

APPENDIX E

GLOSSARY

Aberrations: Deviations from a normal course.

Acoustic, Acoustical: Containing, producing, or rising from, actuated by, related to, or associated with sound.

Acoustic Trauma: Hearing loss caused by sudden loud noise or by sudden blow.

Acuity: Pertaining to the sensitivity of the senses, such as hearing.

Acute: Sharp, severe; having rapid onset, severe symptoms, and a short course.

Addison's Disease: Disease resulting from deficiency in the secretion of adrenocortical hormones.

Adhesion: A holding together by new connective tissues produced by inflammation or injury.

Adsorption: The condensation of gases, liquids, or dissolved substances on the surfaces of solids.

Air Monitoring: The continuous sampling for, and measuring of, pollutants in the atmosphere.

Albuminuria: Presence of readily detectable amounts of albumin protein in the urine.

Allergy: An abnormal response of a hypersensitive person to chemical and physical stimuli.

Alopecia: Baldness or deficiency of hair, partial or complete, localized or generalized.

Alveolar: Concerning the air spaces within the lungs.

Alveoli: Air spaces within the lungs.

- Amblyopia:*** Reduced or dimness of vision.
- Anemia:*** Deficiency in the hemoglobin and/or red blood cells.
- Angina:*** Any disease characterized by attacks of choking or suffocation.
- Anorexia:*** Loss of appetite.
- Anuria:*** Urinary suppression or failure of kidney function.
- Aplastic Anemia:*** Failure of bone marrow to produce red blood cells.
- Arthralgia:*** Pain in a joint.
- Asphyxia:*** Suffocation from lack of oxygen.
- Asthenia:*** Lack or loss of strength: debility.
- Asymptomatic:*** Without symptoms.
- Ataxia:*** Muscular incoordination.
- Atelectasis:*** A collapsed or airless condition of the lung or a segment of the lung.
- Atrophy:*** Reduction in size.
- Attenuation:*** Lessening.
- Audiogram:*** A test and recording of hearing ability.
- Audiometer:*** An instrument for measuring hearing ability.
- Auricular Fibrillation:*** Extermely rapid incomplete contractions of the upper heart chambers (auricles of heart).
- Basophilia:*** A pathological reaction of immature erythrocytes to basic dyes whereby the stained cells appear blue, gray, or contain bluish granules.
- Basophilic Stippling:*** A spotted appearance of erythrocytes in Basophilia due to bluish granules.

Benign: Harmless.

Bilirubin: The orange-colored or yellowish bile pigment formed by the breakdown of heme (such as found in hemoglobin) circulated in the plasma and taken up by liver cells.

Bioassay: Estimation of the strength of a drug on a test animal.

Biologic Monitoring: Periodic examination of blood, urine, or any other body substance to determine exposure to toxic materials.

Biopsy: Removal of small bits of living tissue from the body for study.

Blood Count: A count of the total number of blood cells circulating in the body. A complete blood count totals the number of different kinds of blood cells circulating in the body.

Blood Dyscrasia: An abnormality of the blood or blood forming system.

Body Burden: The amount of a harmful material in the body at a given time.

Bone Conduction Test: A hearing test conducted by placing a vibrating tuning fork on the bony portion of the head.

Bone Marrow: The soft tissue of bone which is a part of the blood forming system.

Bradycardic: Slow heart action.

Brain Dysfunction: Abnormal, inadequate, or impaired function of the brain.

Bronchial Tubes: Branches or subdivisions of the trachea (windpipe).

Bronchiectasis: Dilation, usually of the terminal bronchi, often associated with abnormal secretions.

Bronchiogenic: Originating in the bronchi.

- Bronchiolar*: Pertaining to the bronchioles.
- Bronchiole*: One of the finer subdivisions of the bronchial tree.
- Bronchiolitis Fibrosa Obliterans*: The closing of the bronchioles with fibrous tissue due to irritation.
- Bronchitis*: Inflammation of the bronchial tubes.
- Bronchoscope*: An instrument used for visual examination of the interior of a bronchus.
- Bronchoscopy*: Examination of the bronchi through a bronchoscope.
- Bronchospasm*: Spasm of the bronchi or bronchioles.
- Cancer*: A malignant tumor characterized by proliferation of abnormal cells (carcinoma or sarcoma).
- Caplan's Syndrome*: The appearance of large nodules in the lung, against the background of simple silicosis.
- Carcinogen*: Substance which is capable of causing cancer.
- Carcinoma*: New growth of malignant tumor.
- Carcinomatous Lymphangitis*: Inflammation of lymphatic channels or vessels due to cancer.
- Cardiomyopathies*: Diseases of the heart muscle.
- Ceiling Limit*: The maximum level of an environmental contaminant which should not be exceeded for any period of time.
- Chelation*: Combining of metallic ions with certain heterocyclic ring structures so that the ion is held by chemical bonds from each of the participating rings, permitting elimination from the body.
- Chemical Cartridge*: The type of absorption unit used with a respirator for removal of low concentrations of solvent vapors and certain gases.
- Chemosis*: Swelling of the mucous membrane of the sclera.

Chromatography: An analytical technique for the separation and identification of chemical compounds.

Chronic: Long, drawn out; designating a disease showing little change or of slow progression and long continuance.

Chronic Obstructive Lung Disease: Disease processes which cause decreased pulmonary ventilation (e.g., pulmonary emphysema, pulmonary fibrosis, chronic asthma, and chronic bronchiolitis).

Cirrhosis: Progressive fibrosis of the liver.

Coalescence: Fusion of two or more parts.

Colic: Spasm in any hollow or tubular soft organ such as the colon accompanied by pain.

Colorimetry: An analytical technique based on measuring color.

Coma: Prolonged unconsciousness.

Comedones: Blackheads or plugging of sebaceous gland of skin.

Compound: A chemical substance composed of two or more elements joined according to the laws of chemical combination. Each compound has its own characteristic properties different from those of its constituent elements.

Concomitant: Occurring at the same time.

Conductive Hearing Loss: Type of hearing loss not caused by noise exposure, but due to any disorder in the middle ear or external ear that prevents the sound from reaching the inner ear.

Conjunctiva: The membrane that lines the eyelids and covers the exposed surface of the sclera.

Conjunctivitis: Inflammation of the membrane that lines the eyelids and the front of the eyeball.

Consolidation: The act of becoming solid. Used in connection with the solidification of the lungs due to engorgement of the lung tissues, as occurs in acute pneumonia.

Contaminant: A material that is foreign to the normal medium.

Coproporphyrin: A porphyrin present in urine and feces.

Cor Pulmonale: Hypertrophy (enlargement) and failure of the right ventricle resulting from disorders of the lungs, pulmonary vessels, or chest wall which involve an increase in pulmonary arterial pressure.

Cornea: The transparent part of the eye.

CPS: Cycles per second (Hertz); a measurement of frequency of sound or any other cyclic phenomenon.

Crackles: A crackling sound heard in the lung during certain diseases.

Creatinine: 1-Methylglycocyanidine, the end product of creatine metabolism, a normal alkaline constituent of urine and blood.

Cutaneous: Pertaining to, or affecting the skin.

Cyanosis: Slightly bluish, greyish, slate-like, or dark purple discoloration of the skin due to the presence of abnormal amounts of reduced hemoglobin in the blood.

Cytology: Pertaining to the formation, structure, and function of cells.

Cytoscopy: Microscopic examination of cells for purpose of diagnosis.

dB(A): Sound level in decibels read on the A-scale of a sound level meter.

Dicibel (dB): A unit used to measure sound intensity.

Dermatitis: Inflammation of the skin from any cause.

Differential Blood Count: Determination of the number of (different) white blood cells in a cubic millimeter of blood.

Differential Diagnosis: Comparison of symptoms of two or more similar diseases to determine which disease the worker has.

Digital Clubbing: Rounding and swelling of the ends of the fingers.

Direct-Reading Instrument: An instrument which gives an immediate indication of concentration of an airborne contaminant by some means such as a meter or the changing color of a chemical.

Dysphagia: Inability to swallow or difficulty in swallowing.

Dyspnea: Labored or difficult breathing.

Edema: A swelling of body tissues.

Electrophoretic: A method of analyzing the movement of charged protein particles.

Emphysema: A lung disease in which the walls of the air sac (alveoli) have been stretched and broken down.

Emphysematous Bullae: Large blisters on lung surfaces filled with fluid caused by emphysema.

Eosin: An acid dye used for staining tissues for microscopic examination.

Eosinophil: A white blood cell containing granules that readily stain with the acid stain, eosin.

Epistaxis: Bleeding from the nose.

Epithelioma: Carcinoma of the epithelial cells of the skin.

Epitheliomatous Ulceration: An open sore or lesion originating in the epidermis of the skin or in a mucous membrane.

Erethism: Triad of gingivitis, tremor, and emotional instability.

Erythema: Reddening of the skin.

Erythroblasts: Any form of nucleated red corpuscles.

Erythrocyte: the mature red blood corpuscle.

Erythroleukemia: Malignant growth of both red- and white-blood cell forming tissues.

Erythropoiesis: The formation of red blood corpuscles.

Etiology: The study of the causes of disease.

Euphoria: An exaggerated feeling of well-being.

Exfoliative Dermatitis: Skin disorder characterized by erythema, the scaling off of dead skin, itching, and loss of hair.

Fasciculation: Small rapid movements of muscle fibers.

FEV₁: Forced expiratory volume in one second; a test of pulmonary function.

Fibrosing Alveolitis: Fibrous tissue which replaces normal lung tissue following inflammation of the alveoli.

Fibrosis: A thickening, associated with growth of fibrous tissue.

Fibrotic: Abnormal formation of fibrous tissue.

FVC: Forced vital capacity; a test of lung function.

Gangrenous: Death and decomposition of body tissue due to failure of blood supply, to injury, or to disease.

Gastritis: Inflammation of the lining of the stomach.

Gastrointestinal: Pertaining to the stomach and intestine.

Genitourinary: Pertaining to the genitals, the urinary organs, and their accessories.

Gingivitis: Inflammation of the gums characterized by redness, swelling, and tendency to bleed.

Glycosuria: The presence of glucose in the urine.

Hematemesis: Vomiting of blood.

Hematocrit: The volume of red blood cells.

Hematologic Toxins: Poisonous substances affecting the blood or blood-forming tissues.

Hematology: The study of blood and the blood-forming organs.

Hematuria: Blood in the urine.

Hemoglobin: The red coloring matter of the blood which carries the oxygen.

Hemolysis: Breakdown of red blood cells with liberation of hemoglobin.

Hemolytic Anemia: Anemia resulting from the excessive destruction of red blood cells.

Hemopoietic: Pertaining to the formation of blood in the body.

Hemoptysis: Spitting blood or blood-stained sputum.

Hemorrhage: Profuse bleeding.

Hemosiderosis: A condition characterized by the deposition of iron containing pigment, from the disintegration of hemoglobin into the liver and spleen.

Hepatic: Pertaining to the liver.

Hepatic Injury: Damage to the liver.

Hepatitis: Inflammation of the liver.

Hepatomegaly: Enlargement of the liver.

Hertz: Unit of frequency of sound.

Hilar Nodes: Nodes on the root of the lungs at level of fourth and fifth dorsal vertebrae.

Histological: Pertaining to the study of the microscopic structure of animal and plant tissue.

Hydrocephalus: Increased accumulation of cerebrospinal fluid within the ventricles of the brain.

Hyperaminoaciduria: An abnormal amount of amino acids in the urine.

Hyperemia: Congestion from an unusual amount blood.

Hyperhidrosis: Excessive sweating.

Hyperkeratosis: Overgrowth of the horny layer of the skin.

Hyperpigmentation: Development of increased skin pimentation.

Hyperplastic: Excessive proliferation of cells.

Hyperuricemia: Abnormal amount of uric acid in the blood.

Hypochromic Normocytic: A condition of the blood in which the red blood cells have a reduced hemoglobin content, but are normal in size.

Hypoplasia: Reduced development of tissue.

Hypoplastic: Reduced or defective production of cells.

Industrial Hygiene: The science that deals with the recognition, evaluation, and control of potential health hazards in the industrial environment.

Inflammation: The reaction of body tissue to injury.

Inorganic: Term used to designate compounds that are not derived from hydrocarbons.

Insidious: Working or spreading harmfully without symptoms.

Interstitial: Pertaining to the small spaces between cells.

Intravenous Pyelogram: A roentgenogram of the kidney, ureter, and pelvis.

Jaundice: A condition characterized by yellowness of skin and sclerae (white of eyes), mucous membranes, and body fluids due to deposition of bile pigment resulting from excess bilirubin in the blood.

Keratitis: Inflammation of the cornea.

Lacrimation: Secretion and discharge of tears.

Laryngitis: Inflammation of the larynx.

Larynx: Voice box.

Latent Period: The time which elapses between exposure and the first manifestation of symptoms.

Lesion: An injury, damage, or abnormal change in a tissue or organ.

Leukemia: A blood disease distinguished by a marked increase of white blood cells.

Leukemogen: Any substance or agent that produces or incites leukemia.

Leukocyte: A white blood cell.

Leukocytosis: An increase in the number of white blood cells.

Leukopenia: A reduction in the total number of white blood cells.

Lymphoblastic: A disease characterized by the presence of immature lymphocytes.

Malaise: A feeling of illness or depression.

Malignancy: A neoplasm or tumor that is cancerous.

Malignant: Virulent or harmful.

Maturation: The final stages of differentiation of cells, tissues, or organs.

Mean Corpuscular Volume: A measurement of the volume of red corpuscles.

Medical Monitoring: Periodic evaluation of body functions to ascertain state of health.

Melanosis: Unusual deposit of black pigments in different parts of the body.

Melena: Black vomit due to action of intestinal juices on free blood.

Menorrhagia: Excessive bleeding during the menstrual period in number of days, amount of blood, or both.

Mesothelioma: A malignant tumor of the membrane which surrounds the internal organs of the body.

Metastasis: Spreading of cancer cells from one part of the body to another.

Methemoglobin: A form of hemoglobin wherein the ferrous iron has been oxidized to ferric iron.

Methemoglobinemia: A condition where more than 1% of the hemoglobin in the blood has been oxidized to the ferric form.

Mists: Liquid droplets suspended in air.

Morphological: Pertaining to the biological study of the form and structure of living organisms.

Mucopolysaccharides: A chief constituent of mucous.

Mucopurulent: Consisting of mucous and pus.

Myalgia: Tenderness or pain in the muscles.

Myeloblastic: A condition where the bone marrow cell develops into a large cell in bone marrow from which blood cells are formed.

Myelofibrosis: Replacement of bone marrow by fibrous tissue.

Myeloid: Like marrow.

Myelopoieses: The development of bone marrow or formation of cells derived from bone marrow.

Myocardial: Concerning heart muscle.

Narcotic: Producing stupor or sleep.

Nasal Septum: A partition that divides the nasal cavity into two passages.

Nasopharyngitis: Inflamed condition of the pharynx directly behind the nasal cavity and above the soft palate.

Necrotic: Death of a portion of tissue.

Neoplasm: A new and abnormal formation of tissue, as a tumor or growth.

Nephritis: Inflammation in the kidneys.

Nephropathy: Any disease of the kidney.

Neuropathies: Any disease of the nerve.

NIOSH: National Institute for Occupational Safety and Health.

Node: A small round or oval mass of lymphoid tissue.

Nodular Ulcers: An open sore in a small aggregation of cells.

Nodule: A small node.

Nuisance Dust: An innocuous dust.

Nystagmus: Constant involuntary cyclic movement of the eyeball in any direction.

Opacities: Areas or spots that are not transparent.

Oropharyngeal: Concerning the central portion of the pharynx lying between the soft palate and upper portion of the epiglottis.

OSHA: Occupational Safety and Health Administration or Occupational Safety and Health Act.

Otologist: A physician who has specialized in surgery and diseases of the ear.

Ototoxic: Drugs which can affect hearing acuity.

Palpitation: Abnormal rhythm of the heart of which a person is acutely aware.

Pancytopenia: A reduction in all cellular elements of the blood.

Papillomas: Benign epithelial or endothelial tumors.

Paresthesia: Abnormal sensation such as numbness, prickling, or tingling.

Particulate Matter: A suspension of fine solid or liquid particles in air, such as dust, fog, fume, mist, smoke, or sprays.

Pathological: Abnormal or diseased.

Percutaneous: Effected through the skin.

Peripheral Neuritis: Inflammation of peripheral nerves.

Peritoneal: Concerning the serous membrane reflected over the viscera and lining the abdominal cavity.

Pernicious Anemia: Severe form of blood disease marked by progressive decrease in red blood corpuscles, muscular weakness, and gastrointestinal and neural disturbances.

Peroneal Nerve: Nerve on the fibular side of the leg.

Phelegm: Thick mucous from the respiratory passages.

Plantar Keratosis: A horny growth on the sole of the foot.

Platelet: A round or oval disc, 2 to 4 micrometers in diameter, found in the blood of vertebrates, and are concerned with the clotting of blood.

Pleurisy: Inflammation of the lining of the lungs or chest cavity.

Pneumoconiosis: A condition of the respiratory tract due to the inhalation of dust particles.

Pneumonitis: Inflammation of the lungs.

Polymorphonuclear: A white blood cell consisting of several parts or lobes connected by fine strands.

Polyneuritis: A nerve inflammation involving two or more nerves.

Porphobilinogen: A substance sometimes found in the urine of patients with acute porphyria.

ppm: Parts of vapor or gas per million parts of air (by volume).

Preexisting Disease: A disease known to exist before the onset of current symptoms.

Preleukemic: A condition in which a group of nondiagnostic physical and blood abnormalities may indicate that leukemia will develop later.

Presbycusis: Hearing loss due to age.

Prognosis: Prediction of the future course of a disease.

Prostration: Absolute exhaustion.

Protoporphyrin: A derivative of hemoglobin containing four pyrrole nuclei.

Pruritis: Severe itching.

Pulmonary: Concerning or involving the lungs.

Pulmonary Hemosiderosis: A condition characterized by the deposition of iron containing pigment in the lungs.

Purpura: Hemorrhage into the skin or mucous membranes.

Pustular: Characterized by small elevations of the skin filled with pus.

Pyelography: X-ray examination of the renal pelvis and ureter.

Radiomimetic Substance: A substance which imitates the biological effects of ionizing radiation.

Rafter Sample: A sample of dust taken from a rafter or other settling place. Representative of but not identical to dust suspended in air.

Remission: Lessening severity or abatement of symptoms or signs.

Reticulocytosis: Increase in number of red blood cells containing a network of granules or filaments in circulating blood.

Reticuloendothelial System: Cells scattered throughout the body which have the power to ingest bacteria and colloidal particles.

Rhinitis: Inflammation of the nasal mucosa.

Rhinorrhea: Thin watery discharge from the nose.

Sanguinolent: Containing, or tinged with, blood.

Sarcoidosis: A chronic granulomatous disease of unknown etiology characterized by the formation of tubercle-like lesions in the organs such as skin, lymph nodes, lungs, and bone marrow.

Scalene Node: A particular group of lymph nodes in the neck.

Scotomas: Island-like gaps in the visual fields.

Serum: The watery portion of the blood after coagulation.

Sideroblasts: A ferritin-containing nucleated red blood corpuscle in the bone marrow.

Siderocyte: A red blood cell containing iron in a form other than hematin.

Skin Absorption: Penetration of the unbroken skin by a substance.

Sputum Cytology: Examination of the sputum cells.

Stomatitis: Inflammation of the mouth.

Striated: Skeletal muscle, consisting of fibers marked by cross-wise series of streaks.

Subcutaneous: Beneath or to be introduced beneath the skin.

Substernal: Beneath the breastbone.

Supervene: The development of an additional condition as a complication to an existing disease.

Syncope: Fainting.

Synergism: Producing a total effect greater than the sum of separate effects.

Systemic: Spread throughout the body.

Tachycardia: Rapid heart action, usually defined as over 100 beats per minute.

Tachypnea: Rapid breathing.

Threshold Limit Value (TLV): An atmospheric exposure level under which most people can work without harmful effects.

Thrombocytopenia: Decrease in number of the blood platelets.

Time-Weighted Average (Exposure): An average of several samples taken at various times during a working day. Usually more representative of the true exposure to a person for evaluation of long term effects from a harmful agent.

Tinnitus: A ringing sound in the ears.

Toxic Nephrosis: Kidney failure due to toxic degeneration of the kidney or renal tubules.

Toxicology: Study of the effects of toxic or poisonous substances.

Trachea: Cylindrical tube from the larynx to the bronchial tubes.

Tracheitis: Inflammation of the trachea.

Tracheobronchial: Trachea or bronchial tubes.

Tracheobronchitis: Inflammation of the mucous membrane that lines the trachea or bronchi.

Trauma: An injury or a wound.

Tumor: A swelling or enlargement, may also refer to a spontaneous growth of new tissue.

Ulcerative: Causing ulcers.

Urinary: Pertaining to urine, its production, function, or excretion.

Urobilinogen: A colorless derivative of bilirubin from which it is formed by the action of intestinal bacteria.

Urticaria: A vascular skin reaction characterized by the eruption of pale evanescent wheals which are associated with severe itching.

Vascular: Blood vessels.

VC: Vital capacity; a test of lung function.

Ventricular Arrhythmias: A rhythmic disturbance arising in the ventricles or the lower chambers of the heart that pump blood into the arteries leading to the lungs and body.

Vertigo: Dizziness.

Viscera: Internal organs enclosed within a cavity such as the abdominal or thoracic cavities.

APPENDIX F

SAMPLE OSHA REGULATIONS FOR MANDATORY PHYSICAL EXAMINATIONS AND MEDICAL AND BIOLOGICAL MONITORING

MEDICAL SURVEILLANCE

I. Asbestos

(A) Medical Examinations

(1) General

The employer shall provide or make available at his cost, medical examinations relative to exposure to asbestos required by this paragraph.

(2) Preplacement

The employer shall provide or make available to each of his employees, within 30 calendar days following his first employment in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination, which shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 X 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second ($FEV_{1.0}$).

(3) Annual examinations

On or before January 31, 1973, and at least annually thereafter, every employer shall provide, or make available, comprehensive medical examinations to each of his employees engaged in occupations exposed to airborne concentrations of asbestos fibers. Such annual examination shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 X 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second ($FEV_{1.0}$).

(4) Termination of employment

The employer shall provide, or make available, within 30 calendar days before or after the termination of employment of any employee engaged in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination which shall include, as a minimum, a chest roentgenogram (posterior-anterior 14 X 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume for 1 second (FEV_{1.0}).

(5) Recent examinations

No medical examination is required of any employee, if adequate records show that the employee has been examined in accordance with this paragraph within the past 1-year period.

(6) Medical records

(i) Maintenance

Employers of employees examined pursuant to this paragraph shall cause to be maintained complete and accurate records of all such medical examinations. Records shall be retained by employers for at least 20 years.

(ii) Access

The contents of the records of the medical examinations required by this paragraph shall be made available, for inspection and copying, to the Assistant Secretary of Labor for Occupational Safety and Health, the Director of NIOSH, to authorized physicians and medical consultants of either of them, and, upon the request of an employee or former employee, to his physician. Any physician who conducts a medical examination required by this paragraph shall furnish to the employer of the examined employee all the information specifically required by this paragraph, and any other medical information related to occupational exposure to asbestos fibers.

II. VINYL CHLORIDE

(B) Medical Surveillance

A program of medical surveillance shall be instituted for each employee exposed, without regard to the use of respirators, to vinyl chloride in excess of the action level. The program shall provide each such employee with an opportunity for examinations and tests in accordance with this paragraph. All medical examinations and procedures shall be performed by or under the supervision of a licensed physician, and shall be provided without cost to the employee.

- (1) At the time of initial assignment, or upon institution of medical surveillance;
 - (i) A general physical examination shall be performed, with specific attention to detecting enlargement of liver, spleen or kidneys, or dysfunction in these organs, and for abnormalities in skin, connective tissues and the pulmonary system.
 - (ii) A medical history shall be taken, including the following topics:
 - (A) Alcohol intake;
 - (B) Past history of hepatitis;
 - (C) Work history and past exposure to potential hepatotoxic agents, including drugs and chemicals;
 - (D) Past history of blood transfusions; and
 - (E) Past history of hospitalizations.
 - (iii) A serum specimen shall be obtained and determinations made of:
 - (A) Total bilirubin;
 - (B) Alkaline phosphates;
 - (C) Serum glutamic oxalacetic transaminase (SGOT);
 - (D) Serum glutamic pyruvic transaminase (SGPT); and
 - (E) Gamma glutamyl transpeptidase.

- (2) Examinations provided in accordance with this paragraph shall be performed at least:
 - (i) Every 6 months for each employee who has been employed in vinyl chloride or polyvinyl chloride manufacturing for 10 years or longer; and
 - (ii) Annually for all other employees.
- (3) Each employee exposed to an emergency shall be afforded appropriate medical surveillance.
- (4) A statement of each employee's suitability for continued exposure to vinyl chloride including use of protective equipment and respirators, shall be obtained from the examining physician promptly after any examination. A copy of the physician's statement shall be provided each employee.
- (5) If any employee's health would be materially impaired by continued exposure, such employee shall be withdrawn from possible contact with vinyl chloride.
- (6) Laboratory analyses for all biological specimens included in medical examinations shall be performed in laboratories licensed under 42 CFR Part 74.
- (7) If the examining physician determines that alternative medical examinations to those required by paragraph (B) (1) of this section will provide at least equal assurance of detecting medical conditions pertinent to the exposure to vinyl chloride, the employer may accept such alternative examinations as meeting the requirements of paragraph (B) (1) of this section. If the employer obtains a statement from the examining physician setting forth the alternative examinations and the rationale for substitution. This statement shall be available upon request for examination and copying to authorized representatives of the Assistant Secretary and the Director.

SUPPLEMENTARY MEDICAL INFORMATION

When required tests under paragraph (B)(1) of this section show abnormalities, the tests should be repeated as soon as practicable, preferably within 3 to 4 weeks. If tests remain abnormal, consideration should be given to withdrawal of the employee from contact with vinyl chloride, while a more comprehensive examination is made.

Additional tests which may be useful:

- A. For kidney dysfunction: urine examination for albumin, red blood cells, and exfoliative abnormal cells.
- B. Pulmonary system: Forced vital capacity, forced expiratory volume at 1 second, and chest roentgenogram (posterior-anterior, 14 X 17 inches).
- C. Additional serum tests: Lactic acid dehydrogenase, lactic acid dehydrogenase isoenzyme, protein determination, and protein electrophoresis.
- D. For a more comprehensive examination on repeated abnormal serum tests; Hepatitis B antigen, and liver scanning.

III. CARCINOGENS

4-Nitrobiphenyl
Alpha-Naphthylamine
Methyl chloromethyl ether
3,3' - Dichlorobenzidine (and its salts)
bis-Chloromethyl ether
beta-Naphthylamine
Benzidine
4-Aminodiphenyl
Ethleneimine
beta-Propiolactone
2-Acetylaminofluorene
4-Dimethylaminoazobenzene
N-Nitrosodimethylamine

(C) Medical Surveillance

At no cost to the employee, a program of medical surveillance shall be established and implemented for employees considered for assignment to enter regulated areas, and for authorized employees.

(1) Examinations

- (i) Before an employee is assigned to enter a regulated area, a preassignment physical examination by a physician shall be provided. The examination shall include the personal history of the employee, family and occupational background, including genetic and environmental factors.**
- (ii) Authorized employees shall be provided periodic physical examinations, not less often than annually, following the preassignment examination.**
- (iii) In all physical examinations, the examining physician shall consider whether there exist conditions of increased risk, including reduced immunological competence, those undergoing treatment with steroids or cytotoxic agents, pregnancy and cigarette smoking.**

(2) Records

- (i) Employers of employees examined pursuant to this paragraph shall cause to be maintained complete and accurate records of all such medical examinations. Records shall be maintained for the duration of the employee's employment. Upon termination of the employee's employment, including retirement or death, or in the event that the employer ceases business without a successor, records, or notarized true copies thereof, shall be forwarded by registered mail to the Director.**
- (ii) Records required by this paragraph shall be provided upon request to authorized representatives of the Assistant Secretary or the Director; and upon request of any employee or former employee, to a physician designated by the employee, or to a new employer.**

- (iii) Any physician who conducts a medical examination required by this paragraph shall furnish to the employer a statement of the employee's suitability for employment in the specific exposure.

MEDICAL HISTORY EMPHASIS ITEMS

1. Previous exposures to benzene and any other hematologic toxin; blood dyscrasias including genetically related hemoglobin alterations, bleeding abnormalities and abnormalities in the function of formed blood elements; renal disease; liver disease; alcoholic intake and infection.
2. Respiratory symptoms, i.e, breathlessness, cough, sputum production and wheezing.
3. Nausea, vomiting, visual disturbances and use of alcohol and barbiturates.
4. G. I. symptoms and mental status. Review alcohol consumption.
5. Skin or pulmonary sensitization or a skin or mucous membrane condition that may promote response to chromic acid.
6. Potential skin or pulmonary sensitization, a skin or mucous membrane condition that may be exacerbated by chromium (VI), smoking habits and history of liver or kidney disease.
7. Presence and degree of respiratory symptoms (breathlessness, cough, sputum production and wheezing.
8. Respiratory allergy, chronic obstructive lung disease, cardio-pulmonary symptoms, smoking. (Respiratory questionnaire included).
9. Respiratory disease.
10. Respiratory and renal disease.
11. Musculoskeletal, pulmonary and G. I. symptoms and kidney dysfunction.

12. **Emphasis on signs or symptoms of unacceptable mercury absorption such as loss of weight, sleeplessness, tremors, personality change or other evidence of CNS involvement.**
13. **Occurrence of headache, dizziness, fatigue, pain in the limbs and irritation of the skin and eyes.**
14. **Respiratory symptoms, i.e., breathlessness, cough, sputum production, wheezing and tightness in the chest. Smoking history.**
15. **Headaches, nausea, or G.I. disturbance, dizziness, alcohol consumption. Particular attention to eye mucous membrane or skin irritation.**
16. **Preexisting disorders of the skin, respiratory tract, liver, and kidneys.**