

**Cal/OSHA GENERAL INDUSTRY SAFETY ORDERS, LEAD  
SECTION 5198, amended March 6, 2007**

**Title 8  
California Code of Regulations  
CA DEPT OF PUBLIC HEALTH PROPOSED REVISIONS - DECEMBER 2011  
Occupational Lead Poisoning Prevention Program  
Occupational Health Branch  
California Department of Public Health**

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## Title 8

### California Code of Regulations

#### CA DEPT OF PUBLIC HEALTH PROPOSED REVISIONS - DECEMBER 2011

Occupational Lead Poisoning Prevention Program

Occupational Health Branch

California Department of Health Services

#### Sec. 5198. Lead.

answer periods, skits, or role-playing sessions.  
Lecture is not considered an  
interactive/participatory training method.

##### (a) Scope and Application.

- (1) This section applies to all occupational exposure to lead, except as provided in paragraph (a)(2).
- (2) This section does not apply to the construction industry or to agricultural operations.

Lead. Metallic lead, all inorganic lead compounds, and organic lead soaps. Excluded from this definition are all other organic lead compounds.

##### (b) Definitions.

##### (c) Permissible Exposure Limit (PEL).

Action Level. Employee exposure, without regard to the use of respirators, to airborne lead at an 8-hour time-weighted average concentration of ~~xx30~~ micrograms per cubic meter of air (~~xx30~~ µg/m<sup>3</sup>).

- (1) The employer shall assure that no employee is exposed to lead at an 8-hour time-weighted average concentration greater than ~~xx50~~ micrograms per cubic meter of air (~~xx50~~ µg/m<sup>3</sup>).
- (2) If an employee is exposed to lead for more than 8 hours in any work day, the permissible exposure limit for that day, as a time-weighted average concentration (TWA), shall be reduced according to the following formula:

Maximum permissible limit (in µg/m<sup>3</sup>) = 400÷ hours worked in the day.

**Comment [PC1]:** OLPPP has used "xx" throughout the document as a placeholder until numeric values are derived based on the work of OEHHA.

Altered or disturbed. Subjected to a process that may result in the release of dust, mist, fume, or other particles.

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

De minimus. Lead is present in materials that are altered or disturbed and have a lead concentration less than 0.5% (5000 ppm) by weight or where lead is present in materials where the total weight of such materials altered or disturbed during the calendar year is known to be 16 ounces (1 pound) or less by weight.

- (3) When respirators are used to supplement engineering and work practice controls to comply with the PEL, employee exposure, for the purpose of determining whether the employer has complied with the PEL, may be considered to be at the level provided by the protection factor of the respirator for those periods the respirator is worn. Those periods may be averaged with exposure levels during periods when respirators are not worn to determine the employee's daily TWA exposure.

Director. The Director, National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, or designee.

##### (d) Exposure Monitoring.

Interactive/participatory training methods. Instruction which consists of active participation of the employees, such as brainstorming, hands-on training, demonstration and practice, small group problem-solving, learning games, discussions, risk mapping, field visits, walk-throughs, problem posing, group work assignments, question-and-

##### (1) General.

- (A) For the purposes of subsection (d), employee exposure is that exposure which would occur if the employee were not using a respirator.
- (B) With the exception of monitoring under Section 5198(d)(3), the employer shall collect full shift

(for at least 7 continuous hours) personal samples including at least one sample for each shift for each job classification in each work area.

- (C) Full shift personal samples shall be representative of the monitored employee's regular, daily exposure to lead.
- (2) Initial Determination. Each employer who has a workplace or work operation covered by this standard shall determine if any employee may be exposed to lead at or above the action level.
- (3) Basis of Initial Determination.
  - (A) The employer shall monitor employee exposures and shall base initial determinations on the employee exposure monitoring results and any of the following, relevant considerations:
    - 1. Any information, observations, or calculations which would indicate employee exposure to lead;
    - 2. Any previous measurements of airborne lead; and
    - 3. Any employee complaints of symptoms which may be attributable to exposure to lead.
  - (B) Monitoring for the initial determination may be limited to a representative sample of the exposed employees who the employer reasonably believes are exposed to the greatest concentrations of airborne lead in the workplace.
  - (C) Measurements of airborne lead made in the preceding 12 months may be used to satisfy the requirement to monitor under Section 5198(d)(3)(A) if sampling and analytical methods used meet the accuracy and confidence levels of Section 5198(d)(9).
- (4) Positive Initial Determination and Initial Monitoring.
  - (A) Where a determination conducted under Section 5198(d)(2) and (d)(3) shows the possibility of any employee exposure at or above the action level, the employer shall conduct monitoring which is representative of the exposure for each employee in the workplace who is exposed to lead.
  - (B) Measurements of airborne lead made in the preceding 12 months may be used to satisfy this requirement if the sampling and analytical methods used meet the accuracy and confidence levels of Section 5198(d)(9).
- (5) Negative Initial Determination. Where a determination conducted under Section 5198(d)(2) and (d)(3) is made that no employee is exposed to concentrations of airborne lead at or above the action level, the employer shall make a written record of such determination. The record shall include at least the information specified in Section 5198(d)(3) and shall also include the date of determination, location within the worksite, and the name and social security number of each employee monitored.
- (6) Frequency.
  - (A) If initial monitoring reveals an employee's exposure to be above the permissible exposure limit, the employer shall repeat monitoring quarterly until at least two consecutive measurements, taken at least 7 days apart, are at or below the permissible exposure limit. Subsequent monitoring for that employee shall conform with the applicable provisions of Section 5198(d)(6)(B) or (C).
  - (B) If initial monitoring or monitoring conducted in accordance with Section 5198(d)(6)(A) reveals an employee's exposure to be at or above the action level but no greater than the permissible exposure limit, the employer shall repeat monitoring at least every 6 months. The employer shall continue monitoring at the required frequency until at least two consecutive measurements, taken at least 7 days apart, are below the action level at which time the employer may discontinue monitoring for that employee except as otherwise provided by Section 5198(d)(7).
  - (C) Whenever initial monitoring or monitoring conducted in accordance with Section 5198(d)(6)(A) reveals an employee's exposure to be below the action level, further measurements are not required except as otherwise provided by Section 5198(d)(7).
- (7) Additional Monitoring. Whenever there has been a production, process, control or personnel change which may result in new or additional exposure to lead, or whenever the employer has any other reason to suspect a change which may result in new or additional exposures to lead, additional monitoring in accordance with this subsection shall be conducted.

(8) Employee Notification.

- (A) Within 5 working days after the receipt of monitoring results, the employer shall notify each employee in writing of the results which represent that employee's exposure.
- (B) Whenever the results indicate that the representative employee exposure, without regard to respirators, exceeds the permissible exposure limit, the employer shall include in the written notice a statement that the permissible exposure limit was exceeded and a description of the corrective action taken or to be taken to reduce exposure to or below the permissible exposure limit.

(9) Accuracy of Measurement. The employer shall use a method of monitoring and analysis which has an accuracy (to a confidence level of 95%) within plus or minus 20 percent at concentrations of airborne lead equal to or greater than ~~xx30~~  $\mu\text{g}/\text{m}^3$ .

(e) Compliance.

(1) Methods.

- (A) Where any employee is exposed to lead above the permissible exposure limit for more than 30 days per year, the employer shall implement engineering, work practice, and administrative controls to reduce and maintain employee exposure to lead ~~in accordance with the following implementation schedule~~ except to the extent that the employer can demonstrate that such controls are not feasible. Where engineering, work practice, and administrative controls which can be instituted are not sufficient to reduce employee exposure to or below the permissible exposure limit, they shall nonetheless be used by the employer to reduce exposures to the lowest feasible level.

IMPLEMENTATION SCHEDULE

<u>Industry<sup>a</sup></u>	<u>COMPLIANCE DATES<sup>b</sup></u>		
	<u>150</u>	<u>100</u>	<u>50</u>
	<u><math>\mu\text{g}/\text{m}^3</math></u>	<u><math>\mu\text{g}/\text{m}^3</math></u>	<u><math>\mu\text{g}/\text{m}^3</math></u>
Primary lead smelting	c	3-7-85	3-7-92
Secondary lead smelting	c	3-7-85	3-7-87
Battery manufacturing	c	3-7-84	3-7-87
Automobile manufacture/solder grinding	c	N/A	3-7-89
Electronics	c	N/A	3-7-83
Gray iron foundries	c	N/A	3-7-83
Ink manufacture	c	N/A	3-7-83
Paints and coatings manufacture	c	N/A	3-7-83
Wallpaper manufacture	c	N/A	3-7-83
Can manufacture	c	N/A	3-7-83
Printing	c	N/A	3-7-83

Lead pigment manufacture	c	N/A	1-8-93
Nonferrous foundries	c	N/A	7-19-96 <sup>d</sup>
Leaded steel manufacture	c	N/A	1-19-94
Lead chemical manufacture	c	N/A	7-19-96
Shipbuilding and ship repair	c	N/A	1-8-93
Battery breaking in the collection and processing of scrap (excluding collection and processing of scrap which is part of a secondary lead smelting operation)	c	N/A	1-19-94
Secondary smelting of copper	c	N/A	7-19-96
Lead casting	c	N/A	7-19-96 <sup>d</sup>
All other industries	c	N/A	9-7-84

<sup>a</sup>Includes ancillary activities located on the same worksite.

<sup>b</sup>The date by which compliance with the specified airborne exposure level, as an 8-hour TWA, must be achieved.

<sup>c</sup>Effective 9-8-79.

<sup>d</sup>Large nonferrous foundries (20 or more employees) are required to achieve  $50 \mu\text{g}/\text{m}^3$  by means of engineering and work practice controls. Small non-ferrous foundries (fewer than 20 employees), however, are only required to achieve  $75 \mu\text{g}/\text{m}^3$  by such controls.

- (B) Where controls which can be instituted in accordance with Section 5198(e)(1)(A) are not sufficient to reduce and maintain employee exposure to or below the permissible exposure limit, the employer shall supplement these controls with respiratory protection, in

conformance with Section 5198(f), to control employee exposure within the permissible exposure limit.

- ~~(C) Where any employee is exposed to lead above the permissible exposure limit, but for 30 days or less per year, the employer shall implement feasible engineering controls to reduce exposure to  $150 \mu\text{g}/\text{m}^3$ , but thereafter may implement any combination of engineering, work practice, administrative and respiratory controls to reduce and maintain exposure to lead to or below the permissible exposure limit.~~

**Comment [PC2]:** Recommend deleting the implementation schedule language as it is no longer relevant.

(2) Compliance Program.

- (A) Where applicable, each employer shall establish and implement a written compliance program to reduce exposures to or below the permissible exposure limit ~~and interim levels solely by means of engineering and work practice controls in accordance with the implementation schedule in Section 5198(e)(1).~~

- (B) Written plans for these compliance programs shall include at least the following:

1. A description of each operation in which lead is emitted; e.g. machinery used, material

processed, controls in place, crew size, employee job responsibilities, operating procedures and maintenance practices;

2. A description of the specific means that will be employed to achieve compliance, including engineering plans and studies used to determine methods selected for controlling exposure to lead;
3. A report of the technology considered in meeting the permissible exposure limit;
4. Air monitoring data which documents the source of lead emissions;
5. A detailed schedule for implementation of the program, including documentation such as copies of purchase orders for equipment, construction contracts, etc.;
6. A work practice program which includes items required under Section 5198(g), (h), and (i);
7. An administrative control schedule required by Section 5198(e)(5), if applicable; and
8. Other relevant information.

(C) Written programs shall be submitted upon request to the Chief and the Director, and shall be available at the worksite for examination and copying by the Chief, the Director, and any affected employee or authorized employee representatives.

(D) Written programs shall be revised and updated at least every 6 months to reflect the current status of the program.

~~(3) Bypass of Interim Level. Where an employer's compliance plan provides for a reduction of employee exposures to or below the PEL solely by means of engineering and work practice controls in accordance with the implementation schedule in Section 5198(e)(1), and the employer has determined that compliance with the 100 µg/m<sup>3</sup> interim level would divert resources to the extent that it clearly precludes compliance otherwise attainable with the PEL by the required time, the employer may proceed with the plan to comply with the PEL in lieu of compliance with the interim level if:~~

~~(A) The compliance plan clearly documents the basis of the determination;~~

~~(B) The employer takes all feasible steps to provide maximum protection for employees until the PEL is met; and~~

~~(C) The employer notifies the Chief, in writing, within 10 working days of the completion or revision of the compliance plan reflecting the determination.~~

#### (4) Mechanical Ventilation.

(A) When ventilation is used to control exposure, measurements which demonstrate the effectiveness of the system in controlling exposure, such as capture velocity, duct velocity, or static pressure shall be made at least every 3 months. Measurements of the system's effectiveness in controlling exposure shall be made within 5 days of any change in production, process, or control which might result in a change in employee exposure to lead.

(B) Recirculation of Air. If air from exhaust ventilation is recirculated into the workplace, the employer shall assure that:

1. The exhaust has a high efficiency filter with a reliable back-up filter; and
2. Controls are installed, operating, and maintained which monitor the concentration of lead in the return air and which, in case of failure, automatically prevent the recirculation of exhaust air.

(5) Administrative Controls. If administrative controls are used as a means of reducing employees' TWA exposure to lead, the employer shall establish and implement a job rotation schedule which includes:

- (A) Name or identification number of each affected employee;
- (B) Duration and exposure levels at each job or work station where such affected employee is located; and
- (C) Any other information which may be useful in assessing the reliability of administrative controls to reduce exposure to lead.

#### (f) Respiratory Protection.

(1) General. For employees who are required to use respirators by this section, the employer must provide respirators that comply with the requirements of this subsection. Respirators must be used during:

**Comment [PC3]:** Recommend deleting Section (3) as it is no longer relevant.

- (A) Work operations for which engineering and work practice controls are not sufficient to reduce exposures to or below the permissible exposure limit;
- (B) Periods necessary to implement engineering or work practice controls.
- (C) Periods when an employee requests a respirator.

(2) Respirator Program.

- (A) The employer must implement a respiratory protection program in accordance with Section 5144 (c) (except (d)(1)(C)) through (m).
- (B) If an employee exhibits breathing difficulty during fit testing or respirator use, the employer must provide the employee with a medical examination in accordance with subsection (j)(3)(A)3. to determine whether or not the employee can use a respirator while performing the required duty.

(3) Respirator Selection.

- (A) The employer shall select, and provide to employees, the appropriate respirators specified in Section 5144(d)(3)(A)1.
- (B) The employer shall provide a powered, air purifying respirator in lieu of the respirator specified in Section 5198(f)(3)(A) whenever:
  1. An employee chooses to use this type of respirator; and
  2. This respirator will provide adequate protection to the employee.
- (C) The employer shall provide employees with full facepiece respirators instead of half mask respirators for protection against lead aerosols that cause eye or skin irritation at the use concentrations.
- (D) The employer shall provide N-100, P-100, R-100 or HEPA filters for powered and non-powered air-purifying respirators.

**(g) Protective Work Clothing and Equipment.**

- (1) Provisions and Use. If an employee is exposed to lead above the PEL AL, without regard to the use of respirators, or where the possibility of skin or eye irritation exists, the employer shall provide at no cost to the employee and assure that the employee

uses appropriate protective work clothing and equipment such as, but not limited to:

- (A) Coveralls or similar full-body work clothing;
- (B) Gloves, hats, and shoes or disposable shoe coverlets; and
- (C) Face shields, vented goggles, or other appropriate protective equipment which complies with Article 10.

(2) Cleaning and Replacement.

- (A) The employer shall provide the protective clothing required in Section 5198(g)(1), in a clean and dry condition at least weekly, and daily to employees whose exposure levels without regard to respirator use are over ~~150~~ xx µg/m<sup>3</sup> of lead on an 8-hour time-weighted average basis.
- (B) The employer shall provide for the cleaning, laundering, or disposal of protective clothing and equipment required by Section 5198(g)(1).
- (C) The employer shall repair or replace required protective clothing and equipment as needed to maintain their effectiveness.
- (D) The employer shall assure that all protective clothing is removed at the completion of a work shift and only in change rooms provided for that purpose as prescribed in Section 5198(i)(2).
- (E) The employer shall assure that contaminated protective clothing which is to be cleaned, laundered, or disposed of, is placed in a closed container in the change room which prevents dispersion of lead outside the container.
- (F) The employer shall inform in writing any person who cleans or launders protective clothing or equipment of the potentially harmful effects of exposure to lead.
- (G) The employer shall assure that the containers of contaminated protective clothing and equipment required by Section 5198(g)(2)(E) are labeled as follows:

CAUTION: CLOTHING  
CONTAMINATED WITH LEAD.  
DO NOT REMOVE DUST BY  
BLOWING OR SHAKING.  
DISPOSE OF LEAD-CONTAMINATED  
WASH WATER IN ACCORDANCE WITH  
APPLICABLE LOCAL, STATE OR  
FEDERAL REGULATIONS.

- (H) The employer shall prohibit the removal of lead from protective clothing or equipment by blowing, shaking, or any other means which disperses lead into the air.

NOTE: A downdraft booth, "air shower," or other appropriate means for the removal of lead dust may be used provided employee exposure to airborne lead dust is prevented during such use.

**(h) Housekeeping.**

- (1) Surfaces. All work area surfaces shall be maintained as free as practicable of accumulations of lead.
- (2) Cleaning Floors.
  - (A) Floors and other surfaces where lead accumulates may not be cleaned by the use of compressed air.
  - (B) Shoveling, dry or wet sweeping, and brushing may be used only where vacuuming or other equally effective methods have been tried and found not to be effective.
- (3) Vacuumping. Where vacuuming methods are selected, the vacuums shall be used and emptied in a manner which minimizes the re-entry of lead into the workplace. Those vacuum systems which exhaust air into the workplace shall be equipped with air filters at least as effective as high efficiency particulate air filters. High efficiency particulate air filter means 99.97% efficient against 0.3 micrometer size particles.

**(i) Hygiene Facilities and Practices.**

- (1) The employer shall assure that in areas where ~~employees are exposed to lead above the PEL, lead is present above the de minimus, without regard to the use of respirators,~~ food or beverage is not present or consumed, tobacco products are not present or used, and cosmetics are not applied, except in change rooms, lunchrooms, and showers required under Sections 5198(i)(2) to (i)(4).

(2) The employer shall assure that employees who work in areas where lead is present above the de minimus wash their hands and face prior to eating, drinking, smoking or applying cosmetics.

(3) Clean Eating Area

(A) The employer shall provide a clean eating area for employees who work in areas where lead is present above the de minimus.

(B) When a clean eating area is required under Section 5198 (i)(3)(A), the employer shall test eating area surfaces at least weekly using a colorimetric method. The employer shall use a method that is recognized by the U.S. Environmental Protection Agency (EPA) under the Lead Renovation Repair and Painting (RRP) rule or NIOSH, to determine the presence of lead. When lead is detected the employer shall clean the eating area until no lead is detected.

**(24) Change Rooms.**

- (A) The employer shall provide clean change rooms for employees who work in areas where their airborne exposure to lead is above the ~~PEL~~ AL, without regard to the use of respirators.
- (B) The employer shall assure that change rooms are equipped with separate storage facilities for protective work clothing and equipment and for street clothes which prevent cross contamination.  
EXCEPTION: Separate storage facilities are not required where clean protective clothing and equipment are provided on a daily basis.

(C) When change rooms are required by section 5198(i)(4)(A), lead surface contamination shall not exceed xx micrograms per square foot ( $\mu\text{g}/\text{foot}^2$ ).

**(35) Showers.**

- (A) The employer shall assure that employees who work in areas where their exposure to airborne lead is above the PEL, without regard to the use of respirators, shower at the end of the work shift.
- (B) The employer shall provide shower facilities in accordance with Section 3366(f).
- (C) The employer shall assure that employees who are required to shower pursuant to Section 5198(i)(~~35~~) (A) do not leave the work place wearing any clothing or equipment worn during the work shift.

**(46) Lunchrooms Facilities.**

- (A) The employer shall provide readily accessible lunchroom facilities, in accordance with Section 3368, for employees who work in areas where their exposure to airborne lead is above the PEL, without regard to the use of respirators.

(B) Lunchroom facilities shall have a temperature controlled, positive pressure, filtered air supply except that such facilities need not be under positive pressure if workplace operations produce no contamination by airborne lead. (Title 24, Part 2-1724(c)(1)(D)(2).)

~~(C) The employer shall assure that employees who work in areas where their exposure to airborne lead is above the PEL, without regard to respirator use, wash their hands and face prior to eating, drinking, smoking or applying cosmetics.~~

~~(C)~~ (P) The employer shall assure that employees do not enter lunchroom facilities with protective work clothing or equipment unless surface lead dust has been removed by vacuuming, down-draft booth, or other cleaning method.

(D) When lunchroom facilities are required by section 5198(j)(6)(A), lead surface contamination on surfaces used for food preparation or consumption shall not exceed xx ug/foot<sup>2</sup>.

(E) The employer shall test surfaces for lead in lunchroom facilities, and on food preparation surfaces, at least weekly. The employer may use a colorimetric indicator method for weekly sampling.

(F) When using the colorimetric method for lead testing, the employer shall use a method that is recognized by the U.S. Environmental Protection Agency (EPA) under the Lead Renovation Repair and Painting (RRP) rule or NIOSH, to determine the presence of lead.

(G) For quantitative testing by wipe sampling, surface dust shall be collected using a NIOSH, ASTM, or Federal Occupational Safety and Health Administration (OSHA) method that is specific for lead. Wipe samples shall be sent to a National Lead Laboratory Accreditation Program (NLLAP)-accredited laboratory for analysis. The list of NLLAP laboratories can be found at <http://www.epa.gov/lead/> or by contacting the EPA.

(H) When using a colorimetric indicator method, the employer shall maintain surfaces in lunchroom facilities free of detectable levels of lead. When lead is detected in lunchroom facilities the employer shall increase the frequency of cleaning until no lead is detected in these areas.

(5) Lavatories. The employer shall provide an adequate number of lavatory facilities which comply with Section 3366.

**(j) Medical Surveillance.**

(1) General.

(A) The employer shall institute a medical surveillance program for all employees who work in an area where lead is present above the de minimus level, are or may be exposed at or above the action level for more than 30 days per year.

~~(B)~~ (B) The employer shall assure that all medical examinations and procedures are performed by or under the supervision of a licensed physician.

~~(C)~~ (C) The employer shall provide complete employee demographic information to the licensed health care provider who performs any services covered under Sections 5198 (j)(2) and (3). Demographic information includes employer name, employer address and phone number, employee name and date of birth, employee address, and employee phone number.

~~(D)~~ (D) The employer shall provide the required medical surveillance including multiple physician review under Section 5198(j)(3)(C) without cost to employees and at a reasonable time and place.

~~(E)~~ (E) When exposure to lead above the de minimus level for an employee has ended and an employee's post-exposure blood sampling and analysis indicates a blood lead level below 10 ug/dL of whole blood, the employer need not provide medical surveillance for this employee as required by (j)(2) and (j)(3), until such time as the employee's lead exposure resumes.

(2) Biological Monitoring.

(A) Blood Lead and Zinc Protoporphyrin Sampling and Analysis. The employer shall make available biological monitoring in the form of blood sampling and analysis for lead ~~and zinc protoporphyrin (ZPP)~~ levels to each employee covered under Section 5198(j)(1)(A) on the following schedule:

1. At least every month for the first 3 months of placement, or upon change in task to higher exposure, then every 6 months to each

**Comment [PC4]:** This paragraph was moved to (i) (2).

~~employee covered under Section 5198(j)(1)(A);~~

~~2.~~ At least every ~~two~~three months for each employee whose last blood sampling and analysis indicated a blood lead level at or above ~~40~~10 µg/~~100~~gdL, but below 20 µg/dL, of whole blood. This frequency shall continue until ~~three~~two consecutive blood samples and analysis taken at least four weeks apart indicate a blood lead level below 10~~40~~ µg/~~100~~gdL of whole blood; and

~~2.3.~~ At least every four weeks for each employee whose last blood sampling and analysis indicated a blood lead level at or above 20 µg/dL of whole blood. This frequency shall continue until three consecutive blood samples and analysis taken at least four weeks apart indicate a blood lead level below 10 µg/dL of whole blood; and

~~3.4.~~ At least ~~monthly~~every four weeks during the removal period of each employee removed from exposure to lead due to an elevated blood lead level.

~~4. ZPP determinations shall be made available as soon as possible but no later than the first biological monitoring scheduled for an employee after July 1, 1982.~~

(B) Follow-Up Blood Sampling Tests. Whenever the results of a blood lead level test indicate that an employee's blood lead level exceeds the numerical criterion for medical removal under Section 5198(k)(1), the employer shall provide a second (follow-up) blood sampling test within two weeks after the employer receives the results of the first blood sampling test.

(C) Accuracy of Blood Lead Level Sampling and Analysis. Blood lead level sampling and analysis provided pursuant to this section shall be analyzed by a laboratory which meets Federal OSHA accuracy requirements in blood lead proficiency testing (PT) and is on the OSHA List of Laboratories Approved for Blood Lead Analysis. ~~have an accuracy (to a confidence level of 95 percent) within plus or minus 15 percent or 6 µg/100 mL, whichever is greater, and shall be conducted by a laboratory licensed by the Center for Disease Control (CDC), U.S. Department of Health and Human Services, or which has received a satisfactory grade in blood lead proficiency testing from CDC in the prior 12 months.~~

(D) Provision of Employee Demographic Information to Analyzing Laboratory. The employer shall instruct the licensed health care provider ordering the blood lead level test to provide the analyzing laboratory with the employee demographic information per Section 5198 (j)(1)(C).

~~(D)~~ Employee Notification. Within five working days after the receipt of biological monitoring results, the employer shall notify in writing each employee ~~whose blood lead level exceeds 40 µg/100 g:~~

1. Of that employee's blood lead level; and
2. That the standard requires temporary medical removal with Medical Removal Protection benefits when an employee's blood lead level exceeds the numerical criterion for medical removal under Section 5198(k)(1).

(3) Medical Examinations and Consultations.

(A) Frequency. The employer shall make available medical examinations and consultations to each employee covered under Section 5198(j)(1)(A) on the following schedule:

1. ~~Within four weeks~~At least annually for each employee for whom a blood sampling ~~test conducted at any time during the preceding 12 months~~ indicated a blood lead level at or above ~~40~~20 µg/~~100~~gdL unless that employee has had a medical exam and consultation within the preceding 12 months;
2. Prior to assignment for each employee being assigned for the first time to an area in which 8-hour time-weighted concentrations of airborne lead are at or above the action level;
3. As soon as possible, upon notification by an employee either that the employee has developed signs or symptoms commonly associated with lead intoxication, that the employee desires medical advice concerning the effects of current or past exposure to lead on the employee's ability to procreate a healthy child, or that the employee has demonstrated difficulty in breathing during a respirator fitting test or during use; and
4. As medically appropriate for each employee removed from exposure to lead due to a risk of sustaining material impairment to health, or otherwise limited pursuant to a final medical determination.

5. Annually, a blood pressure measurement and the brief medical questionnaire in Appendix C for each employee that has not had, within the preceding 12 months, an examination pursuant to subSections 5198(j)(3)(A)1-4.

(B) Content. Medical examinations made available pursuant to Section 5198(j)(3)(A)1-2 shall include the following elements:

1. A detailed work history and a medical history, with particular attention to past lead exposure (occupational and non-occupational), personal habits (smoking, hygiene), and past gastrointestinal, hematologic, renal, cardiovascular, reproductive and neurological problems;
2. A thorough physical examination, with particular attention to ~~teeth, gums,~~ hematologic, gastrointestinal, renal, cardiovascular, and neurological systems. Pulmonary status should be evaluated if respiratory protection will be used;
3. A blood pressure measurement;
4. A blood sample and analysis which determines:
  - a. Blood lead level;
  - b. Hemoglobin and hematocrit determinations, red cell indices, and examination of peripheral smear morphology;
  - c. Zinc protoporphyrin
  - d. Blood urea nitrogen; and
  - e. Serum creatinine.
5. A routine urinalysis with microscopic examination; and
6. Any laboratory or other test which the examining physician deems necessary by sound medical practice.

The content of medical examinations made available pursuant to Section 5198(j)(3)(A)3-4 shall be determined by an examining physician and, if requested by an employee, shall include pregnancy testing or laboratory evaluation of male fertility.

Medical examinations made available pursuant to Section 5198(j)(3)(A)5. shall include a blood

pressure measurement and brief medical questionnaire regarding the presence of medical conditions that might increase the risk of adverse health effects from lead exposure. The blood pressure measurement and medical questionnaire must be reviewed by a licensed physician.

(C) Multiple Physician Review Mechanism.

1. If the employer selects the initial physician who conducts any medical examination or consultation provided to an employee under this section, the employee may designate a second physician to review any findings, determinations or recommendations of the initial physician and to conduct such examinations, consultations, and laboratory tests as the second physician deems necessary to facilitate this review.
2. The employer shall promptly notify an employee of the right to seek a second medical opinion after each occasion that an initial physician conducts a medical examination or consultation pursuant to this section. The employer may condition participation in, and payment for, the multiple physician review mechanism by requiring the employee (within 15 days from the date of the foregoing notice or receipt of the initial physician's written opinion, whichever is later) to inform the employer that the employee intends to seek a second medical opinion and to initiate steps to make an appointment with a second physician.
3. If the findings, determinations or recommendations of the second physician differ from those of the initial physician, then the employer and the employee shall assure that efforts are made for the two physicians to resolve any disagreement.
4. If the two physicians are unable to resolve their disagreement quickly, the employer and employee through their respective physicians shall designate a third physician to review any findings, determinations, or recommendations of the prior physicians and to conduct such examinations, consultations, laboratory tests, and discussions with the prior physicians which the third physician deems necessary to resolve the disagreement of the prior physicians.

5. The employer shall act consistent with the findings, determinations and recommendations of the third physician, unless the employer and the employee reach an agreement which is otherwise consistent with the recommendations of at least one of the three physicians.
- (D) Alternate Physician Determination Mechanisms. The employer and an employee or authorized employee representative may agree upon the use of any expeditious alternate physician determination mechanism in lieu of the multiple physician review mechanism provided by this section so long as the alternate mechanism otherwise satisfies the requirements contained in this section.
- (4) Information Provided to Examining and Consulting Physicians.
- (A) The employer shall provide the following information to and initial physician conducting a medical examination or consultation under the provisions of this section:
1. A copy of this regulation and its appendices;
  2. A description of the affected employee's duties as they relate to the employee's exposure;
  3. The employee's exposure level or anticipated exposure level to lead and to any other toxic substance (if applicable);
  4. A description of any personal protective equipment used or to be used;
  5. Prior blood lead determinations; and
  6. All prior written medical opinions concerning the employee in the employer's possession or control.
- (B) The employer shall provide the foregoing information to a second or third physician conducting a medical examination or consultation under this section upon request either by the second or third physician, or by the employee.
- (5) Written Medical Opinions.
- (A) The employer shall obtain and furnish the employee with a copy of a written medical report from each examining or consulting physician which contains the following information:
1. The physician's opinion as to whether the employee has any detected medical condition which would place the employee at increased risk of material impairment of the employee's health from exposure to lead.
  2. Any recommended special protective measures to be provided to the employee, or limitations to be placed upon the employee's exposure to lead.
  3. Any recommended limitation upon the employee's use of respirators, including a determination of whether the employee can wear a powered air-purifying respirator if the physician determines that the employee cannot wear a negative pressure respirator; and
  4. The results of the blood lead determinations.
- (B) The employer shall instruct the examining physician to:
1. Not reveal either in the written opinion, or in any other means of communication with the employer, findings, including laboratory results, or diagnoses unrelated to the employee's occupational exposure to lead; and
  2. Advise the employee of any medical condition, occupational or non-occupational, which dictates further medical examination or treatment.
- (6) Chelation.
- (A) The employer shall assure that any person whom he retains, employs, supervises, or controls does not engage in prophylactic chelation of any employee at any time.
- (B) If therapeutic or diagnostic chelation is to be performed by any person in Section 5198(j)(6)(A), the employer shall assure that it be done under the supervision of a licensed physician in a clinical setting with thorough and appropriate medical monitoring and that the employee is notified in writing prior to its occurrence.
- (k) **Medical Removal Protection.**
- (1) Temporary Removal Due to Elevated Blood Lead Levels.
- (A) ~~First Year of the Standard. During the first year following the effective date of this section, t~~The employer shall remove an employee from work

~~in an area where lead is present above the de minimus level having a daily 8-hour TWA exposure to lead at or above 100 µg/m<sup>3</sup> on each occasion that a periodic and a follow-up blood sampling test conducted pursuant to this section indicate that the employee's blood lead level is at or above 80 µg/100-g dL of whole blood or on each occasion that the last two blood sampling tests conducted pursuant to this section 5198(j)(2)(A) indicate that the employee's blood lead level is at or above 20 µg/dL;~~

~~(B) Second Year of the Standard. During the second year following the effective date of this section, the employer shall remove an employee from work having a daily 8-hour TWA exposure to lead at or above 50 µg/m<sup>3</sup> on each occasion that a periodic and a follow-up blood sampling test conducted pursuant to this section indicate that the employee's blood lead level is at or above 70 µg/100-g of whole blood;~~

~~(C) Third Year of the Standard, and Thereafter. Beginning with the third year following the effective date of this section, the employer shall remove an employee from work having an exposure to lead at or above the action level on each occasion that a periodic and a follow-up blood sampling test conducted pursuant to this section indicate that the employee's blood lead level is at or above 60 µg/100-g of whole blood; and~~

~~(D) Fifth Year of the Standard, and Thereafter. Beginning with the fifth year following the effective date of this section, the employer shall remove an employee from work having an exposure to lead at or above the action level on each occasion that the average of the last three blood sampling tests conducted pursuant to this section (or the average of all blood sampling tests conducted over the previous six (6) months, whichever is longer) indicates that the employee's blood lead level is at or above 50 µg/100-g of whole blood; provided, however, that an employee need not be removed if the last blood sampling test indicates a blood lead level at or below 40 µg/100-g of whole blood.~~

(2) Temporary Removal Due to a Final Medical Determination.

(A) The employer shall remove an employee from work in an area where lead is present above the de minimus level having an exposure to lead at

~~or above the action level~~ on each occasion that a final medical determination results in a medical finding, determination, or opinion that the employee has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to lead.

NOTE: For the purposes of this section, the phrase "final medical determination" shall mean the outcome of the multiple physician review mechanism or alternate physician determination mechanism used pursuant to the medical surveillance provisions of this section.

(B) Where a final medical determination results in any recommended special protective measures for an employee, or limitations on an employee's exposure to lead, the employer shall implement and act consistent with the recommendation.

(3) Return of the Employee to Former Job Status.

(A) The employer shall return an employee to his or her former job status:

1. For an employee removed ~~removed under the provisions of (k) (1) (A) due to a blood lead level at or above 80 µg/100-g~~ when two consecutive blood sampling tests taken at least four weeks apart indicate that the employee's blood lead level is at or below ~~60~~15 µg/100-g dL of whole blood;

~~2. For an employee removed due to a blood lead level at or above 70 µg/100-g when two consecutive blood sampling tests indicate that the employee's blood lead level is at or below 50 µg/100-g of whole blood;~~

~~3. For an employee removed due to a blood lead level at or above 60 µg/100-g or due to an average blood lead level at or above 50 µg/100-g when two consecutive blood sampling tests indicate that the employee's blood lead level is at or below 40 µg/100-g of whole blood; and~~

4. For an employee removed due to a final medical determination, when a subsequent final medical determination results in a medical finding, determination, or opinion that the employee no longer has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to lead.

(B) For the purposes of this section, the requirement that an employer return an employee to his or her former job status is not intended to expand upon or restrict any rights an employee has or would have had, absent temporary medical removal, to a specific job classification or position under the terms of a collective bargaining agreement.

(4) Removal of Other Employee Special Protective Measures or Limitations.

The employer shall remove any limitations placed on an employee or end any special protective measures provided to an employee pursuant to a final medical determination when a subsequent final medical determination indicates that the limitations or special protective measures are no longer necessary.

(5) Employer Options Pending a Final Medical Determination. Where the multiple physician review mechanism, or alternate medical determination mechanism used pursuant to the medical surveillance provisions of this section, has not yet resulted in a final medical determination with respect to an employee, the employer shall act as follows:

(A) Removal. The employer may remove the employee from exposure to lead, provide special protective measures to the employee, or place limitations upon the employee, consistent with the medical findings, determinations, or recommendations of any of the physicians who have reviewed the employee's health status.

(B) Return. The employer may return the employee to his or her former job status, end any special protective measures provided to

the employee, and remove any limitations placed upon the employee, consistent with the medical findings, determinations, or recommendations of any of the physicians who have reviewed the employee's health status.

EXCEPTIONS:

(1) If the initial removal, special protection, or limitation of the employee resulted from a final medical determination which differed from the findings, determinations, or recommendations of the initial physician.

(2) If the employee has been on removal status for the preceding eighteen months due to an elevated blood lead level, the employer shall await a final medical determination.

(6) Medical Removal Protection Benefits.

(A) Provision of Medical Removal Protection Benefits. The employer shall provide to an employee up to eighteen (18) months of medical removal protection benefits on each occasion that an employee is removed from exposure to lead or otherwise limited pursuant to this section.

(B) Definition of Medical Removal Protection Benefits. For the purposes of this section, the requirement that an employer provide medical removal protection benefits means that the employer shall maintain the earnings, seniority and other employment rights and benefits of an employee as though the employee had not been removed from normal exposure to lead or otherwise limited.

(C) Follow-Up Medical Surveillance During the Period of Employee Removal or Limitation. During the period of time that an employee is removed from normal exposure to lead or otherwise limited, the employer may condition the provision of medical removal protection benefits upon the employee's participation in follow-up medical surveillance made available pursuant to this section.

(D) Worker's Compensation Claims. If a removed employee files a claim for worker's compensation payments for a lead-related disability, then the employer shall continue to provide medical removal protection benefits pending disposition of the claim. To the extent that an award is made to the employee for earnings lost during the period of removal, the employer's medical removal protection obligation shall be reduced by such amount. The employer shall receive no credit for worker's compensation payments received by the employee for treatment related expenses.

(E) Other Credits. The employer's obligation to provide medical removal protection benefits to a removed employee shall be reduced to the extent that the employee receives compensation for earnings lost during the period of removal either from a publicly or employer-funded compensation program, or receives income from employment with another employer made possible by virtue of the employee's removal.

**Comment [PC5]:** OLPPP is evaluating the need to extend the maximum period of time for MRP benefits for employees with chronic lead exposure and significant bone lead stores.

(F) Employees Whose Blood Lead Levels Do Not Adequately Decline Within 18 Months of Removal. The employer shall take the following measures with respect to any employee removed from exposure to lead due to an elevated blood lead level whose blood lead level has not declined within the past eighteen (18) months of removal so that the employee has been returned to his or her former job status.

1. The employer shall make available to the employee a medical examination pursuant to this section to obtain a final medical determination with respect to the employee.
2. The employer shall assure that the final medical determination obtained indicates whether or not the employee may be returned to his or her former job status, and if not, what steps should be taken to protect the employee's health.
3. Where the final medical determination has not yet been obtained, or once obtained indicates that the employee may not yet be returned to his or her former job status, the employer shall continue to provide medical removal protection benefits to the employee until either the employee is returned to former job status, or a final medical determination is made that the employee is incapable of ever safely returning to his or her former job status.
4. Where the employer acts pursuant to a final medical determination which permits the return of the employee to his or her former job status despite what would otherwise be an unacceptable blood lead level, later questions concerning removing the employee again shall be decided by a final medical determination. The employer need not automatically remove such an employee pursuant to the blood lead level removal criteria provided by this section.

(G) Voluntary Removal or Restriction of an Employee. Where an employer, although not required by this section to do so, removes an employee from exposure to lead or otherwise places limitations on an employee due to the effects of lead exposure on the employee's medical condition, the employer shall provide medical removal protection benefits to the employee equal to that required by Section 5198(k)(5)(A).

## (I) Employee Information and Training.

### (1) Training Program.

- (A) Each employer who has a workplace in which ~~there is a potential exposure to airborne lead at any level~~ lead is present above the de minimus shall inform employees of the content of Appendices A and B of this regulation.
- (B) The employer shall institute a training program for and assure the participation of all employees who are subject to exposure to lead at or above the action level or for whom the possibility exists of skin or eye irritation from exposure to lead. The training shall be provided in a language understandable to employees and shall use methods appropriate for employees with no or low literacy skills. The training shall use interactive/participatory training methods.
- (C) The employer shall provide initial-complete training ~~by 180 days from the effective date~~ for those employees covered by Section 5198(l)(1)(B) ~~on the standard's effective date~~ and prior to the time of initial job assignment ~~for those employees subsequently covered by this paragraph.~~
- (D) ~~The training program shall be repeated at least annually. Complete training shall be provided annually and refresher training shall be provided quarterly~~ for each employee covered by Section 5198(l)(1)(C).
- (E) ~~The employer shall assure that each employee covered by Section 5198 (l)(1)(C) is informed of Complete annual training provided pursuant to Section 5198(l) (1) (D) shall include~~ the following:
  1. The content of this standard and its appendices;
  2. The specific nature of the operations which could result in exposure to lead above the action level;
  3. The purpose, proper selection, fitting, use, and limitations of respirators;
  4. The purpose and a description of the medical surveillance program, and the medical removal protection program including information concerning the adverse health effects associated with ~~excessive~~ exposure to lead (with particular attention to the adverse

reproduction effects on both males and females, and the health risks of chronic and low-level exposure);

5. The engineering controls and work practices associated with the employee's job assignment;

6. Recognition that lead brought home from the job on a worker's clothes, shoes, and/or body can endanger the health of a worker's household members, especially young children and pregnant women;

6-7. The contents of any compliance plan in effect; and

78. Instructions to employees that chelating agents should not routinely be used to remove lead from their bodies and should not be used at all except under the direction of a licensed physician.

(F) Quarterly refresher training provided pursuant to Section 5198(l)(1)(D) shall include at a minimum the following:

1. Review of lead safety topics previously covered in the annual training as needed;

2. Changes in work materials, practices, processes, or exposure controls since the previous quarterly training;

3. Changes in personal protective equipment since the previous quarterly training;

4. New or unappreciated lead safety hazards identified since the previous quarterly training.

(2) Access to Information and Training Materials.

- (A) The employer shall make a copy of this standard and its appendices readily available to all affected employees including employees exposed below the action level.
- (B) The employer shall provide, upon request, all materials relating to the employee information and training program to the Chief.

**(m) Signs.**

(1) General.

- (A) The employer may use signs required by other statutes, regulations or ordinances in addition

to, or in combination with, signs required by this section.

- (B) The employer shall assure that no statement appears on or near any sign required by this section which contradicts or detracts from the meaning of the required sign.

(2) Signs.

- (A) The employer shall post the following warning signs in each work area where lead is present above the de minimus level the PEL is exceeded:

WARNING  
LEAD WORK AREA  
POISON  
NO SMOKING OR EATING

(B) The signs shall be in a language understandable to workers.

- (B)C The employer shall assure that signs required by this section are illuminated and cleaned as necessary so that the legend is readily visible.

**(n) Recordkeeping.**

(1) Exposure Monitoring.

- (A) The employer shall establish and maintain an accurate record of all monitoring required in Section 5198(d).

(B) This record shall include:

1. The date(s), number, duration, location and results of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure where applicable;
2. A description of the sampling and analytical methods used and evidence of their accuracy;
3. The type of respiratory protective devices worn, if any;
4. Name, social security number employee identification number, and job classification of the employee monitored and of all other employees whose exposure the measurement is intended to represent; and
5. The environmental variables that could affect the measurement of employee exposure.

- (C) The employer shall maintain these monitoring records for at least 40 years or for the duration

**Comment [PC6]:** Suggest that SSN# be deleted and substituted with "employee identification number". Use of SSN# in this way is not advisable and may no longer be allowable.

of employment plus 20 years, whichever is longer.

(2) Medical Surveillance.

- (A) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance as required by Section 5198(j).
- (B) This record shall include:
  - 1. The name, ~~social security number~~ employee identification, and description of the duties of the employee;
  - 2. A copy of the physician's written opinions;
  - 3. Results of any monitoring of exposure to airborne lead done for that employee and the representative exposure level supplied to the physician; and
  - 4. Any employee medical complaints related to exposure to lead.
- (C) The employer shall keep, or assure that the examining physician keeps, the following medical records:
  - 1. A copy of the medical examination results including medical and work history required under Section 5198(j).
  - 2. A description of the laboratory procedures and a copy of any standards or guidelines used to interpret the test results or references to that information.
  - 3. A copy of the results of biological monitoring.
- (D) The employer shall maintain or assure that the physician maintains those medical records for at least 40 years, or for the duration of employment plus 20 years, whichever is longer.

(3) Medical Removals.

- (A) The employer shall establish and maintain an accurate record for each employee removed from current exposure to lead pursuant to Section 5198(k).
- (B) Each record shall include:
  - 1. The name and ~~social security number~~ employee identification number of the employee;

- 2. The date on each occasion that the employee was removed from current exposure to lead as well as the corresponding date on which the employee was returned to his or her former job status;
  - 3. A brief explanation of how each removal was or is being accomplished; and
  - 4. A statement with respect to each removal indicating whether or not the reason for the removal was an elevated blood lead level.
- (C) The employer shall maintain each medical removal record for at least the duration of an employee's employment.

(4) Measurements of lead surface contamination.

- (A) The employer shall establish and maintain an accurate record of all surface sampling required in Sections 5198(i)(6)(E), 5198(i)(6)(F), and 5198(i)(6)(G).
- (B) This record shall include the date(s), number, location, and results of each of the samples taken, including a description of the sampling method used.
- (C) The employer shall maintain records of lead surface testing for at least 30 years.

(5) Availability.

- (A) The employer shall make available upon request all records required to be maintained by this subsection to the Chief and the Director for examination and copying.
- (B) Environmental monitoring, medical removal, and medical records required by this section shall be provided upon request to employees, designated representatives, and authorized representatives of the Chief in accordance with Section 3204. Medical removal records shall be provided as prescribed by Section 3204 for monitoring records.

(6) Transfer of Records.

- (A) Whenever the employer ceases to do business, the successor employer shall receive and retain all records required to be maintained by Section 5198(n).

**Comment [PC7]:** See previous comment on removing SSN# and substituting with employee identification number.

- (B) Whenever the employer ceases to do business and there is no successor employer to receive and retain the records required to be maintained by this section for the prescribed period, these records shall be transmitted to the Director.
- (C) At the expiration of the retention period for the records required to be maintained by this section, the employer shall notify the Director at least 3 months prior to the disposal of such records and shall transmit those records to the Director if requested within the period.
- (D) The employer shall also comply with any additional requirements involving the transfer of records set forth in Section 3204.

- ~~(1) Lunchroom facilities must comply with Section 5198(i)(4)(B) no later than January 1, 1983. Plans for the construction or renovation of lunchroom facilities which comply with Section 5198(i)(4)(B) — September 7, 1982.~~
- ~~(2) Powered, air purifying respirators provided under Section 5198(f)(2)(B) — July 1, 1982.~~
- ~~(3) Written compliance plans required by Section 5198(e)(2) shall be completed and available for inspection and copying as soon as possible but no later than the following schedule:~~
  - ~~(A) Electronics, gray iron foundries, ink manufacture, paints and coating manufacture, wallpaper manufacture, can manufacture and printing — September 7, 1982.~~
  - ~~(B) Solder grinding in automobile manufacture — March 7, 1983.~~
  - ~~(C) Secondary lead smelting and battery manufacturing — March 7, 1983, except for Sections 5198(e)(2)(B)2 and (e)(2)(B)5 which must be completed by September 1, 1983.~~
  - ~~(D) Primary lead smelting — March 7, 1983 for the interim level, except for Sections 5198(e)(2)(B)2 and (e)(2)(B)5 which must be completed by September 1, 1983, and March 7, 1987 for the permissible exposure limit.~~

**(o) Observation of Monitoring.**

During any observation of monitoring under Section 5198(d) or of surface sampling under Section (i) by an affected employee or employees or their representative (pursuant to Section 340.1) in an area where the use of respirators, protective clothing or equipment is required, the employer shall provide the observer with, and assure the use of, such respirators, clothing and equipment and shall require the observer to comply with all other applicable safety and health procedures. Without interfering with the monitoring, the observer shall be entitled to receive an explanation of the measurement procedures used.

~~**(p) Startup Dates.**~~

~~Certain provisions of this regulation become operative more than two years beyond the regulation's effective date of September 8, 1979. Where the effective date is not prescribed within the text of any such provision, the required date is established by this subsection.~~

**(q) Appendices.**

The information contained in the appendices to this section is not intended to create any additional obligations not otherwise imposed by this standard nor detract from any existing obligation.

**Comment [PC9]:** Appendices A-C will need to be revised to bring them into agreement with a revised standard. OLPPP can provide assistance in revising these appendices at the appropriate time.

**Comment [PC8]:** Recommend deleting strikethrough language as it is no longer relevant.