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- Title: Enforcement Procedures and Scheduling for Occupational Exposure to Tuberculosis
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OSHA Instruction CPL 2.106 February 9, 1996 Office of Health Compliance Assistance

SUBJECT: Enforcement Procedures and Scheduling for Occupational Exposure to Tuberculosis

A. **Purpose**. This instruction provides uniform inspection procedures and guidelines to be followed when conducting inspections and issuing citations under Section 5(a)(1) of the OSH Act and pertinent standards for employees who are occupationally exposed to tuberculosis.

B. **Scope**. This instruction applies OSHA-wide.

C. **References**.
1. OSHA Instruction CPL 2.103, September 26, 1994, Field Inspection Reference Manual (FIRM).

2. OSHA Instruction CPL 2.45B, June 15, 1985, The Revised Field Operations Manual (FOM).

3. American Public Health Association - 1990 or current edition, Control of Communicable Diseases in Man.

4. OSHA Instruction CPL 2-2.20B, CH-3, August 22, 1994. Occupational Safety and Health Administration Technical Manual Chapter No. 7.

5. OSHA Instruction, ADM 1-31, the IMIS Enforcement Data Processing Manual.

6. OSHA Instruction ADM 1-32, Enforcement User Skills Manual (for those Area Offices still using the NCR system).

7. Centers for Disease Control and Prevention (CDC), Biosafety in Microbiological and Biomedical Laboratories, 3rd Edition, or current edition.

8. Department of Health and Human Services, Public Health Service, 42 CFR Part 84; Final Rule

9. Centers for Disease Control and Prevention (CDC); Guidelines for Preventing the transmission of mycobacterium tuberculosis in Health Care Facilities, 1994; MMWR October 26, 1994 Vol. 43, No. RR-13.
D. **Action**. OSHA Regional Administrators and Area Directors shall use this instruction to ensure uniformity when performing inspections for occupational exposures to tuberculosis (TB). The Directorate of Compliance Programs shall provide support as necessary to assist the Regional Administrators and Area Directors in enforcing this directive. Issuance of this directive cancels the Memorandum to Regional Administers dated October 8, 1993, and entitled Enforcement Policy and Procedures for Occupational Exposure to Tuberculosis.

E. **Federal Program Change**. This is a federal program change which impacts state programs.
1. The Regional Administrator (RA) shall ensure that this change is promptly forwarded to each state designee using a format consistent with the Plan Change Two-way Memorandum in Appendix A, State Plan Policies and Procedures Manual (SPM).

2. The RA shall explain the content of this change to the state designee as required.

3. The state shall respond to this change within 70 days in accordance with paragraph I.1.a.(2).(a). and (b)., Part I, Chapter III of the SPM.

4. The state's acknowledgment shall include (a) the state's plan to adopt and implement an identical change, (b) the state's plan to develop an alternative, which is as effective, or the reasons why no change is necessary to maintain a program which is as effective. The state shall submit a plan supplement within six months in accordance with I.1.a.(3).(c)., Part I, Chapter III of the SPM.

5. The RA shall advise state designees of the following:

a. In order to ensure a sound and consistent national enforcement and litigation strategy in relation to complex issues addressed by this instruction, state implementation of the procedures in this instruction, or comparable state procedures, must be carefully coordinated with OSHA.

b. The state is also responsible for extending coverage under its procedures for addressing occupational exposure to tuberculosis to the public sector employees in workplaces covered by this instruction.

c. The Directorate of Technical Support is available to assist the states in locating expert witnesses (see paragraph M., expert witnesses). Also, the Directorate of Compliance Programs will provide support to the states through the RA to assist in the enforcement of this directive.

6. The RA shall review policies, instructions, and guidelines issued by the state to determine that this change has been communicated to state compliance personnel.

F. **Definitions**. For a complete list of definitions applicable to tuberculosis please refer to the list of definitions in the 1994 CDC guidelines found in Appendix A beginning on page 113.

G. **Background**. Since 1985, the incidence of tuberculosis (TB) in the general U.S. population has increased approximately 14 percent, reversing a 30-year downward trend. In 1993, 25,313 new cases of TB were reported in the United States. Increases in the incidence of TB have been observed in some geographic areas; these increases are related partially to the high risk for TB among immunosuppressed persons, particularly those infected with human immunodeficiency virus (HIV). Other factors (e.g., socioeconomic) have alsocontributed to these increases. Outbreaks have occurred in hospitals, correctional institutions, homeless shelters, nursing homes, and residential care facilities for AIDS patients. During 1994 and 1995 there has been a decrease in the number of TB cases in the United States that is likely been due to increased awareness and efforts in the prevention and control of TB, including the implementation of TB control measures recommended by the CDC and required by OSHA.

Recently, drug resistant strains of M. tuberculosis have become a serious concern and cases of multi-drug-resistant (MDR) TB have occurred in forty states. In a recent New York City study, 33% of cases had organisms resistant to the two most effective drugs available for treating the disease.

When organisms are resistant to both drugs, the course of the treatment increases from six months to 18-24 months, and the cure rate decreases from 100% to 60% or less.

In a 1992 American Hospital Association survey/CDC survey, 90 of 729 (13%) respondents reported nosocomial TB transmission to health care workers. More than 80% of those facilities experienced TB skin test conversions among workers. More than 100 cases of active TB disease in health care workers were known to CDC and reported to Congress by Dr. William Roper in the Spring of 1993. Twelve (12) health care workers have died. Nationwide, at least several hundred employees have become infected and required medical treatment after workplace exposure to TB. In general, persons who become infected with TB have approximately a 10% risk for developing active TB in their lifetimes.

M. tuberculosis is carried through the air in tiny infectious droplet nuclei of 1 to 5 microns in diameter.

These droplets may be generated when a person with pulmonary and laryngeal TB disease coughs, speaks, sings, sneezes, or spits. When inhaled by susceptible persons, themycobacteria in these droplets may become established in the lungs and, in some cases, spread throughout the body. After an interval of months, years, or even decades, the initial infection may then progress to clinical illness (i.e., tuberculosis disease). Transmission of TB is most likely to occur from persons with pulmonary or laryngeal TB that are not on effective anti-TB therapy and who have not been placed in respiratory isolation.

In occupational healthcare settings, where patients with TB are seen, workers exposed to tuberculosis droplet nuclei are at increased risk of infection with exposure to TB. Certain high-risk medical procedures that are cough-inducing or aerosol generating can further increase the risk ofinfection in health-care workers.

The employer's obligations are those set forth in the Occupational Safety and Health Act (OSH Act) of 1970. Recommendations for preventing the transmission of TB for health care settings were originally established with the 1990 CDC Guidelines. In October, of 1994, those guidelines were revised and published (Appendix A). The new guidelines emphasize the control of TB through an effective TB infection control program. Under these guidelines the control of TB is to be accomplished through the early identification, isolation, and treatment of persons with TB, use of engineering and administrative procedures to reduce the risk of exposure, and through the use of respiratory protection. OSHA believes these guidelines reflect an industry recognition of the hazard as well as appropriate, widely recognized, and accepted standards of practice to be followed by employers in carrying out their responsibilities under the OSH Act.

H. **Inspection Scheduling and Scope**
1. The evaluation of occupational exposure to TB shall be conducted in response to employee complaints, related fatality/catastrophes, or as part of all industrial hygiene inspections conducted in workplaces where the CDC has identified workers as having a greater incidence of TB infection than in the general population. The degree of risk of occupational exposure of a worker to TB will vary based on a number of factors discussed in detail by the CDC (Appendix A, pg. 4-5). These workplaces have been the subject of reports issued by the CDC which provide recommendations for the control of tuberculosis. Specifically, these workplaces are as follows:

a. health care facilities b. correctional institutions c. long-term care facilities for the elderly d. homeless shelters e. drug treatment centers

Note: Health-care facilities include hospitals where patients with confirmed or suspect TB are treated or to which they are transported. Coverage of non-hospital health care settings (i.e., doctors' offices, clinics, etc.) includes only personnel present during the performance of high hazard procedures on suspect or active TB patients. Dental health care personnel are covered by the directive only if they treat suspect or active patients in a hospital or correctional facility.

Homeless shelters - due to a variety of circumstances, the control of TB in homeless shelters presents unique problems for the protection of workers. Shelters must establish protocols that provide for rapid early identification followed by immediate transfer of suspect cases if the shelters have elected not to treat these patients.

2. All inspections in these workplaces shall include a review of the employer's plans for employee TB protection, if any. Such plans may include the infection control program, respiratory protection and skin testing. Employee interviews and site observations are an integral part of the process evaluation.

3. Complaints received from state and local government employees who are outside federal jurisdiction in federal enforcement states shall be referred to the appropriate agency by the Area Office.
I. **Inspection Procedures**. The procedure given in the FIRM, Chapter II, shall be followed except as modified in the following sections:
1. Health care facilities generally have internal infection control and employee health programs. This function may be performed by a team or individual. Upon entry, the CSHO shall request the presence of the

infection control director and employee occupational health professional responsible for occupational health hazard control. Other individuals who will be responsible for providing records pertinent to the inspection may include: training director, facilities engineer, director of nursing, etc.

2. The CSHO shall establish whether or not the facility has had a suspect or confirmed TB case within the previous six (6) months from the opening conference to determine coverage under the OSH Act. This determination may be based upon interviews and, in a hospital, a review of the infection control data.

3. If the facility has had a suspect or confirmed TB case within the previous six months, the CSHO shall proceed with the TB portion of the inspection. The CSHO shall verify implementation of the employer's plans for TB protection through employee interviews and direct observation where feasible. Professional judgment shall be used to identify which areas of a facility must be inspected during the walkthrough (e.g., emergency rooms, respiratory therapy areas, bronchoscopy suites, and morgue). After review of the facility plans for worker TB protection, employee interviews combined with an inspection of appropriate areas of the facility, shall be used to determine compliance.

4. CSHOs who perform smoke-trail visualization tests should review the protocol in Appendix B of this directive.

5. CSHOs should be prepared to present to the employer the material safety data sheet (MSDS) for the smoke that is released on a smoke-trail visualization.

J. **Compliance Officer Protection**

1. Area Directors or Assistant Area Directors shall ensure that CSHOs performing TB related inspections are familiar with the CDC Guidelines, terminology, and are adequately trained through either course work or field/work experience in health care settings. Consultation with the regional TB coordinators is encouraged prior to beginning such inspections.

2. CSHOs shall not enter occupied respiratory isolation [AFB (acid fast bacilli)] rooms to evaluate compliance unless, in their determination entry is required to document a violation. Prior to entry CSHOs will discuss the need for entry with the Area Director. Photographs or video taping where practical shall be used for case documentation. Under no circumstances shall photographing or videotaping of patients be done. CSHO's must take all necessary precautions to assure and protect patient confidentiality.

3. CSHOs shall exercise professional judgement and extreme caution when engaging in activities that may involve potential exposure to TB. CSHOs normally shall establish the existence of hazards and adequacy of work practices through employee interviews and shall observe them in a manner which prevents exposure (e.g., through an observation window where available).

4. On rare occasions when entry into potentially hazardous areas is judged necessary (e.g., where the CSHO determines that direct observation of a high hazard procedure is necessary), the CSHO shall be properly equipped as required by the facility, this directive, and following consultation with the CSHO's supervisor. Since CSHOs' respiratory protection is used in more than one type of industry they shall use their negative pressure elastomeric face piece respirators equipped with HEPA filters as the minimum level of respiratory protection.

5. CSHOs who conduct TB inspections shall have been offered the TB skin tests. CSHOs exposed to an individual(s) with active infectious TB shall receive a follow-up examination and follow Sections J. and K. of Appendix A beginning on page 37.

Note: A "TB Skin Test" means the intradermal injection (Mantoux Method) of tuberculin antigen (usually PPD) with subsequent measurement of the induration by designated, trained personnel.

6. If an isolation room is occupied by a patient with confirmed or suspect TB or has not been adequately purged when a smoke-trail test is performed, then the CSHO should assume that the isolation room is not under negative pressure. Under such circumstances CSHOs shall wear a negative pressure HEPA respirator

when performing air tests as described in Appendix B or if entry into the room is determined to be necessary.

K. **Citation Policy.** Relevant chapters of the FIRM shall be followed when preparing and issuing citations for hazards related to TB.

1. The following requirements apply when citing hazards found in target workplaces. Employers must comply with the provisions of these requirements whenever an employee may be occupationally exposed to TB:

Section 5(a)(1) -- General Duty Clause and Executive Order 12196, Section 1-201(a) for Federal facilit

29 CFR 1910.134 -- Respiratory Protection

29 CFR 1910.145 -- Accident Prevention Signs and Tags

29 CFR 1910.20 -- Access to Employee Exposure and Medical Records

29 CFR 1904 -- Recording and Reporting Occupational Injuries & Illness

L. **Violations**. All elements in this section must be addressed to ensure adequate protection of employees from TB hazards. Violations of these OSHA requirements will normally be classified as serious.

1. **General Duty Clause - Section 5(a)(1)**. Section 5(a)(1) provides: "Each employer shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees."

a. Section 5(a)(1) citations must meet the requirements outlined in the FIRM, and shall be issued only when there is no standard that applies to the particular hazard. The hazard, not the absence of a particular means of abatement, is the basis for a general duty clause citation. All applicable abatement methods identified as correcting the same hazard shall be issued under a single 5(a)(1) citation.

b. Recognition, for purposes of citing section 5(a)(1), is shown by the CDC Guidelines for the types of exposures detailed below because the CDC is an acknowledged body of experts familiar with the hazard.

c. Citations shall be issued to employers with employees working in one of the workplaces where the CDC has identified workers as having a higher incidence of TB infection than the general population, when the employees are not provided appropriate protection **and** who have exposure as defined below:

1. Exposure to the exhaled air of an individual with suspected or confirmed pulmonary TB disease, or

Note: A suspected case is one in which the facility has identified an individual as having symptoms consistent with TB. The CDC has identified the symptoms to be: productive cough, coughing up blood, weight loss, loss of appetite, lethargy/weakness, night sweats, or fever.

2. Employee exposure without appropriate protection to a high hazard procedure performed on an individual with suspected or confirmed infectious TB disease and which has the potential to generate infectious airborne droplet nuclei. Examples of high hazard procedures include aerosolized medication treatment, bronchoscopy, sputum induction, endotracheal intubation and suctioning procedures, emergency dental, endoscopic procedures, and autopsies conducted in hospitals.

d. If a citation under 5(a)(1) is justified, the citation, after setting forth the SAVE for section 5(a)(1), shall state:

Section 5(a)(1) of the Occupational Safety and Health Act of 1970: The employer did not furnish employment and a place of employment which were free from recognized hazards that were causing or likely to cause death or serious physical harm to employees exposed to the hazard of being infected with Mycobacterium tuberculosis through unprotected contact with [specify group such as patients, inmates,

clients, etc.] who was/were infectious or suspected to be infectious with tuberculosis in that: [list deficiencies]

Feasible and useful abatement methods for reducing this hazard, as recommended by the CDC, include, but are not limited to: [list abatement methods].

e. The following are examples of feasible and useful abatement methods, which must be implemented to abate the hazard. Deficiencies found in any category can result in the continued existence of a serious hazard and may, therefore, allow citation under 5(a)(1).

1. **Early Identification of Patient/Client.** The employer shall implement a protocol for the early identification of individuals with active TB. See Appendix A pages 19-30.

2. **Medical Surveillance:**

a. Initial Exams. The employer, in covered workplaces, shall offer TB skin tests (at no cost to the employees) to all current potentially exposed employees and to all new employees prior to exposure. A two-step baseline shall be used for new employees who have an initially negative PPD test result and who have not had a documented negative TB skin test result during the preceding 12 months (See Appendix A, pg. 63). TB skin tests shall be offered at a time and location convenient to workers. Follow-up and treatment evaluations are also to be offered at no cost to the workers.

Note: The reading and interpretation of the TB skin tests shall be performed by a qualified individual as described in the CDC Guidelines.

b. Periodic Evaluations. TB skin testing shall be conducted every three (3) months for workers in high risk categories, every six (6) months for workers in intermediate risk categories, and annually for low risk personnel (The CDC has defined the criteria for high, intermediate, and low risk categories, see Appendix A, pg. 8-17). Workers with a documented positive TB skin test who have received treatment for disease or preventive therapy for infection are exempt from the TB skin test but must be informed periodically about the symptoms of TB and the need for immediate evaluation of any pulmonary symptoms suggestive of TB by a physician or trained health care provider to determine if symptoms of TB disease have developed.

Note: If the facility has not completed a risk assessment the CSHO shall review the TB related records to establish required testing frequencies for the facility and areas of the facility.

c. Reassessment following exposure or change in health. Workers who experience exposure to an individual with suspect or confirmed infectious TB for whom infection control precautions have not been taken shall be managed according to CDC recommendations (Appendix A). An employee who develops symptoms of TB disease shall be immediately evaluated according to the CDC Guidelines.

3. **Case Management of Infected Employees shall include the following:**

a. Protocol for New Converters. Conversion to a positive TB skin test shall be followed as soon as possible, by appropriate physical, laboratory, and radiographic evaluations to determine whether the employee has infectious TB disease. (See Appendix A, pg. 65).

b. Work Restrictions for Infectious Employees. See Appendix A, page 41.

4. **Worker Education and Training.** Training and information to ensure employee knowledge of such issues as the mode of TB transmission, its signs and symptoms, medical surveillance and therapy, and site specific protocols including the purpose and proper use of controls shall be provided to all current employees and to new workers upon hiring. (See Appendix A, pgs. 36-37) Training should be repeated as needed.

Workers shall be trained to recognize, and report to a designated person, any patients or clients with

symptoms suggestive of infectious TB and instructed on the post exposure protocols to be followed in the event of an exposure incident. (See Appendix A, pg. 23)

5. **Engineering Controls.** The use of each control measure must be based on its ability to abate the hazard.

a. Individuals with suspected or confirmed infectious TB disease must be placed in a respiratory acid-fast bacilli (AFB) isolation room. High hazard procedures on individuals with suspected or confirmed infectious TB disease must be performed in AFB treatment rooms, AFB isolation rooms, booths, and/or hoods. AFB isolation refers to a negative pressure room or an area that exhausts room air directly outside or through HEPA filters if recirculation is unavoidable.

b. Isolation and treatment rooms in use by individuals with suspected or confirmed infectious TB disease shall be kept under negative pressure to induce airflow into the room from all surrounding areas (e.g., corridors, ceiling plenums, plumbing chases, etc.). (See Appendix A, Supplement No. 3, page 76)

Note: The employer must assure that AFB isolation rooms are maintained under negative pressure. At a minimum, the employer must use nonirritating smoke trails or some other indicator to demonstrate that direction of airflow is from the corridor into the isolation/treatment room with the door closed. If an anteroom exists, direction of airflow must be demonstrated at the inner door between the isolation/treatment room and the anteroom. (See Appendix B)

c. Air exhausted from AFB isolation or treatment rooms must be safely exhausted directly outside and not recirculated into the general ventilation system. (See Appendix A, Supplement No. 3, page 87).

In circumstances where recirculation is unavoidable, HEPA filters must be installed in the duct system from the room to the general ventilation system. (See Appendix A, Supplement No. 3, page 82). For these HEPA filters, a regularly scheduled monitoring program to demonstrate as-installed effectiveness should include; 1) recognized field test method, 2) acceptance criteria, and 3) testing frequencies (see Appendix A,Supplement No. 3, page 85). The air handling system should be appropriately marked with a TB warning where maintenance personnel would have access to the duct work, fans, or filters for maintenance or repair activities.

d. In order to avoid leakage, all potentially contaminated air which is ducted through the facility must be kept under negative pressure until it is discharged safely outside (i.e., away from occupied areas and air intakes), or

e. The air from isolation and treatment rooms must be decontaminated by a recognized process (e.g., HEPA filter) before being recirculated back to the isolation/treatment room. The use of UV radiation as the sole means of decontamination shall not be used. The CDC Guidelines allow the use of UV in waiting rooms, emergency rooms, corridors, and the like where patients with undiagnosed TB could potentially contaminate the air. (See appendix A, pg. 90)

Note: The opening and closing of doors in an isolation or treatment room which is not equipped with an anteroom compromises the ability to maintain negative pressure in the room. For theserooms, the employer should utilize a combination of controls and practices to minimize spillage of contaminated air into the corridor. Recognized controls and practices include, but are not limited to: minimizing entry to the room; adjusting the hydraulic closer to slow the door movement and reduce displacement effects; adjusting doors to swing into the room where fire codes permit; avoiding placement of room exhaust intake near the door; etc.

f. If high-hazard procedures are performed within AFB isolation or treatment rooms without benefit of source control ventilation or local exhaust ventilation (e.g., hood, booth, tent, etc.), and droplets are released into the environment (e.g., coughing), then a purge time interval must be imposed during which personnel must use a respirator when entering the room. (See Appendix A, pg. 35 and Suppl. 3, Table S3-1)

g. Interim or supplemental ventilation units equipped with HEPA filters as described in Appendix A pgs.

70-73 are acceptable.

2. **Respiratory Protection - 29 CFR 1910.134(a)(2) and (b).** The standard provides in part:

"Respirators shall be provided by the employer when such equipment is necessary to protect the health of the employee. The employer shall provide the respirators which are applicable and suitable for the purpose intended. The employer shall be responsible for the establishment and maintenance of a respiratory protective program which shall include the requirement outlined in paragraph (b) of this section."

a. **Requirements for a minimal acceptable program**. The 1994 CDC Guidelines specify standard performance criteria for respirators for exposure to TB. These criteria include (see appendix A pg 97):

1. The ability to filter particles 1 um in size in the unloaded state with a filter efficiency of greater than or equal to 95% (i.e., filter leakage of less than or equal to 5%), given flow rates of up to 50L per minute.

2. The ability to be qualitatively or quantitatively fit tested in a reliable way to obtain a face-seal leakage of less than or equal to 10%.

3. The ability to fit the different facial sizes and characteristics of health care workers which can usually be met by making the respirators available in at least three sizes.

4. The ability to be checked for face piece fit, in accordance with OSHA standards and good industrial hygiene practice, by health care workers each time they put on their respirator.

b. Under the new NIOSH criteria, filter materials would be tested at a flow rate of 85 L/minute for penetration by particles with a median aerodynamic diameter of 0.3 um and, if certified would be placed in one of the following categories: Type 100 (99.7% efficient), Type 99 (99% efficient), and Type 95 (95% efficient). NIOSH has determined that these categories of respirators are effective against TB. Based upon thesecriteria, the minimally acceptable level of respiratory protection for TB is the Type 95 Respirator. The classes of these air-purifying, particulate respirators to be certified are described under 42 CFR Part 84 Subpart K. See Volume 60 of the Federal Register, page 30338 (June 8, 1995). Until these classes of respirators are commercially available the minimal acceptable respiratory protection meeting the criteria will remain the HEPA respirator (see Appendix A, pg 98). The following respiratory protection measures must be addressed:

1. Employees wear HEPA or respirators certified under 42 CFR Part 84 Subpart K in the following circumstances:

a. When workers enter rooms housing individuals with suspected or confirmed infectious TB.

b. When workers are present during the performance of high hazard procedures on individuals who have suspected or confirmed infectious TB.

c. When emergency-medical-response personnel or others transport, in a closed vehicle, an individual with suspected or confirmed infectious TB.

Note: If a facility chooses to use disposable respirators as part of their respiratory protection program, their reuse by the same health care worker is permitted as long as the respirator maintains its structural and functional integrity and the filter material is not physically damaged or soiled. The facility must address the circumstances inwhich a disposable respirator will be considered to be contaminated and not available for reuse.

2. The following sample language is provided for citations which are warranted under 1910.134(a)(2):

"The employer did not provide respirators which were applicable and suitable for the purpose intended, nor was a respiratory protection program established which included the requirements outlined in 29 CFR

1910.134(b):

(a) Employees were given a [surgical mask or list manufacturer/model number] respirator for protection against airborne Mycobacterium tuberculosis when entering isolation rooms or performing high hazard procedures [including vehicular transporting if applicable]. They shall use NIOSH approved respirators (HEPA or those certified under 42 CFR Part 84 Subpart K).

NIOSH approved respirators providing greater protection would also be acceptable.

3. When respiratory protection (including disposable respirators) is required, a complete respiratory protection program must be in place in accordance with 29 CFR 1910.134(b).

3. Access to employee medical and exposure records: **29 CFR 1910.20**.

a. A record concerning employee exposure to TB is an employee exposure record within the meaning of 29 CFR 1910.20.

b. A record of TB skin test results and medical evaluations and treatment are employee medical records within the meaning of 29 CFR 1910.20. Where known, the workers exposure record should contain a notation of the type of TB, to which the employee was exposed to (e.g., multidrug resistant TB).

c. These records shall be handled according to 29 CFR 1913.10 in order for the CSHO to determine compliance with 29 CFR 1910.20.

4. Accident prevention signs and tags: **29 CFR 1910.145**.

a. In accordance with 1910.145(f)(8), a warning shall be posted outside the Respiratory isolation or treatment room. 1910.145(f)(4) requires that a signal word (i.e. "STOP", "HALT", or "NO ADMITTANCE") or biological hazard symbol be presented as well as a major message (e.g., "special respiratory isolation", "Respiratory isolation", or AFB isolation). A description of the necessary precautions, e.g., respirators must be donned before entering. Respiratory isolation rooms in an emergency department or a message referring one to the nursing station for instruction must also be posted.

b. The employer shall also use biological hazard tags on air transport components (e.g., fans, ducts, filters) which identify TB hazards to employees associated with working on air systems that transport contaminated air (See Appendix A, page 85).

c. The standard provides in part:

29 CFR 1910.145(e)(4): Biological hazard warning signs were not used to signify the actual or potential presence of a biohazard and to identify equipment, containers, rooms, materials, experimental animals, or combinations thereof, which contain, or are contaminated with viable hazardous agents:

Sample violation language:

a. On or about [date], warning signs posted outside respiratory (Respiratory) isolation or treatment rooms did not state the entry requirement of wearing HEPA filtered respirators.

Abatement Note: Warning signs must be posted on respiratory isolation or treatment rooms stating "pulmonary isolation", "respiratory isolation," or "AFB isolation." The sign must state specifically the precautions required to interact with those patients. Indicators on patient records or tags on corpses, printed in language or symbols easily recognized by employees are additional methods to achieve this purpose.

5. OSHA 200 log - **29 CFR 1904**:

a. For OSHA Form 200 record keeping purposes, both tuberculosis infections (positive TB skin test) and

tuberculosis disease are recordable in the high risk setting referenced in section H.1. A positive skin test for tuberculosis, even on initial testing (except pre-assignment screening) is recordable on the OSHA 200 log because there is a presumption of work-relatedness in these settings unless there is clear documentation that an outside exposure occurred.

Note: In this case preassignment means the same as pre employment and initial testing is the same as baseline testing.

b. If the employee's tuberculosis infection which was entered on the OSHA 200 log progresses to tuberculosis disease during the five-year maintenance period, the original entry for the infection shall be updated to reflect the new information. Because it is difficult to determine if tuberculosis disease resulted from the source indicated by the skin test conversion or from subsequent exposures, only one case should be entered to avoid double counting.

c. A positive TB skin test provided within two weeks of employment does not have to be recorded on the OSHA 200 forms. However, the initial test must be performed prior to any potential workplace exposure within the initial two weeks of employment.

M. **Expert Witness**. The Directorate of Technical Support will assist Regional Offices and the States in locating expert witnesses. Expert witnesses must be contacted before issuance of citations.

1. In the event that a 5(a)(1) citation is contested, proper expert witness support will be required. Issues which the expert must be prepared to address include:

a. The risk to workers associated with the exposure circumstances.

b. Existence, feasibility and utility of abatement measures.

c. Recognition of the hazard in the industry.

2. Expert witnesses may also be necessary in other cases, particularly those involving 29 CFR 1910.134.

N. **Recording in the IMIS**. A TB-related inspection is any health inspection conducted to investigate the presence or alleged presence of TB disease (i.e., a referral or complaint inspection).

1. When a TB-related inspection is conducted, complete the OSHA-1 as for any inspection and enter the code "N 02 TB" in Item 42, Optional Information. EXAMPLE:

Type	ID	Value
N	2	TB

2. When an OSHA-7 is completed and the complaint alleges the presence of TB hazards, enter the code "N 02 TB" in Item 46, Optional Information.

3. When an OSHA-90 is completed and the referral alleges the presence of TB hazards, enter the code "N 02 TB" in Item, 26, Optional Information.

4. All IMIS case file data for TB-related inspections conducted since October 1, 1990, shall be modified to include the appropriate TB code.

O. **Referrals**

1. When a complaint or inquiry is received from a source in a state plan regarding occupational exposure to TB, the Area Office shall refer it to the state plan designee for action.

2. When a complaint or inquiry regarding occupational exposure to TB in a state or local government health care facility is received in a state without an OSHA-approved state plan, the Regional Administrator shall refer it to the appropriate State public health agency or local health agency.

P. **Pre-citation Review**. Citations proposed pursuant to this program shall be reviewed prior to issuance, by the Regional Administrator and Regional Office Solicitor for consistency with these procedures. The Directorate of Technical Support shall be contacted to establish expert witness support. The Office of

Health Compliance Assistance shall be provided with a copy of all citations issued related to TB during the first 6 months of this directive.

Joseph A. Dear Assistant Secretary

Distribution: National, Regional, and Area Offices All Compliance Officers State Designees NIOSH Regional Program Directors 7(c)(1) Consultation Project Managers

See PDF for Appendix A

Appendix B

Smoke-Trail Testing Method for Negative pressure Isolation Room

Test Method Description:

One of the purposes of a negative pressure TB isolation room is to prevent TB droplet nuclei from escaping the isolation room and entering the corridor or other surrounding uncontaminated spaces. To check for negative room pressure, use smoke-trails to demonstrate that the pressure differential is inducing airflow from the corridor, through the crack at the bottom of the door (undercut) and into the isolation room. When performing a smoke-trail test follow these recommendations where applicable:

1. Test only with the isolation room door shut. If not equipped with an anteroom, it is assumed that there will be a loss of space pressure control when the isolation door is opened and closed. It is not necessary to demonstrate direction of airflow when the door is open.

2. If there is an anteroom, release smoke at the inner door undercut, with both anteroom doors shut.

3. In addition to a pedestrian entry, some isolation rooms are also accessed through a wider wheeled-bed stretcher door. Release smoke at all door entrances to isolation rooms.

4. So that the smoke is not blown into the isolation room, hold the smoke bottle/tube parallel to the door so the smoke is released perpendicular to the direction of airflow through the door undercut.

5. Position the smoke bottle/tube tight to the floor, centered in the middle of the door jamb and approximately two inches out in front of the door.

6. Release a puff of smoke and observe the resulting direction of airflow. Repeat the test at least once or until consistent results are obtained.

7. Minimize momentum imparted to the smoke by squeezing the bulb or bottle slowly. This will also help minimize the volume of smoke released.

8. Depending on the velocity of the air through the door undercut, the smoke plume will either stay disorganized or it will form a distinct streamline. In either case, the smoke will directionally behave in one of three ways. It will:
a. go through the door undercut into the isolation room,

b. remain motionless, or

c. be blown back into the corridor.

Compliance with the intent of the CDC Guidelines for negative pressure requires that the smoke be drawn into the isolation room through the door undercut.
9. Release smoke from the corridor side of the door only for occupied TB isolation rooms. If the room is unoccupied, also release smoke inside the isolation room (same position as in Step No. 5) to verify that released smoke remains contained in the isolation room (i.e., smoke as a surrogate for TB droplet nuclei).

10. If photography is performed or videotaping, it is recommended that a dark surface be placed on the floor to maximize contrast. Be aware that most autofocusing cameras cannot focus on smoke.

Testing "As Used" Conditions:

Testing of negative pressure isolation rooms requires that the test reflect "as-used" conditions. Consider the following use variables which may affect space pressurization and the performance of the negative pressure isolation room:

1. Patient toilet rooms are mechanically exhausted to control odors. The position of the toilet room door may affect the pressure differential between the isolation room and the corridor. Smoke-trail tests should be performed with the toilet room door open and the toilet room door closed. This will not be necessary if the toilet room door is normally closed and controlled to that position by a mechanical door closer.

2. An open window will adversely affect the performance of a negative pressure isolation room. If the isolation room is equipped with an operable window, perform smoke-trail tests with the window open and the window closed.

3. There may be corridor doors that isolate the respiratory ward or wing from the rest of the facility. These corridor doors are provided in the initial design to facilitate space pressurization schemes and/or building life safety codes. Direct communication with the rest of the facility may cause pressure transients in the corridor (e.g., proximity to an elevator lobby) and affect the performance of the isolation room. Perform isolation room smoke-trail testing with these corridor doors in their "as-used" position which is either normally open or normally closed.

4. Isolation rooms may be equipped with auxiliary, fan-powered, recirculating, stand alone HEPA filtration or UV units. These units must be running when smoke-trail tests are performed.

5. Do not restrict corridor foot traffic while performing smoke-trail tests.

6. Negative pressure is accomplished by exhausting more air than is supplied to the isolation room. Some HVAC systems employ variable air volume (VAV) supply air and sometimes VAV exhaust air. By varying the supply air delivered to the space to satisfy thermal requirements, these VAV systems can adversely impact the performance of a negative pressure isolation room. If the isolation room or the corridor is served by a VAV system you should perform the smoke test twice. Perform the smoke test with the zone thermostat thermally satisfied and again with the zone thermostat thermally unsatisfied thus stimulating the full volumetric flowrate range of the VAV system serving the area being tested.

Smoke:

Most smoke tubes, bottles and sticks use titanium chloride ($TiCl_4$) to produce a visible fume. There is no OSHA PEL or ACGIH TLV for this chemical although it is a recognized inhalation irritant. Health care professionals are concerned about releasing $TiCl_4$ around pulmonary patients. The smoke released at the door undercut makes only one pass through the isolation room and is exhausted directly outside. Isolation room air is typically not "recirculated."

The CDC in the supplementary information to the 1994 TB Guidelines has indicated that "The concern over the use of smoke is unfounded." Controlled tests by NIOSH have shown that the quantity of smoke

that is released is so minute that it is not measurable in the air. Nonirritating smoke tubes are available and should never-the-less be utilized whenever possible.

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