PLAINTIFF'S EXHIBIT
UC-1128

UNION CARBIDE

INTERNAL CORRESPONDENCE

CHEMICALS AND PLASTICS

P. O. BOX 471, TEXAS CITY, TEXAS 77590

TO (NAME) Dr. L. P. Berti

COMPANY

LOCATION TEXAS CITY PLANT

DATE August 16, 1978

COPY TO Mr. W. H. Barlow
Dr. D. H. Glenn
Mr. J. B. Leverton
Mr. F. S. Provenzano

SUBJECT Demolition of Buildings #20 and #21

Regarding your letter to D. E. Deese inquiring about our obligations to the demolition contractors, I would like to make the following recommendations:

It is of utmost importance that the contractors be warned of the hazardous nature of the materials involved, precautions and safe work practices required, and the nature of health injury which may result if and when these materials are improperly handled.

Attached is a copy of the federal regulation concerning occupational exposure to asbestos. The present permissible airborne asbestos concentration based on an 8-hour time weighted average (TWA) is 2 fibers per cubic centimeter. (The proposed standard permits only 0.5 fiber per cubic centimeter.) To list some of the requirements to comply with this standard, asbestos and asbestos containing materials must be wetted sufficiently whenever handled, cut, removed, etc. (paragraph (C)(2)(i)). Persons engaged in demolition or removal must be provided with approved respiratory equipment and special clothing. Caution signs must be posted at the demolition site where levels may be in excess of permissible limits. Scrap, waste, debris, and all material containing asbestos must be labeled as specified in the standard. Waste material containing asbestos must be collected and disposed of in sealed or closed impermeable containers. External surfaces must be maintained free of accumulated asbestos dust.

I have also attached the results of area monitoring downwind of the demolition area. Even though the levels were less than one fiber per cubic centimeter, it is important to remember that these samples were taken in the perimeter of the demolition area. Monitoring will be continued.

As for nickel, the present OSHA standard is 1 mg per cubic meter as an 8-hour TWA. Skin exposure and inhalation of the nickel dust must be avoided through the use of impermeable clothing and approved respiratory protection. The proposed limit is 0.015 mg per cubic meter of air. Recent findings indicate nickel to be a possible carcinogen.

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Dowtherm A, Phenyl ether-Biphenyl Eutectic mixture, has a TLV of 1 ppm. This level was accepted as the limit due to the highly disagreeable odor.

In order to initiate personnel exposure monitoring to asbestos and nickel, I suggest that we obtain the U/A of Louisiana Chemical. Also, please advise them of the requirements of the standards if not done so already. I am also enclosing a copy of the NIOSH Criteria Document for Nickel.

Please do not hesitate to contact me if you have any questions or if I can be of any assistance.

Yours very truly.

A. Perihan Yalçınkaya

A. P. YALCINKAYA

APY/ag

Attachments:
Asbestos Standard
Nickel Criteria Document
Preliminary Report of Asbestos Monitoring

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Industrial Hygiene Department PRELIMINARY REPORT	TEXAS CITY Date: 08-09-78

DISTRIBUTION:

TO: L. P. Berti

COPIES:
Dr. D. H. Glenn
J. B. Leverton
F. S. Provenzano

SUMMARY:

Monitor for asbestos fiber contamination of areas downwind of demolition by Louisiana Chemical at Bldg. 20.

PROCEDURE:

Samples were collected and analyzed by the UCC Method 38C-29X4-R1 using cellulose membrane filters and phase contrast microscopy.

Samples were collected at the piperack areas downwind of Bldg. 20 during the demolition work. All samples were taken at breathing zone levels.

Samples were collected 7-6-78 and 8-7-78.

RESULTS:

All samples taken were less than one fiber per cubic centimeter, greater than five microns in length.

The TLV for asbestos fibers per 8-hour day is 2 fibers/cc >5μ in length.

CONCLUSIONS/RECOMMENDATIONS

To maintain optimum working conditions, the insulation being removed should be wetted down, removed, and placed in labeled plastic bags for proper disposal.

Refer to attached letter for more information.

Surveyed By: C.W.P.

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Approved By: A. P. Yalcinkaya

A. P. Yalcinkaya

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§ 1910.93 Air contaminants.

* * * * *

Table G-2 Mineral Dusts

Substance	Mppcf	Mg/M³
Silica:		
Crystalline:		
Quartz (respirable)	250 [1]	10mg/M³ [2]
	%SiO₂+5	%SiO₂+2
Quartz (total dust)		30mg/M³
		%SiO₂+2
Cristobalite: Use ½ the value calculated from the count or mass formulae for quartz.		
Tridymite: Use ½ the value calculated from the formulae for quartz.		
Amorphous, including natural diatomaceous earth	20	80mg/M³
		%SiO₂
Silicates (less than 1% crystalline silica):		
Mica	20	
Soapstone	20	
Talc	20	
Portland cement	50	
Graphite (natural)	15	
Coal dust (respirable fraction less than 5% SiO₂)		2.4mg/M³ or
For more than 5% SiO₂		10mg/M³
		%SiO₂+2
Inert or Nuisance Dust:		
Respirable fraction	15	5mg/M³
Total dust	50	15mg/M³

NOTE: Conversion factors—
mppcf×35.3=million particles per cubic meter
=particles per c.c.

[1] Millions of particles per cubic foot of air, based on impinger samples counted by light-field technics.

[2] The percentage of crystalline silica in the formula is the amount determined from airborne samples, except in those instances in which other methods have been shown to be applicable.

[3] As determined by the membrane filter method at 430× phase contrast magnification.

[4] Total dust concentration and 5 percent limits for the application of this limit are to be determined from the use of a personal sampling pump in the zone of breathing in conjunction with a 10-mm nylon cyclone which shall have the following characteristics:

Aerodynamic diameter (unit density sphere)	Percent passing selector
2	90
2.5	75
3.5	50
5.0	25
10	0

The measurements under this note refer to the use of an AEC instrument. If the respirable fraction of coal dust is determined with a MRE the figure corresponding to that of 2.4 Mg/M³ in the table for coal dust is 4.5 Mg/M³.

2. A new § 1910.93a is added to Part 1910, reading as follows:

§ 1910.93a Asbestos.

(a) *Definitions.* For the purpose of this section, (1) "Asbestos" includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.

(2) "Asbestos fibers" means asbestos fibers longer than 5 micrometers.

(b) *Permissible exposure to airborne concentrations of asbestos fibers*—(1) *Standard effective July 7, 1972.* The 8-hour time-weighted average airborne concentrations of asbestos fibers to which any employee may be exposed shall not exceed five fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(2) *Standard effective July 1, 1976.* The 8-hour time-weighted average airborne concentrations of asbestos fibers to which any employee may be exposed shall not exceed two fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(3) *Ceiling concentration.* No employee shall be exposed at any time to airborne concentrations of asbestos fibers in excess of 10 fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in paragraph (e) of this section.

(c) *Methods of compliance*—(1) *Engineering methods.* (i) *Engineering controls.* Engineering controls, such as, but not limited to, isolation, enclosure, exhaust ventilation, and dust collection, shall be used to meet the exposure limits prescribed in paragraph (b) of this section.

(ii) *Local exhaust ventilation.* (a) Local exhaust ventilation and dust collection systems shall be designed, constructed, installed, and maintained in accordance with the American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI Z9.2–1971, which is incorporated by reference herein.

(b) See § 1910.6 concerning the availability of ANSI Z9.2–1971, and the maintenance of a historic file in connection therewith. The address of the American National Standards Institute is given in § 1910.100.

(iii) *Particular tools.* All hand-operated and power-operated tools which may produce or release asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section, such as, but not limited to, saws, scorers, abrasive wheels, and drills, shall be provided with local exhaust ventilation systems in accordance with subdivision (ii) of this subparagraph.

(2) *Work practices*—(i) *Wet methods.* Insofar as practicable, asbestos shall be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet state sufficient to prevent the emission of airborne fibers in excess of the exposure limits prescribed in paragraph (b) of this section, unless the usefulness of the product would be diminished thereby.

(ii) *Particular products and operations.* No asbestos cement, mortar, coating, grout, plaster, or similar material containing asbestos shall be removed from bags, cartons, or other containers in which they are shipped, without being either wetted, or enclosed, or ventilated so as to prevent effectively the release of airborne asbestos fibers in excess of the limits prescribed in paragraph (b) of this section.

(iii) *Spraying, demolition, or removal.* Employees engaged in the spraying of asbestos, the removal, or demolition of pipes, structures, or equipment covered or insulated with asbestos, and in the removal or demolition of asbestos insulation or coverings shall be provided with respiratory equipment in accordance with paragraph (d)(2)(iii) of this section and with special clothing in accordance with paragraph (d)(3) of this section.

(d) *Personal protective equipment*—(1) Compliance with the exposure limits prescribed by paragraph (b) of this section may not be achieved by the use of respirators or shift rotation of employees, except:

(i) During the time period necessary to install the engineering controls and to institute the work practices required by paragraph (c) of this section;

(ii) In work situations in which the methods prescribed in paragraph (c) of this section are either technically not feasible or feasible to an extent insufficient to reduce the airborne concentrations of asbestos fibers below the limits prescribed by paragraph (b) of this section; or

(iii) In emergencies.

(iv) Where both respirators and personnel rotation are allowed by subdivisions (i), (ii), or (iii) of this subparagraph, and both are practicable, personnel rotation shall be preferred and used.

(2) Where a respirator is permitted by subparagraph (1) of this paragraph, it shall be selected from among those approved by the Bureau of Mines, Department of the Interior, or the National Institute for Occupational Safety and Health, Department of Health, Education, and Welfare, under the provisions of 30 CFR Part 11 (37 F.R. 6244, Mar. 25, 1972), and shall be used in accordance with subdivisions (i), (ii), (iii), and (iv) of this subparagraph.

(i) *Air purifying respirators.* A reusable or single use air purifying respirator, or a respirator described in subdivision (ii) or (iii) of this subparagraph, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed no more than 10 times those limits.

(ii) *Powered air purifying respirators.* A full facepiece powered air purifying respirator, or a powered air purifying respirator, or a respirator described in subdivision (iii) of this subparagraph, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average concentrations of asbestos fibers are reasonably expected to exceed 10 times, but not 100 times, those limits.

(iii) *Type "C" supplied-air respirators, continuous flow or pressure-demand class.* A type "C" continuous flow or pressure-demand, supplied-air respirator shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in paragraph (b) of this section, when the ceiling or the 8-hour time-weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed 100 times those limits.

(iv) *Establishment of a respirator program.* (a) The employer shall establish a respirator program in accordance with

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the requirements of the American National Standards Practices for Respiratory Protection, ANSI Z88.2–1969, which is incorporated by reference herein.

b. See § 1910.6 concerning the availability of ANSI Z88.2–1969 and the maintenance of an historic file in connection therewith. The address of the American National Standards Institute is given in § 1910.100.

(c) No employee shall be assigned to tasks requiring the use of respirators if, based upon his most recent examination, an examining physician determines that the employee will be unable to function normally wearing a respirator, or that the safety or health of the employee or other employees will be impaired by his use of a respirator. Such employee shall be rotated to another job or given the opportunity to transfer to a different position whose duties he is able to perform with the same employer, in the same geographical area and with the same seniority, status, and rate of pay he had just prior to such transfer, if such a different position is available.

(3) Special clothing: The employer shall provide, and require the use of, special clothing, such as coveralls or similar whole body clothing, head coverings, gloves, and foot coverings for any employee exposed to airborne concentrations of asbestos fibers, which exceed the ceiling level prescribed in paragraph (b) of this section.

(4) Change rooms: (i) At any fixed place of employment exposed to airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section, the employer shall provide change rooms for employees working regularly at the place.

(ii) Clothes lockers: The employer shall provide two separate lockers or containers for each employee, so separated or isolated as to prevent contamination of the employee's street clothes from his work clothes.

(iii) Laundering: (*a*) Laundering of asbestos contaminated clothing shall be done so as to prevent the release of airborne asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section.

(*b*) Any employer who gives asbestos-contaminated clothing to another person for laundering shall inform such person of the requirement in (*a*) of this subdivision to effectively prevent the release of airborne asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section.

(*c*) Contaminated clothing shall be transported in sealed impermeable bags, or other closed, impermeable containers, and labeled in accordance with paragraph (g) of this section.

(e) *Method of measurement.* All determinations of airborne concentrations of asbestos fibers shall be made by the membrane filter method at 400–450 × (magnification) (4 millimeter objective) with phase contrast illumination.

(f) *Monitoring*—(1) *Initial determinations.* Within 6 months of the publication of this section, every employer shall cause every place of employment where asbestos fibers are released to be monitored in such a way as to determine whether every employee's exposure to asbestos fibers is below the limits prescribed in paragraph (b) of this section. If the limits are exceeded, the employer shall immediately undertake a compliance program in accordance with paragraph (c) of this section.

(2) *Personal monitoring*—(i) Samples shall be collected from within the breathing zone of the employees, on membrane filters of 0.8 micrometer porossity mounted in an open-face filter holder. Samples shall be taken for the determination of the 8-hour time-weighted average airborne concentrations and of the ceiling concentrations of asbestos fibers.

(ii) Sampling frequency and patterns. After the initial determinations required by subparagraph (1) of this paragraph, samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of employees. In no case shall the sampling be done at intervals greater than 6 months for employees whose exposure to asbestos may reasonably be foreseen to exceed the limits prescribed by paragraph (b) of this section.

(3) *Environmental monitoring*—(i) samples shall be collected from areas of a work environment which are representative of the airborne concentrations of asbestos fibers which may reach the breathing zone of employees. Samples shall be collected on a membrane filter of 0.8 micrometer porosity mounted in an open-face filter holder. Samples shall be taken for the determination of the 8-hour time-weighted average airborne concentrations and of the ceiling concentrations of asbestos fibers.

(ii) *Sampling frequency and patterns.* After the initial determinations required by subparagraph (1) of this paragraph, samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of the employees. In no case shall sampling be at intervals greater than 6 months for employees whose exposures to asbestos may reasonably be foreseen to exceed the exposure limits prescribed in paragraph (b) of this section.

(4) *Employee observation of monitoring.* Affected employees, or their representatives, shall be given a reasonable opportunity to observe any monitoring required by this paragraph and shall have access to the records thereof.

(g) *Caution signs and labels.* (1) *Caution signs.* (i) *Posting.* Caution signs shall be provided and displayed at each location where airborne concentrations of asbestos fibers may be in excess of the exposure limits prescribed in paragraph (b) of this section. Signs shall be posted at such a distance from such a location so that an employee may read the signs and take necessary protective steps before entering the area marked by the signs. Signs shall be posted at all approaches to areas containing excessive concentrations of airborne asbestos fibers.

(ii) *Sign specifications.* The warning signs required by subdivision (i) of this subparagraph shall conform to the requirements of 20" x 14" vertical format signs specified in § 1910.145(d)(4), and to this subdivision. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to that specified in this subdivision.

Legend	*Notation*
Asbestos	1" Sans Serif, Gothic or Block.
Dust Hazard	¾" Sans Serif, Gothic or Block.
Avoid Breathing Dust	¼" Gothic.
Wear Assigned Protective Equipment.	¼" Gothic.
Do Not Remain In Area Unless Your Work Requires It.	¼" Gothic.
Breathing Asbestos Dust May Be Hazardous To Your Health.	14 point Gothic.

Spacing between lines shall be at least equal to the height of the upper of any two lines.

(2) *Caution labels*—(i) *Labeling.* Caution labels shall be affixed to all raw materials, mixtures, scrap, waste, debris, and other products containing asbestos fibers, or to their containers, except that no label is required where asbestos fibers have been modified by a bonding agent, coating, binder, or other material so that during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section will be released.

(ii) *Label specifications.* The caution labels required by subdivision (i) of this subparagraph shall be printed in letters of sufficient size and contrast as to be readily visible and legible. The label shall state:

CAUTION

Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause Serious Bodily Harm

(h) *Housekeeping*—(1) *Cleaning.* All external surfaces in any place of employment shall be maintained free of accumulations of asbestos fibers if, with their dispersion, there would be an excessive concentration.

(2) *Waste disposal.* Asbestos waste, scrap, debris, bags, containers, equipment, and asbestos-contaminated clothing, consigned for disposal, which may produce in any reasonably foreseeable use, handling, storage, processing, disposal, or transportation airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in paragraph (b) of this section shall be collected and disposed of in sealed impermeable bags, or other closed, impermeable containers.

(i) *Recordkeeping*—(1) *Exposure records.* Every employer shall maintain records of any personal or environmental monitoring required by this section. Records shall be maintained for a period of at least 3 years and shall be made available upon request to the Assistant Secretary of Labor for Occupational Safety and Health, the Director of the National

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Institute for Occupational Safety and Health, and to authorized representatives of either.

(2) *Employee access.* Every employee and former employee shall have reasonable access to any record required to be maintained by subparagraph (1) of this paragraph, which indicates the employee's own exposure to asbestos fibers.

(3) *Employee notification.* Any employee found to have been exposed at any time to airborne concentrations of asbestos fibers in excess of the limits prescribed in paragraph (b) of this section shall be notified in writing of the exposure as soon as practicable but not later than 5 days of the finding. The employee shall also be timely notified of the corrective action being taken.

(j) *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 at 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.

3. A new § 1910.19 is added to Subpart B of Part 1910, reading as follows:

§ 1910.19 Asbestos dust.

Section 1910.93a shall apply to the exposure of every employee to asbestos dust in every employment and place of employment covered by § 1910.12, § 1910.13, § 1910.14, § 1910.15, or § 1910.16, in lieu of any different standard on exposure to asbestos dust which would otherwise be applicable by virtue of any of those sections.

Effective date. Paragraph (b)(2) of § 1910.93a shall become effective July 1, 1976. All other provisions of §§ 1919.93a, 1910.93, and 1910.19 shall become effective July 7, 1972. The current emergency temporary standard remains in effect until July 7, 1972.

(Sec. 6, 2, 84 Stat. 1593, 1599; 29 U.S.C. 655, 657; 29 CFR 1910.4; Secretary of Labor's Order No. 12-71, 36 F.R. 8754)

Signed at Washington, D.C., this 2d day of June 1972.

G. C. GUENTHER,
Assistant Secretary of Labor.

[FR Doc.72-8574 Filed 6-6-72;8:48 am]

Title 41—PUBLIC CONTRACTS AND PROPERTY MANAGEMENT

Chapter 9—Atomic Energy Commission

PART 9-1—GENERAL

Subpart 9-1.1—Procurement Regulations

MISCELLANEOUS AMENDMENTS

The changes made in AECPR Subpart 9-1.1, Procurement Regulations, have been made in order to establish the AECPR Temporary Regulations, which are a part of the AEC Procurement Regulations and the Federal Procurement Regulations System. The AECPR Temporary Regulations implement and supplement the FPR Temporary Regulations. They also contain policies and procedures initiated by the AEC which are to be effective for a period of 6 months or less. The AEC Procurement Instruction section has been revised accordingly. Minor editorial changes have also been made.

1. Section 9-1.101 *Scope of subpart,* is revised to read as follows:

§ 9-1.101 Scope of subpart.

This subpart describes the Atomic Energy Commission Procurement Regulations and the AECPR Temporary Regulations. It also describes exclusions from the AECPR as contained in the AEC Procurement Instructions.

2. Section 9-1.102 *Establishment of AEC Procurement Regulations,* is revised to read as follows:

§ 9-1.102 Establishment of the AEC Procurement Regulations and the AECPR Temporary Regulations.

§ 9-1.102-1 AEC Procurement Regulations.

(a) The AEC Procurement Regulations (AECPR) are hereby established.

(b) These regulations implement and supplement the Federal Procurement Regulations (FPR) and are a part of the Federal Procurement Regulations System.

(c) The effective date of FPR issuances throughout AEC will be the date indicated in the respective issuances unless otherwise provided in the AEC Procurement Regulations.

(d) The effective date of AECPR issuances throughout AEC will be the date indicated in the respective issuances.

§ 9-1.102-2 AECPR Temporary Regulations.

(a) The AECPR Temporary Regulations are hereby established.

(b) These regulations implement and supplement the Federal Procurement Regulations Temporary Regulations. They also contain policies and procedures initiated by the AEC which are expected to be effective for a period of 6 months or less.

(c) The effective date of the FPR Temporary Regulations issuances throughout AEC will be the date indicated in the respective issuances unless otherwise provided in the AECPR Temporary Regulations.

(d) The effective date of the AECPR Temporary Regulations issuances throughout AEC will be the date indicated in the respective issuances.

(e) The AECPR Temporary Regulations are a part of the AEC Procurement Regulations and the Federal Procurement Regulations System. All references to the AEC Procurement Regulations or AECPR in §§ 9-1.105 through 9-1.109 of this subpart shall be deemed to include the AECPR temporary regulations.

3. Section 9-1.103 *Authority,* is revised to read as follows:

§ 9-1.103 Authority.

The AEC Procurement Regulations are prescribed by the General Manager, Assistant General Manager for Administration, or the Director, Division of Contracts of the AEC, pursuant to the authority of the Atomic Energy Act of 1954, and the Federal Property and Administrative Services Act of 1949.

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NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH RECOMMENDATIONS FOR WORKPLACE EXPOSURE TO INORGANIC NICKEL

The National Institute for Occupational Safety and Health (NIOSH) recommends that employee exposure to inorganic nickel in the workplace be controlled by adherence to the following sections. The standard is designed to protect the health and provide for the safety of employees for up to a 10-hour work shift, 40-hour workweek, over a working lifetime. Compliance with all sections of the standard should, at the minimum, substantially reduce the risk of nickel-induced cancer and dermatitis and prevent other adverse effects of exposure to nickel in the workplace. The employer should regard the recommended workplace environmental limit as the upper boundary for exposure and make every effort to keep the exposure as low as possible. The criteria and standard will be subject to review and revision as necessary.

Even though the available evidence indicates an association between human exposure to inorganic nickel and the development of cancer, the mixed exposures, both to different nickel compounds and to other elements, frequently occurring in the workplace have prevented complete differentiation of the effects of individual compounds. Should sufficient information become available to indicate that the standard offers greater or lesser protection from some nickel compounds than is needed, it will be considered for revision

"Nickel" is defined in this standard as elemental nickel and all nickel compounds except organonickel compounds with a covalent carbon-nickel bond, such as nickel carbonyl. "Occupational exposure to nickel" is defined as working with compounds, solutions, or metals containing nickel that can become airborne or can spill or splash on the skin or in the eyes. Occupational exposure to nickel does not include the handling of solid products, such as stainless-steel tools, provided no particle-generating operations, such as grinding or cutting, occur. The recommended method of sampling and analysis does not differentiate between individual nickel particles, thus, the standard applies to all particulate nickel. Where no occupational exposure to nickel occurs, but nickel is present in the workplace, adherence is required only to Section 8(a).

Section 1 — *Environmental (Workplace Air)*

(a) Concentration

Occupational exposure to nickel shall be controlled so that no employee is exposed to nickel at a concentration greater than 15 micrograms, measured as nickel, per cubic meter of air (15 ug Ni cu m), determined as a time-weighted average (TWA) concentration for up to a 10-hour work shift, 40-hour workweek.

(b) Sampling and Analytical Methods

The TWA concentration limit represents the lowest reliably detectable concentration of nickel measurable by the recommended sampling and analytical methods selected. Procedures for the collection and analysis of environmental samples shall be as provided in Appendices I and II, or by any methods at least equivalent in accuracy, precision and sensitivity to the methods specified.

Section 2 — *Medical*

Medical surveillance shall be provided, as outlined below, to all employees occupationally exposed to nickel

(a) Preplacement or initial medical examinations for workers shall include:

(1) Comprehensive medical and work histories with special emphasis on skin conditions or allergies, illnesses or sensitizations of the upper and lower respiratory systems, and smoking history.

(2) A complete physical examination giving particular attention to examination of the upper respiratory tract membranes for evidence of irritation, bleeding, ulcerations, or perforations, and examination of the skin for evidence of dermatitis or irritation.

(3) Specific clinical tests, such as 14" x 17" postero-anterior chest X-ray film and pulmonary function tests including the forced vital capacity (FVC) and forced expiratory volume during the first second (FEV 1). In addition, more specific tests, such as sputum cytology, should be considered by the responsible physician after having evaluated their availability and applicability to the situation. Measurements of concentrations of nickel and protein in urine and administration of a questionnaire to assess symptoms of chronic respiratory disease are also suggested.

(4) A judgment of the employee's ability to use positive or negative pressure respirators.

(b) Initial medical examinations shall be made available to all workers within 6 months after promulgation of a standard based on these recommendations.

(c) Periodic examinations shall be made available at least annually. These examinations shall include:

(1) Interim medical and work histories.

(2) Physical examination as outlined in paragraphs (a)(2) and (a)(3) of this section.

(d) Employees or prospective employees with medical conditions, e.g., dermatitis, which may be directly or indirectly aggravated by exposure to nickel shall be further counseled on the increased risk of impairment of their health from working with this substance.

(e) Appropriate medical services shall be made available to any employee with adverse health effects from nickel in the workplace.

(f) In the event of wound contamination by nickel, the wound shall be promptly and thoroughly washed.

(g) Pertinent medical records shall be maintained for all employees exposed to nickel in the workplace. Such records shall be retained for at least 40 years after the last occupational exposure to nickel. These records shall be made available to the designated medical representatives of the Secretary of Health, Education, and Welfare, of the Secretary of Labor, of the employer, and the employee or former employee.

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Section 3 — *Labeling and Posting*

A label shall be placed on each shipping and storage container of nickel in liquid, powder, or crystalline form, and all areas where there is occupational exposure to nickel shall be posted.

All labels and warning signs shall be printed both in English and in the predominant language of non-English-reading workers. Illiterate workers and workers reading languages other than those used on labels and posted signs shall receive information regarding hazardous areas

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and shall be informed of the instructions printed on labels and signs

(a) Labeling

Each container of nickel in liquid, powder, or crystalline form shall carry in a readily visible location a label stating:

NAME OF COMPOUND
(Trademark, Common Name, or Chemical Name)
DANGER! CONTAINS NICKEL
INHALATION IS HAZARDOUS
AND MAY CAUSE NASAL OR LUNG CANCER
SKIN CONTACT MAY CAUSE IRRITATION OR RASH
Keep container closed
Avoid breathing dust, fume, or mist.
Use only with adequate ventilation.
Do not get in eyes, in open wounds, or on skin or clothing.
First Aid In case of skin or eye contact or contact with an open wound, flush promptly with running water.

(b) Posting

Warning placards shall be affixed in readily visible locations in or near areas where there is occupational exposure to nickel The information shall be arranged as in the following example

NICKEL
DANGER!
INHALATION CAN BE HARMFUL
AND MAY CAUSE NASAL OR LUNG CANCER
SKIN CONTACT MAY CAUSE IRRITATION OR RASH
AUTHORIZED PERSONNEL ONLY
Do not get in eyes, in open wounds, or on skin or clothing.
First Aid. In case of skin or eye contact or contact with an open wound, flush promptly with running water.

If respiratory protection is required in accordance with Section 4 the following statement in large letters shall be added to the required sign:

RESPIRATORY PROTECTION REQUIRED IN THIS AREA

Section 4 — *Personal Protective Clothing and Equipment*

(a) Protective Clothing

(1) The employer shall provide safety goggles or face shields (8-inch minimum) with goggles and shall ensure that employees wear the protective equipment during any operation in which nickel may enter the eyes.

(2) The employer shall provide appropriate protective clothing, such as gloves, aprons, suits, hats, or face shields, for employees, such as platers, who are likely to have appreciable skin contact with nickel, and for those who are especially sensitive to nickel.

(b) Respiratory Protection

(1) Engineering controls shall be used when needed to keep concentrations of airborne nickel at or below the recommended TWA concentration limit. Respiratory protective equipment may be used in the following circumstances:

(A) During the time necessary to install or test the required engineering controls.

(B) For operations such as nonroutine maintenance and repair activities in which brief exposure concentrations in excess of the TWA concentration limit may occur.

(C) During emergencies when concentrations of airborne nickel might exceed the TWA concentration limit.

(2) When a respirator is permitted by paragraph (b)(1) of this section, it shall be selected and used in accordance with the following requirements:

(A) The employer shall establish and enforce a respiratory protective program. The requirements for such a program are listed in 29 CFR 1910.134.

(B) The employer shall provide respirators in accordance with Table I-1 and shall ensure that employees use the respirators in a proper manner when the concentration of airborne nickel exceeds the recommended TWA concentration limit. The respirators shall be those approved by NIOSH or the Mining Enforcement and Safety Administration. The standard for approval is specified in 30 CFR 11. The employer shall ensure that respirators are properly cleaned, maintained, and stored when not in use.

TABLE I-1

RESPIRATOR SELECTION GUIDE

Concentration of Nickel	Respirator Type Approved under Provisions of 30 CFR 11
Greater than 15 µg/cu m or Emergency (entry into area of unknown concentration for emergency purposes)	(1) Self-contained breathing apparatus with full facepiece operated in pressure-demand or other positive pressure mode (2) Combination Type C supplied-air respirator with full facepiece operated in pressure-demand mode and auxiliary self-contained air supply

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(C) Escape equipment shall be located at clearly identified stations within the work area and shall be adequate to permit all employees to escape safely from the area. Protective equipment suitable for emergency entry shall be located at clearly identified stations outside the work area.

Section 5 — *Informing Employees of Hazards from Nickel*

(a) The employer shall ensure that each employee assigned to work in an area where there is occupational exposure to nickel is informed of the hazards and relevant symptoms

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of exposure to nickel, and of proper conditions and precautions for the handling and use of nickel. Workers shall be advised that handling nickel may cause dermatitis and that exposure to airborne nickel may increase the risk of developing cancer of the respiratory organs. Information shall be given to employees at the beginning of employment and at least twice a year thereafter.

(b) The employer shall institute a continuing education program, conducted by instructors qualified by experience or training, to ensure that all employees have current knowledge of job hazards, proper maintenance and cleanup methods, and proper respirator use. The instructional program shall include a description of the environmental and medical surveillance procedures and of the advantages to the employee of participating in these examinations. Instruction shall include the information specified in Appendix IV [omitted] which shall be kept on file and readily accessible to employees at all places of employment where there is occupational exposure to nickel. Workers engaged in maintenance and repair shall be included in these training programs

(c) Required information shall be recorded on the "Material Safety Data Sheet" shown in Appendix IV [omitted] or on a similar form approved by the Occupational Safety and Health Administration, US Department of Labor.

Section 6 — *Work Practices*

(a) Control of Airborne Nickel

Engineering controls, such as process enclosure or local exhaust ventilation, shall be used whenever feasible and necessary to keep concentrations of airborne nickel at or below the recommended TWA concentration limit. If used, ventilation systems shall be so designed and operated as to prevent accumulation or recirculation of airborne nickel in the workplace environment and to effectively remove nickel from the breathing zone of employees. Exhaust ventilation systems discharging to outside air must conform to applicable local, state, and federal regulations and must not constitute hazards to employees or to the general population. Before maintenance work on control equipment begins, sources of airborne nickel shall be eliminated to the extent feasible.

Enclosures, exhaust hoods, and ductwork shall be kept in good repair so that design airflows are maintained. Airflow at each hood shall be measured at least semiannually and preferably monthly. Continuous airflow indicators are recommended, such as water or oil manometers properly mounted at the juncture of fume hood and duct throat (marked to indicate acceptable airflow). A log shall be kept showing design airflow and results of semiannual inspections.

(b) Regulated Areas

Regulated areas shall be established and maintained where there is occupational exposure to nickel, and access to these areas shall be limited to authorized persons.

(c) Cleanup of spills

Dusts or solutions containing nickel shall be removed from work areas by vacuum cleaning or by other methods, including wet methods, which do not increase the concentration of airborne nickel. No dry sweeping, blowing by compressed air, or any other method of dust removal that increases the concentration of airborne nickel shall be allowed

(d) Emergency Procedures

Procedures for emergencies, including fires and the inadvertent formation of nickel carbonyl, shall be established to meet foreseeable events. Necessary emergency equipment shall be kept in readily accessible locations. Where appropriate, respirators shall be available for use during evacuation.

(e) Disposal of Waste

Waste material shall be disposed of in a manner that is not hazardous to employees or to the general population. Nickel wastes shall be appropriately marked and any aerosol-generating operations shall be enclosed. In selecting the method of waste disposal, applicable local, state, and federal regulations should be consulted.

(f) Storage

Containers of nickel in liquid, powder, or crystalline form shall be kept tightly closed when not in use. Containers shall be stored in a safe manner to minimize the possibility of accidental breakage or spills. Corrosion of nickel shall also be minimized during storage.

(g) General Work Practices

(1) Good housekeeping practices shall be observed to prevent contamination of areas and equipment with nickel dusts, liquids, or mists and to prevent buildup of such contamination.

(2) Good personal hygiene practices should be encouraged. Employees who have skin or eye contact with nickel should promptly and thoroughly wash the affected part. Workers occupationally exposed to nickel shall be required to shower at the end of the workshift.

(h) Work clothing

(1) Coveralls or similar full-body protective clothing and head, leg, and shoe coverings, fire retardant where necessary, shall be worn by each employee occupationally exposed to nickel.

(2) Such clothing shall be changed daily at the end of the work shift or if accidentally contaminated with nickel.

(3) The employer shall provide for the laundering of this clothing and shall ensure that soiled work clothing is not taken home by the employee. Precautions shall be taken to protect personnel who handle and launder soiled clothing. These workers shall be advised of the hazards of and means of preventing exposure to nickel.

Section 7 — *Sanitation*

(a) Conveniently located washing facilities shall be provided for all employees occupationally exposed to nickel. Locker-room facilities, including showers, located in nonexposure areas, shall be provided for employees required to change clothes before and after each work shift. The facilities shall provide for storage of street clothing and clean work clothing separately from soiled work clothing. Covered containers shall be provided for work clothing removed at the end of the work shift or after a contamination incident. The clothing shall be held in these containers until it is removed for decontamination or disposal.

(b) Food preparation, dispensing (including vending machines), and eating shall be prohibited in areas where there is occupational exposure to nickel.

(c) Smoking or carrying uncovered smoking or chewing materials, such as chewing tobacco and gum, shall be prohibited in work areas where there is occupational exposure to nickel.

Section 8 — *Monitoring and Recordkeeping Requirements*

(a) Monitoring

(1) Within 6 months of the promulgation of a standard based on these recommendations, each employer who has a place of employment in which nickel is refined, handled, stored, or otherwise used shall determine by an industrial hygiene survey if occupational exposure to nickel may occur.

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Surveys shall be repeated at least once every year and within 30 days of any process change likely to result in occupational exposure to nickel. Records of these surveys, including the basis for any conclusion that there is no occupational exposure to nickel, shall be retained until the next survey has been completed.

(2) If occupational exposure to nickel is possible, a program of personal monitoring shall be instituted to measure or permit calculation of the exposure of all employees.

(A) In all personal monitoring, samples representative of the breathing zones of the employees shall be collected.

(B) For each TWA determination, a sufficient number of samples shall be taken to characterize the employees' exposures during each work shift. Variations in work and production schedules and in employees' locations and job functions shall be considered in choosing sampling times, locations, and frequencies.

(C) Each operation in each work area shall be sampled at least once every 3 months.

(3) If an employee is found to be exposed to nickel in excess of the recommended TWA concentration limit, the exposure of that employee shall be measured at least once a week, control measures shall be initiated, and the employee shall be notified of the extent of the exposure and of the control measures being implemented. Such monitoring shall continue until two consecutive determinations, 1 week apart, indicate that the employee's exposure no longer exceeds the recommended TWA concentration limit. Routine monitoring may then be resumed.

(b) Recordkeeping

Environmental monitoring records shall be maintained for at least 40 years after the employee's last occupational exposure to nickel. These records shall include the dates and time of measurements, job function and location of employees within the worksite, methods of sampling and analysis used, types of respiratory protection in use at the time of sampling, TWA concentrations found, and identification of exposed employees. Each employee shall be able to obtain information on that employee's own environmental exposures. Daily rosters of authorized persons who enter regulated areas shall be retained for 40 years. Environmental monitoring records and entry rosters shall be made available to designated representatives of the Secretary of Labor and of the Secretary of Health, Education, and Welfare.

Pertinent medical records for each employee shall be retained for 40 years after the employee's last occupational exposure to nickel. Records of environmental exposures applicable to an employee should be included in that employee's medical records. These medical records shall be made available to the designated medical representatives of the Secretary of Labor, of the Secretary of Health, Education, and Welfare, of the employer, and of the employee or former employee

APPENDIX I

METHOD FOR SAMPLING NICKEL IN AIR

The following sampling method is adapted from that described in Method No. 173 of the NIOSH Manual of Analytical Methods [187].

General Requirements

Collect breathing-zone samples representative of the individual employee's exposure. At the time of sample collection, record a description of sampling location and conditions, equipment used, date, time and rate of sampling, and any other pertinent information.

Equipment

The sampling train consists of a filter in a filter cassette, a suitable length of tubing, and a vacuum pump.

(a) Filters and cassettes: a 2- or 3-piece filter cassette containing a 37-mm cellulose mixed-ester membrane filter with a 0.8-um pore size.

(b) Pump: A battery-operated vacuum pump, complete with clip for attachment to the employee's belt, capable of operating at 2.0 liters/minute for up to 8 hours.

Calibration

Accurate calibration of a sampling pump is essential to obtain a correct value for the volume of air sampled. The frequency of calibration depends on the use, care, and handling to which the pump is subjected. If the pump receives hard use, more frequent calibration may be necessary. Pumps should be recalibrated if they have been subjected to misuse or if they have just been repaired or received from a manufacturer. Maintenance and calibration should be performed and recorded on a regular schedule, for example, after every 40 hours of use or once a month regardless of use.

Ordinarily, pumps should be calibrated in the laboratory both before they are used in the field and at intervals after they have been used to collect a large number of field samples. The accuracy of calibration depends on the type of instrument used as a reference. The choice of calibration instrument will depend largely upon where the calibration is to be performed. For laboratory testing, a 1-liter soapbubble meter is recommended, although other standard calibration instruments, such as the wet-test meter, can be used.

Instructions for calibration with the soapbubble meter follow. If another calibration device is used, equivalent procedures should be used. The calibration setup for a personal sampling pump with a filter is shown in Figure XV-2. Since the flow rate obtained with a pump depends on the pressure drop across the sampling device, in this case a cellulose mixed-ester membrane filter, the pump must be calibrated while operating with a representative filter in line.

(a) Check the voltage of the pump battery with a voltmeter to assure adequate voltage for calibration. Charge the battery if necessary.

(b) Place a membrane filter in the holder.

(c) Assemble the sampling train as shown in Figure XV-2.

(d) Turn the pump on and moisten the inside of the soapbubble meter by immersing the buret in the soap solution. Draw bubbles up the inside until they are able to travel the entire buret length without bursting.

(e) Adjust the pump rotometer to provide the desired flowrate.

(f) Check the water manometer to insure that the pressure drop across the sampling train does not exceed 12 inches of water (approximately 1 inch of mercury) at 2.0 liters/minute.

(g) Start a soapbubble up the buret and measure with a stopwatch the time it takes for the bubble to move from one calibration mark to another. If, for the pump being calibrated, the number of strokes is used to determine volume, count the number of strokes required to move the bubble from one marker to another.

(h) Repeat the procedure in (g) at least three times, average the results, and calculate the flowrate by dividing the volume between the preselected marks by the time required for the soapbubble to traverse the distance.

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(i) Record calibration data, including the volume measured, elapsed time, pressure drop, air temperature, atmospheric pressure, serial number of the pump, date, and name of the person performing the calibration.

(j) Use graph paper to record the airflow as the ordinate and the rotometer readings as the abscissa.

Sampling Procedure

(a) Open a filter cassette and connect the back of the cassette to the pump with tubing. The filter cassette is supported or clipped in a vertical position, facing down, in the employee's breathing zone.

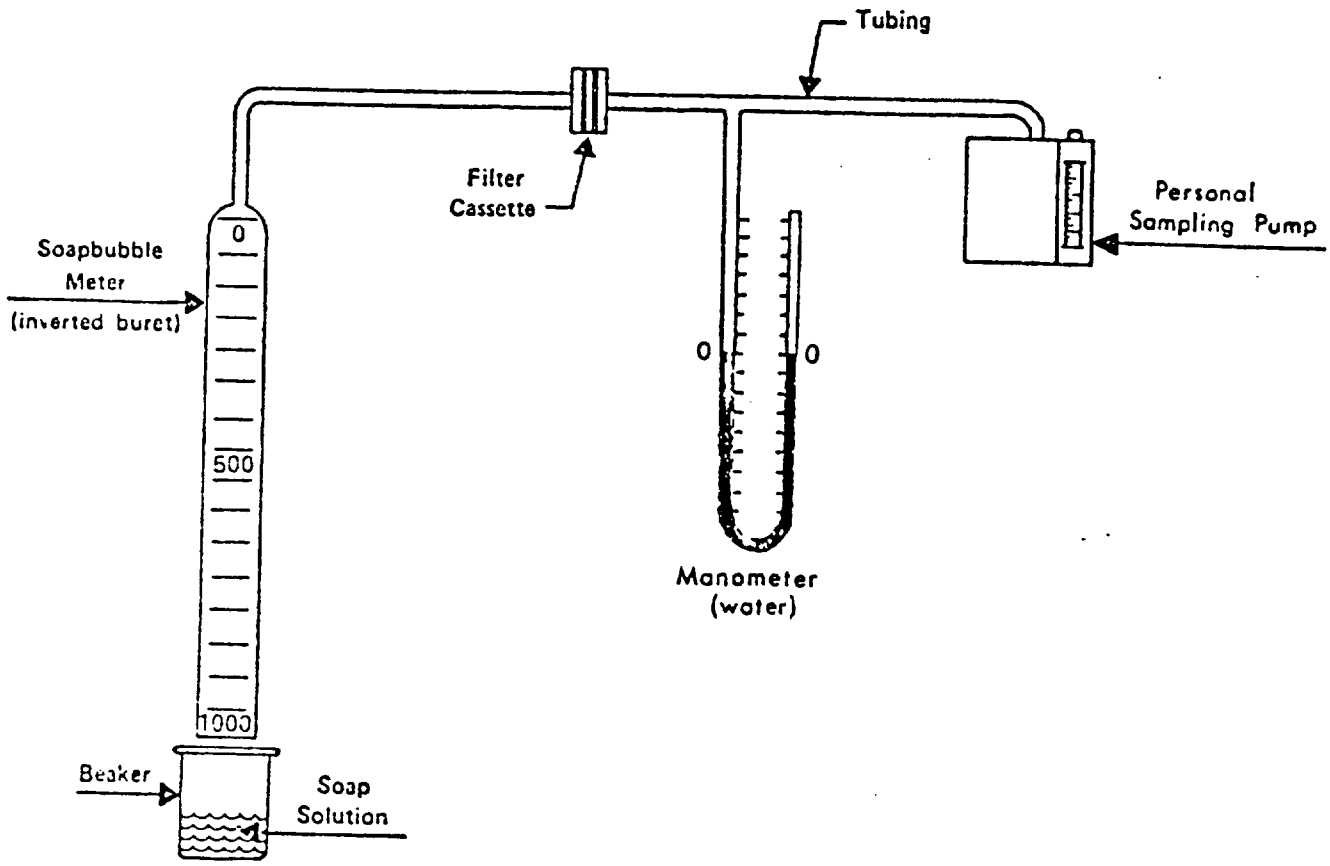
(b) Sample a minimum of 700 liters of air. For example, 2.0 liters/minute for about 6 hours.

(c) Measure and record the temperature and pressure of the atmosphere being sampled.

(d) Treat at least one filter in the same manner as sample filters (break open, reseal, and ship), but draw no air through it. This filter serves as a blank.

(e) Immediately after the samples are collected, recap the filter cassette, label, and ship for analysis. Include a blank filter with each batch of filters sent to be analyzed.

FIGURE XV-2 CALIBRATION SETUP FOR PERSONAL SAMPLING PUMP WITH FILTER CASSETTE



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APPENDIX II

ANALYTICAL METHOD FOR AIRBORNE NICKEL

The recommended atomic absorption spectrophotometric method is based on Method No. 173, described in the NIOSH Manual of Analytical Methods [187].

Principle of the Method

Particles are collected on a cellulose mixed-ester membrane filter. The filter is ashed in nitric acid, and the residue is dissolved in dilute nitric acid. The absorbance of nickel at 232 nm is determined by atomic absorption spectrophotometry in an oxidizing flame and compared to the absorbance of standards.

Range and Sensitivity

The working range of the method is 1.0-20 ug nickel/ml of the redissolved ash solution. This range is somewhat instrument dependent and can be extended to higher concentrations by dilution of the sample or measurement of a less sensitive line.

The sensitivity of the method has been determined to be 0.2 ug nickel/ml of the redissolved ash solution. This value will vary somewhat depending on individual instrumentation.

Interferences

No interferences are listed in the NIOSH Manual of Analytical Methods [187], although another report [209] has indicated that a hundredfold excess of iron, manganese, chromium, copper, cobalt, or zinc may decrease the absorbance recorded for nickel by as much as 12%. However, it also was noted [209] that this effect can be minimized by proper burner elevation and by the use of an oxidizing flame. In addition, a high solids content in the aspirated solution will cause increased nonspecific absorbance if the 232-nm line is used [250].

Precision and Accuracy

The coefficient of variation for analysis by atomic absorption is approximately 2% for absorbances greater than 1%. An absorbance of less than 1% increases the coefficient of variation. At the lowest end of the working range, a reading error of as much as 3% can occur with an instrument equipped with a digital readout.

No data on accuracy are available at this time.

Apparatus

(a) Atomic absorption spectrophotometer with nickel hollow-cathode lamp and a burner head for an air-acetylene flame.
(b) Hotplate.
(c) Volumetric flasks.
(d) Pipets.
(e) Oxidant: air which has been filtered to remove oil, water, and other foreign materials.
(f) Fuel: commercially available acetylene.
(g) Pressure-reducing valves.
(h) Breakers.
(i) Watchglasses.

Reagents

All reagents used must be ACS certified reagent grade or better.

(a) Doubly distilled or deionized water.
(b) Redistilled concentrated nitric acid.
(c) Distilled 1:1 hydrochloric acid.
(d) Commercially prepared aqueous stock standard (1,000 ug of nickel/mlr: serially dilute commercial standards in 5% nitric acid to cover a range of nickel concentrations from 1.0 ug/ml to 20 ug/ml. The diluted standards should be stored in polyethylene bottles which have been soaked in 5% nitric acid and should be stored for no more than 1 week.

Procedure

(a) Clean glassware if it has never been used by soaking it for 24 hours in 5% nitric acid. Rinse throughly with warm tap water and then with doubly distilled water. After glassware has been used, wash it first in detergent and rinse with tap water. Then soak it in 5% nitric acid for 1 hour, rinse it thoroughly with doubly distilled water, and allow it to dry. Use plastic containers for washing and do not handle the glassware without gloves which are impervious to sweat.

(b) Transfer the sample and the blank filter to 125-ml beakers and add 5 ml of concentrated nitric acid to each. Cover each beaker with a watchglass and heat it on a hotplate in a ventilation hood until only a few drops of solution remain in the beaker. Several additions of nitric acid may be needed for complete ashing.

(C) Dissolve the ash in 5% nitric acid with heating. If solids are present in the solution, repeat the ashing procedure with an additional 5 ml of a 1:4 mixture of hydrochloric and nitric acids. Quantitatively transfer the solution to a volumetric flask. Increase the total volume to 10 ml with 5% nitric acid. Dilution may be necessary if the amount of nickel in the sample exceeds the upper limit of the range of detection.

(d) Aspirate the sample solutions and the standard solutions into an oxidizing flame. Measure and record the absorbance of each sample at 232 nm. It is advisable to run the set of standards before, during, and after a sample run to ensure that conditions have not changed. Correction for nonspecific absorption can be made for measurements at 232.0 nm by the use of a hydrogen or deuterium lamp, or by subtracting the absorbance at the 231.7-nm nonabsorbing line of nickel.

Calculations

Prepare a calibration curve by plotting the absorbance of the standards versus the concentration (ug/ml) of each standard on linear graph paper. Subtract the absorbance of the filter blank from the absorbance of each sample. Read the nickel concentration corresponding to this absorbance value from the corrected calibration curve. The concentration of nickel in air is calculated as:

$$\text{mg nickel/cu m} = \frac{\text{µg nickel/ml (from graph)} \times \text{total ml of solution}}{\text{cu m of air sampled}}$$

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