Proficiency Analytical Testing Program (PAT) for organics that is sponsored by the American Industrial Hygiene Association (AIHA)**.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS

CHAPTER 4. DIVISION OF INDUSTRIAL SAFETY

SUBCHAPTER 7. GENERAL INDUSTRY SAFETY ORDERS

GROUP 16. CONTROL OF HAZARDOUS SUBSTANCES

ARTICLE 107. DUSTS, FUMES, MISTS, VAPORS AND GASES

§ 5155. Airborne Contaminants.

(a) Scope and Application.

(1) This section establishes requirements for controlling employee exposure to airborne contaminants and skin contact with those substances which are readily absorbed through the skin and are designated by the "S" notation in Table AC-1 at all places of employment in the state.

(2) When this section references another section for controlling employee exposures to a particular airborne contaminant, the provisions of this section for such substance shall apply only to those places of employment which are exempt from the other standard.

Exception: The provisions for strontium chromate contained in this section shall continue to apply in all workplaces and shall be in addition to the requirements stated in Sections 1532.2, 5206, and 8359. The provisions for strontium chromate contained in this section shall continue to apply in all workplaces and shall be in addition to the requirements stated in Sections 1532.2, 5206, and 8359.

Note: Table AC-1 of this section presents concentration limits for airborne contaminants to which nearly all workers may be exposed daily during a 40-hour workweek for a working lifetime without adverse effect. Because of some variation in individual susceptibility, an occasional worker may suffer discomfort, aggravation of a pre-existing condition, or occupational disease upon exposure to concentrations even below the values specified in these tables. The exposure limits established by this section reflect current medical opinion and **industrial hygiene** practice, doubts being resolved on the side of safety, and are intended to be used in accordance with good **industrial hygiene** practice by qualified persons. The division recognizes the need for almost continuous review of these concentration limits and also anticipates the need for including new or additional

substances. Harmful exposure to any substances not listed in this section shall be controlled in accordance with section 5141.

(b) Definitions.

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(e) Workplace Monitoring.

(1) Whenever it is reasonable to suspect that employees may be exposed to concentrations of airborne contaminants in excess of levels permitted in section 5155(c), the employer shall monitor (or cause to have monitored) the work environment so that exposures to employees can be measured or calculated.

(2) When exposures to airborne contaminants are found or are expected to exceed allowable levels, measures to control such harmful exposures shall be instituted in accordance with section 5141.

(3) For the adequate protection of employees, the person supervising, directing or evaluating the monitoring and control methods shall be versed in this standard and shall be competent in **industrial hygiene** practice.

Note: To facilitate the detection of conditions leading to serious overexposures, the screening of the work environment by any person authorized by the employer, using appropriate measuring devices, is encouraged.

(4) All monitoring results shall be recorded and such records shall be retained in accordance with section 3204.

(f) Medical Surveillance. A medical surveillance program approved by the division may be required to ensure satisfactory maintenance of employee health and to ascertain the effectiveness of the control method(s).

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS CHAPTER 4. DIVISION OF INDUSTRIAL SAFETY SUBCHAPTER 7. GENERAL INDUSTRY SAFETY ORDERS GROUP 16. CONTROL OF HAZARDOUS SUBSTANCES ARTICLE 109. HAZARDOUS SUBSTANCES AND PROCESSES

§ 5191. Occupational Exposure to Hazardous Chemicals in Laboratories.

(a) Scope and application.

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(4) It is listed in either Group 2A or 2B by IARC or under the category, “reasonably anticipated to be carcinogens” by NTP, and causes statistically significant tumor incidence in experimental animals in accordance with any of the following criteria:

(A) After inhalation exposure of 6-7 hours per day, 5 days per week, for a significant portion of a lifetime to dosages of less than 10 mg/m³;

(B) After repeated skin application of less than 300 mg/kg of body weight per week; or

(C) After oral dosages of less than 50 mg/kg of body weight per day.

(c) Exposure limits. For laboratory uses of Cal/OSHA regulated substances, the employer shall ensure that laboratory employees' exposures to such substances do not exceed the exposure limits specified in Title 8, California Code of Regulations, Group 16, Section 5139 et seq., of the General Industry Safety Orders.

(d) Employee exposure determination

(1) Initial monitoring. The employer shall measure the employee's exposure to any substance regulated by a standard which requires monitoring if there is reason to believe that exposure levels for that substance exceed the action level (or in the absence of an action level, the exposure limit). The person supervising, directing or evaluating the monitoring shall be competent in **industrial hygiene** practice.

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Appendix A. Diacetyl Sampling and Analytical Protocol (Mandatory)

This appendix establishes requirements for sampling protocols and the procedure for taking and analyzing air samples for diacetyl including quality control procedures that must be implemented by the person conducting the sampling and by the laboratories performing the analysis. All employers who are required to conduct air monitoring under subsection (c) of this section are required to utilize analytical laboratories that use this procedure, or an equivalent method, for collecting and analyzing samples.

(a) Sampling Protocols.

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(b) Sampling Procedure.

(1) Samples shall be collected using a personal sampling pump calibrated prior to and after each day of sampling, with a representative sampling train attached between the pump and the calibration device, to within $\pm 5\%$ of the recommended flow rate specified in the OSHA Method or in the equivalent method selected. In the OSHA Method the tubes must be wrapped in aluminum foil (or a special tube cover used) to protect the sampling devices from light, especially sunlight, during sampling, storage and handling.

(2) Review and follow the sampling procedures in the OSHA Method or in the equivalent method selected. The sampling procedure shall also include the following:

(A) Record sample air volumes (liters), sampling time (minutes) and sampling rate (mL/min) for each sample, along with any potential interference(s) on a sample summary form.

(B) Personal samples shall be taken in the “breathing zone” of the employee (i.e., attached near the collar or lapel near the worker's face). The sampler inlet shall be located outside of the respirator, and outside of any personal protective equipment or clothing, and there shall be no impediment to airflow into the sampler.

(C) Each set of samples taken will include 10% field blanks or a minimum of one field blank, whichever is greater. These blanks must come from the same lot as the tubes used for sample collection. Handle the blank sample in the same manner as the other samples except draw no air through it. A set consists of any sample or group of samples for which an evaluation for this standard must be made. Any samples represented by a field blank having an excess of the limit of detection (LOD) of the method being used shall be rejected, and additional sampling conducted to represent that exposure.

(c) Analytical Procedures.

(1) All samples shall be analyzed by a laboratory accredited in accordance with the program of the **American Association for Laboratory Accreditation**.

(2) The laboratory shall analyze all samples using the OSHA Method or an equivalent method.

(3) Each sampling tube shall be analyzed separately, and the results recorded. For each sampling tube, the employer shall ensure that the record includes the date, time, location and identity of the process being sampled, the name and employee identifier of the employee being sampled, the employee's job classification, the specific job duties of the employee, and the mass collected from the tube. The records for each dual-tube sample shall include the measured air concentration from the dual-tube samples, the method RQL for the sample, field evidence of its accuracy, including ambient temperature and humidity, and any comments from the analytical laboratory pertaining to the accuracy of the sample. The record for short term exposure samples shall also identify the specific activity being sampled.

(4) All laboratories as part of their accreditation shall participate in an appropriate national sample testing scheme such as the **Proficiency Analytical Testing Program (PAT) for organics that is sponsored by the American Industrial Hygiene Association (AIHA).**

Appendix A - National Research Council

Recommendations Concerning Chemical Hygiene in Laboratories (Non-Mandatory)

Foreword

As guidance for each employer's development of an appropriate laboratory Chemical Hygiene Plan, the following non-mandatory recommendations are provided. They were extracted from "Prudent Practices for Handling Hazardous Chemicals in Laboratories" (referred to below as "Prudent Practices"), which was published in 1981 by the National Research Council and is available from the National Academy Press, 2101 Constitution Ave., NW., Washington DC 20418.

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In this appendix, those recommendations directed primarily at administrators and supervisors are given in sections A - D. Those recommendations of primary concern to employees who are actually handling laboratory chemicals are given in section E. (Reference to page numbers in "Prudent Practices" are given in parentheses.)

A. General Principles for Work with Laboratory Chemicals

In addition to the more detailed recommendations listed below in sections B-E, “Prudent Practices” expresses certain general principles, including the following:

1. It is prudent to minimize all chemical exposures. Because few laboratory chemicals are without hazards, general precautions for handling all laboratory chemicals should be adopted, rather than specific guidelines for particular chemicals (2,10). Skin contact with chemicals should be avoided as a cardinal rule (198).
2. Avoid underestimation of risk. Even for substances of no known significant hazard, exposure should be minimized; for work with substances which present special hazards, special precautions should be taken (10, 37, 38). One should assume that any mixture will be more toxic than its most toxic component (30, 103) and that all substances of unknown toxicity are toxic (3, 34).
3. Provide adequate ventilation. The best way to prevent exposure to airborne substances is to prevent their escape into the working atmosphere by use of hoods and other ventilation devices (32, 198).
4. Institute a chemical hygiene program. A mandatory chemical hygiene program designed to minimize exposures is needed; it should be a regular, continuing effort, not merely a standby or short-term activity (6,11). Its recommendations should be followed in academic teaching laboratories as well as by full-time laboratory workers (13).
5. Observe the exposure limits and TLVs. The Exposure limits of Cal/OSHA and the Threshold Limit Values of the **American Conference of Governmental Industrial Hygienists** should not be exceeded (13).

B. Chemical Hygiene Responsibilities

Responsibility for chemical hygiene rests at all levels (6, 11, 21) including the:

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Appendix B

References (Non-Mandatory)

The following references are provided to assist the employer in the development of a Chemical Hygiene Plan. The materials listed below are offered as non-mandatory guidance. References listed here do not imply specific endorsement of a book, opinion, technique, policy or a specific solution for a safety or health problem. Other references not listed here may better meet the needs of a specific laboratory.

(a) Materials for the development of the Chemical Hygiene Plan:

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12. Young, Jay A., Ed., Improving Safety in the Chemical Laboratory, John Wiley & Sons, Inc. New York, 1987.

(b) Hazardous Substances Information:

1. **American Conference of Governmental Industrial Hygienists**. Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment with Intended Changes, 6500 Glenway Avenue, Building D-7, Cincinnati, OH 45211-4438 (latest edition).

2. Annual Report on Carcinogens, National Toxicology Program , U.S. Department of Health and Human Services, Public Health Service, U.S. Government Printing Office, Washington, DC. (1985 edition).

3. Best Company, Best Safety Directory, Vols. I and II, Oldwick, N.J. 1981.

4. Bretherick, L., Handbook of Reactive Chemical Hazards, 2nd edition, Butterworths, London, 1979.

5. Bretherick, L., Hazards in the Chemical Laboratory, 3rd edition, Royal Society of Chemistry, London, 1986.

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(c) Information on Ventilation:

1. **American Conference of Governmental Industrial Hygienists** Industrial Ventilation. (latest edition), 6500 Glenway Avenue, Building D-7, Cincinnati, OH 45211-4438.

2. American National Standards Institute, Inc. American National Standards Fundamentals Governing the Design and Operation of Local Exhaust Systems ANSI Z 9.2-1979 American National Standards Institute, N.Y. 1979.

3. Imad, A.P. and Watson, C.L. Ventilation Index: An Easy Way to Decide about Hazardous Liquids, Professional Safety pp. 15-18, April 1980.

4. National Fire Protection Association, Fire Protection for Laboratories Using Chemicals NFPA-45, 1982.

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS CHAPTER 4. DIVISION OF INDUSTRIAL SAFETY SUBCHAPTER 7. GENERAL INDUSTRY SAFETY ORDERS GROUP 16. CONTROL OF HAZARDOUS SUBSTANCES ARTICLE 110. REGULATED CARCINOGENS

Appendix F: Nonmandatory Protocol for Biological Monitoring

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1. General Discussion

1.1. Background

1.1.1. History or procedure

Creatinine has been analyzed by several methods in the past. The earliest methods were of the wet chemical type. As an example, creatinine reacts with sodium picrate in basic solution to form a red complex, which is then analyzed colorimetrically (Refs. 5.1 and 5.2).

Since **industrial hygiene** laboratories will be analyzing for Cd and B2M in urine, they will be normalizing those concentrations to the concentration of creatinine in urine. A literature search revealed several HPLC methods (Refs. 5.3., 5.4., 5.5. and 5.6) for creatinine in urine and because many **industrial hygiene** laboratories have HPLC equipment, it was desirable to develop an **industrial hygiene** HPLC method for creatinine in urine. The method of Hausen, Fuchs, and Wachter was chosen as the starting point for method development, SEP-PAKs were used for sample clarification and cleanup in this method to protect the analytical column. The urine aliquot which has been passed through the SEP-PAK is then analyzed by reverse-phase HPLC using ion-pair techniques.

This method is very similar to that of Ogata and Taguchi (Ref. 5.6.) except they used centrifugation for sample clean-up. It is also of note that they did a comparison of their HPLC results to those of the Jaffe method (a picric acid method commonly used in the health care industry) and found a linear relationship of close to 1:1. This indicates that

either HPLC or colorimetric methods may be used to measure creatinine concentrations in urine.

1.1.2. Physical properties (Ref 5.7.)

Molecular weight: 113.12

Molecular formula: C₄-H₇-N₃-O

Chemical name: 2-amino-1.5-dihydro-1-methyl-4H-imidazol-4- one

CAS#: 60-27-5

Melting point: 300>C (decomposes)

Appearance: white powder

Solubility: soluble in water; slightly soluble in alcohol; practically insoluble in acetone, ether, and chloroform

Synonyms: 1-methylglycocyamidine, 1-methylhydation-2- imide

Structure: see Figure #1

1.2. Advantages

1.2.1. This method offers a simple, straightforward, and specific alternative method to the Jaffe method.

1.2.2. HPLC instrumentation is commonly found in many **industrial hygiene** laboratories.

2. Sample Stabilization Procedure

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4. Conclusions

The determination of creatinine in urine by HPLC is a good alternative to the Jaffe method for **industrial hygiene** laboratories. Sample clarification with SEP-PAKs did not change the amount of creatinine found in urine samples. However, it does protect the analytical column. The results of this creatinine in urine procedure are unaffected by the pH of the urine sample under the conditions tested by this procedure. Therefore, no special measure are required for creatinine analysis whether the urine sample has been

stabilized with 10% nitric acid for the Cd analysis or brought to a pH of 7 with 0.11 NaOH for the B2M analysis.

Appendix D: 5208. Asbestos.

(a) Scope and application -

(1) This section applies to all occupational exposures to asbestos in all industries covered by the California Occupational Safety and Health Act, except as provided in subsection (a)(2) and (3) of this section.

(2) This section does not apply to construction work as defined in Section 1502, except for the spraying of asbestos containing material in subsection 5208(f)(1)(J). (Exposure to asbestos in construction work other than spraying is covered by Section 1529).

(3) This section does not apply to ship repairing, shipbuilding and shipbreaking employments and related employments as defined in Section 8354: Definitions. (Exposure to asbestos in these employments is covered by Section 8358).

(4) Whenever employee exposure to asbestos as defined in subsection (b) of this section consists only of exposure to tremolite, anthophyllite, and actinolite in the non-asbestiform mineral habit, the provisions of section 5208.1 shall apply and supersede the provisions of this section.

(5) The provisions of this section are subject to the requirements of the Occupational Carcinogen Control Act of 1976 (Labor Code, Division 5, Part 10).

(b) Definitions -

“Asbestos” includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that have been chemically treated and/or altered.

“Asbestos-containing material (ACM)” means any material containing more than 1% asbestos.

“Chief” means the Chief of the Division of Occupational Safety and Health, California Department of Industrial Relations.

“Authorized person” means any person authorized by the employer and required by work duties to be present in regulated areas.

“Building/facility owner” is the legal entity, including a lessee, which exercises control over management and record keeping functions relating to a building and/or facility in which activities covered by this standard take place.

“**Certified Industrial Hygienist (CIH)**” means one certified in the practice of **industrial hygiene** by the **American Board of Industrial Hygiene**.

“Director” means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

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(c) Permissible exposure limit (PELS) -

(1) Time-weighted average limit (TWA): The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1 fiber per cubic centimeter (0.1 f/cc) of air as an eight (8)-hour time-weighted average (TWA) as determined by the method prescribed in Appendix A to this section, or by an equivalent method.

(2) Excursion limit: The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1.0 fiber per cubic centimeter of air (1 f/cc) as averaged over a sampling period of thirty (30) minutes as determined by the method prescribed in Appendix A to this section, or by an equivalent method.

(d) Exposure monitoring -

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(B) An employer or owner may demonstrate that PACM does not contain asbestos by the following:

1. Having a completed inspection conducted pursuant to the requirements of AHERA (40 CFR 763, Subpart E) which demonstrates that no ACM is present in the material; or

2. Performing tests of the material containing PACM which demonstrate that no ACM is present in the material. Such tests shall include analysis of bulk samples in the manner described in 40 CFR 763.86. The tests, evaluation and sample collection shall be conducted by an accredited inspector or by a **CIH**. Analysis of samples shall be performed by persons or laboratories with proficiency demonstrated by current successful participation in a nationally recognized testing program such as the National Voluntary Laboratory Accreditation Program (NVLAP) or the National Institute for Standards and Technology (NIST) or the **Round Robin for bulk samples administered by the**

American Industrial Hygiene Association (AIHA) or an equivalent nationally recognized round robin testing program.

(C) The employer and/or building owner may demonstrate that flooring material including associated mastic and backing does not contain asbestos, by a determination of an industrial hygienist based upon recognized analytical techniques showing that the material is not ACM.

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Appendix A

OSHA Reference Method Mandatory

This mandatory appendix specifies the procedure for analyzing air samples for asbestos, tremolite, anthophyllite, and actinolite and specifies quality control procedures that must be implemented by laboratories performing the analysis. The sampling and analytical methods described below represent the elements of the available monitoring methods (such as appendix B to this section, the most current version of the OSHA method ID-60, or the most current version of the NIOSH 7400 method) which OSHA considers to be essential to achieve adequate employee exposure monitoring while allowing employers to use methods that are already established within their organizations. All employers who are required to conduct air monitoring under subsection (d) of this section are required to utilize analytical laboratories that use this procedure, or an equivalent method, for collecting and analyzing samples.

Sampling and Analytical Procedure

1. The sampling medium for air samples shall be mixed cellulose ester filter membranes. These shall be designated by the manufacturer as suitable for asbestos, tremolite, anthophyllite, and actinolite counting. See below for rejection of blanks.

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Quality Control Procedures

1. Intra-laboratory program. Each laboratory and/or each company with more than one microscopist counting slides shall establish a statistically designed quality assurance program involving blind recounts and comparisons between microscopists to monitor the variability of counting by each microscopist and between microscopists. In a company with more than one laboratory, the program shall include all laboratories and shall also evaluate the laboratory-to-laboratory variability.

2. a. Interlaboratory program. Each laboratory analyzing asbestos, tremolite, anthophyllite, and actinolite samples for compliance determination shall implement an interlaboratory quality assurance program that as a minimum includes participation of at least two other independent laboratories. Each laboratory shall participate in round robin testing at least once every 6 months with at least all the other laboratories in its interlaboratory quality assurance group. Each laboratory shall submit slides typical of its own work load for use in this program. The round robin shall be designed and results analyzed using appropriate statistical methodology.

b. All laboratories should participate in a national sample testing scheme such as the **Proficiency Analytical Testing Program (PAT), the Asbestos Registry sponsored by the American Industrial Hygiene Association (AIHA).**

3. All individuals performing asbestos, tremolite, anthophyllite, and actinolite analysis must have taken the NIOSH course for sampling and evaluating airborne asbestos, tremolite, anthophyllite, and actinolite dust or an equivalent course.

4. When the use of different microscopes contributes to differences between counters and laboratories, the effect of the different microscope shall be evaluated and the microscope shall be replaced, as necessary.

5. Current results of these quality assurance programs shall be posted in each laboratory to keep the microscopists informed.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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American Conference of Governmental Industrial Hygienists (ACGIH). (1986). *Documentation of the Threshold Limit Values and Biological Exposure Indices*. 5th edition. p. BEI-55.

Bernard A, Buchet J, Roels H, Masson P, and Lauwerys R. (1979). Renal excretion of proteins and enzymes in workers exposed to cadmium. *European Journal of Clinical Investigation*, 9, 11-22.

Bernard A and Lauwerys R. (1990). Early markers of cadmium nephrotoxicity: Biological significance and predictive value. *Toxicological and Environmental Chemistry*, 27, 65-72.

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Appendix E

CADMIUM IN WORKPLACE ATMOSPHERES

Method Number: ID-189

Matrix: Air

OSHA Permissible Exposure Limits:

5. References:

- 5.1. Slavin, W. Graphite Furnace AAS - A Source Book; Perkin-Elmer Corp., Spectroscopy Div.: Ridgefield, CT , 1984; p. 18 and pp. 83-90.
- 5.2. Grosser, Z., Ed.; Techniques in Graphite Furnace Atomic Absorption Spectrophotometry; Perkin-Elmer Corp., Spectroscopy Div.: Ridgefield, CT, 1985.
- 5.3. Occupational Safety and Health Administration Salt Lake Technical Center: Metal and Metalloid Particulate in Workplace Atmospheres (Atomic Absorption) (USDOL/OSHA Method No. ID-121). In OSHA Analytical Methods Manual 2nd ed. Cincinnati, OH: **American Conference of Governmental Industrial Hygienists**, 1991.
- 5.4. Occupational Safety and Health Administration Salt Lake Technical Center: Metal and Metalloid Particulate in Workplace Atmospheres (ICP) (USDOL/OSHA Method No. ID-125G). In OSHA Analytical Methods Manual 2nd ed. Cincinnati, OH: **American Conference of Governmental Industrial Hygienists**, 1991.
- 5.5. Windholz, M., Ed.; The Merck Index, 10th ed.; Merck & Co.: Rahway, NJ, 1983.
- 5.6. Analytical Methods for Atomic Absorption Spectrophotometry, The Perkin-Elmer Corporation: Norwalk, CT, 1982.
- 5.7. Slavin, W., D.C. Manning, G. Carnrick, and E. Pruszkowska: Properties of the Cadmium Determination with the Platform Furnace and Zeeman Background Correction. Spectrochim. Acta 38B:1157-1170 (1983).
- 5.8. Occupational Safety and Health Administration Salt Lake Technical Center: Standard Operating Procedure for Atomic Absorption. Salt Lake City, UT: USDOL/OSHA-SLTC, In progress.
- 5.9. Occupational Safety and Health Administration Salt Lake Technical Center: AAS-HGA Standard Operating Procedure. Salt Lake City, UT: USDOL/OSHA-SLTC, In progress.

5.10. Mandel, J.: Accuracy and Precision, Evaluation and Interpretation of Analytical Results, The Treatment of Outliers. In Treatise On Analytical Chemistry, 2nd ed., Vol.1, edited by I. M. Kolthoff and P. J. Elving. New York: John Wiley and Sons, 1978. pp. 282-285.

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Appendix A

Substance Safety Data Sheet Cadmium

IV. Physician Information

B. Health Effects

The major health effects associated with cadmium overexposure are described below.

3. Lung and Prostate Cancer

The primary sites for cadmium-associated cancer appear to be the lung and the prostate (L-140-50). Evidence for an association between cancer and cadmium exposure derives from both epidemiological studies and animal experiments. Mortality from prostate cancer associated with cadmium is slightly elevated in several industrial cohorts, but the number of cases is small and there is not clear dose-response relationship. More substantive evidence exists for lung cancer.

The major epidemiological study of lung cancer was conducted by Thun et al., (Ex. 4-68). Adequate data on cadmium exposures were available to allow evaluation of dose-response relationships between cadmium exposure and lung cancer. A statistically significant excess of lung cancer attributed to cadmium exposure was observed in this study even when confounding variables such as co-exposure to arsenic and smoking habits were taken into consideration (Ex. L-140-50).

The primary evidence for quantifying a link between lung cancer and cadmium exposure from animal studies derives from two rat bioassay studies; one by Takenaka et al., (1983), which is a study of cadmium chloride and a second study by Oldiges and Glaser (1990) of four cadmium compounds.

Based on the above cited studies, the U.S. Environmental Protection Agency (EPA) classified cadmium as “B1”, a probable human carcinogen, in 1985 (Ex. 4-4). The International Agency for Research on Cancer (IARC) in 1987 also recommended that cadmium be listed as “2A”, a probable human carcinogen (Ex. 4- 15). The **American Conference of Governmental Industrial Hygienists (ACGIH)** has recently recommended that cadmium be labeled as a carcinogen. Since 1984, NIOSH has concluded that cadmium is possibly a human carcinogen and has recommended that exposures be controlled to the lowest level feasible.

Formaldehyde.

(a) Scope and application. This standard applies to all occupational exposures to formaldehyde, i.e. from formaldehyde gas, its solutions, and materials that release formaldehyde.

(b) Definitions. For purposes of this standard, the following definitions shall apply:

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(A) The provisions of subsection (l)(8) apply when an employee reports significant irritation of the mucosa of the eyes or of the upper airways, respiratory sensitization, dermal irritation, or dermal sensitization attributed to workplace formaldehyde exposure. Medical removal provisions do not apply in the case of dermal irritation or dermal sensitization when the product suspected of causing the dermal condition contains less than 0.05% formaldehyde.

(B) An employee's report of signs or symptoms of possible overexposure to formaldehyde shall be evaluated by a physician, selected by the employer pursuant to subsection (l)(3). If the physician determines that a medical examination is not necessary

under subsection (l)(3)(B), there shall be a two-week evaluation and remediation period to permit the employer to ascertain whether the signs or symptoms subside untreated or with the use of creams, gloves, first aid treatment or personal protective equipment.

Industrial hygiene measures that limit the employee's exposure to formaldehyde may also be implemented during this period. The employee shall be referred immediately to a physician prior to expiration of the two-week period if the signs or symptoms worsen. Earnings, seniority and benefits may not be altered during the two-week period by virtue of the report.

(C) If the signs or symptoms have not subsided or been remedied by the end of the two-week period, or earlier if signs or symptoms warrant, the employee shall be examined by a physician selected by the employer. The physician shall presume, absent contrary evidence, that observed dermal irritation or dermal sensitization are not attributable to formaldehyde when products to which the affected employee is exposed contain less than 0.1% formaldehyde.

(D) Medical examinations shall be conducted in compliance with the requirements of subsection (l)(5)(A) and (B). Additional guidelines for conducting medical exams are contained in Appendix C.

(E) If the physician finds that significant irritation of the mucosa of the eyes or of the upper airways, respiratory sensitization, dermal irritation, or dermal sensitization result from workplace formaldehyde exposure and recommends restrictions or removal, the employer shall promptly comply with the restrictions or recommendation of removal. In the event of a recommendation of removal, the employer shall remove the affected employee from the current formaldehyde exposure and if possible, transfer the employee to work having no or significantly less exposure to formaldehyde.

(F) When an employee is removed pursuant to subsection (l)(8)(E), the employer shall transfer the employee to comparable work for which the employee is qualified or can be trained in a short period (up to 6 months), where the formaldehyde exposures are as low as possible, but not higher than the action level. The employer shall maintain the employee's current earnings, seniority, and other benefits. If there is no such work available, the employer shall maintain the employee's current earnings, seniority and other benefits until such work becomes available, until the employee is determined to be unable to return to workplace formaldehyde exposure, until the employee is determined to be able to return to the original job status, or for six months, whichever comes first.

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS

CHAPTER 4. DIVISION OF INDUSTRIAL SAFETY

SUBCHAPTER 18. SHIP BUILDING, SHIP REPAIRING AND SHIP BREAKING SAFETY ORDERS.

§ 8354. Definitions Applicable to this Subchapter.

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Capable of being locked out. An energy-isolating device is capable of being locked out if it has a locking mechanism built into it, or it has a hasp or other means of attachment to which, or through which, a lock can be affixed. Other energy-isolating devices are capable of being locked out if lockout can be achieved without the need to dismantle, rebuild, or replace the energy-isolating device or permanently alter its energy-control capability.

Certified Industrial Hygienist (CIH). An **industrial hygienist** who is certified by the **American Board of Industrial Hygiene.**

Chief. The Chief of the Division of Occupational Safety and Health or designee.

Class II Standpipe System. A 1 1/2 inch (3.8 cm) hose system which provides a means for the control or extinguishment of incipient stage fires.

Coast Guard Authorized Person. An individual who meets the requirement of Appendix B to section 8355 for tank vessels, for passenger vessels, and for cargo and miscellaneous vessels.

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Enter with Restrictions. Denotes a space where entry for work is permitted only if engineering controls, personal protective equipment, clothing, and time limitations are as

specified by the Marine Chemist, **Certified Industrial Hygienist**, or the shipyard competent person.

Entry. The action by which a person passes through an opening into a space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

Fire Hazard. A condition or material that may start or contribute to the spread of a fire.

Fire Protection. Methods of providing fire prevention, response, detection, control, extinguishment, and engineering.

Fire Response. The activity taken by the employer at the time of an emergency incident involving a fire at the worksite, including fire suppression activities carried out by internal or external resources or a combination of both, or total or partial employee evacuation of the area exposed to the fire.

Fire Response Employee. A shipyard employee who carries out the duties and responsibilities of shipyard firefighting in accordance with the fire safety plan.

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CALIFORNIA REGULATIONS

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS CHAPTER 4. DIVISION OF INDUSTRIAL SAFETY SUBCHAPTER 18. SHIP BUILDING, SHIP REPAIRING AND SHIP BREAKING SAFETY ORDERS. ARTICLE 4. CONTROL OF HAZARDOUS WORK

§ 8358. Asbestos.

(a) Scope and application.

This section regulates asbestos exposure in all shipyard employment work as defined in Section 8347, including but not limited to the following:

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“Certified Industrial Hygienist (CIH)” means one certified in the practice of **industrial hygiene** by the **American Board of Industrial Hygiene**.

“Chief”. The Chief of the Division of Occupational Safety and Health, P.O. Box 420603, San Francisco, CA 94142.

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“Homogeneous area” means an area of surfacing material or thermal system insulation that is uniform in color and texture.

“Incident” means any unanticipated event which causes, or is immediately likely to cause, an exposure of an employee, unprotected by an appropriate respirator, to asbestos fibers in excess of the PEL and/or excursion limit.

“Industrial hygienist” means a professional qualified by education, training, and experience to anticipate, recognize, evaluate and develop controls for occupational health hazards.

“Intact” means that the ACM has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix.

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2. Work practices:

- a. Before use, the mini-enclosure shall be inspected for leaks and smoke-tested to detect breaches, and any breaches sealed.
- b. Before reuse, the interior shall be completely washed with amended water and HEPA-vacuumed.
- c. During use, air movement shall be directed away from the employee's breathing zone within the mini-enclosure.

(6) Alternative control methods for Class I work. Class I work may be performed using a control method which is not referenced in subsection (g)(5) of this section, or which modifies a control method referenced in subsection (g)(5) of this section, if the following provisions are complied with:

(A) The control method shall enclose, contain or isolate the processes or source of airborne asbestos dust, or otherwise capture or redirect such dust before it enters the breathing zone of employees.

(B) A **certified industrial hygienist** or licensed professional engineer who is also qualified as a project designer as defined in subsection (b) of this section, shall evaluate the work area, the projected work practices and the engineering controls and shall certify in writing that: the planned control method is adequate to reduce direct and indirect employee exposure to below the PELs under worst-case conditions of use, and that the planned control method will prevent asbestos contamination outside the regulated area, as measured by clearance sampling which meets the requirements of EPA's Asbestos in Schools Rule issued under AHERA, or perimeter monitoring which meets the criteria in subsection (g)(4)(B)2. of this section.

1. Where the TSI or surfacing material to be removed is 25 linear or 10 square feet or less, the evaluation required in subsection (g)(6) of this section may be performed by a “qualified person”, and may omit consideration of perimeter or clearance monitoring otherwise required.

2. The evaluation of employee exposure required in subsection (g)(6) of this section, shall include and be based on sampling and analytical data representing employee exposure

during the use of such method under worst-case conditions and by employees whose training and experience are equivalent to employees who are to perform the current job.

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(A) At any time, an employer and/or building/vessel owner may demonstrate, for purposes of this standard, that PACM does not contain asbestos. Building/vessel owners and/or employers are not required to communicate information about the presence of building material for which such a demonstration pursuant to the requirements of subsection (k)(5)(B) of this section has been made. However, in all such cases, the information, data and analysis supporting the determination that PACM does not contain asbestos, shall be retained pursuant to subsection (n) of this section.

(B) An employer or owner may demonstrate that PACM does not contain more than 1% asbestos by the following:

1. Having a completed inspection conducted pursuant to the requirements of AHERA (40 CFR Part 763, Subpart E) which demonstrates that the material is not ACM or;
2. Performing tests of the material containing PACM which demonstrate that no ACM is present in the material. Such tests shall include analysis of bulk samples collected in the manner described in 40 CFR 763.86. The tests, evaluation and sample collection shall be conducted by an accredited inspector or by a **CIH**. Analysis of samples shall be performed by persons or laboratories with proficiency demonstrated by current successful participation in a nationally recognized testing program such as the National Voluntary Laboratory Accreditation Program (NVLAP) or the National Institute for Standards and Technology (NIST) or the **Round Robin for bulk samples administered by the American Industrial Hygiene Association (AIHA)**, or an equivalent nationally-recognized round robin testing program.

(C) The employer and/or building/ vessel owner may demonstrate that flooring material including associated mastic and backing does not contain asbestos, by a determination of an **industrial hygienist** based upon recognized analytical techniques showing that the material is not ACM.

(6) At the entrance to mechanical rooms/areas in which employees reasonably can be expected to enter and which contain TSI or surfacing ACM and/or PACM, the building/vessel owner shall post signs which identify the material which is present, its location, and appropriate work practices which, if followed, will ensure that ACM and/or PACM will not be disturbed. The employer shall ensure, to the extent feasible, that employees who come in contact with these signs can comprehend them. Means to ensure employee comprehension may include the use of foreign languages, pictographs, graphics, and awareness training.

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Appendix A

OSHA Reference Method Mandatory

This mandatory appendix specifies the procedure for analyzing air samples for asbestos and specifies quality control procedures that must be implemented by laboratories performing the analysis. The sampling and analytical methods described below represent the elements of the available monitoring methods (such as appendix B to this section, the most current version of the OSHA method ID-60, or the most current version of the NIOSH Method 7400) which OSHA considers to be essential to achieve adequate employee exposure monitoring while allowing employers to use methods that are already established within their organizations. All employers who are required to conduct air monitoring under subsection (f) of this section are required to utilize analytical laboratories that use this procedure, or an equivalent method, for collecting and analyzing samples.

Sampling and Analytical Procedure

1. The sampling medium for air samples shall be mixed cellulose ester filter membranes. These shall be designated by the manufacturer as suitable for asbestos counting. See below for rejection of blanks.

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Quality Control Procedures

1. Intralaboratory program. Each laboratory and/or each company with more than one microscopist counting slides shall establish a statistically designed quality assurance program involving blind recounts and comparisons between microscopists to monitor the variability of counting by each microscopist and between microscopists. In a company with more than one laboratory, the program shall include all laboratories and shall also evaluate the laboratory-to-laboratory variability.

2. a. Interlaboratory program. Each laboratory analyzing asbestos, tremolite, anthophyllite, and actinolite samples for compliance determination shall implement an interlaboratory quality assurance program that as a minimum includes participation of at least two other independent laboratories. Each laboratory shall participate in round robin testing at least once every 6 months with at least all the other laboratories in its interlaboratory quality assurance group. Each laboratory shall submit slides typical of its own work load for use in this program. The round robin shall be designed and results analyzed using appropriate statistical methodology.

b. All laboratories should participate in a national sample testing scheme such as the **Proficiency Analytical Testing Program (PAT), the Asbestos Registry sponsored by the American Industrial Hygiene Association (AIHA).**

3. All individuals performing asbestos, tremolite, anthophyllite, and actinolite analysis must have taken the NIOSH course for sampling and evaluating airborne asbestos, tremolite, anthophyllite, and actinolite dust or an equivalent course.
4. When the use of different microscopes contributes to differences between counters and laboratories, the effect of the different microscope shall be evaluated and the microscope shall be replaced, as necessary.
5. Current results of these quality assurance programs shall be posted in each laboratory to keep the microscopists informed.

Appendix B

6. Analysis

6.1. Safety Precautions

6.1.1. Acetone is extremely flammable and precautions must be taken not to ignite it. Avoid using large containers or quantities of acetone. Transfer the solvent in a ventilated laboratory hood. Do not use acetone near any open flame. For generation of acetone vapor, use a spark free heat source.

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6.4. Standard Preparation

A way to prepare standard asbestos samples of known concentration has not been developed. It is possible to prepare replicate samples of nearly equal concentration. This has been performed through the PAT program. These asbestos samples are distributed by the **AIHA to participating laboratories**.

Since only about one-fourth of a 25-mm sample membrane is required for an asbestos count, any PAT sample can serve as a “standard” for replicate counting.

6.5. Sample Mounting

Note: See Safety Precautions in Section 6.1. before proceeding. The objective is to produce samples with a smooth (non-grainy) background in a medium with a refractive index of approximately 1.46. The technique below collapses the filter for easier focusing and produces permanent mounts which are useful for quality control and interlaboratory comparison.

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS

CHAPTER 4. DIVISION OF INDUSTRIAL SAFETY

SUBCHAPTER 20. TUNNEL SAFETY ORDERS

Appendix B - Labor Code Excerpts

DIVISION 5. SAFETY IN EMPLOYMENT PART 1. WORKMEN'S SAFETY

Chapter 3. Responsibilities and Duties of Employers and Employees

6406. No person shall do any of the following:

- (a) Remove, displace, damage, destroy or carry off any safety device, safeguard, notice, or warning, furnished for use in any employment or place of employment.
- (b) Interfere in any way with the use thereof by any other person.
- (c) Interfere with the use of any method or process adopted for the protection of any employee, including himself, in such employment, or place of employment.
- (d) Fail or neglect to do every other thing reasonably necessary to protect the life and safety of employees.

PART 9. TUNNEL AND MINE SAFETY

Chapter 1. Tunnels and Mines

Chapter 2. Gassy and Extrahazardous Tunnels

7979. In tunnels or underground mines classified extrahazardous, sufficient air shall be supplied to maintain an atmosphere of all of the following conditions:

- (a) Not less than 19 percent oxygen.

(b) Not more than 0.5 percent carbon dioxide.

(c) Not more than 5 parts per million nitrogen dioxide.

(d) No petroleum vapors or other toxic gases in concentrations exceeding the threshold limit values established annually by the **American Conference of Governmental Industrial Hygienists**.

7980. All electrical equipment and machines, including diesel engines, used in tunnels or underground mines classified extrahazardous shall be permissible equipment. The division may, however, permit the use of nonpermissible equipment in a tunnel or underground mine in areas where it finds there is no longer danger from gas or other hazards.

7981. An escape chamber or alternate escape route shall be maintained within 5,000 feet of the tunnel face or areas being used to excavate material in an underground mine classified as gassy or extrahazardous. Workers shall be provided with emergency rescue equipment and trained in its use.

7982. Records of air flow and air sample tests to assure compliance with required standards shall be maintained by the employer at the site of any tunnel or underground mine classified extrahazardous. Such records shall be made available to any division representative upon request.

7983. The main fan line used for ventilation in any tunnel or underground mine classified extrahazardous shall contain a cutoff switch capable of halting all machinery underground automatically should the fan fail or its performance fall below minimum power needed to maintain a safe atmosphere.

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS

CHAPTER 8. OFFICE OF THE DIRECTOR

SUBCHAPTER 5. DEPARTMENT OF INDUSTRIAL RELATIONS – CONFLICT OF INTEREST CODE

Appendix A

Department of Industrial Relations

Disclosure Categories

Category 8:

Designated employees assigned to Category 8 shall report as follows:

All investments, business positions in business entities, and income (including receipt of gifts, loans, and travel payments) from any source that: (1) is subject to the authority of either the Division of Occupational Safety and Health, the Occupational Safety and Health Standards Board, or the Occupational Safety and Health Appeals Board; (2) is an organization or association composed primarily of persons or entities subject to the authority of either the Division of Occupational Safety and Health, the Occupational Safety and Health Standards Board, or the Occupational Safety and Health Appeals Board; or (3) engages in or derives any of its income from providing consulting services or educational seminars concerning occupational safety and health, **industrial hygiene**, or safety engineering.

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS CHAPTER 3.2 CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH REGULATIONS (CAL/OSHA)

SUBCHAPTER 2. REGULATIONS OF THE DIVISION OF OSHA ARTICLE 2.7 APPROVAL OF COURSES AND COURSE PROVIDERS

Appendix A

40 CFR Part 763, Appendix C to Subpart E,

Asbestos Model Accreditation Plan.

I. Asbestos Model Accreditation Plan for States

A. Definitions

For purposes of Appendix C:

1. "Friable asbestos-containing material (ACM)" means any material containing more than one percent asbestos which has been applied on ceilings, walls, structural members, piping, duct work, or any other part of a building, which when dry, may be crumbled, pulverized, or reduced to powder by hand pressure. The term includes non-friable asbestos-containing material after such previously non-friable material becomes damaged to the extent that when dry it may be crumbled, pulverized, or reduced to powder by hand pressure.

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4. Management Planner

All persons who prepare management plans for schools must be accredited. All persons seeking accreditation as management planners shall complete a 3-day inspector training course as outlined above and a 2-day management planner training course. Possession of current and valid inspector accreditation shall be a prerequisite for admission to the management planner training course. The management planner course shall include lectures, demonstrations, course review, and a written examination.

EPA recommends the use of audiovisual materials to complement lectures, where appropriate.

TSCA Title II does not require accreditation for persons performing the management planner role in public and commercial buildings. Nevertheless, such persons may find this training and accreditation helpful in preparing them to design or administer asbestos operations and maintenance programs for public and commercial buildings.

The management planner training course shall adequately address the following topics:

(a) Course overview. The role and responsibilities of the management planner; operations and maintenance programs; setting work priorities; protection of building occupants.

(b) Evaluation/interpretation of survey results. Review of TSCA Title II requirements for inspection and management plans for school buildings as given in section 203(i)(1) of TSCA Title II; interpretation of field data and laboratory results; comparison of field inspector's data sheet with laboratory results and site survey.

(c) Hazard assessment. Amplification of the difference between physical assessment and hazard assessment; the role of the management planner in hazard assessment; explanation of significant damage, damage, potential damage, and potential significant damage; use of a description (or decision tree) code for assessment of ACM; assessment of friable ACM; relationship of accessibility, vibration sources, use of adjoining space, and air plenums and other factors to hazard assessment.

(d) Legal implications. Liability; insurance issues specific to planners; liabilities associated with interim control measures, in-house maintenance, repair, and removal; use of results from previously performed inspections.

(e) Evaluation and selection of control options. Overview of encapsulation, enclosure, interim operations and maintenance, and removal; advantages and disadvantages of each method; response actions described via a decision tree or other appropriate method; work practices for each response action; staging and prioritizing of work in both vacant and occupied buildings; the need for containment barriers and decontamination in response actions.

(f) Role of other professionals. Use of **industrial hygienists**, engineers, and architects in developing technical specifications for response actions; any requirements that may exist for architect sign-off of plans; team approach to design of high-quality job specifications.

(g) Developing an operations and maintenance (O&M) plan. Purpose of the plan; discussion of applicable EPA guidance documents; what actions should be taken by custodial staff; proper cleaning procedures; steam cleaning and HEPA vacuuming; reducing disturbance of ACM; scheduling O&M for off-hours; rescheduling or canceling renovation in areas with ACM; boiler room maintenance; disposal of ACM; in-house procedures for ACM-bridging and penetrating encapsulants; pipe fittings; metal sleeves; polyvinyl chloride (PVC), canvas, and wet wraps; muslin with straps, fiber mesh cloth; mineral wool, and insulating cement; discussion of employee protection programs and staff training; case study in developing an O&M plan (development, implementation process, and problems that have been experienced).

5. Project Designer

A person must be accredited as a project designer to design any of the following activities with respect to friable ACBM in a school or public and commercial building: (1) A response action other than a SSSD maintenance activity, (2) a maintenance activity that disturbs friable ACBM other than a SSSD maintenance activity, or (3) a response action for a major fiber release episode. All persons seeking accreditation as a project designer shall complete at least a minimum 3-day training course as outlined below. The project designer course shall include lectures, demonstrations, a field trip, course review and a written examination.

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(n) Contract preparation and administration.

(o) Legal/liabilities/defenses. Insurance considerations; bonding; hold-harmless clauses; use of abatement contractor's liability insurance; claims made versus occurrence policies.

(p) Replacement. Replacement of asbestos with asbestos-free substitutes.

(q) Role of other consultants. Development of technical specification sections by **industrial hygienists** or engineers; the multi-disciplinary team approach to abatement design.

(r) Occupied buildings. Special design procedures required in occupied buildings; education of occupants; extra monitoring recommendations; staging of work to minimize occupant exposure; scheduling of renovation to minimize exposure.

(s) Relevant Federal, State, and local regulatory requirements, procedures and standards, including, but not limited to:

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E. Qualifications

In addition to requiring training and an examination, a State may require candidates for accreditation to meet other qualification and/or experience standards that the State considers appropriate for some or all disciplines. States may choose to consider requiring qualifications similar to the examples outlined below for inspectors, management planners and project designers. States may modify these examples as appropriate. In addition, States may want to include some requirements based on experience in performing a task directly as a part of a job or in an apprenticeship role. They may also wish to consider additional criteria for the approval of training course instructors beyond those prescribed by EPA.

1. Inspectors: Qualifications -possess a high school diploma. States may want to require an Associate's Degree in specific fields (e.g., environmental or physical sciences).
2. Management Planners: Qualifications -Registered architect, engineer, or **certified industrial hygienist** or related scientific field.
3. Project Designers: Qualifications -registered architect, engineer, or **certified industrial hygienist**.
4. Asbestos Training Course Instructor: Qualifications -academic credentials and/or field experience in asbestos abatement.

EPA recommends that States prescribe minimum qualification standards for training instructors employed by training providers.

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS **CHAPTER 3.2 CALIFORNIA OCCUPATIONAL SAFETY AND** **HEALTH REGULATIONS (CAL/OSHA)**

SUBCHAPTER 2. REGULATIONS OF THE DIVISION OF OSHA **ARTICLE 10. CIVIL AND CRIMINAL ENFORCEMENT POLICY** **OF THE DIVISION OF OSHA**

§ 344.52. Referral of Cases Other Than Accident Cases by Compliance Personnel to the Bureau of Investigations.

If Division compliance personnel become aware that there are conditions which may constitute criminal violations, the case must be referred through the Regional Manager/Supervising **Industrial Hygienist**, with a copy to the appropriate Deputy, to the respective Northern or Southern Office of the Bureau of Investigations. In cases referred for investigation the Supervising Special Investigator will assign the case to a Special investigator for investigation. The investigator will review the facts of the case, interview witnesses, and otherwise, conduct a thorough investigation. The assigned investigator shall prepare a report to the Supervising Special Investigator which shall include a summary of evidence, findings, and recommendations for appropriate action.

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS

CHAPTER 4. DIVISION OF INDUSTRIAL SAFETY

SUBCHAPTER 7. GENERAL INDUSTRY SAFETY ORDERS

§ 3204. Access to Employee Exposure and Medical Records.

(a) Purpose. The purpose of this section is to provide employees and their designated representatives and authorized representatives of the Chief of the Division of Occupational Safety and Health (DOSH) a right of access to relevant exposure and medical records. Access by employees, their representatives, and representatives of

(c) Definitions.

(8) Exposure or Exposed. Employee subjection to a toxic substance or harmful physical agent in the course of employment through any route of entry (inhalation, ingestion, skin contact or absorption, etc.), and includes past exposure and potential (e.g., accidental or possible) exposure, but does not include situations where the employer can demonstrate that the toxic substance or harmful physical agent is not used, handled, stored, generated, or present in the workplace in any manner different from typical non-occupational situations.

(9) Health Professional. A physician, occupational health nurse, **industrial hygienist**, toxicologist, or epidemiologist providing medical or other occupational health services to exposed employees.

(10) Record. Any item, collection, or grouping of information regardless of the form or process by which it is maintained (e.g., paper document, microfiche, microfilm, X-ray film, or automated data processing).

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS

CHAPTER 4. DIVISION OF INDUSTRIAL SAFETY

SUBCHAPTER 7. GENERAL INDUSTRY SAFETY ORDERS

GROUP 16. CONTROL OF HAZARDOUS SUBSTANCES

ARTICLE 108. CONFINED SPACES

Appendix B - Procedures for Atmospheric Testing.

Atmospheric testing is required for two distinct purposes:

evaluation of the hazards of the permit space and verification that acceptable entry conditions for entry into that space exist.

(1) Evaluation testing. The atmosphere of a confined space should be analyzed using equipment of sufficient sensitivity and specificity to identify and evaluate any hazardous atmospheres that may exist or arise, so that appropriate permit entry procedures can be developed and acceptable entry conditions stipulated for that space. Evaluation and interpretation of these data, and development of the entry procedure, should be done by, or reviewed by, a technically qualified professional (e.g., Cal/OSHA consultation service, or **certified industrial hygienist**, registered safety engineer, **certified safety professional**, certified marine chemist, etc.) based on evaluation of all serious hazards.

(2) Verification testing. The atmosphere of a permit space which may contain a hazardous atmosphere should be tested for residues of all contaminants identified by evaluation testing using permit specified equipment to determine that residual concentrations at the time of testing and entry are within the range of acceptable entry conditions. Results of testing (i.e., actual concentration, etc.) should be recorded on the permit in the space provided adjacent to the stipulated acceptable entry condition.

(2) Duration of testing. Measurement of values for each atmospheric parameter should be made for at least the minimum response time of the test instrument specified by the manufacturer.

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CALIFORNIA REGULATIONS

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS CHAPTER 4. DIVISION OF INDUSTRIAL SAFETY SUBCHAPTER 7. GENERAL INDUSTRY SAFETY ORDERS GROUP 16. CONTROL OF HAZARDOUS SUBSTANCES ARTICLE 109. HAZARDOUS SUBSTANCES AND PROCESSES

Appendix A - National Research Council

Recommendations Concerning Chemical Hygiene in Laboratories (Non-Mandatory)

Table of Contents

Foreword

As guidance for each employer's development of an appropriate laboratory Chemical Hygiene Plan, the following non-mandatory recommendations are provided. They were extracted from "Prudent Practices for Handling Hazardous Chemicals in Laboratories" (referred to below as "Prudent Practices"), which was published in 1981 by the National Research Council and is available from the National Academy Press, 2101 Constitution Ave., NW., Washington DC 20418.

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A. General Principles for Work with Laboratory Chemicals

In addition to the more detailed recommendations listed below in sections B-E, "Prudent Practices" expresses certain general principles, including the following:

1. It is prudent to minimize all chemical exposures. Because few laboratory chemicals are without hazards, general precautions for handling all laboratory chemicals should be adopted, rather than specific guidelines for particular chemicals (2,10). Skin contact with chemicals should be avoided as a cardinal rule (198).

2. Avoid underestimation of risk. Even for substances of no known significant hazard, exposure should be minimized; for work with substances which present special hazards, special precautions should be taken (10, 37, 38). One should assume that any mixture will be more toxic than its most toxic component (30, 103) and that all substances of unknown toxicity are toxic (3, 34).

3. Provide adequate ventilation. The best way to prevent exposure to airborne substances is to prevent their escape into the working atmosphere by use of hoods and other ventilation devices (32, 198).

4. Institute a chemical hygiene program. A mandatory chemical hygiene program designed to minimize exposures is needed; it should be a regular, continuing effort, not merely a standby or short-term activity (6,11). Its recommendations should be followed in academic teaching laboratories as well as by full-time laboratory workers (13).

5. Observe the exposure limits and TLVs. The Exposure limits of Cal/OSHA and the Threshold Limit Values of the **American Conference of Governmental Industrial Hygienists** should not be exceeded (13).

B. Chemical Hygiene Responsibilities

Responsibility for chemical hygiene rests at all levels (6, 11, 21) including the:

1. Chief executive officer, who has ultimate responsibility for chemical hygiene within the institution and must, with other administrators, provide continuing support for institutional chemical hygiene (7, 11).

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Appendix B

References (Non-Mandatory)

The following references are provided to assist the employer in the development of a Chemical Hygiene Plan. The materials listed below are offered as non-mandatory guidance. References listed here do not imply specific endorsement of a book, opinion, technique, policy or a specific solution for a safety or health problem. Other references not listed here may better meet the needs of a specific laboratory.

(a) Materials for the development of the Chemical Hygiene Plan:

1. American Chemical Society, Safety in Academic Chemistry Laboratories, 4th edition, 1985.

.....

12. Young, Jay A., Ed., Improving Safety in the Chemical Laboratory, John Wiley & Sons, Inc. New York, 1987.

(b) Hazardous Substances Information:

1. **American Conference of Governmental Industrial Hygienists**. Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment with Intended Changes, 6500 Glenway Avenue, Building D-7, Cincinnati, OH 45211-4438 (latest edition).

2. Annual Report on Carcinogens, National Toxicology Program , U.S. Department of Health and Human Services, Public Health Service, U.S. Government Printing Office, Washington, DC. (1985 edition).

.....
13. Sax, N.I. Dangerous Properties of Industrial Materials, 5th edition, Van Nostrand Reinhold, NY., 1989.

14. Sittig, Marshall, Handbook of Toxic and Hazardous Chemicals, Noyes Publications. Park Ridge, NJ, 1981.

(c) Information on Ventilation:

1. **American Conference of Governmental Industrial Hygienists** Industrial Ventilation. (latest edition), 6500 Glenway Avenue, Building D-7, Cincinnati, OH 45211-4438.

2. American National Standards Institute, Inc. American National Standards Fundamentals Governing the Design and Operation of Local Exhaust Systems ANSI Z 9.2-1979 American National Standards Institute, N.Y. 1979.

§ 5192. Hazardous Waste Operations and Emergency Response.

(3) Definitions.

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Permissible exposure limit (PEL): The exposure, inhalation or dermal permissible exposure limit specified in 8 CCR, Chapter 4, Subchapter 7, Groups 14 and 15; and Group 16, Articles 107, 109, and 110.

Post-emergency response: That portion of an emergency response performed after the immediate threat of a release has been stabilized or eliminated and clean-up of the site has begun. If post emergency response is performed by an employer's own employees

who were part of the initial emergency response, it is considered to be part of the initial response and not post-emergency response. However, if a group of an employer's own employees, separate from the group providing initial response, performs the clean-up operation, then the separate group of employees would be considered to be performing post-emergency response and subject to subsection (q)(11) of this section.

Pre-job health and safety conference: A health and safety conference or briefing held prior to entering a site for the purpose of initiating hazardous substance removal work.

Published exposure level: The exposure limits published in “NIOSH Recommendations for Occupational Safety and Health Standards 1988” incorporated by reference, or if no limit is specified, the exposure limits published in the standards specified by the **American Conference of Governmental Industrial Hygienists** in their publication “Threshold Limit Values and Biological Exposure Indices for 1989-90” dated 1989 incorporated by reference.

Qualified person: A person with specific training, knowledge and experience in the area for which the person has the responsibility and the authority to control.

Site safety and health supervisor (or official): The individual located on a hazardous waste site who is responsible to the employer and has the authority and knowledge necessary to implement the site safety and health plan and verify compliance with applicable safety and health requirements.

Appendix C

Compliance Guidelines (Non-Mandatory)

1. **Occupational Safety and Health Program:** Each hazardous waste site clean-up effort will require an occupational safety and health program headed by the site coordinator or the employer's representative. The purpose of the program will be the protection of employees at the site and will be an extension of the employer's overall safety and health program. The program will need to be developed before work begins on the site and implemented as work proceeds as stated in subsection (b). The program is to facilitate coordination and communication of safety and health issues among personnel responsible for the various activities which will take place at the site. The program will provide the means for identifying and controlling worksite hazards and the means for monitoring program effectiveness. It will provide the overall means for planning and implementing the needed safety and health training and job orientation of employees, who will be working at the site. The program will need to cover the responsibilities and authority of the site coordinator or the employer's manager on the site for the safety and health of employees at the site, and the relationships with contractors or support services as to what each employer's safety and health responsibilities are for their employees on the site.

Each contractor on the site needs to have its own safety and health program so structured that it will smoothly interface with the program of the site coordinator or principal contractor.

Also those employers involved with treating, storing or disposal of hazardous waste as covered in subsection (p) must have implemented a safety and health program for their employees. This program is to include the hazard communication program required in subsection (p)(1) and the training required in subsections (p)(7) and (p)(8) as parts of the employer's comprehensive overall safety and health program. This program is to be in writing.

Each site or workplace safety and health program will need to include the following: (1) Policy statements of the line of authority and accountability for implementing the program, the objectives of the program, and the role of the site safety and health supervisor or manager and staff; (2) means or methods for the development of procedures for identifying and controlling workplace hazards at the site; (3) means or methods for the development and communication to employees of the various plans, work rules, standard operating procedures and practices that pertain to individual employees and supervisors; (4) means for the training of supervisors and employees to develop the needed skills and knowledge to perform their work in a safe and healthful manner; (5) means to anticipate and prepare for emergency situations; and (6) means for obtaining information feedback to aid in evaluating the program and for improving the effectiveness of the program. The management and employees should be trying continually to improve the effectiveness of the program thereby enhancing the protection being afforded those working on the site.

Accidents on the site should be investigated to provide information on how such occurrences can be avoided in the future. When injuries or illnesses occur on the site or workplace, they will need to be investigated to determine what needs to be done to prevent this incident from occurring again. Such information will need to be used as feedback on the effectiveness of the program and the information turned into positive steps to prevent any reoccurrence. Receipt of employee suggestions or complaints relating to safety and health issues involved with site or workplace activities is also a feedback mechanism that can be used effectively to improve the program and may serve in part as an evaluative tool(s).

For the development and implementation of the program to be the most effective, professional safety and health personnel should be used. Personnel such as, but not necessarily limited to **Certified Safety Professionals, Board Certified Industrial Hygienist**, or Registered Professional Safety Engineers are good examples of professional stature for safety and health managers who will administer the employer's program.

2. Training: The training programs for employees subject to the requirements of subsection (e) of this standard should address: The safety and health hazards employees should expect to find on hazardous waste clean-up sites; what control measures or

techniques are effective for those hazards; what monitoring procedures are effective in characterizing exposure levels; what makes an effective employer's safety and health program; what a site safety and health plan should include; hands on training with personal protective equipment and clothing they may be expected to use; the contents of the OSHA standard relevant to the employee's duties and function; and employee's responsibilities under OSHA and other regulations. Supervisors will need training in their responsibilities under the safety and health program and its subject areas such as the spill containment program, the personal protective equipment program, the medical surveillance program, the emergency response plan, and other areas.

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5194. Hazard Communication.

(a) Purpose.

(1) The purpose of this section is to ensure that the hazards of all chemicals produced or imported are classified, and that information concerning the classified hazards is transmitted to employers and employees. The requirements of this section are intended to be consistent with the provisions of the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS), Revision 3. The transmittal of information is to be accomplished by means of comprehensive hazard communication programs, which are to include container labeling and other forms of warning, safety data sheets and employee training.

(2) This occupational safety and health standard is intended to address comprehensively the issue of classifying the potential hazards of chemicals, and communicating information concerning hazards and appropriate protective measures to employees. Classifying the potential hazards of chemicals and communicating information concerning hazards and appropriate protective measures to employees, may include, for example, but is not limited to, provisions for: developing and maintaining a written hazard communication program for the workplace, including lists of hazardous chemicals present; labeling of containers of chemicals in the workplace, as well as of containers of chemicals being shipped to other workplaces; preparation and distribution of safety data sheets to employees and downstream employers; and development and implementation of employee training programs regarding hazards of chemicals and protective measures.

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(d) Hazard Classification.

(1) Manufacturers and importers shall evaluate chemicals produced in their workplaces or imported by them to classify the chemicals in accordance with this section. For each chemical, the manufacturer or importer shall determine the hazard classes, and where

appropriate, the category of each class that apply to the chemical being classified. Employers are not required to classify chemicals unless they choose not to rely on the classification performed by the manufacturer or importer for the chemical to satisfy this requirement.

(2) Manufacturers, importers, or employers classifying chemicals shall identify and consider the full range of available scientific literature and other evidence concerning the potential hazards. For health hazards, evidence which is statistically significant and which is based on at least one positive study conducted in accordance with established scientific principles is considered to be sufficient to establish a hazardous effect if the results of the study meet the definitions of health hazards in this section. Appendix A to section 5194 shall be consulted for classification of health hazards covered, and Appendix B to section 5194 shall be consulted for the classification of physical hazards.

(3) The manufacturer, importer, or employer classifying chemicals shall treat any of the following sources as establishing that the chemicals listed in them are hazardous:

(A) The list of hazardous substances prepared by the Director pursuant to Labor Code section 6382 and as promulgated in title 8, California Code of Regulations, section 339. The concentrations and footnotes which are applicable to the list shall be understood to modify the same substance on all other source lists or hazard determinations set forth in sections 5194(d)(3)(B)-5194(d)(5)(C).

(B) 29 CFR part 1910, subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA).

(C) Threshold Limit Values for Chemical Substances in the Work Environment, American Conference of Governmental Industrial Hygienists (ACGIH) (latest edition).

The manufacturer, importer, or employer is still responsible for classifying the hazards associated with the chemicals in these source lists in accordance with the requirements of the standard.

(4) Manufacturers, importers, and employers classifying chemicals shall treat any of the following sources as establishing that a chemical is a carcinogen or potential carcinogen for hazard communication purposes:

(A) National Toxicology Program (NTP), *Annual Report on Carcinogens*, (latest edition).

(B) International Agency for Research on Cancer (IARC) *Monographs* (latest editions).

(C) 29 CFR Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration.

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(2) Where a treating physician or nurse determines that a medical emergency exists and the specific chemical identity and/or specific percentage of composition of a hazardous chemical is necessary for emergency or first-aid treatment, the manufacturer, importer, or employer shall immediately disclose the specific chemical identity or percentage composition of a trade secret chemical to that treating physician or nurse, regardless of the existence of a written statement of need or a confidentiality agreement. The manufacturer, importer, or employer may require a written statement of need and confidentiality agreement, in accordance with the provisions of sections 5194(i)(3) and (4), as soon as circumstances permit.

(3) In non-emergency situations, a manufacturer, importer, or employer shall, upon request, disclose a specific chemical identity or percentage composition, otherwise permitted to be withheld under section 5194(i)(1), to a health or safety professional (i.e., physician, nurse, **industrial hygienist**, safety professional, toxicologist, or epidemiologist) providing medical or other occupational health services to exposed employee(s), and to employees and designated representatives, if:

(A) The request is in writing;

(B) The request describes with reasonable detail one or more of the following occupational health needs for the information:

1. To assess the hazards of the substances to which employees will be exposed;
2. To conduct or assess sampling of the workplace atmosphere to determine employee exposure levels;
3. To conduct pre-assignment or periodic medical surveillance of exposed employees;
4. To provide medical treatment to exposed employees;
5. To select or assess appropriate personal protective equipment for exposed employees;
6. To design or assess engineering controls or other protective measures for exposed employees; and,
7. To conduct studies to determine the health effects of exposure.

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§ 5197. Occupational Exposure to Food Flavorings Containing Diacetyl.

(b) Definitions.

(1) “American Thoracic Society Guidelines” means “ATS/ERS *Task Force: Standardisation of Lung Function Testing*,” a five part series published jointly in 2005 by the American Thoracic Society [ATS] and the European Respiratory Society in five consecutive issues of the European Respiratory Journal.

(2) “Authorized person” means any person specifically authorized by the employer and required by work duties to be present in regulated areas, or any person entering such an area as a designated representative of employees for the purpose of exercising the right to observe monitoring and measuring procedures, or the Chief.

(3) “CDPH Guidelines” means “Medical Surveillance for Flavorings-Related Lung Disease Among Flavor Manufacturing Workers in California,” published in August 2007 by the California Department of Public Health (CDPH).

(4) “**Certified Industrial Hygienist (CIH)**” means an **industrial hygienist** who is certified by the **American Board of CIH**.

(5) “Chief” means the Chief of the Division of Occupational Safety and Health, or designee.

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(23) “Process” means an activity or combination of activities that at any stage cools, heats, sprays, mixes, blends, transfers, or otherwise utilizes diacetyl or diacetyl-containing flavorings or food products in the preparation or manufacture of flavorings or food products. For purposes of this standard any interconnected group of vessels that utilizes diacetyl or diacetyl-containing flavorings or food products at any stage shall be considered a single process. Cleaning or sanitizing is considered a distinct process, and spill cleanup is also considered a distinct process.

(24) “Program reviewer” means a **certified industrial hygienist** or licensed professional engineer who is knowledgeable in both industrial ventilation design and the control of hazardous exposures, and who is responsible for certifying the effectiveness of the employer's diacetyl control program in accordance with subsection (e)(6).

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS

CHAPTER 4. DIVISION OF INDUSTRIAL SAFETY

SUBCHAPTER 7. GENERAL INDUSTRY SAFETY ORDERS

GROUP 16. CONTROL OF HAZARDOUS SUBSTANCES

ARTICLE 110. REGULATED CARCINOGENS

Appendix D to Section 5200 -Sampling and Analytical Methods for MDA Monitoring and Measurement Procedures

OSHA METHODOLOGY

Sampling Procedure. Apparatus:

Samples are collected by use of a personal sampling pump that can be calibrated within +5% of the recommended flow rate with the sampling filter in line.

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Sample preparation. The sample filters are received in vials containing deionized water. 1 mL of 0.5N NaOH and 2.0 mL toluene are added to each vial. The vials are recapped and shaken for 10 min. After allowing the layers to separate, approximately 1 mL aliquots of the toluene (upper) layers are transferred to separate vials with clean disposable pipets. The toluene layers are treated and analyzed.

Interferences (analytical). Any compound that gives an electron capture detector response and has the same general retention time as the HFAA derivative of MDA is a potential interference. Suspected interferences reported to the laboratory with submitted samples by the **industrial hygienist** must be considered before samples are derivatized. GC parameters may be changed to possibly circumvent interferences. Retention time on a single column is not considered proof of chemical identity. Analyte identity should be confirmed by GC/MS if possible.

Calculations. The analyte concentration for samples is obtained from the calibration curve in terms of mg MDA per sample. The extraction efficiency is 100%. If any MDA is

found on the blank, that amount is subtracted from the sample amounts. The air concentrations are calculated using the following formulae:

$$\mu\text{g}/\text{m}^3 = (\text{mg MDA per sample})(1000)/(\text{L of air sampled})$$

$$\text{ppb} = (\mu\text{g}/\text{m}^3)(24.46)/(198.3) = (\mu\text{ g}/\text{m}^3)(0.1233) \text{ where } 24.46 \text{ is the molar volume at } 25 \text{ degrees C and } 760 \text{ mm Hg}$$

Safety Precautions (analytical) . Avoid skin contact and inhalation of all chemicals. Restrict the use of all chemicals to a fume hood if possible. Wear safety glasses and a lab coat at all times while in the lab area.

Appendix A

Substance Safety Data Sheet Cadmium

IV. Physician Information

A. Introduction

The medical surveillance provisions of paragraph (l) generally are aimed at accomplishing three main interrelated purposes: first, identifying employees at higher risk of adverse health effects from excess, chronic exposure to cadmium; second, preventing cadmium-induced disease; and third, detecting and minimizing existing cadmium-induced disease. The core of medical surveillance in this standard is the early and periodic monitoring of the employee's biological indicators of: a) recent exposure to cadmium; b) cadmium body burden; and c) potential and actual kidney damage associated with exposure to cadmium.

The main adverse health effects associated with cadmium overexposure are lung cancer and kidney dysfunction. It is not yet known how to adequately biologically monitor human beings to specifically prevent cadmium-induced lung cancer. By contrast, the kidney can be monitored to provide prevention and early detection of cadmium-induced kidney damage. Since, for non-carcinogenic effects, the kidney is considered the primary target organ of chronic exposure to cadmium, the medical surveillance provisions of this standard effectively focus on cadmium-induced kidney disease. Within that focus, the aim, where possible, is to prevent the onset of such disease and, where necessary, to minimize such disease as may already exist. The by-products of successful prevention of kidney disease are anticipated to be the reduction and prevention of other cadmium-induced diseases.

B. Health Effects

The major health effects associated with cadmium overexposure are described below.

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The primary evidence for quantifying a link between lung cancer and cadmium exposure from animal studies derives from two rat bioassay studies; one by Takenaka et al., (1983), which is a study of cadmium chloride and a second study by Oldiges and Glaser (1990) of four cadmium compounds.

Based on the above cited studies, the U.S. Environmental Protection Agency (EPA) classified cadmium as “B1”, a probable human carcinogen, in 1985 (Ex. 4-4). The International Agency for Research on Cancer (IARC) in 1987 also recommended that cadmium be listed as “2A”, a probable human carcinogen (Ex. 4- 15). The **American Conference of Governmental Industrial Hygienist (ACGIH)** has recently recommended that cadmium be labeled as a carcinogen. Since 1984, NIOSH has concluded that cadmium is possibly a human carcinogen and has recommended that exposures be controlled to the lowest level feasible.

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Appendix E

4. Backup Data

4.1. Introduction

4.1.1. The purpose of this evaluation is to determine the analytical method recovery, working standard range, and qualitative and quantitative detection limits of the two atomic absorption analytical techniques included in this method. The evaluation consisted of the following experiments:

.....

4.10. Conclusions

The experiments performed in this evaluation show the two atomic absorption analytical techniques included in this method to be precise and accurate and have sufficient sensitivity to measure airborne cadmium over a broad range of exposure levels and sampling periods.

5. References:

5.3. Occupational Safety and Health Administration Salt Lake Technical Center: Metal and Metalloid Particulate in Workplace Atmospheres (Atomic Absorption) (USDOL/OSHA Method No. ID-121). In OSHA Analytical Methods Manual 2nd ed. Cincinnati, OH: **American Conference of Governmental Industrial Hygienists**, 1991.

5.4. Occupational Safety and Health Administration Salt Lake Technical Center: Metal and Metalloid Particulate in Workplace Atmospheres (ICP) (USDOL/OSHA Method No. ID-125G). In OSHA Analytical Methods Manual 2nd ed. Cincinnati, OH: **American Conference of Governmental Industrial Hygienists**, 1991.

5.5. Windholz, M., Ed.; The Merck Index, 10th ed.; Merck & Co.: Rahway, NJ, 1983.

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5.11. National Institute for Occupational Safety and Health: Documentation of the NIOSH Validation Tests by D. Taylor, R. Kupel, and J. Bryant (DHEW/NIOSH Pub. No. 77-185). Cincinnati, OH: National Institute for Occupational Safety and Health, 1977.

5.12. Occupational Safety and Health Administration Analytical Laboratory: Precision and Accuracy Data Protocol for Laboratory Validations. In OSHA Analytical Methods Manual 1st ed. Cincinnati, OH: **American Conference of Governmental Industrial Hygienists** (Pub. No. ISBN: 0-936712-66-X), 1985.

5.13. Long, G.L. and J.D. Winefordner: Limit of Detection -A Closer Look at the IUPAC Definition. Anal.Chem. 55:712A-724A (1983).

5.14. **American Conference of Governmental Industrial Hygienists**: Documentation of Threshold Limit Values and Biological Exposure Indices. 5th ed. Cincinnati, OH: **American Conference of Governmental Industrial Hygienists**, 1986.

Appendix F: Nonmandatory Protocol for Biological Monitoring

1.0 INTRODUCTION

Under the final OSHA cadmium rule, monitoring of biological specimens and several periodic medical examinations are required for eligible employees. These medical examinations are to be conducted regularly, and medical monitoring is to include the periodic analysis of cadmium in blood (CDB), cadmium in urine (CDU) and beta-2-microglobulin in urine (B2MU). As CDU and B2MU are to be normalized to the

concentration of creatinine in urine (CRTU), then CRTU must be analyzed in conjunction with CDU and B2MU analyses.

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6.0 REFERENCES

Adamsson E, Piscator M, and Nogawa K. (1979). Pulmonary and gastrointestinal exposure to cadmium oxide dust in a battery factory. *Environmental Health Perspectives*, 28, 219-222.

American Conference of Governmental Industrial Hygienists (ACGIH). (1986). *Documentation of the Threshold Limit Values and Biological Exposure Indices*. 5th edition. p. BEI-55.

Bernard A, Buchet J, Roels H, Masson P, and Lauwerys R. (1979). Renal excretion of proteins and enzymes in workers exposed to cadmium. *European Journal of Clinical Investigation*, 9, 11-22.

Bernard A and Lauwerys R. (1990). Early markers of cadmium nephrotoxicity: Biological significance and predictive value. *Toxicological and Environmental Chemistry*, 27, 65-72.

Braunwald E, Isselbacher K, Petersdorf R, Wilson J, Martin J, and Fauci A (Eds.). (1987). *Harrison's Principles of Internal Medicine*. New York: McGraw-Hill Book Company.

Buchet J, Roels H, Bernard I, and Lauwerys R. (1980). Assessment of renal function of workers exposed to inorganic lead, cadmium, or mercury vapor. *Journal of Occupational Medicine*, 22, 741-750.

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS

CHAPTER 4. DIVISION OF INDUSTRIAL SAFETY

SUBCHAPTER 17. MINE SAFETY ORDERS

ARTICLE 31. AIR QUALITY, RADIATION, AND VENTILATION

§ 7090. Environmental Controls.

(a) (5-1a) The exposure to airborne contaminants of a person working in a mine shall not exceed, on the basis of a time-weighted average, the threshold limit values adopted by the **American Conference of Governmental Industrial Hygienists**, as set forth and explained in the most recent edition of the Conference's publication entitled "Threshold Limit Values of Airborne Contaminants." Excursions above the listed threshold limit values shall not be of a greater magnitude than is characterized as permissible by the Conference. This paragraph (a) does not apply to airborne contaminants given a "C" designation by the Conference -for example, nitrogen dioxide.

(b) (5-1b) Employees shall be withdrawn from areas in which there is a concentration of an airborne contaminant given a "C" designation by the Conference which exceeds the threshold limit value (ceiling "C" limit) listed for that contaminant.

(c) General Industry Safety Orders for control of Dust, Fumes, Mists, Vapors, and Gases shall be minimum standards for mines.

(d) (5-2) Dust, gas, mist, and fume surveys shall be conducted as frequently as necessary to determine the adequacy of control measures.

(e) (5-5) Respirators shall not be substituted for environmental control measures. However, where environmental controls have not been developed or when necessary by nature of the work involved (for example, welding, sandblasting, lead burning), a person may work for reasonable periods of time in concentrations of airborne contaminants which exceed ceiling "C" limits or the limit of permissible excursions referred to in (a) and (b), if such person wears a respiratory protective device approved by the Bureau of Mines as protection against the particular hazards involved.

(f) (20-5) Carbon tetrachloride shall not be used unless under strict environmental controls.

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS

CHAPTER 4. DIVISION OF INDUSTRIAL SAFETY

SUBCHAPTER 4. CONSTRUCTION SAFETY ORDERS

ARTICLE 2. DEFINITIONS

§ 1504. Definitions.

(a) The following definitions shall apply in the application of these Orders.

Access. A means of reaching a workspace or a work area.

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Bull Float. A tool used to spread out and smooth a concrete surface.

Carryall. A self-loading and unloading vehicle pulled by a tractor or powered attachment, and used for movement and placing of earth or other materials.

Certified Safety Professional or CSP. A safety professional who has met education and experience standards, has demonstrated by examination the knowledge that applies to professional safety practice, continues to meet recertification requirements established by the **Board of Certified Safety Professionals (BCSP)**, and is authorized by **BCSP** to use the **Certified Safety Professional** designation.

Closed Container. A container as herein defined, so sealed by means of a lid or other device that neither liquid nor vapor will escape from it at ordinary temperatures.

Combustible Liquid. A liquid having a flash point at or above 100° F (37.8 degrees C). Combustible liquids shall be subdivided as follows:

(A) Class II liquids shall include those having flash points at or above 100° F (37.8° C) and below 140° F (60° C).

(B) Class IIIA liquids shall include those having flash points at or above 140° F (60° C) and below 200° F (93.4° C).

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS

CHAPTER 4. DIVISION OF INDUSTRIAL SAFETY

SUBCHAPTER 7. GENERAL INDUSTRY SAFETY ORDERS

ARTICLE 1. DEFINITIONS

§ 3207. Definitions.

(a) The following terms are defined for general use in these regulations; specialized definitions appear in individual articles. (See Definitions in the Index)

Access. A means of reaching a work space of a work area.

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Cellar. That portion of a building between floor and ceiling which is wholly or partly below grade and so located that the vertical distance from grade to the floor below is equal to or greater than the vertical distance from grade to ceiling. (See "Story.")

Certified Safety Professional or CSP. A safety professional who has met education and experience standards, has demonstrated by examination the knowledge that applies to professional safety practice, continues to meet recertification requirements established by the **Board of Certified Safety Professionals (BCSP)**, and is authorized by **BCSP** to use the **Certified Safety Professional** designation.

Court. An open, uncovered and unoccupied space, unobstructed to the sky, bounded on three or more sides by exterior building walls.

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS

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GROUP 16. CONTROL OF HAZARDOUS SUBSTANCES

ARTICLE 108. CONFINED SPACES

Appendix B - Procedures for Atmospheric Testing.

Atmospheric testing is required for two distinct purposes:

evaluation of the hazards of the permit space and verification that acceptable entry conditions for entry into that space exist.

(1) Evaluation testing. The atmosphere of a confined space should be analyzed using equipment of sufficient sensitivity and specificity to identify and evaluate any hazardous atmospheres that may exist or arise, so that appropriate permit entry procedures can be developed and acceptable entry conditions stipulated for that space. Evaluation and interpretation of these data, and development of the entry procedure, should be done by, or reviewed by, a technically qualified professional (e.g., Cal/OSHA consultation service, or **certified industrial hygienist**, registered safety engineer, **certified safety professional**, certified marine chemist, etc.) based on evaluation of all serious hazards.

(2) Verification testing. The atmosphere of a permit space which may contain a hazardous atmosphere should be tested for residues of all contaminants identified by evaluation testing using permit specified equipment to determine that residual concentrations at the time of testing and entry are within the range of acceptable entry conditions. Results of testing (i.e., actual concentration, etc.) should be recorded on the permit in the space provided adjacent to the stipulated acceptable entry condition.

(3) Duration of testing. Measurement of values for each atmospheric parameter should be made for at least the minimum response time of the test instrument specified by the manufacturer.

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS

CHAPTER 4. DIVISION OF INDUSTRIAL SAFETY

SUBCHAPTER 20. TUNNEL SAFETY ORDERS

ARTICLE 3. INJURY AND ILLNESS PROGRAM

§ 8406. Injury and Illness Prevention Program.

Every employer shall establish, implement and maintain an effective Injury and Illness Prevention Program in accordance with Section 3203 of the General Industry Safety Orders and the following:

- (a) All safety suggestions shall be given prompt consideration by the employer and a written record shall be maintained for the duration of the underground work and made available to the Division upon request.
- (b) The adoption and use of a code of safe practices and procedures for underground operations similar to the Safe Practices Code in Appendix A of these orders.
- (c) Copies of such code shall be posted in accordance with Section 8409 and available at the job site for inspection by the Division.
- (d) The employer shall hold meetings at least once each month with supervisory personnel and foremen for a discussion of safety problems and accidents that have occurred. A record of such meetings shall be kept, stating the meeting date, time, place, supervisory personnel present, subjects discussed and corrective action taken, if any, and maintained for inspection by the Division.
- (e) Supervisory personnel shall conduct “toolbox” or “tailgate” safety meetings with their crews at least weekly on the job to emphasize safety. Records of all meetings shall be kept, stating the meeting date, time, personnel present, subjects discussed, and corrective actions taken if any, and maintained for inspection by the Division.
- (f) In all places of employment where these safety orders apply, the employer shall designate an on-site Safety Representative who is qualified to recognize hazardous conditions and is certified by the Division. This person shall have the authority to correct

unsafe conditions and practices, or stop the work if an imminent hazard exists. This person shall be responsible for directing the required safety and health program.

(g) All applicants for certification as a Safety Representative shall meet the following minimum requirements:

(1) Two years experience performing safety related work in tunnels and/or underground mines.

(2) In lieu of one year of the above experience, applicants may substitute equivalent education or work experience as follows:

(A) Work experience in the capacity of managing or directing tunnel safety programs, or

(B) Formal safety related education degree in safety or certification as A **Certified Safety Professional (CSP), Certified Industrial Hygienist (CIH)**, Professional Safety Engineer (PSE), or similar.

(3) Be able to communicate with affected employees.

(4) Be of such physical condition that it would not interfere with the proper performance of their duties.

(5) Be thoroughly familiar and conversant with all Tunnel Safety Orders and other applicable safety orders.

(6) Knowledge of the means and methods of underground construction operations.

(7) The ability to identify and evaluate unsafe conditions; and knowledge of the safeguards required to protect employees from the effect of these hazards.

(8) Pass a written and oral examination administered by the Division.

(h) All applicants for certification as a Gas Tester as required by these safety orders shall have the following minimum requirements:

(1) One year experience in performing underground work in mines or tunnels.

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS **CHAPTER 8. OFFICE OF THE DIRECTOR** **SUBCHAPTER 2. ADMINISTRATION OF SELF-INSURANCE** **ARTICLE 7. INJURY AND ILLNESS PROGRAM**

§ 15353. Injury and Illness Prevention Program.

(a) As part of the application process, an individual private sector applicant for a Certificate to Self-Insure shall provide one of the following:

(1) an independent evaluation of the applicant employer's injury and illness prevention program as set forth in Labor Code Section 6314.5 and 6401.7 and Section 3203 of Title 8, California Code of Regulations prepared by an independent, licensed, California professional engineer, a **Certified Safety Professional** certified by the **Board of Certified Safety Professionals** and/or a **Certified Industrial Hygienist**.

(A) The evaluation preparer shall be considered independent if: (i) the preparer or the preparer's firm has had no business dealings with the applicant employer or its owner for the prior two years; (ii) the preparer is not or has not been employed by the applicant employer's present or prior insurance carrier or insurance broker during the past five years; and (iii) the preparer or preparer's firm has not been employed by the applicant employer or its parent in a safety and health or accident prevention capacity during the past five years.

(B) The evaluation report preparer shall disclose any such business relationships noted in subsection (a)(1)(A) of this Section in the evaluation report. The Manager shall reject a submitted evaluation report where a conflict of interest may exist between the evaluation preparer and the applicant employer as set forth in Subsection (1)(1)(A); or

(2) Written report or citation of a Division of Occupational Safety and Health (DOSH) inspection of the applicant employer's injury and illness prevention program pursuant to Labor Code Sections 6314.5 and 6401.7 and Section 3203 of Title 8, California Code of Regulations. The Division of Occupational Safety and Health (DOSH) inspection shall have been conducted within 120 days of the date of application to become self insured.

(b) An evaluation report pursuant to subsection (a) that shows the applicant for a Certificate to Self Insure to be without an effective injury prevention program shall be good cause for denial of the application for self insurance by the Director without prejudice to reapplication at a later date.

(c) The applicant employer must abate all serious violations found in the safety and health evaluation report. Written verification of abatement must be sent from the evaluation preparer to Self Insurance Plans.

Note: The pamphlet “A sample of an Injury and Illness Prevention Program” can be obtained from the Cal/OSHA Consultation Services.

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TITLE 8. INDUSTRIAL RELATIONS

DIVISION 1. DEPARTMENT OF INDUSTRIAL RELATIONS **CHAPTER 8. OFFICE OF THE DIRECTOR** **SUBCHAPTER 2. ADMINISTRATION OF SELF-INSURANCE** **ARTICLE 13. GROUP SELF-INSURANCE**

§ 15486.1. Group Self Insurer Injury and Illness Prevention Program.

(a) As part of the application process, a group self insurer applicant for a Certificate of Consent to Self Insure shall provide one of the following:

(1) A written independent evaluation of each core applicant employer's injury and illness prevention program as set forth in Labor Code Section 6401.7. The evaluation shall be completed by an independent, licensed, California Professional Engineer, a **Certified Safety Professional** certified by the **Board of Certified Safety Professionals**, and/or a **Certified Industrial Hygienist**. The evaluation preparer shall disclose to the Manager in the evaluation report if any of the following are true:

(A) The preparer or the preparer's firm has had any business dealings with the applicant group self insurer, any of the applicant members being evaluated, or any applicant member's owner over the two years preceding the evaluation;

(B) The preparer is or has been employed by the present or prior insurance carrier or insurance broker of any applicant member being evaluated at any time during the five years preceding the evaluation; or

(C) The preparer or preparer's firm has been employed by the applicant or its parent in a safety and health or accident prevention capacity at any time during the two years preceding the evaluation.

(2) A copy of a written report of inspection and evaluation of the core applicant employer's injury and illness prevention program conducted by the Division of Occupational Safety and Health (DOSH) pursuant to Labor Code Sections 6314.5. The Division of Occupational Safety and Health inspection shall have been conducted within 120 days of the date of the application to become self insured.

(b) An evaluation report conducted pursuant to subsection (a) that shows the applicant member for a Certificate of Consent to Self Insure to be without an effective injury and illness prevention program shall be good cause for denial of the group member application for self insurance without prejudice to reapplication at a later date when the employer has submitted an evaluation report showing the applicant member to have an effective injury and illness prevention program.

(c) The applicant core group member must abate all serious violations found in any report prepared as provided by this section. Written verification of abatement must be provided to the Office of Self Insurance Plans by the report preparer to document such abatement. Failure to document abatement of any serious violations shall be good cause for denial of the application.

(d) Each private group self insurer shall institute an effective injury and illness prevention program among its membership. Each new and existing member of the group self insurer shall adopt and maintain an effective injury and illness prevention program.

(e) The Board of Trustees shall direct the Group Administrator to ensure ongoing risk control and safety support to group members. Ongoing risk control and safety support shall be under the general direction of a California Professional Engineer, a **Certified Safety Professional**, and/or a **Certified Industrial Hygienist**. The California Professional Engineer, **Certified Safety Professional**, or **Certified Industrial Hygienist** shall report the impact of safety and risk control activities to the Board of Trustees no less frequently than annually, and shall solicit continuing support and direction from the Board of Trustees.

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TITLE 17. PUBLIC HEALTH

DIVISION 3. AIR RESOURCES

CHAPTER 1. AIR RESOURCES BOARD

SUBCHAPTER 7.5. AIRBORNE TOXIC CONTROL MEASURES

§ 93101.5. Airborne Toxic Control Measure to Reduce Emissions of Hexavalent Chromium and Nickel from Thermal Spraying.

(a) Applicability

This Airborne Toxic Control Measure (ATCM) shall apply to each thermal spraying operation at a stationary source that uses materials containing chromium, chromium compounds, nickel, or nickel compounds. This ATCM does not apply to portable thermal spraying operations.

(b) Definitions

For the purposes of this section, the following definitions shall apply:

(1) "Air Pollution Control System" means equipment that is installed for the purpose of collecting and containing emissions of airborne particles from thermal spraying processes. "Air Pollution Control System" includes, but is not limited to, enclosures, exhaust hoods, ductwork, fans/blowers, particulate control devices, and exhaust stacks/vents.

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(B) Enclosure Standards

All existing thermal spraying operations that are subject to subsection (c)(1)(A) must use air pollution control systems that meet the following criteria by January 1, 2006. All modified or new thermal spraying operations that are subject to subsection (c)(2)(A)2. or (c)(3)(A)1., respectively, must use air pollution control systems that meet the following criteria upon initial startup.

1. Enclosures must be exhaust ventilated such that a continuous inward flow of air is maintained from all designed make-up air openings during thermal spraying operations.
2. To ensure good capture of airborne pollutants, the average inward face velocity of air through the enclosure must either be:
 - a. a minimum of 100 feet per minute; or
 - b. the minimum velocity for metal spraying facilities as established in “Industrial Ventilation, A Manual of Recommended Practice”, 25th Edition, published by the **American Conference of Governmental Industrial Hygienists**, which is incorporated by reference herein.

The inward face velocity must be confirmed by a velocity measuring device approved by the permitting agency (e.g., a pitot tube or anemometer.) Measurement of inward face velocity must be performed in accordance with the methods set forth in Appendix 2 or an alternative method approved by the permitting agency. This subsection does not require the use of an independent tester to measure inward face velocity.

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§ 93107. Airborne Toxic Control Measure for Emissions of Toxic Metals from Non-Ferrous Metal Melting.

(a) Definitions. For the purposes of this section, the following definitions shall apply:

(1) “Aluminum and aluminum-based alloys” means any metal that is at least 80% aluminum by weight.

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(7) “Emission collection system” means equipment which is installed for the purpose of directing, taking in, confining, and conveying an air contaminant and which conforms to specifications for design and operation given in Industrial Ventilation, Manual of Recommended Practices, 20th edition, 1988, published by the **American Conference of Government and Industrial Hygienists**, which is incorporated by reference herein.

(8) “Emission point” means any location where molten metal is or can be exposed to air, including but not limited to, furnaces, crucibles, refining kettles, ladles, tap holes, pouring spouts, and slag channels. A mold or die in which metal is cooling is not considered an emission point.

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