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PART II

ENVIRONMENTAL PROTECTION AGENCY

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Asbestos, Beryllium, and Mercury

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Asbestos, Beryllium, and Mercury

On March 31, 1971 (36 FR 5931), pursuant to section 112 of the Clean Air Act, as amended, the Administrator published an initial list of three hazardous air pollutants which, in his judgment, may cause, or contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness. The pollutants were asbestos, beryllium, and mercury. On December 7, 1971 (36 FR 23239), the Administrator proposed standards for these pollutants.

Interested persons participated in the rulemaking by giving testimony at public hearings and by sending comments to EPA. Public hearings were held in New York City on January 18, 1972, and in Los Angeles on February 15 and 16, 1972. A third hearing, scheduled to be held in Kansas City, on February 1, 1972, was canceled because of a lack of requests to participate. Sixty-eight persons gave testimony at the public hearings, and 56 persons sent comments to EPA. Represented were industries, universities, governmental agencies—Federal, State, and local, and environmental groups. Copies of the public hearing records are available at all EPA Regional Offices and at the Division of Stationary Source Enforcement, room 3220, 401 M Street SW., Washington, D.C. 20460, where copies of the comments received are also available.

The bases for the Administrator's determinations that asbestos, beryllium, and mercury are hazardous, the derivations of the standards now adopted, the Environmental Protection Agency's responses to the significant comments received, and the principal revisions to the proposed standards are summarized below. A more detailed statement is available on request from the Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, N.C. 27711, Attention: Mr. Don Goodwin. In addition, the Administrator is issuing information on control techniques for asbestos, beryllium, and mercury as directed by section 112(b)(2) of the act. [illegible] documents may be [illegible] charge from EPA [illegible]

Asbestos

Asbestos is a hazardous air pollutant within the meaning of section 112. Many persons exposed to asbestos [illegible] developed asbestosis when the dust concentration was high or the duration of exposure was long (1–7). A large number of studies have shown that there is an association between occupational exposure to asbestos and a higher-than-expected incidence of bronchial cancer (8–30). Asbestos also has been identified as a causal factor in the development of mesotheliomas, cancers of the membranes lining the chest and abdomen (30–47). There are reports of mesotheliomas associated with nonoccupational exposures in the neighborhood of asbestos sources (38, 42, 47, 48). An outstanding feature has been the long period, commonly over 20 years, between the first exposure to asbestos and the appearance of a tumor (49, 50). There is evidence which indicates that mesotheliomas occur after much less exposure to asbestos dust than the exposure associated with asbestos (51, 52).

It is not practicable, at this time, to establish allowable numerical concentrations or mass emission limits for asbestos. Satisfactory means of measuring ambient asbestos concentrations have only recently been developed, and satisfactory means of measuring asbestos emissions are still unavailable. Even if satisfactory means of measuring asbestos emissions did exist, the previous unavailability of a satisfactory means of measuring ambient levels of asbestos makes it impossible to estimate even roughly the quantitative relationship between asbestos-caused illness and the dose which caused those illnesses. This is a major problem, since some asbestos-caused illness have a 20-year latency period.

EPA considered the possibility of banning production, processing, and use of asbestos or banning all emissions of asbestos into the atmosphere, but rejected these approaches. [illegible]

[illegible] is probable that the effects of asbestos inhalation are cumulative; that is, low-level and/or intermittent exposure to asbestos over a long time may be equally as important in the etiology of asbestos disease as high level and/or continuous exposure over a shorter period. On the other hand, the available evidence does not indicate that levels of asbestos in most community air cause asbestotic disease. Taking both these considerations into account, the Administrator has determined that, in order to provide an ample margin of safety to protect the public health from asbestos, it is necessary to control emissions from major man-made sources of asbestos emissions into the atmosphere but that it is not necessary to prohibit all emissions.

In this determination, the Administrator has relied on the National Academy of Sciences' report on asbestos (53), which concludes: "Asbestos is too important in our technology and economy for its essential use to be stopped. But, because of the known serious effects of uncontrolled inhalation of asbestos minerals in industry and uncertainty as to the shape and character of the dose-response curve in man, it would be highly imprudent to permit additional contamination of the public environment with asbestos. Continued use at minimal risk to the public requires that the major sources of man-made asbestos emission into the atmosphere be defined and controlled."

The means of control used are limitations on visible emissions with an option in some cases to use designated control equipment, requirements that certain procedures be followed, and prohibitions on the use of certain materials or of certain operations. [illegible]

[illegible] the Administrator considered the effect other Federal regulations will have on the emissions from such sources and the proximity of such sources to the public. In addition, the Administrator considered comments on the proposed standard and additional information that was available before promulgation. The following paragraphs explain these considerations and the changes made to the standard between proposal and final promulgation.

The promulgated standard applies to asbestos mills, selected manufacturing operations, the use of spray-on asbestos

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[illegible] dewatering operation, and the [illegible] Administrator will continue to investigate other existing and new sources of asbestos exposure and if any of them are found to be major sources, the standard will be revised to cover them.

As applied to mines, the proposed standard would have limited the emissions from milling operations and prohibited visible emissions of particulate matter in mine exhaust. Compliance with asbestos tables of the Bureau of Mines has previously been required by regulations (30 CFR 55.5) for the purpose of protecting life, the promotion of health and safety, and the prevention of accidents in open pit metal and nonmetallic mines. As related to asbestos mines, these regulations prohibit persons working in a mine from being exposed to asbestos concentrations which exceed the threshold limit value adopted by the American Conference of Governmental Industrial Hygienists. The regulations specify that respirators shall not be used to prevent persons from being exposed to asbestos where environmental measures are available. For drilling operations, the regulations require that the holes be collared and drilled wet. The regulations recommend that haulage roads, rock transfer points, grizzlers, and other points where dust (asbestos) is produced sufficient to cause a health or safety hazard be wetted down as often as necessary unless the dust is controlled adequately by other means. In the judgment of the Administrator, implementation of these regulations will prevent asbestos mines from being a major source which must be covered by the standard promulgated herein. Furthermore, the public is sufficiently removed from the mine work environment that their exposure should be significantly less than that of the workers in the work environment. Accordingly, the promulgated standard does not apply to drilling operations or roadways at mine locations.

For asbestos mills, the proposed standard would have applied to ore dumps, open storage areas for asbestos materials, tailings dumps, ore dryers, air for processing ore, air for exhausting particulate material from work areas, and any milling operation which continuously generates instant visible emissions. The promulgated standard prohibits visible emissions from any part of the mill, but it does not apply to dumps of asbestos tailings or open storage of asbestos ore. The Bureau of Mines' regulations previously referenced and regulations issued by the Occupational Safety and Health Administration (29 CFR 1910.93a) protect workers from the hazards of air contaminants in the work environment. The Occupational Safety and Health Administration regulations were promulgated on June 7, 1972. The regulations are intended to protect the health of employees from asbestos exposure by means of engineering controls (e.g. isolation, enclosures, and dust collection) rather than by personal protective equipment. It is the judgment of the Administrator that measures taken to comply with the Bureau of Mines and Occupational Safety and Health Administration regulations will serve to protect the health of persons who work in proximity to mills, and open storage areas will prevent the dispersion of large amounts of asbestos emissions.

The proposed standard would have applied to rock crushers, structures, or facilities within which any fabricating or manufacturing operation is carried out which involves the use of asbestos materials. Comments received on the proposed standard indicated that the requirements for fabricating and manufacturing operations were confusing. Much of the confusion was created by the use of terms such as "spray," "continuously," and "forced gas streams." The promulgated standard is more definitive as to applicability of the provisions. The promulgated standard prohibits visible emissions from the same manufacturing operations which, in the judgment of the Administrator, are major sources of asbestos. The promulgated standard does not cover fabrication operations. Of all fabrication operations, only those operations at new construction sites are considered to be major sources of asbestos emissions. The Occupational Safety and Health Administration regulations specify that all hand- or power-operated tools (i.e. saws, cutters, abrasive wheels, and drills) which produce asbestos dust be provided with dust collection systems. In the judgment of the Administrator, implementation of these regulations will prevent fabrication operations from being a major source which must be covered by the standard promulgated herein.

The proposed standard would have prohibited visible emissions of asbestos particulate material from the repair or demolition of any building or structure other than a single-family dwelling. Comments indicated that the no visible emission requirement would prohibit repair or demolition in many situations, since it would be impracticable, if not impossible, to do such work without causing visible emissions. Accordingly, the promulgated standard specifies certain work practices which must be followed when demolishing certain buildings or structures. The standard covers institutional, industrial, and commercial buildings or structures, including apartments or buildings having more than four dwelling units, which contain friable asbestos material. This coverage is based on the National Academy of Sciences' report (42) which states, "In general, single-family residential structures contain only small amounts of asbestos insulation. Demolition of industrial and commercial buildings that have been fireproofed with asbestos-containing materials will prove to be an emission source in the future, requiring control measures." Apartment houses with four dwelling units or less are considered to be equivalent to single-family residential structures. The standard requires that the Administrator be notified at least 20 days prior to the commencement of demolition.

The proposed standard would have [illegible] exceptions from a number of [illegible] stipulated that such exceptions would not exceed [illegible] would be emitted in a manner [illegible] were equipped with a fabric filter or in some cases a wet collection and cleaning device. The exceptions provided a standard based on [illegible] technique which is not currently available. The promulgated standard prohibits visible emissions which contain asbestos and provides the option of using specified air-cleaning methods. The existence of particulate asbestos material in a mill air stream vented to the atmosphere can be determined by collecting a sample on a filter and analyzing it by microscopic techniques. The proposed standard stated that the air-cleaning requirement would not be met if a number of listed faults, e.g., broken bags, leaking gaskets, threadbare bags, existed and it required that collection hoppers on some baghouses be emptied without generating visible emissions. Comments received suggested that this negative approach tended to make the quality of air-cleaning operations dependent upon the ability of EPA to anticipate and to include in the standard all the factors which would constitute improper methods. Since the stated purpose, and is, to require high quality air-cleaning operations, the promulgated standard requires proper installation, use, operation, and maintenance without specifically defining the means to be used.

The proposed standard would have prohibited the spraying of asbestos material containing asbestos on any surface of a building or structure, prohibited the spraying of any material containing asbestos in an area directly open to the atmosphere, and limited emissions from all other spraying of any material containing asbestos to the amount which would be emitted if specified air-cleaning equipment were used. Comments received pointed out that this standard would: (1) Prohibit the use of decorative materials only the trace amounts of asbestos which occur in inorganic fillers and admixtures, (2) prohibit the use of spray-on fireproofing materials in which very small percentages of asbestos are added in order to enhance their effectiveness, and (3) prohibit the use of materials in which the asbestos is strongly bound and which would not release airborne particulate asbestos emissions. The promulgated standard applies to these uses of spray-on asbestos materials which could generate major emissions of particulate asbestos material. For these spray-on materials used to insulate or fireproof buildings, structures, pipes and conduits, the standard limits the asbestos content to no more than 1 percent. Materials currently used contain from 10- to 85-percent asbestos. The intent of the 1-percent limit is to ban the use of materials which contain significant quantities of asbestos, but to allow the use of materials which would: (1) Contain trace amounts of asbestos which occur in numerous natural substances, and (2) include very small quantities of asbestos (less than 1 percent) added to enhance the material's effectiveness. Although a

standard yet [illegible] has not been developed to quantitatively determine the content of asbestos in [illegible]. There are acceptable methods available, based on electron microscopy, which independent laboratories have used to [illegible] determine the asbestos content of a material with these methods is approximately 300 and the results are accurate within plus or minus 50 percent. These limitations on accuracy were taken into account in establishing the 1 percent limitation.

The proposed standard would have prohibited the disposal of any property with asbestos tailings. The promulgated standard applies to all roadways except those on ore deposits. Since roadways are temporary, and control measures taken to comply with the Bureau of Mines regulations prevent them from being a major source which must be covered by the standard promulgated herein. At this time, the application of asbestos tailings to public roadways is not widely practiced, but because of the close proximity of roads to the public, a ban on using asbestos tailings on roadways is included in the promulgated standard to avoid a future problem and stop the practice where it is followed. The term "surfacing" is defined to include the deposit of asbestos tailings on roadways covered with snow or ice; therefore, this practice is prohibited.

Consideration was given to including provisions in the standard requiring proper disposal of the asbestos material generated during demolition and collected in control devices used to comply with the requirements of this standard. It was decided that this was not necessary because the Occupational Safety and Health Administration regulations (29 CFR 1910.93a(h)) include housekeeping and waste disposal requirements. These regulations require that any asbestos waste, consigned for disposal, be collected and disposed of in sealed impermeable bags or other closed, impermeable containers.

The potential environmental impact of the promulgated standard was evaluated, and it was concluded that the standard will not cause any adverse effects. The potentially adverse environmental effects of the standard are:

(1) The asbestos-materials which will be collected in control devices and generated during demolition will have to be disposed of or recycled.

(2) Materials, such as mineral wool, ceramic wool, and fiberglass, will be substituted for asbestos presently contained in spray-applied fireproofing and insulating materials.

In some manufacturing operations, a major portion of the asbestos-material collected by fabric filters is either recycled to the process or is marketed for other uses. For example, one asbestos textile mill recycles large quantities of broken-fiber asbestos for process use and sells more than 90 percent of the remaining collected materials to a brake lining manufacturer. Consequently, a significant portion of the increased quantities of "waste" asbestos materials which will result from the implementation of the standard will not require disposal. Where disposal is required, the Occupational Safety and Health Administration regulations (29 CFR 1910.93a(h)) require that any asbestos waste, consigned for disposal be collected and disposed of in sealed impermeable bags or other closed, impermeable containers. The contamination of groundwater supplies with asbestos from improper disposal is not considered a problem.

The substitution of ceramic wool, mineral wool, and fiberglass for asbestos is not now known to be a problem. There is no evidence that these materials cause health effects at the concentrations found in occupational or ambient environments.

Although the standard was not based on economic considerations, EPA is aware of the impact (§5) and considers it to be reasonable. Costs among the various sources covered by the standard are quite variable. Although the standard may adversely affect some individual plants or companies which are marginal operations, it appears that such effects will be minimal and the impact to the asbestos industries as a whole will not be large.

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BERYLLIUM

Beryllium is a hazardous air pollutant within the meaning of section 112. The proven effects of airborne beryllium materials on human health include both acute and chronic lethal inhalation effects (1, 2), as well as skin and conjunctival effects (2). Insufficient data are available to incriminate beryllium as a human carcinogen (1, 2), but the lack of of any mechanism for the total elimination of beryllium body burdens, and the resulting possibly long residence time may enhance the opportunity for cancer induction. The Beryllium Registry now contains over 820 proven c[illegible]s of beryllium-related disease (3), [illegible]st since many of 1[illegible] were most likely due to exposure [illegible] control [illegible] of the [illegible] of exposure is not [illegible] possible 1, 2[illegible], however [illegible] beryllium [illegible] is [illegible] not only with activities involving [illegible] process[illegible] at 64 re[illegible] from exposure [illegible] beryllium [illegible] (3). There are at least 45 [illegible] with the registry [illegible] approximately half have been fatal (2). And [illegible] studies of the concentration of beryllium that resulted in [illegible] of chronic beryllium disease from nonoccupational exposure have con[illegible] that the lowest concentration which produced disease was greater than 0.01 μg/m³ and probably less than 0.10 μg/m³ (4).

In 1949, when it became apparent that beryllium was a toxic material, the Atomic Energy Commission adopted a limit for beryllium concentrations in community air (i.e., 0.01 μg of beryllium per cubic meter of air averaged over a 30-day period) (2). Beryllium refining companies holding contracts with the AEC to operate AEC-owned refinery facilities and expand their own refinery capacity to meet AEC's beryllium requirements, were required to observe the community air limit. With the termination of these contracts in the 1961-62 period due to a reduction in AEC requirements for beryllium, the refineries were no longer subject to the AEC community air limit. The AEC's health and safety requirements, however, have continued to apply to all AEC-owned facilities, some of which fabricate and assemble beryllium parts.

In the period since the implementation of the AEC guideline, no reported cases of chronic beryllium disease have occurred as a result of community exposure, and the Committee on Toxicology of the National Academy of Sciences concluded that the AEC guideline limit represents a safe level of exposure (2).

Accordingly, the Administrator has determined that in order to provide an ample margin of safety to protect the public health from beryllium, sources of beryllium dust, fume, or mist emissions into the atmosphere should be controlled to insure that ambient concentrations of beryllium do not exceed 0.01 μg/m³—30-day average.

The beryllium standard covers extraction plants, foundries, ceramic manufacturing plants, machine shops (processing beryllium or beryllium alloys containing in excess of 5 percent beryllium) and disposal of beryllium-containing wastes. Most affected beryllium sources are limited to emissions of not more than 10 grams per day. This level was determined through dispersion estimates as the level which would protect against the occurrence of 30-day average ambient concentrations exceeding 0.01 μg/m³. The sources covered by the standard are the only known ones that could result in ambient beryllium concentrations in excess of 0.01 μg/m³. The assumptions and equations used to make the [illegible] estimates are [illegible] in the [illegible] formation report for [illegible] lium and [illegible] (AP[illegible]) [illegible] at the time the [illegible] proposed.

[illegible] to make [illegible] of 75 m[illegible] per [illegible] meter [illegible] ing a[illegible] period [illegible] The [illegible] the [illegible] the Committee [illegible] National Academy of Sciences [illegible] tion of [illegible] lent exposure [illegible] pounds ar[illegible] from the [illegible] rocket motors (1).

The proposed standard [illegible] include a provision on open burning [illegible] containing waste. The promulgated standard includes a ban on open burning of beryllium-containing waste. This change was made because information received after proposal indicated that such sources can cause ambient concentrations of beryllium in excess of 0.01 μg/m³ and because it is not possible to control the emissions from open burning. The promulgated standard does allow disposal of beryllium-containing waste in incinerators which are controlled so as not to exceed the 10-gram-per-day limit. The disposal of beryllium-containing explosive waste is included in the standard covering rocket testing.

The proposed standard would have covered all machining operations which use alloys containing any amount of beryllium. Comments were received which claimed that numerous machining operations use alloys containing low concentrations of beryllium and do not exceed the 10-gram-per-day emission limitation. An investigation of these comments revealed that alloys which include beryllium either contain a large amount (greater than 60 percent) or a small amount (less than 5 percent), and that approximately 3,000 machining operations use the low beryllium content alloys. Tests were conducted by the Agency to determine the beryllium [illegible] from the operations which use the low beryllium content alloys (e.g. [illegible] tube drawing, milling, and [illegible]). [illegible] results indicated that, even if the [illegible] were vented to the outside [illegible] which they ordinarily are not, they [illegible] be significantly below the 10-gram-per-day emission limitation. After considering these results and the administrative burden if the standard applied to such a large number of sources, the proposed standard was changed to exempt the machining operations which use alloys containing less than 5-percent beryllium.

The proposed standard would have allowed all sources of beryllium to choose between meeting the 10-gram-per-day emission limit and complying by use of ambient monitoring to insure that the 0.01 μg/m³ 30-day average is never exceeded. After reconsidering the proposed standard and the difficulty inherent in using ambient air quality data, as opposed to emission data, as a regulatory tool, it was decided to limit the use of ambient data as a means of compliance

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[illegible] and have [illegible] control [illegible] Therefore, the [illegible] Directorate of [illegible] to [illegible] the [illegible] A minimum of 2 years of data was [illegible] to [illegible] of the [illegible] with a potential for [illegible] the [illegible] of [illegible] per cubic meter of air [illegible] a definite risk of mercury [illegible] (3).

To determine the ambient air level of mercury that does not impair health, the [illegible] burden must be considered together with the water- and food-borne burden. An expert group convened, based on its study of several episodes of mercury poisoning in Japan, that 4 micrograms of methylmercury per kilogram of body weight per day would result in the intoxication of a sensitive adult; application of a safety factor of 10 yielded an acceptable exposure of about 30 micrograms per day for a 70-kilogram man, and this level is also believed to provide satisfactory protection against genetic lesions, and poisoning of the fetus and of children (4).

It should be noted that methylmercury is considered to be by far the most hazardous mercury compound, particularly via the ingestion of fish in which it has been concentrated through the food chain. (3, 5). The Environmental Protection Agency, in view of the present limited knowledge as to the effects of inhaled mercury in the general population, and in order to best assure the requisite "ample margin of safety to protect the public health," has concluded that it is prudent to consider exposures to methylmercury (diet) and mercury vapor (air) to be equivalent and additive. It has been estimated that from average diets, over a considerable period, mercury intakes of 10 micrograms per day may be expected (6), so that, in order to restrict total intake to 30 micrograms per day, the average mercury intake from air would have to be limited to 20 micrograms per day. Assuming inhalation of 20 cubic meters of air per day, the air could contain an average daily concentration of no more than 1 microgram of mercury per cubic meter.

The standard promulgated herein regulates the only two sources, mercury ore processing facilities and mercury cell chlor-alkali plants, which have been found to emit mercury in a manner that could cause the ambient concentration to exceed the inhalation effects limits of 1 microgram per cubic meter. The standard limits emissions from these facilities to not more than 2,300 grams per day. The emission limit of 2,300 grams per day was derived from dispersion estimates as the level which would protect against the violation of an average daily ambient concentration of 1 microgram per cubic meter. The assumptions and

[illegible]

[illegible] Information [illegible] for Air [illegible] beryllium, and [illegible] (AP-11) [illegible] published at the time the [illegible] were [illegible]

[illegible] cell chlor-alkali plant cell rooms [illegible] several sources of [illegible] problems due to their design and construction. Site specific [illegible] construction [illegible] cell rooms so that accurate source tests can be made or employ housekeeping and maintenance practices that minimize mercury emissions from the cell room. Source test data and calculations have indicated that when such practices are used, 1,360 grams per day is a reasonable estimate of emissions from the cell room. Therefore, when this option is chosen, an emission of 1,360 grams per day will be assumed to the cell room. This permits emissions of not more than 1,600 grams per day from the hydrogen and end box ventilation streams combined.

Compliance with the standard will be determined by the EPA reference method or EPA-approved substitute methods. Where a chlor-alkali plant chooses the housekeeping and maintenance practices option, determination of compliance of the cell room emission will be based on the use of EPA-approved practices. A list of approved practices may be obtained from EPA on request to regional offices.

The only major change in the monitoring standard is the introduction of the alternative option of assigning an emission number to the cell room provided certain housekeeping and maintenance requirements are met. When this option is chosen, testing is not required for emissions from the cell room. This option is offered because comments, testimony, and EPA source testing experience indicated that most existing cell rooms cannot be accurately tested for mercury emissions. Accurate emission tests are unduly complicated and costly because of the cell room configuration.

Some of the changes suggested in written comments and public hearings [illegible] many were considered by EPA, but not made. The most significant was [illegible] the environmental objectionability of mercury, that is, environmental mercury is [illegible] methylmercury is transformed to [illegible] under the action of ultraviolet radiation, and since metallic mercury is not as toxic as elemental mercury, the standard should be less stringent. This argument is based on laboratory experiments under controlled conditions with concentrated radiation. The reaction cited in the testimony occurs when elemental mercury is irradiated with ultraviolet light with a wavelength of 2,537 angstroms (Å). Naturally occurring ozone in the upper atmosphere absorbs light in the ultraviolet region below 3,000 Å; (7) hence the wavelength of ultraviolet necessary for the reaction is absent in the ambient atmosphere, and the reaction does not proceed at as high a rate as implied by the submitted testimony. Field measurements of both mercury vapors and particulate mercury in ambient air indicate that as much as 95 percent of the mercury de-

[illegible] Committee on Toxicology, National Academy of Sciences: Air Quality Criteria for Beryllium and Its Compounds. Report prepared under contract to the U.S. Public Health Service (Contract PHSm-391(61)), Washington, March 1, 1968.

2 National Institute for Occupational Safety and Health: Occupational Exposure to Beryllium (Criteria for a Recommended Standard). Washington, U.S. Department of Health, Education, and Welfare (PHS, NIOSH-A), 1972 (HSM 72-10268).

3 Massachusetts General Hospital, U.S. Beryllium Case Registry, Boston, Mass.

4 Theobald, M. R. C. Waszia, C. Dutton, I. T. Goodman, W. B. Harris, and H. S. Wolf: Occupational Beryllosis. J. Ind. Hyg. Toxicol. 31: 282-294, 1949.

5 Research Triangle Institute: Comprehensive Study of Specified Air Pollution Sources to Assess the Economic Impact of Air [illegible] Standards—Asbestos, Beryllium, Mercury. Report prepared under contract to the Environmental Protection Agency (Contract [illegible]), August 1972.

References at end of article.

tested was in an elemental vapor form [illegible] EPA at the Federal Building in [illegible], W. Va.)

The Environmental Protection Agency recognizes that mercury and its compounds [illegible] a multimedia pollutant and that a multiple [illegible] evidence [illegible] the environmental [illegible] cause or [illegible] water or soil [illegible] naturally, [illegible] mercury [illegible] and [illegible] levels are [illegible] with the result that [illegible] residue levels are [illegible] determined by fish and shellfish.

Current data on the environmental impact of mercury do not permit a clear assessment of the effect of mercury emissions into the atmosphere on the mercury content of the water and terrestrial environment. Results of ongoing research will determine if there is a need for more comprehensive control of mercury emissions into the air. The standard promulgated herein is intended to protect the public health from the effects of inhaled mercury.

The environmental impact of this standard was evaluated and it was concluded that the standard will not cause any adverse effects since the control of mercury emissions to the atmosphere will have only minimal impact on other areas of environmental concern. The simplest control for mercury emissions to the atmosphere is cooling to condense the mercury. This cooling can be indirect or direct. By indirect cooling, the mercury condenses and is retained for recycle or sale. By direct cooling with a water scrubber, the water is usually recirculated after using centrifugal or gravitational separation to remove the mercury. The water cannot be reused indefinitely and eventually requires additional treatment to remove the mercury. In most cases, such treatment facilities are already being utilized to meet water quality standards.

A widely used control device for particulate mercury emissions is the mist eliminator. Residues in these devices are removed by gravity and washing with a recycled liquid. Another control method is chemical scrubbing. In this system, scrubbing liquids are continuously made up while waste materials are usually recycled to the process [illegible] solutions. Recycling of these liquids [illegible] contamination of water with mercury residues.

The use of adsorption beds is a highly efficient control method for removing mercury from gas streams. Two primary types are available: (1) Chemically treated activated carbon beds, and (2) molecular sieves. Most of the mercury collected by activated carbon can be reclaimed by retorting the carbon but this usually destroys the carbon structure and necessitates disposal. Some small amount of residual mercury will remain with the carbon, but it is tightly bound and is not easily transferred into the air or water. Regenerative molecular sieves do not cause a waste disposal problem because the sieves can be regenerated in place without retorting and can be reused many times.

Although the standard was not based on economic considerations, EPA is aware of the impact it and considers it to be reasonable because mercury is an international commodity, world prices determine the fortunes of the domestic mercury mining industry. Historically, mercury prices fluctuate greatly in response to small changes in demand or supply. Domestic mercury mines are considered high-cost producers in relation to foreign producers. Because the average price has dropped from $404 per flask in 1969 to approximately $120 currently, the number of domestic mercury mines in operation has dropped sharply from 109 in 1969 to six or seven in March 1973. As long as the price of mercury remains below marginal costs of production (generally about $400), the remaining domestic mines will be ill equipped to absorb any cost increases.

The total chlor-alkali industry comprises 68 plants. Approximately 26 are mercury cell plants and account for about 27 percent of the U.S. production of chlorine and caustic.

The future of the chlorine-caustic industry appears healthy. Demand for chlorine is expected to grow at an annual rate of 6 percent projected from 1971. Demand for caustic soda will grow at least at the same rate as chlorine, and perhaps faster. Prices for chlorine and sodium hydroxide have been rising steadily through the sixties into 1971. Based on these trends, the cost of control to comply with the mercury standard will be passed forward to the consumer. Use of these two basic commodities is so diverse that any price increases will be well dispersed through all manufacturing activities.

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6. Wessel, G.: Mercury in Pesticides—Is There a Great Risk of Poisoning? VAR FODA, 4, 1-6, 1943.

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General Provisions

The standards promulgated herein are applicable to [illegible] existing source. A source [illegible] must comply with the standard upon beginning operation. [illegible] source that [illegible] comply with the standard [illegible] 90 days after promulgation, unless a waiver of compliance is granted.

After considering the proposed general provisions and the comments received thereto, the Administrator made several changes which are included in the standards promulgated below. A new section was added to specifically require new stationary sources to notify the Administrator before beginning operation. The requirements for source reporting and request for waiver of compliance were combined into one section. The time for submitting the source report was extended from 30 to 90 days to provide sources with more time to complete the information required. Appendix A was added to provide sources a description and format of the information required.

The proposed standards required all sources of mercury and beryllium to [illegible] their emissions within 3 months of the effective date and at least once every 12 months thereafter; a provision was included to allow the Administrator to waive the periodic tests for sources in compliance with a standard. The standards promulgated below require the initial test within 90 days of the effective date and include a provision to allow the Administrator to waive this requirement if the source is meeting the standard, has requested a waiver of compliance. Periodic tests are still required unless specifically requested by the Administrator. The Administrator may grant a waiver of emission tests and may require a test under the authority of [illegible] of the Act at any time. Appendix A specifies the information which is necessary to provide the Administrator when requesting a waiver of initial emission [illegible].

The standards promulgated [illegible] not require the owner or operator to request a waiver of compliance [illegible] specific date. However, the owner or operator should submit the request [illegible] 30 days after the effective date of the regulation to be assured that action will be taken on the waiver application prior to the 90th day after the effective date. Continued operation in excess of a standard after the 90th day without a waiver is a violation of the act.

The Administrator may grant an existing source a waiver, permitting a period of up to 2 years for compliance, provided that steps will be taken during the waiver period to assure that the health of persons will be protected from unreasonable endangerment and provided that time period is necessary for the installation of controls. To be granted a waiver of compliance, a source must submit a written request to the Administrator and must provide certain information to assist the Administrator in making a judgment.

Within 60 days after receiving a request, the Administrator will notify the owner or operator of approval or intention to deny the waiver. Any waiver of compliance granted by the Administrator will be in writing and specify conditions the source must meet during the waiver period. If the Administrator intends to deny a request, the owner or operator will be given a specified time to provide additional information or arguments prior to final action on the request. Final action on a request will be in writing by the Administrator, and if denied, will include reasons for denial.

The President may exempt any new, modified, or existing stationary source from compliance with the standards for a period of up to 2 years, provided the technology is not available to implement the standards and the operation of such source is required for reasons of national security. Also, the President may grant exemptions for additional periods of 2 years or less.

The construction of a new source or modification of an existing source covered by these standards cannot begin without approval of the Administrator. To obtain approval, the owner or operator of such sources must apply in writing to the Administrator. Within 60 days, the Administrator will notify the owner or operator of approval or intention to deny approval. If the Administrator intends to deny approval, a specified time will be given to provide additional information or arguments prior to final action on the application. The final action on any application will be in writing by the Administrator, and if denied, will include the reasons for denial.

Although the demolition of buildings or structures containing [illegible] material and the spraying of [illegible] material will in many cases be [illegible] of existing stationary sources, the Administrator's approval is not required before beginning such operations. Section 112(c)(1) of the act specifies that no person may construct any new source or modify any existing source [illegible] unless the Administrator finds that such source if properly operated will not cause emissions in violation of such standard. The demolition and spraying [illegible] are expressed in terms of [illegible] followed. Therefore, if [illegible] erly operated, it will [illegible] the standard, and [illegible] the Administrator [illegible] respect to each new [illegible] these provisions.

Each source covered by [illegible] ards is required to submit [illegible] istrator within 90 days af[illegible] tion certain information pertaining to its operation. Changes in the information must be submitted within 30 days after the change, except where the change is considered a modification. Then the requirements for a modified source are applicable.

These terms are associated with determining compliance by means of source testing: (1) Reference method, (2) equivalent method, and (3) alternative method. Reference methods are the preferred methods of sampling and analyzing used to determine compliance. The reference methods for beryllium and mercury are included in appendix B to this part. An equivalent method is any method of sampling and analyzing which has been demonstrated to the Administrator's satisfaction to have a consistent and quantitatively known relationship to the reference method under specified conditions. An alternative method is any method of sampling and analyzing which does not meet all the criteria for equivalency but which can be used in specific cases to determine compliance. Alternative methods may be approved by the Administrator for source testing; however, in cases where determinations of compliance using an alternative method are disputed, use of the reference method or its equivalent will be required by the Administrator. An approved alternative method for beryllium is included in appendix B hereto.

All emission data provided to or obtained by the Administrator in carrying out these regulations will be available to the public. Records, reports, or information other than trade secrets will be available to the public.

Pursuant to section 112(d)(1) of the act, the Environmental Protection Agency intends to delegate the authority to implement and enforce national emission standards [illegible]

[illegible]

Dated: March [illegible]

[illegible]

[illegible]

61.20 Applicability.
61.21 Definitions.

Sec.
61.22 Emission standard.
61.23 Air cleaning.
61.24 Reporting.

Subpart C—National Emission Standard for Beryllium

61.30 Applicability.
61.31 Definitions.
61.32 Emission standard.
61.33 Stack sampling.
61.34 Air sampling.

Subpart D—National Emission Standard for Beryllium Rocket Motor Firing

61.40 Applicability.
61.41 Definitions.
61.42 Emission standard.
61.43 Emission testing—rocket firing or propellant disposal.
61.44 Stack sampling.

Subpart E—National Emission Standard for Mercury

61.50 Applicability.
61.51 Definitions.
61.52 Emission standard.
61.53 Stack sampling.
Appendix A—Compliance Status Information.
Appendix B—Test Methods.
Method 103—Reference method for determination of particulate and gaseous mercury emissions from stationary sources (air streams).
Method 102—[illegible]
[illegible]

[illegible]

(c) [illegible] date or dates by which [illegible] of persons is [illegible] with the standards of this part and with any steps toward such compliance which are set forth in a waiver of compliance under § 61.11.

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(j) "Construction" means fabrication, erection, or installation of a stationary source.

(k) "Effective date" is the date of promulgation in the FEDERAL REGISTER of an applicable standard or other regulation under this part.

(l) "Equivalent method" means any method of sampling and analyzing for an air pollutant which has been demonstrated to the Administrator's satisfaction, to have a consistent and quantitatively known relationship to the reference method under specified conditions.

(m) "Existing source" means any stationary source which is not a new source.

(n) "Modification" means any physical change in, or change in the method of operation of, a stationary source which increases the amount of any hazardous air pollutant emitted by such source or which results in the emission of any hazardous air pollutant not previously emitted, except that:

(1) Routine maintenance, repair, and replacement shall not be considered physical changes, and

(2) The following shall not be considered a change in the method of operation:

(i) An increase in the production rate, if such increase does not exceed the operating design capacity of the stationary source;

(ii) An increase in hours of operation.

(o) "New source" means any stationary source, the construction or modification of which is commenced after the publication in the FEDERAL REGISTER of proposed national emission standards for hazardous air pollutants which will be applicable to such source.

(p) "Owner or operator" means any person who owns, leases, operates, controls, or supervises a stationary source.

(q) "Reference method" means any method of sampling and analyzing for an air pollutant, as described in appendix B to this part.

(r) "Source" means the setting in operation of a stationary source for any purpose.

(s) "Standard" means a national emission standard for a hazardous air pollutant proposed or promulgated under this part.

(t) "Stationary source" means any building, structure, facility, or installation which emits or may emit any air pollutant which has been designated as hazardous by the Administrator.

§ 61.03 Abbreviations.

The abbreviations used in this part have the following meanings:

°C—Degrees Centigrade.
cfm—Cubic feet per minute.
ft²—Square feet.
ft³—Cubic feet.
°F—Degrees Fahrenheit.
hr—Hour.
l—Liter.
m—Meter.
m³—Cubic meter.
mm—Millimeter.
oz—Ounces.
v/v—Volume per volume.
yd²—Square yards.
w.g.—Water gage.
in.Hg—Inches of mercury.
in.H₂O—Inches of water.
g—Grams.
mg—Milligrams.
N—Normal.
°R—Degrees Rankine.
min.—Minute.
s—Second.
a.c.f.m—Actual cubic feet per minute.
I.D.—Inside diameter.
O.D.—Outside diameter.
µg—Micrograms (10⁻⁶ gram).
%—Percent.
Hg—Mercury.
Be—Beryllium.

§ 61.04 Address.

All requests, reports, applications, submittals, and other communications to the Administrator pursuant to this part shall be submitted in duplicate and addressed to the appropriate regional office of the Environmental Protection Agency, to the attention of the Director, Enforcement Division. The regional offices are as follows:

Region I (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont), John F. Kennedy Federal Building, Boston, Mass. 02203.

Region II (New York, New Jersey, Puerto Rico, Virgin Islands), Federal Office Building, 26 Federal Plaza (Foley Square), New York, N.Y. 10007.

Region III (Delaware, District of Columbia, Pennsylvania, Maryland, Virginia, West Virginia), Curtis Building, Sixth and Walnut Streets, Philadelphia, Pa. 19106.

Region IV (Alabama, Florida, Georgia, Mississippi, Kentucky, North Carolina, South Carolina, Tennessee), Suite 300, 1421 Peachtree Street, Atlanta, Ga. 30309.

Region V (Illinois, Indiana, Minnesota, Michigan, Ohio, Wisconsin), 1 North Wacker Drive, Chicago, Ill. 60606.

Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, Texas), 1600 Patterson, Suite 1100, Dallas, Tex. 75201.

Region VII (Iowa, Kansas, Missouri, Nebraska), 1735 Baltimore Street, Kansas City, Mo. 64108.

Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming), 900 Lincoln Tower, 1860 Lincoln Street, Denver, Colo. 80203.

Region IX (Arizona, California, Hawaii, Nevada, Guam, American Samoa), 100 California Street, San Francisco, Calif. 94111.

Region X (Washington, Oregon, Idaho, Alaska), 1200 Sixth Avenue, Seattle, Wash. 98101.

§ 61.05 Prohibited activities.

(a) After the effective date of any standard prescribed under this part, no owner or operator shall construct, modify or operate any stationary source subject to such standard without first obtaining written approval of the Administrator in accordance with this subpart, except under an exemption granted by the President under section 112(c)(2) of the act. However, the construction or modification of which commenced after the publication date of the standard proposed to be applicable to such source, are subject to this prohibition.

(b) After the effective date of any standard prescribed under this part, no owner or operator shall operate any new source in violation of such standard except under an exemption granted by the President under section 112(c)(2) of the act.

(c) Ninety days after the effective date of any standard prescribed under this part, no owner or operator shall operate any existing stationary source in violation of such standard except under a waiver granted by the Administrator in accordance with this subpart or under an exemption granted by the President under section 112(c)(2) of the act.

(d) No owner or operator subject to the provisions of this part shall fail to report, revise reports, or report source test results as required under this part.

§ 61.06 Determination of construction or modification.

Upon written application by an owner or operator, the Administrator will make a determination of whether actions taken or intended to be taken by such owner or operator constitute construction or modification or the commencement thereof within the meaning of this part. The Administrator will, within 30 days of receipt of sufficient information, inform the applicant in writing of his determination.

§ 61.07 Application for approval of construction or modification.

(a) The owner or operator of any stationary source to which a standard prescribed under this part is applicable shall, with respect to each change in which construction or modification is planned to commence within 30 days after the effective date of this part or in the case of a new source that should have commenced construction or modification before this part became operative, submit to the Administrator an application for approval of such construction or modification, if separate construction approval would be required for such stationary source by any State or local agency.

(b) Such application shall include:

(1) The name and address of the owner or operator;

(2) The location or proposed location of the source;

(3) Technical information describing the proposed nature, size, design, operating capacity, and method of operation of the source, including a description of any equipment to be used for control of emissions. Such technical information shall include calculations of emission estimates in sufficient detail to permit assessment of the validity of such calculations.

§ 61.08 Approval by Administrator.

(a) Before beginning any actual construction or modification, the owner or operator shall obtain written approval of the Administrator to construct or modify a stationary source subject to a standard prescribed under this part. The Administrator will grant such approval if he determines that the owner or operator has satisfactorily complied with § 61.07 of this part and that the construction or modification will be in accordance with all requirements applicable to such source under this part. The Administrator will notify the owner or operator in writing of his approval or disapproval of the application within 30 days of receipt of the application, or within 30 days of receipt of such additional information as may be required under § 61.07(b)(3).

(b) If the Administrator determines that a stationary source for which an

§ 61.14 Source test and analytical methods.

[illegible] 101, 102, and 104 [illegible] shall be used for [illegible] required under this part. [illegible] equivalent method or an alternative method [illegible] approved by the Administrator.

[illegible] Appendix B to this [illegible] by the Administrator [illegible] method [illegible] and [illegible] method [illegible] Administrator may require the use of the reference method or its equivalent.

§ 61.15 Availability of information.

(a) Emission data provided to, or otherwise obtained by, the Administrator in accordance with the provisions of this part shall be available to the public.

(b) Any records, reports, or information, other than emission data, provided to, or otherwise obtained by, the Administrator in accordance with the provisions of this part shall be available to the public, except that upon a showing satisfactory to the Administrator by any person that such records, reports, or information, or particular part thereof (other than emission data), if made public, would divulge methods or processes entitled to protection as trade secrets of such person, the Administrator will consider such records, reports, or information, or particular part thereof, confidential in accordance with the purposes of section 1905 of title 18 of the United States Code, except that such records, reports, or information, or particular part thereof, may be disclosed to other officers, employees, or authorized representatives of the United States concerned with carrying out the provisions of the act or when relevant in any proceeding under the act.

§ 61.16 State authority.

(a) The provisions of this part shall not be construed in any manner to preclude any State or political subdivision thereof from:

(1) Adopting and enforcing any emission limiting regulation applicable to a stationary source, provided that such emission limiting regulation is not less stringent than the standards prescribed under this part.

(2) Requiring the owner or operator of a stationary source, other than a stationary source owned or operated by the United States, to obtain permits, licenses, or approvals prior to initiating construction, modification, or operation of such source.

Subpart B—National Emission Standard for Asbestos

§ 61.20 Applicability.

The provisions of this subpart are applicable to those sources specified in § 61.22.

§ 61.21 Definitions.

Terms used in this subpart are defined in the Act, in [illegible] A of this part, or in this section as follows:

(a) "Active waste disposal site" means any [illegible] site, dump site, or [illegible] that receives asbestos material.

(b) "Asbestos material" means asbestos or any material containing asbestos.

(c) "Particulate asbestos material" means finely divided particles of asbestos material.

(d) "Asbestos tailings" means any solid waste product of asbestos mining or milling operations which contains asbestos.

(e) "Outside air" means the air outside buildings and structures.

(f) "Visible emissions" means any emissions which are visually detectable without the aid of instruments and which contain particulate asbestos material.

§ 61.22 Emission standard.

(a) Asbestos mills: There shall be no visible emissions to the outside air from any asbestos mill except as provided in paragraph (f) of this section. Outside storage of asbestos materials is not considered a part of an asbestos mill.

(b) Roadways: The surfacing of roadways with asbestos tailings is prohibited, except for temporary roadways on an area of asbestos ore deposits. The deposition of asbestos tailings on roadways covered with snow or ice is considered "surfacing."

(c) Manufacturing: There shall be no visible emissions to the outside air, except as provided in paragraph (f) of this section, from any building or structure in which the following operations are conducted or directly from any of the following operations if they are conducted outside of buildings or structures.

(1) The manufacture of cloth, cord, wicks, tubing, tape, twine, rope, thread, yarn, roving, lap, or other textile materials.

(2) The manufacture of cement products.

(3) The manufacture of fireproofing and insulating materials.

(4) The manufacture of friction products.

(5) The manufacture of paper, millboard, and felt.

(6) The manufacture of floor tile.

(7) The manufacture of paints, coatings, caulks, adhesives, sealants.

(8) The manufacture of plastics and rubber materials.

(9) The manufacture of chlorine.

(d) Demolition: Any owner or operator of a demolition operation who intends to demolish any institutional, commercial, or industrial building (including apartment buildings having more than four dwelling units), structure, facility, installation, or portion thereof which contains any friable asbestos material that is regulated by this paragraph shall comply with the requirements of this paragraph.

(1) Notice of intention to demolish shall be provided to the Administrator as early as [illegible] days prior to commencement of [illegible] demolition [illegible] prior to commencement of demolition [illegible] paragraph (d)(2) of this section.

[illegible] notice shall include the following information:

(i) Name of owner or operator.

(ii) Address of owner or operator.

(iii) Description of the building, structure, facility, or installation to be demolished.

(iv) Address or location of the building, structure, facility, or installation.

(v) Scheduled starting and completion dates of demolition.

(vi) Method of demolition to be employed.

(vii) Procedures to be employed to meet the requirements of this paragraph.

(2) The following procedures shall be used to prevent emissions of particulate asbestos material to outside air:

(i) Friable asbestos materials, used to insulate or fireproof any boiler, pipe, or load-supporting structural member, shall be wetted and removed from any building, structure, facility, or installation subject to this paragraph before wrecking of load-supporting structural members is commenced. The friable asbestos debris shall be wetted adequately to ensure that such debris remains wet during all stages of demolition and related handling operations.

(ii) No pipe or load-supporting structural member that is covered with friable asbestos insulating or fireproofing material shall be dropped or thrown to the ground from any building, structure, facility, or installation subject to this paragraph, but shall be carefully lowered or taken to ground level.

(iii) No friable asbestos debris shall be dropped or thrown to the ground from any building, structure, facility, or installation subject to this paragraph, or from any floor to any floor below. For buildings, structures, facilities, or installations 50 feet or greater in height, friable asbestos debris shall be transported to the ground via dust-tight chutes or containers.

(3) Sources subject to this paragraph are exempt from the requirements of §§ 61.24(a), 61.27, and 61.28.

(4) Any owner or operator of a demolition operation who intends to demolish a building, structure, facility, or installation to which the provisions of this paragraph would be applicable but which has been declared by proper State or local authority to be structurally unsound and which is in danger of imminent collapse is exempt from the requirements of this paragraph other than the reporting requirements specified by paragraph (d)(1) of this section and the wetting of friable asbestos debris as specified by paragraph (d)(2)(i) of this section.

[illegible] shall be [illegible]

[illegible]

[illegible]

[illegible] information.

(i) Name of owner or operator.

(ii) Address of owner or operator.

(iii) Location of [illegible] operation.

(iv) Procedures to be followed to meet the requirements of this paragraph.

(f) Rather than meet the no-visible-emission requirements of paragraphs (a), (c), and (e) of this section, an owner or operator may elect to use the methods specified by § 61.23 to clean emissions containing particulate asbestos material before such emissions escape to, or are vented to, the outside air.

§ 61.23 Air-drawing.

If air-cleaning is elected, as permitted by § 61.22(f), the requirements of this section must be met.

(a) *Fabric filter collection devices* must be used, except as noted in paragraphs (b) and (c) of this section. Such devices must be operated at a pressure drop of no more than 4 inches water gage, as measured across the filter fabric. The fabric permeability, as determined by ASTM method D737-69, must not exceed 50 ft³/min./ft² for woven fabrics or 35 ft³/min./ft² for felted fabrics, except that 60 ft³/min./ft² for woven and 40 ft³/min./ft² for felted fabrics is allowed for filtering air from asbestos ore dryers. Such ore dryers [illegible] fabric filter [illegible] weight at least 24 [illegible] fabric filter [illegible] fibrous [illegible] yarn other than [illegible].

(b) If the use of [illegible] a fire or explosion [illegible] water may authorize [illegible] factors designed to [illegible] existing design of [illegible] water gage pressure.

(c) The Administrator may authorize the use of filtering equipment other than that described in paragraphs (a) and (b) of this section if the owner or operator demonstrates to the satisfaction of the Administrator that the filtering of particulate asbestos material is equivalent to that of the described equipment.

(d) All air-cleaning equipment authorized by this section must be properly installed, used, operated, and maintained. Bypass devices may be used only during upset or emergency conditions and then [illegible]

[illegible]

§ 61.24 Reporting.

[illegible]

(a) [illegible] emission control [illegible]

(b) [illegible] to [illegible] drop [illegible] fabric filter [illegible] water [illegible]

(c) If the fabric filter device uses a woven fabric, the actual permeability in ft³/min./ft², and if the fabric is synthetic, indicate whether the fill yarn is [illegible] spun.

(d) If the fabric filter device utilizes a felted fabric, the density in oz/yd², the minimum thickness in inches, and the airflow permeability in ft³/min./ft².

(e) Such information shall accompany the information required by § 61.10. The appropriate form is contained in appendix A to this part.

Subpart C—National Emission Standard for Beryllium

§ 61.30 Applicability.

The provisions of this subpart are applicable to the following stationary sources:

(a) Extraction plants, ceramic plants, foundries, incinerators, and propellant plants which process beryllium ore, beryllium, beryllium oxide, beryllium alloys, or beryllium-containing waste.

(b) Machine shops which process beryllium, beryllium oxide, or any alloy when such alloy contains more than 5 percent beryllium by weight.

§ 61.31 Definitions.

Terms used in this subpart are defined in the act, in subpart A of this part, or in this section as follows:

(a) "Beryllium" means the element beryllium. Where weights or concentrations are specified, such weights or concentrations apply to beryllium only, excluding the weight or concentration of any associated elements.

(b) "Extraction plant" means a facility chemically processing beryllium ore to beryllium metal, alloy, or oxide, or processing [illegible] of the intermediate steps in their [illegible] process.

(c) "Beryllium ore" means any naturally occurring material mined or processed for its beryllium content.

(d) "Machine shop" means a facility performing [illegible] grinding, turning, boring, milling, [illegible] sawing, electrochemical machining, etching, or other similar operations.

(e) "Ceramic plant" means a manufacturing plant producing ceramic [illegible]

(f) "Foundry" means a foundry engaged in the melting or casting of beryllium metal or alloy.

(g) "Beryllium-containing waste" means material contaminated with beryllium and/or beryllium compounds used or generated during any process or operation performed by a source subject to this subpart.

(h) "Incinerator" means any furnace used in the [illegible] of combustible [illegible] primary purpose of [illegible] the volume of the waste by removing combustible [illegible]

(i) "Propellant plant" means a facility [illegible] chemically compound [illegible] combustion to provide [illegible]

(j) "Beryllium alloy" means any metal to which beryllium has been added in order to increase its beryllium content to [illegible] more than 0.1 percent by weight.

(k) "Propellant plant" means any facility engaged in the mixing, casting, or machining of propellant.

§ 61.32 Emission standard.

(a) Emissions to the atmosphere from stationary sources subject to the provisions of this subpart shall not exceed 10 grams of beryllium over a 24-hour period, except as provided in paragraph (b) of this section.

(b) Rather than meet the requirement of paragraph (a) of this section, an owner or operator may request approval from the Administrator to meet an ambient concentration limit on beryllium in the vicinity of the stationary source of 0.01 μg/m³, averaged over a 30-day period.

(1) Approval of such requests may be granted by the Administrator provided that:

(i) At least 2 years of data is available which in the judgment of the Administrator demonstrates that the future ambient concentrations of beryllium in the vicinity of the stationary source will not exceed 0.01 μg/m³, averaged over a 30-day period. Such 2-year period shall be the 2 years ending 30 days before the effective date of this standard.

(ii) The owner or operator requests such approval in writing within 30 days after the effective date of this standard.

(iii) The owner or operator submits a report to the Administrator within 45 days after the effective date of this standard which report includes the following information:

(a) Description of sampling method including the method and frequency of collection.

(b) Method of sample analysis.

(c) Averaging technique for demonstrating 30-day average concentrations.

(d) Number, identity, and location (address, coordinates, or distance and bearing from plant) of sampling sites.

(e) Ground elevations and height above ground of sampling inlets.

(f) Plant and sampling area plot showing emission points and sampling sites. Topographic features significantly affecting dispersion, including [illegible] building heights and locations shall be [illegible]

(g) Information necessary for estimating dispersion, including stack height, inside diameter, exit gas temperature, exit velocity or flow rate, and beryllium concentration.

(h) A description of data and procedures (methods or models) used to design the air sampling network (i.e., number and location of sampling sites).

[illegible] stationary source for the 3-year period specified in paragraph (b)(1) of this section. This data shall be presented chronologically and include the beryllium concentration and location of each individual sample taken by the network and the corresponding 30 day average beryllium concentration.

[illegible] reporting such [illegible] will notify the Administrator in writing whether such [illegible] prior to demonstrating compliance with the provisions of paragraph (b) of this section, the Administrator will consult with representatives of the [illegible] source for which the demonstration report was submitted.

(c) The burning of beryllium and/or beryllium-containing waste, except propellants is prohibited except in incinerators, emissions from which must comply with the standard.

§ 61.33 Stack sampling.

(a) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator required to comply with § 61.32(a) shall test emissions from his source.

(1) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(2) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(b) The Administrator shall be notified at least 30 days prior to an emission test so that he may at his option observe the test.

(c) Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which will occur in any 24-hour period. Where emissions depend upon the relative frequency of operation of different types of processes, operating hours, operating capacities, or other factors, the calculation of maximum 24-hour-period emissions will be based on that combination of factors which is likely to occur during the subject period and which result in the maximum emissions. No changes in the operation shall be made which would potentially increase emissions above that determined by the most recent source test, until a new emission level has been estimated by calculation and the results reported to the Administrator.

(d) All samples shall be analyzed and beryllium emissions shall be determined within 30 days after the source test. All determinations shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(e) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

§ 61.34 Air sampling.

(a) Stationary sources subject to § 61.32(b) shall locate air sampling sites [illegible] located to provide maximum as is calculated to detect maximum concentrations of beryllium in the ambient air.

(b) All monitoring sites shall be operated continuously except for a reasonable time allowance for instrument maintenance and calibration, for changing filters, or for replacement of equipment [illegible] major repair.

(c) Filters shall be analyzed and concentrations calculated within 30 days after filters are collected. Records of concentrations at all sampling sites and other data used to determine such concentrations shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(d) Concentrations measured at all sampling sites shall be reported to the Administrator every 30 days by a registered letter.

(e) The Administrator may at any time require changes in, or expansion of, the sampling network.

Subpart D—National Emission Standard for Beryllium Rocket Motor Firing

§ 61.40 Applicability.

The provisions of this subpart are applicable to rocket motor test sites.

§ 61.41 Definitions.

Terms used in this subpart are defined in the Act, in Subpart A of this part, or in this section as follows:

(a) "Rocket motor test site" means any building, structure, facility, or installation where the static test firing of a beryllium rocket motor and/or the disposal of beryllium propellant is conducted.

(b) "Beryllium propellant" means any propellant incorporating beryllium.

§ 61.42 Emission standard.

(a) Emissions to the atmosphere from rocket-motor test sites shall not cause time-weighted atmospheric concentrations of beryllium to exceed 20 micrograms minutes per cubic meter of air within the limits of 10 to 60 minutes, accumulated during any 2 consecutive weeks, in any area in which an effect adverse to public health could occur.

(b) If combustion products from the firing of beryllium propellant are collected in a closed tank, emissions from such tank shall not exceed 2 grams per hour and a maximum of 10 grams per day.

§ 61.43 Emission testing—rocket firing or propellant disposal.

(a) Ambient air concentrations shall be measured during and after firing of a rocket motor or propellant disposal and in such a manner that the effect of these emissions can be compared with the standard. Such sampling techniques shall be approved by the Administrator.

(b) All samples shall be analyzed and results shall be calculated within 30 days after samples are taken and before any subsequent rocket motor firing or propellant disposal at the given site. All results shall be reported to the Administrator by a registered letter dispatched [illegible] determination of such results.

(c) Records of air sampling test results and other data needed to determine integrated intermittent concentrations shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(d) The Administrator shall be notified at least 30 days prior to an air sampling test so that he may at his option observe the test.

§ 61.44 Stack sampling.

(a) Sources subject to § 61.42(b) shall be continuously sampled during release of combustion products from the tank, in such a manner that compliance with the standard can be determined. The provisions of § 61.14 shall apply.

(b) All samples shall be analyzed, and beryllium emissions shall be determined within 30 days after samples are taken and before any subsequent rocket motor firing or propellant disposal at the given site. All determinations shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determinations.

(c) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(d) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

Subpart E—National Emission Standard for Mercury

§ 61.50 Applicability.

The provisions of this subpart are applicable to those stationary sources which process mercury ore to recover mercury, and to those which use mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide.

§ 61.51 Definitions.

Terms used in this subpart are defined in the Act, in subpart A of this part, or in this section as follows:

(a) "Mercury" means the element mercury, including any associated chemicals, and includes mercury in particulates, vapors, aerosols, and compounds.

(b) "Mercury ore" means a mineral mined specifically for its mercury content.

(c) "Mercury ore processing facility" means a facility processing mercury ore to obtain mercury.

(d) "Condenser stack gases" means the gaseous effluent evolved from the stack of processes utilizing heat to extract mercury metal from mercury ore.

(e) "Mercury chlor-alkali cell" means a device which is basically comprised of an electrolyzer section and a denuder (decomposer) section and utilizes mercury to produce chlorine gas, hydrogen gas, and alkali metal hydroxide.

(f) "Mercury chlor-alkali electrolyzer" means an electrolytic device which is part of a mercury chlor-alkali cell and utilizes a flowing mercury cathode to produce chlorine gas and alkali metal amalgam.

§ 61.52 Emission standard.

[illegible] to the atmosphere from stationary sources subject to the provisions of this subpart shall not exceed 2300 grams of mercury per 24 hour period.

§ 61.53 Stack sampling.

(a) Mercury ore processing facility.

(1) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator processing mercury ore shall test emissions from his source.

(i) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(ii) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(2) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

(3) Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which will occur in a 24-hour period. No changes in the operation shall be made, which would potentially increase emissions above that determined by the most recent source test, until the new emission level has been estimated by calculation and the results reported to the Administrator.

(4) All samples shall be analyzed, and mercury emissions shall be determined within 30 days after the source test. Each determination will be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(5) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available for inspection by the Administrator for a minimum of 2 years.

(b) Mercury chlor-alkali plant—hydrogen and end-box ventilation gas streams.

(1) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator employing mercury chlor-alkali cell(s) shall test emissions from his source.

(i) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(ii) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(2) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

(3) Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which will occur in a 24-hour period. No changes in the operation shall be made, which would potentially increase emissions above that determined by the most recent source test, until the new emission level has been estimated by calculation and the results reported to the Administrator.

(4) All samples shall be analyzed and mercury emissions shall be determined within 30 days after the source test. All the determinations will be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(5) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(c) [illegible]

(1) [illegible]

(2) [illegible] or operation [illegible] from the [illegible] of [illegible].

(3) [illegible] in lieu of any [illegible] requirements under [illegible] startup date provisions [illegible].

(d) Waiver of emission tests.

(1) The Administrator will grant a waiver of emission testing of any mercury cell chlor-alkali plant which is shut down on or before [illegible] and which will remain shut down until [illegible] and which will not resume operation unless the Administrator has been notified of the intent to resume operation and emission tests are conducted during such operation.

(2) The Administrator will grant a waiver of emission testing of any mercury ore processing facility which is shut down on or before [illegible] and which will remain shut down until [illegible] and which will not resume operation unless the Administrator has been notified of the intent to resume operation and emission tests are conducted during such operation.

(3) Any owner or operator applying for a waiver of emission testing shall include with his application sufficient information to document the irrevocable nature and extent of the shutdown. The Administrator will evaluate the application according to criteria such as the reason for shutdown, the extent of equipment removal or dismantling, and restrictions against future operation. Any shutdown for which a waiver is granted shall be recorded in the permanent plant record. Any owner or operator receiving a waiver shall provide notice of the date and time he plans to terminate the shutdown status of the facility at least 30 days prior to that date and time. Any notice of termination of shutdown status shall serve to cancel the waiver granted for that facility.

(4) Any owner or operator who has been granted a waiver of emission testing under this paragraph shall forfeit the waiver if he fails to give the notice of termination of shutdown status required by subparagraph (3) of this paragraph.

(e) Waiver of tests in the case of a source which did not have an initial startup date prior to the effective date.

(1) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

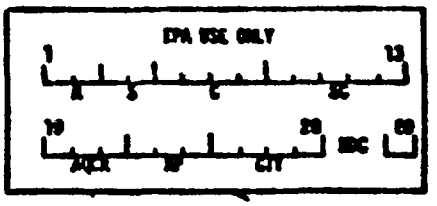
(2) An owner or operator may carry out approved design, maintenance, and housekeeping practices. A list of approved design, maintenance, and housekeeping practices may be obtained from the Administrator.

APPENDIX A

National Emission Standards for Hazardous Air Pollutants

Compliance Status Information

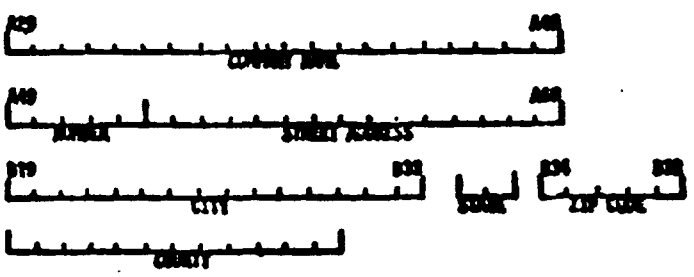
1. SOURCE REPORT



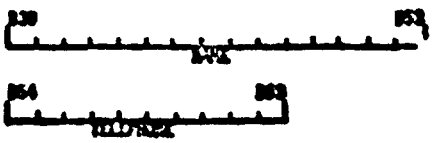
Instructions: Owners or operators of sources of hazardous pollutants subject to the National Emission Standards for Hazardous Air Pollutants are required to submit the information contained in Section I to the appropriate Environmental Protection Agency Regional Office before (date which is 90 days after the standards are promulgated). A listing of regional offices is provided in § 61.04.

A. SOURCE INFORMATION

1. Identification/Location - Indicate the name and address of each source.



2. Contact - Indicate the name and telephone number of the owner or operator or other responsible official whom EPA may contact concerning this report.



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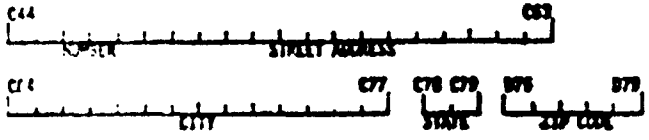
3. Source Description - Briefly state the nature of the source (e.g., "Chlor-alkali Plant", or "Machine Shop").

4. Alternative Mailing Address - Indicate an alternative mailing address if correspondence is to be directed to a location different than that specified above.



5. Compliance Status - The emissions from this source can cannot meet the emission limitations contained in the National Emission Standards on or before (date which is 90 days after the promulgation of the standard).

Signature of owner, operator or other responsible official

NOTE: If the emissions from the source will exceed those limits set by the National Emission Standards for Hazardous Air Pollutants, the source will be in violation and subject to Federal enforcement action unless granted a waiver of compliance by the Administrator of the Environmental Protection Agency. The information needed for such waivers is listed in Section II of this form.

B. PROCESS INFORMATION. Part B should be completed separately for each point of emission for each hazardous pollutant.

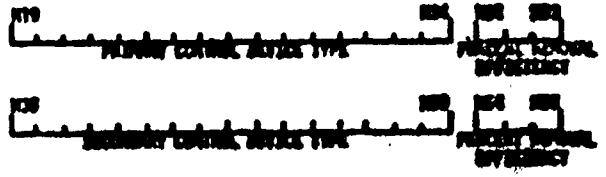
1. Process Description - Provide a brief description of each process (e.g., "Hydrogen and heat" in a mercury chlor-alkali plant, "grinding machine" in a beryllium machine shop). Use additional sheets if necessary.

2. Pollutant Emitted - Indicate the type of hazardous pollutant emitted by the process. Indicate "AS" for asbestos, "BE" for beryllium, or "HG" for mercury.

3. Amount of Pollutant - Indicate the average weight of the hazardous material named in Item 2 which enters the process in pounds per month (based on the previous twelve months of operation).

4. Control Devices

a. Indicate the type of pollution control devices, if any, used to reduce the emissions from the process (e.g., venturi scrubber, baghouse, wet cyclone) and the estimated percent of the pollutant which the device removes from the process gas stream.



b. Asbestos Emission Control Devices Only

1. If a baghouse is specified in Item 4a give the following information:

- The air flow permeability in cubic feet per minute per square foot of fabric area

Air flow permeability = _____ cfm/ft²

- The pressure drop in inches water gauge across the filter at which the bypass is opened

  Operating pressure drop = _____ inches w.g.

- If the baghouse material contains synthetic fill yarn, check whether this material is wool ☐ or not wool ☐.

  If the baghouse utilizes a felted fabric, give the minimum thickness in inches and the density in ounces per square yard.

  Thickness = _____ inches Density = _____ oz/yd²

11. If a wet collection device is specified in item 4a, give the designed unit contacting energy in inches water gauge.

    Unit contacting energy = _____ inches w.g.

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III. WAIVER REQUESTS

A. WAIVER OF COMPLIANCE. Owners or operators of sources unable to operate in compliance with the National Emission Standards for Hazardous Air Pollutants by the applicable compliance date specified in Subpart A, Section 61.05 of the [illegible] may request a waiver of compliance from the Administrator of the Environmental Protection Agency for the time period necessary to install abatement control devices or make modifications to the source. The Administrator may grant a waiver of compliance with the standard for a period not exceeding two years from the effective date of the respective pollutant standard if he finds that such period is necessary for the installation of controls and that steps will be taken during the period of the waiver to assure that the health of persons will be protected from imminent endangerment.

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...ter of particulate matter. The filter holder must provide a positive seal against leakage from outside or around the filter. A heating system capable of maintaining the filter at a minimum temperature of 250° F should be used to prevent condensation from ambient...

2.1.8 *Barometer.* To measure atmospheric pressure to ... in Hg.

2.2 *Measurement of stack conditions.* Pitot tube, temperature gauge, manometer, and pressure gauge, as specified in Type S, or equivalent, to determine stack pressure, temperature, and velocity over the ranges encountered.

2.2.1 *Differential pressure gauge for pitot tube.* Inclined manometer or equivalent device. One leg should be readable to within 0.01 in. H₂O, the other to within 0.1 in. H₂O. The minimum value should be used if ...

2.2.2 *Temperature gauge.* Any temperature measuring device to measure stack temperature to within 1.5° F.

2.2.3 *Pressure gauge.* Pitot tube and inclined manometer, or equivalent, to measure stack pressure to within 0.1 in Hg.

2.3 *Moisture determination.* Wet and dry bulb thermometers, drying tubes, condensers, or equivalent, to determine stack gas moisture content to within 1 percent.

2.4 *Sample recovery.*—2.4.1 *Leakless glass sample bottles.* 500 ml and 100 ml with Teflon ... tops.

2.4.2 *Graduated cylinder.* 250 ml.

2.4.3 *Plastic jar.* Approximately 500 ml.

Analysis.—3.4.1 *Spectrophotometer.* ... ultraviolet absorbance at 205.7 nm. Perkin ... Model 202, with a cylindrical gas cell ... approximately 1.5 ml, 0.D. = 7 in.) with ... glass windows, and heater cuffs ... or equivalent.

... *gas sampling bottles.* Fisher Scientific ... Ring Bubbler, Catalogue No. ... or equivalent.

... *pipettes.* For measuring the desired ... of sample.

... *flasks.* 50 ml.

... *Stock reagents.*—3.1.1 ... Reagent grade.

... water.—3.1.2 *Potassium* ... *iodate.* 99 percent. Dissolve 900 g ... in distilled water (reagent 3.1.1) ... 1 L.

... *Concentrated sulfuric acid.* Reagent grade, ... *Sodium hydroxide (NaOH) 1.0N.* Dissolve ... NaOH in distilled water (reagent 3.1.1) ... 1 L. Dilute 100 ml of concentrated sodium ... to 1 L with distilled water (reagent 3.1.1).

... *Sodium arsenite.* 0.1N. Dissolve 4.95 g ... arsenite and 5.85 g of sodium chloride in ... distilled water (reagent 3.1.1) and dilute ... 1 L with distilled water (reagent 3.1.1).

... *Hydrochloric acid.* 1.2N. Dilute 100 ml ... concentrated hydrochloric acid to 1 L ... distilled water (reagent 3.1.1).

... *Hydrochloric acid.* 6.0N. Dilute 500 ml ... concentrated hydrochloric acid to 1 L ... distilled water (reagent 3.1.1).

... *Hydrochloric acid.* 0.6N. Dilute 100 ml ... concentrated hydrochloric acid to 1 L ... distilled water (reagent 3.1.1).

... *Hydrochloric acid.* 0.1N. Dilute 25.4 ml of concentrated hydrochloric acid to 1 L with distilled water (reagent 3.1.1).

... *Standard mercury solutions.*—3.4.1 *Stock solution.*—Add 0.1354 g of mercuric chloride to 1 ml of 0.6N hydrochloric acid. After the mercuric chloride has dissolved, add 0.6N hydrochloric acid and adjust the volume to 100 ml. One ml of this solution is equivalent to 1 mg of free mercury.

... *Standard solutions.*—Prepare calibration solutions by serially diluting the stock solution (3.4.1) with 0.6N hydrochloric acid. Prepare solutions at concentrations in the linear working range for the instrument to be used. Solutions of 0.2 μg/ml, 0.6 μg/ml and 0.6 μg/ml have been found acceptable for most instruments. Store all solutions in glass-stoppered, glass bottles. These solutions should be stable for at least 2 months; however, periodic checks should be performed to insure quality.

4. *Procedure.*—4.1 *Guidelines for source testing* are detailed in the following sections. These guidelines are generally applicable; however, most sample sites differ to some degree and temporary alterations such as ... extensions or alterations often are required to secure the best possible sample site. Further, since mercury is hazardous, care should be taken to minimize exposure. Finally, since the total quantity of mercury to be collected generally is small, the test ... be carefully conducted to prevent ... contamination or loss of sample.

4.2 *Selection of a sampling site and minimum number of traverse points.*

4.2.1 *Select a suitable sampling site that is as close to a particulate as the point of atmospheric emission. If practical, gaseous ... that is 1 foot in diameter should not be sampled.*

4.2.2 *The sampling site should be at least ... stack or duct diameters downstream and ... diameters upstream from a ... disturbance such as a bend, expansion or ... Further, the minimum cross-sectional ... site may be a duct diameter from the ... following equation:*

$$D_e = \frac{2LW}{L + W} \quad \text{eq 101-1}$$

where:

D_e = Equivalent diameter
L = Length.
W = Width.

4.2.3 *When the above sampling site criteria can be met, the minimum number of traverse points is four (4) for stacks 1 foot in diameter or less, eight (8) for stacks larger than 1 foot but 2 feet in diameter or less, and twelve (12) for stacks larger than 2 feet.*

4.2.4 *If the sampling situations may render the above sampling site criteria impractical. When this is the case, choose a convenient sampling location and use figure 101-3 to determine the minimum number of traverse points. However, use figure 101-3 only for stacks 1 foot in diameter or larger.*

4.2.5 *To use figure 101-3, first measure the distance from the chosen sampling location to the nearest upstream and downstream disturbances. Divide this distance by the diameter or equivalent diameter to determine the distance in terms of pipe diameters. Determine the corresponding number of traverse points for each distance from figure 101-3. Select the higher of the two numbers of traverse points, or a greater value, such that for circular stacks the number is a multiple of four, and for rectangular stacks the number follows the criteria of section 4.2.3.*

4.2.6 *If a selected sampling point is closer than 1 inch from the stack wall, adjust the location of that point to ensure that the sample is taken at least 1 inch away from the wall.*

4.3 *Gross particulate loading and location of traverse points.*

4.3.1 *For circular stacks locate the traverse points on at least two diameters according to figure 101-4 and table 101-1. The diameters used shall divide the stack cross section into equal parts.*

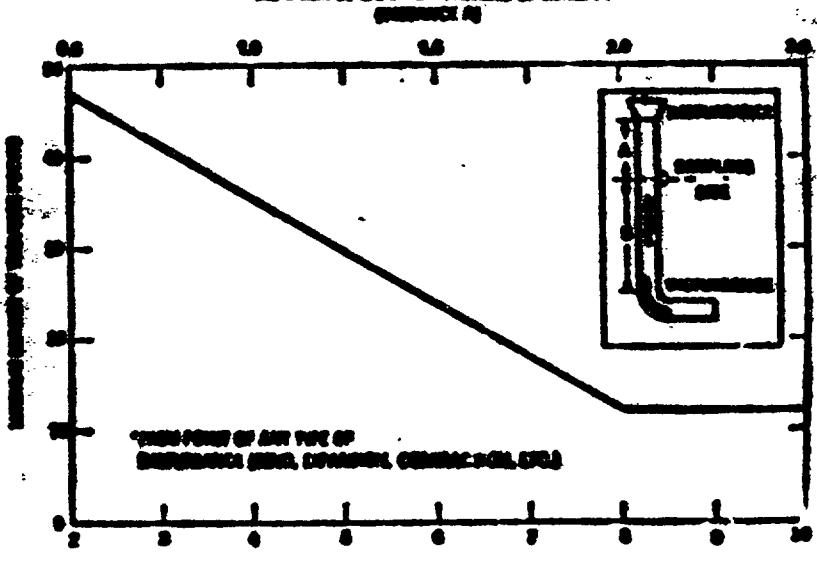

Figure 101-3. Minimum number of traverse points.

Table 101-1. Location of traverse points in circular stacks
(Percent of stack diameter from inside wall to traverse point)

Traverse point number on a diameter	Number of traverse points on a diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.3	2.5	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.7	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.5	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.5	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.3	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.5	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.5	36.6	28.3	23.6	20.4	18.0	16.1
8				96.7	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.1	23.0
10					97.5	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.3	76.4	69.6	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	86.4	79.6	73.9	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.6
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

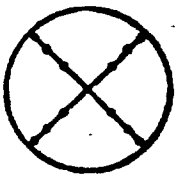

Figure 101-1. Cross section of circular stack showing location of traverse points in equivalent rectangles.

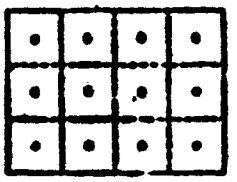

Figure 101-2. Cross section of rectangular stack divided into 12 equal areas, with traverse points at centroid of each area.

4.5.2 For rectangular stacks divide the cross section into as many equal rectangular areas as traverse points, such that the ratio of the length to the width of the elemental areas is between one and two. Locate the traverse points at the centroid of each equal area according to Figure 101-2.

4.6 Measurement of gas velocities.

4.6.1 Use the apparatus as shown in Figure 101-3, Make sure all connections are tight and leak-free. Measure the velocity head and temperature at the traverse points specified by section 4.5 of this 4.5.

4.6.2 Measure the static pressure in the stack.

4.6.3 Determine the stack gas moisture.

4.6.4 Determine the stack gas molecular weight from the measured moisture content and knowledge of the expected gas stream composition. A standard Orsat analysis has been found adequate in combustion sources. In all cases, sound engineering judgment should be used.

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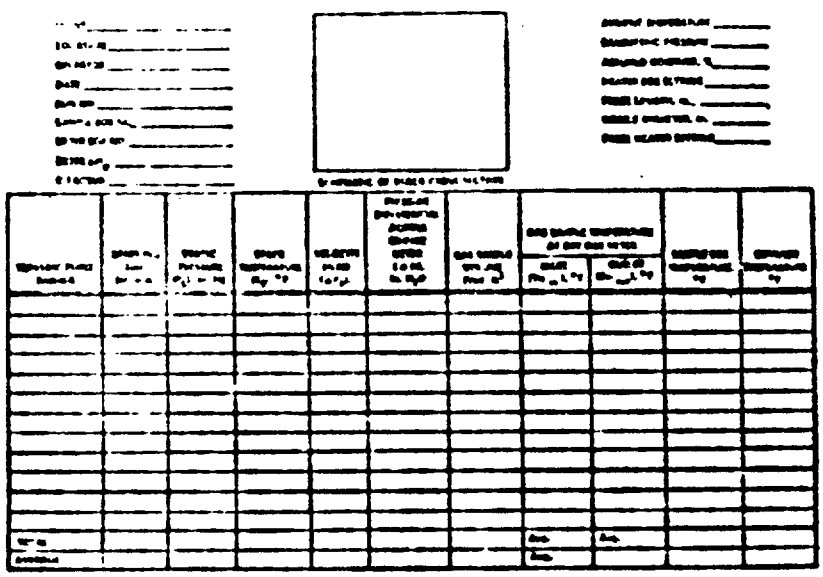

Figure 101-6. Field data

4.6.3 To begin sampling, position the nozzle at the first traverse point with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. Sample for at least 5 minutes at each traverse point; sampling time must be the same for each point. Maintain isokinetic sampling throughout the sampling period. Nomographs which aid in the rapid adjustment of the sampling rate without other computations are in APTD-0576 and are available from commercial suppliers. Note the standard nomographs are applicable only for type S pitot tubes and air or a stack gas with an equivalent density. Contact EPA or the sampling train supplier for instructions when the standard nomograph is not applicable.

4.6.4 Turn off the pump at the conclusion of each run and record the final readings. Immediately remove the probe and nozzle from the stack and handle in accordance with the sample recovery process described in section 4.7.

4.7 Sample recovery.

4.7.1 All glass storage bottles and the graduated cylinder must be precleaned as in section 4.5.1). This operation should be performed in an area free of possible mercury contamination. Industrial laboratories and ambient air around mercury-using facilities are not normally free of mercury contamination. When the sampling train is moved, care must be exercised to prevent breakage and contamination.

4.7.2 Disconnect the probe from the impinger train. Place the contents (measured to ±1 ml) of the first three impingers into a 500 ml sample bottle. Rinse the probe and all glassware between it and the back half of the third impinger with two 50 ml portions of 0.1M HCl solutions. Add these rinses to the first sample bottle. For a blank, place 50 ml of the 0.1M HCl in a 100 ml sample bottle. If used, place the filter along with 100 ml of 0.1M HCl in another 100 ml sample bottle. Retain a filter blank. Place the silica gel in the plastic jar provided and secure all containers for shipment. If an additional test is desired, the glassware can be carefully dried or rinsed with distilled water and reassembled. However, if the glassware is to be out of use more [illegible] 2 d [illegible]

4.8 Analysis.

4.8.1 [illegible] the data to [illegible]

4.8.2 [illegible] the sample [illegible] to 50 ml with distilled water. Adjust the volume to 50 ml with [illegible] if required. Add 5 ml of 10 N sodium hydroxide, cap tube with a clean glass stopper and shake vigorously. Prolonged, vigorous shaking at this point is necessary to obtain an accurate analysis. Add 5 ml of the reducing agent (reagent 3.3.2), cap tube with a clean glass stopper and shake vigorously and immediately in sample line.

4.8.4 Mercury determination.—After the system has been stabilized, prepare samples from the sample bottle according to section 4.8.2. Aerate the sample until a maximum peak height is reached on the recorder. The mercury content is determined by comparing the peak heights of the samples to the peak heights of the calibration solutions. If collected samples are out of the linear range, the samples should be diluted. Prepare a blank from the 100 ml bottle according to section 4.8.3 and analyze to determine the reagent blank mercury level.

5. Calibration.—5.1 Sampling train.—5.1.1 Use standard methods and equipment as detailed in APTD-0576 to calibrate the rate meter, pitot tube, dry gas meter, and probe heater (if used). Recalibrate prior to each test series.

5.2 Analysis.—5.2.1 Prepare a calibration curve for the spectrophotometer using the standard mercury solutions. Plot the peak heights read on the recorder versus the concentrations of mercury in the standard solutions. Standards should be interspersed with the samples since the calibration can change slightly with time. A new calibration curve should be prepared for each new set of samples run.

6. Calculations.—6.1 Average dry gas meter temperature, stack temperature, stack pressure and average orifice pressure drop. See data sheet (fig. 101-6).

6.2 Dry gas volume.—Correct the sample volume measured by the dry gas meter to stack conditions by using equation 101-2.

$$V_{m_s} = V_m \frac{T_s}{T_m} \frac{\left(P_{bar} + \frac{\Delta H}{13.6}\right)}{P_s} \qquad \text{eq. 101-2}$$

where:

V_{m_s} = Volume of gas sample through the dry gas meter (stack conditions), ft³.

V_m = Volume of gas sample through the dry gas meter (meter conditions), ft³.

T_s = Average stack temperature, °R.

T_m = Average dry gas meter temperature, °R.

P_{bar} = Barometric pressure at the orifice meter, in.Hg.

ΔH = Average pressure drop across the orifice meter, in. H$_2$O.

13.6 = Specific gravity of mercury.

P_s = Stack pressure, $P_{bar} \pm$ static pressure, in.Hg.

6.3 *Volume of water vapor.*

$$V_{w_s} = K_w V_{l_c} \frac{T_s}{P_s} \quad \text{eq. 101-3}$$

where:

V_{w_s} = Volume of water vapor in the gas sample (stack conditions), ft³.

K_w = 0.00267 [illegible], when these units are used.

V_{l_c} = Total volume of liquid collected in impingers and silica gel (see figure 101-7), ml.

T_s = Average stack gas temperature, °R.

P_s = Stack pressure, [illegible] static pressure, in. Hg [illegible].

$$V_{total} = V_{m_s} + V_{w_s} \quad \text{eq. 101-4}$$

where:

V_{total} = Total volume of gas sample (stack conditions), ft³.

V_{m_s} = Volume of gas through gas meter (stack conditions), ft³.

V_{w_s} = Volume of water vapor in gas sample (stack conditions), ft³.

	Volume of liquid water collected	
	Impinger volume, ml	Silica gel weight, g
Final		
Initial		
Liquid collected		
Total volume collected		g ml

[illegible]

Figure 101-7. Analytical data.

6.4 Stack gas velocity. Use equation 101-5 to calculate the stack gas velocity.

$$(v_s)_{avg} = K_p C_p (\sqrt{\Delta P})_{avg} \sqrt{\frac{(T_s)_{avg}}{P_s M_s}} \quad \text{eq. 101-5}$$

where:

[illegible]

Figure 101-8 shows a sample recording sheet for velocity traverse data. Use the averages in the last two columns of figure 101-8 to determine the average stack gas velocity from equation 101-5.

6.5 Mercury collected. Calculate the total weight of mercury collected by using equation 101-6.

[illegible] eq. 101-6

where:

W_t = total weight of mercury collected, µg.

PLANT__________

DATE__________

RUN NO.__________

STACK DIAMETER, in.__________

BAROMETRIC PRESSURE, in. Hg__________

STATIC PRESSURE IN STACK (P_g), in. Hg.__________

OPERATORS__________

SCHEMATIC OF STACK CROSS SECTION

Traverse point number	Velocity head, in. H_2O	$\sqrt{\Delta p}$	Stack Temperature (T_s), °F
AVERAGE			

Figure 101-8. Velocity traverse data.

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[illegible]

eq. 101-7

Where:

M = Rate of emission, g/day.
K_m = Units conversion factor, [illegible].
V_{msd} = Total volume of gas sample (dry conditions), dscf.
$(p_s)_{avg}$ = Average stack gas velocity, feet per second.
A_n = Stack area, ft².

6.8 Isokinetic variation (comparison of velocity of gas in probe tip to stack velocity).

$$I = \frac{100 V_{msd}}{A_n \theta (v_s)_{avg}} \quad \text{eq. 101-8}$$

Where:

I = Percent of isokinetic sampling.
V_{msd} = Total volume of gas sample (dry conditions), dscf.
A_n = Probe tip area, ft².
θ = Sampling time, sec.
$(v_s)_{avg}$ = Average stack gas velocity, feet per second.

7. *Evaluation of results*—7.1 *Determination of compliance*—7.1.1 Each performance test shall consist of three repetitions of the applicable test method. For the purpose of determining compliance with an applicable national emission standard, the average of results of all repetitions shall apply.

7.2 *Acceptable isokinetic results*—7.2.1 The following range sets the limit on acceptable isokinetic sampling variation:

If $90\% \leq I \leq 110\%$, the results are acceptable; otherwise, reject the test and repeat.

8. *References*.—8. Addendum to Specifications for Incinerator Testing at Federal Facilities. PHS, NCAPC, Dec. 6, 1967.

2. Determining Dust Concentration in a Gas Stream. ASME Performance Test Code No. 27. New York, N.Y., 1957.

3. Devorkin, Howard, et al., Air Pollution Source Testing Manual. Air Pollution Control District, Los Angeles, Calif., Nov. 1963.

4. Hatch, W. R. and W. L. Ott, "Determination of Sub-Microgram Quantities of Mercury by Atomic Absorption Spectrophotometry." Anal. Chem., 40:2085-87, 1968.

5. Mark, L. S., Mechanical Engineers' Handbook, McGraw-Hill Book Co., Inc., New York, N.Y., 1951.

6. Martin, Robert M., Construction Details of Isokinetic Source Sampling Equipment, Environmental Protection Agency, APTD-0581.

7. Methods for Determination of Velocity, Volume, Dust and Mist Content of Gases. Western Precipitation Division of Joy Mfg. Co., Los Angeles, Calif. Bul. WP-50, 1968.

8. Perry, J. H., Chemical Engineers' Handbook. McGraw-Hill Book Co., Inc., New York, N.Y., 1960.

9. Rom, Jerome J., Maintenance, Calibration, and Operation of Isokinetic Source Sampling Equipment, Environmental Protection Agency, APTD-0576.

10. Shigehara, R. T., W. F. Todd, and W. S. Smith, Significance of Errors in Stack Sampling Measurements. Presented at the Annual Meeting of the Air Pollution Control Association, St. Louis, Mo., June 11-15, 1972.

11. [illegible] Presented at the Annual Meeting of the Air Pollution Control Association, St. Louis, Mo., June 11-15, 1972.

12. [illegible] Presented at the Annual Meeting of the Air Pollution Control Association, St. Louis, Mo., June 11-15, 1972.

13. Specifications for Incinerator Testing at Federal Facilities. NCAPC, 1967.

14. Standard Method for Sampling Stacks for Particulate Matter. In: 1971 Book of ASTM Standards, part 23. Philadelphia, 1971. ASTM Designation D 2928-71.

15. Vennard, J. K., Elementary Fluid Mechanics. John Wiley and Sons, Inc., New York, 1947.

METHOD 102—REFERENCE METHOD FOR DETERMINATION OF PARTICULATE AND GASEOUS MERCURY EMISSIONS FROM STATIONARY SOURCES (INTERNAL CIRCULATION)

1. *Principle and applicability*—1.1 *Principle*. [illegible]

2. *Apparatus*—2.1 *Sampling train*. A schematic of the sampling train used by EPA is shown in figure 102-1. Commercial models of this train are available, although complete construction details are described in APTD-0581,[1] and operating and maintenance procedures are described in APTD-0576. The components essential to this sampling train are the following:

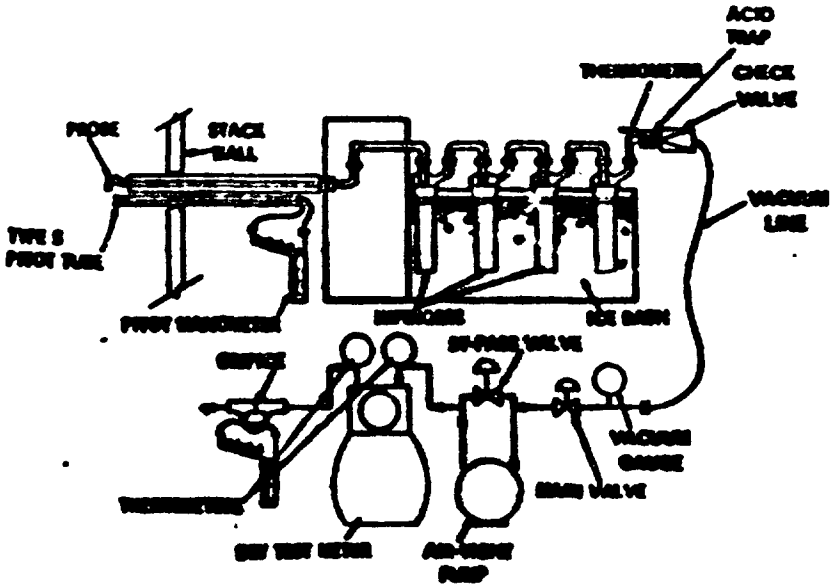

Figure 102-1. Mercury sampling train

2.1.1 *Nozzle*. Stainless steel or glass with sharp, tapered leading edge.

2.1.2 *Probe*. Stainless[2] glass.

2.1.3 *Pitot tube*. Type S (figure 102-2), or equivalent, with a coefficient within 5 percent over the working range, attached to probe to monitor stack gas velocity.

2.1.4 *Impingers*. Four Greenburg-Smith impingers connected in series with glass ball joints. The first, third, and fourth impingers may be modified by replacing the tip with one-half inch ID glass tube extending to one-half inch from the bottom of the flask.

2.1.5 *Acid trap*. Mine safety appliances air line filter, catalogue No. 89407, with acid absorbing cartridge and suitable connections, or equivalent.

2.1.6 *Metering system*. Vacuum gage, leak-free pump, thermometers capable of measuring temperature to within 5°F, dry gas meter with 2 percent accuracy, and related equipment, described in APTD-0581, to maintain an isokinetic sampling rate and to determine sample volume.

2.1.7 *Barometer*. To measure atmospheric pressure to ± 0.1 in Hg.

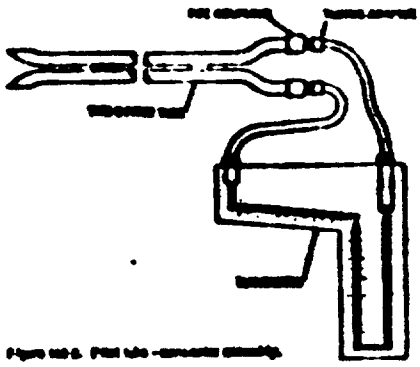

Figure 102-2. Pitot tube—[illegible] assembly.

[1] These documents are available for a nominal cost from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Va. 22151.

[2] Mention of trade names or commercial products does not constitute endorsement by the Environmental Protection Agency.

2.2 [illegible] conditions [illegible] temperature, and [illegible] 2.1. Field data [illegible] 5, of [illegible] not to [illegible] 5 percent [illegible].

2.3 [illegible] Incident [illegible] pressure [illegible] a pitot [illegible] measurements [illegible] and be used [illegible] method.

2.4 [illegible] range. Any temperature [illegible] stack temperature [illegible].

2.5 [illegible] and indicator [illegible] to measure [illegible] to within 0.1 in. Hg.

2.6 [illegible] drying [illegible] to determine [illegible] moisture content in hydrogen [illegible] effluent.

2.7 [illegible] assembly—2.7.1 *Impingers.* Glass [illegible] bottles, 500 ml and 100 ml, with Teflon-lined tops.

2.7.2 *Graduated cylinder.* 250 ml.

2.7.3 *Plastic jar.* Approximately 300 ml.

2.8 *Analysis*—2.8.1 *Spectrophotometer.* To measure absorbance at 2537 nm. Perkin Elmer model 303, with a cylindrical gas cell (approximately 1.5 in od x 7 in) with quartz glass windows, and hollow cathode source, or equivalent.

2.8.2 *Gas bubbling bubbler.* Tudor Scientific Co. Bubbling Bubbler, catalogue No. TP-1150, or equivalent.

2.8.3 *Recorder.* To match output of spectrophotometer.

3. *Reagents*—3.1 *Stock reagents*—3.1.1 *Potassium iodide.* Reagent grade.

3.1.2 *Distilled water.*

3.1.3 *Potassium iodide solution, 25 percent.*—Dissolve 250 g of potassium iodide (reagent 3.1.1) in distilled water and dilute to 1 l.

3.1.4 *Hydrochloric acid.* Concentrated.

3.1.5 *Potassium iodate.* Reagent grade.

3.1.6 *Iodine monochloride (ICl) 1.0N.* To 900 ml of 25 percent potassium iodide solution (reagent 3.1.3), add 100 ml of concentrated hydrochloric acid. Cool to room temperature. With vigorous stirring, slowly add 126 g of potassium iodate and continue stirring until all free iodine has disappeared to give a clear orange-red solution. Cool to room temperature and dilute to 1.000 ml with distilled water. The solution should be kept in amber bottles to prevent deprotonation.

3.1.7 *Sodium hydroxide pellets.* Reagent grade.

3.1.8 *Nitric acid.* Concentrated.

3.1.9 *Hydroxylamine sulfate.* Reagent grade.

3.1.10 *Sodium chloride.* Reagent grade.

3.1.11 *Mercuric chloride.* Reagent grade.

3.2 *Sampling*—3.2.1 *Absorbing solution, 0.1N ICl.* Dilute 100 ml of the 1.0N ICl stock solution (reagent 3.1.6) to 1 l with distilled water. The solution should be kept in glass bottles to prevent degradation. This reagent should be stable for at least 6 months; however, periodic checks should be performed to insure quality.

3.2.2 *Wash acid, 1:9 V/V nitric acid-water.*

3.2.3 *Distilled, deionized water.*

3.2.4 *Silica gel.* Indicating type, 6 to 16 mesh, dried at 350°F for 2 hours.

3.3 *Analysis*—3.3.1 *Sodium hydroxide, 1.0N.* Dissolve 400 g of sodium hydroxide pellets in distilled water and dilute to 1 l.

3.3.2 *Buffering agent. 12 percent hydroxylamine sulfate, 12 percent sodium chloride.* To 60 ml of distilled water, add 12 g of hydroxylamine sulfate and 12 g of sodium chloride. Dilute to 100 ml. This quantity is sufficient for 20 analyses and must be prepared daily.

3.3.3 *Aeration gas.* Zero grade air.

3.3.4 *Hydrochloric acid, 6.0N.* Dilute 25.5 ml of concentrated hydrochloric acid to 1 l with distilled water.

3.4 *Standard solutions.* [illegible] solution [illegible] 6.0 N hydrochloric acid [illegible] After the last [illegible] 6.0 N hydrochloric acid and adjust the volume to 100 ml. One ml of this solution is equivalent to 1 mg of free mercury.

3.4.2 *Standard mercuric chloride calibration solutions.* Prepare calibration solutions for serially diluting the stock solution (3.4.1) with 0.1N hydrochloric acid. Prepare solutions at concentrations in the linear working range for the instrument to be used. Solutions of 0.2 μg/ml, 0.4 μg/ml and 0.6 μg/ml have been found acceptable for most instruments. Store all solutions in glass-stoppered, glass bottles. These solutions should be stable for at least 2 months; however, periodic checks should be performed to insure quality.

4. *Procedure.* 4.1 *Guidelines for source testing* are detailed in the following sections. These guidelines are generally applicable; however, most sample sites differ to some degree and temporary alterations such as plant extensions or expansions often are required to insure the best possible sample site. Further, since mercury is hazardous, care should be taken to minimize exposure. Finally, since the total quantity of mercury to be collected generally is small, the test must be carefully conducted to prevent contamination or loss of sample.

4.2 *Selection of a sampling site and minimum number of traverse points.*

4.2.1 *Select a suitable sampling site that is as close as is practicable to the point of atmospheric emission. If possible, stacks smaller than 1 foot in diameter should not be sampled.*

4.2.2 *The sampling site [illegible] the stack [illegible] and two diameters [illegible] from any [illegible] such as a bend, expansion [illegible] For [illegible] determine an equivalent diameter from the following equation:*

$$D_e = \frac{2LW}{L+W} \qquad \text{eq 102}$$

where:

D_e = equivalent diameter.
L = length
W = width

4.2.3 *When the above sampling site criteria can be met, the minimum number of traverse points is four (4) for stacks 1 foot in diameter or less, eight (8) for stacks larger than 1 foot but 2 feet in diameter or less, and twelve (12) for stacks larger than 2 feet.*

4.2.4 *Some sampling situations may render the above sampling site criteria impractical. When this is the case, choose a convenient sampling location and use figure 102-3 to determine the minimum number of traverse points. However, use figure 102-3 only for stacks 1 foot in diameter or larger.*

4.2.5 *To use figure 102-3, first measure the distance from the chosen sampling location to the nearest upstream and downstream disturbances. Divide this distance by the diameter or equivalent diameter to determine the distance in terms of pipe diameters. Determine the corresponding number of traverse points for each distance from figure 102-3. Select the higher of the two numbers of traverse points, or a greater value, such that for circular stacks the number is a multiple of four, and for rectangular stacks the number follows the criteria of section 4.2.6.*

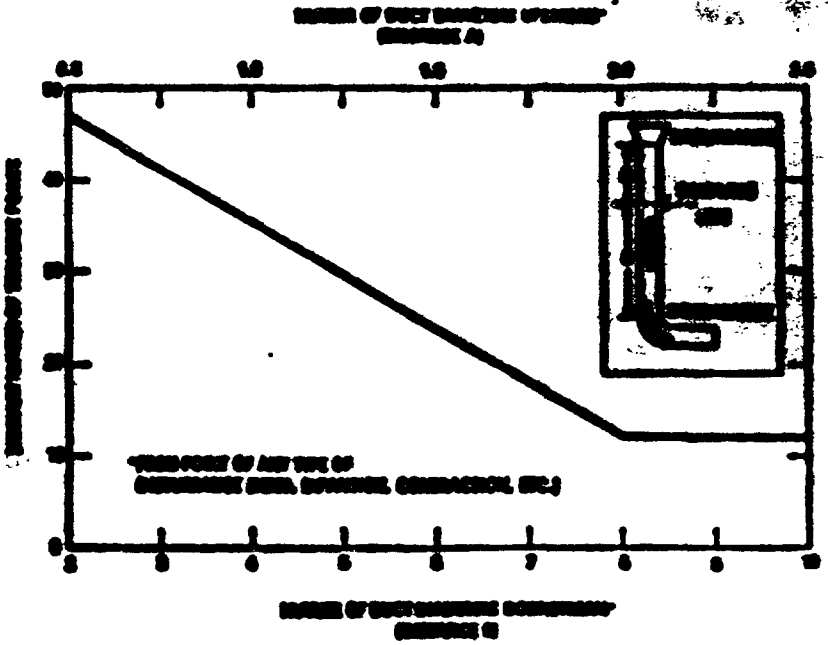

Figure 102-3. Minimum number of traverse points.

4.2.6 *If a selected sampling point is closer than 1 inch from stack wall, adjust the location of that point to insure that the sample is taken at least 1 inch away from the wall.*

4.3 Cross-sectional layout and location of traverse points.

4.3.1 *For circular stacks* locate the traverse points on at least two diameters according to figure 1G2-4 and table 1G2-1. The traverse axes shall divide the stack cross section into equal parts.

4.3.2 *For rectangular stacks* divide the cross section into as many equal rectangular areas as traverse points such that the ratio of the length to the width of the elemental area is between one and two. Locate the traverse points at the centroid of each equal area according to figure 1G2-5

4.4 Measurements of stack conditions.

4.4.1 Set up the apparatus as shown in figure 1G2-2 Make sure all connections are tight and leak free. Measure the velocity head and temperature at the traverse points specified by section 4.3 and 4.3.

4.4.2 Measure the static pressure in the stack.

4.4.3 Determine the stack gas moisture.

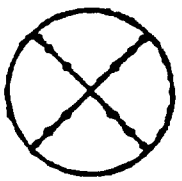

Figure 1G2-4. Cross section of circular stack showing location of traverse points in perpendicular diameters.

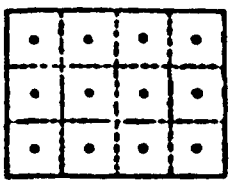

Figure 1G2-5. Cross section of rectangular stack divided into 12 equal areas, with traverse points at centroid of each area.

4.4.4 Determine the stack gas molecular weight from the measured moisture content and knowledge of the expected gas stream composition. Sound engineering judgment should be used.

4.5 Preparation of sampling train.

4.5.1 *Prior to assembly,* clean all glassware (probe, impingers, and connectors) by rinsing with wash acid, tap water, 0.1M HCl, tap water, and finally distilled water. Place 100 ml of 0.1M HCl in each of the first three impingers, and place approximately 200 g. of preweighed silica gel in the fourth impinger. Save a ml of the 0.1M HCl as a blank in the cyanide analysis. Set up the train and the probe as in Figure 1G2-1.

4.5.2 Leak check the sampling train at the sampling site. The leakage rate should not be in excess of 1 percent of the desired sampling rate. Place crushed ice around the impingers. Add more ice during the run to keep the temperature of the gases leaving the last impinger at 70° F or less.

4.6 Recovery train operation.

4.6.1 *Safety precautions.* It is imperative that the sampler conduct the source test under conditions of utmost safety, since hydrogen and HF mixtures are explosive. The sample train externally is insulated, so that operation at high temperatures can be accomplished at the inlet and outlet, but internally

Table 1G2-1. Location of traverse points in circular stacks (Percent of stack diameter from inside wall to traverse point)

Traverse point number on a diameter	Number of traverse points on a diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.3	2.6	2.1	1.8	1.4	1.2	1.0	0.9	0.8
2	85.4	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.2	3.7	3.3	3.0
3		75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.4
4		93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.6	67.7	34.2	25.0	19.8	16.5	14.2	12.5	11.2	10.1
6			95.6	80.6	65.8	35.6	26.9	21.5	18.0	15.5	13.6	12.2
7				89.5	77.4	64.4	36.6	28.3	23.2	19.6	17.1	15.2
8				96.7	85.4	75.0	63.4	37.5	29.6	24.5	21.0	18.4
9					91.8	82.3	71.7	62.5	38.2	30.4	25.4	21.8
10					97.4	88.3	78.7	69.5	61.8	38.8	31.1	26.2
11						93.3	85.3	75.5	67.7	61.2	39.3	31.7
12						98.0	90.1	81.7	73.8	67.4	61.6	39.8
13							94.3	87.5	79.4	73.1	67.7	61.9
14							98.2	92.7	85.4	78.5	73.2	68.2
15								95.1	90.1	83.5	78.0	73.4
16								98.5	93.8	88.0	82.5	78.0
17									96.6	91.7	86.5	82.1
18									98.9	94.5	90.0	85.9
19										96.7	92.8	89.1
20										98.7	95.1	91.6
21											97.0	93.7
22											98.5	95.5
23												97.0
24												98.3

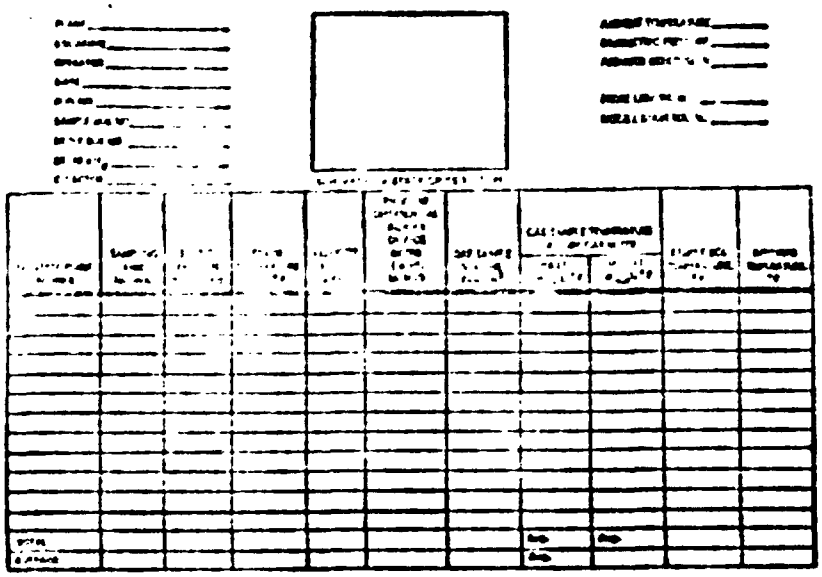

Figure 108-6 Field data

4.5.4 To begin sampling, position the nozzle at the first traverse point with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. Sample for at least 5 minutes at each traverse point; sampling time must be the same for each point. Maintain isokinetic sampling throughout the sampling period, using the following procedure.

4.5.4.1 Nomographs which aid in the rapid adjustment of the sampling rate without other computations are in APTD-0576 and are available from commercial suppliers. The available nomographs, however, are set up for use in air streams, and minor changes are required to provide applicability to hydrogen.

4.5.4.2 Calibrate the meter box orifice. Use the techniques as described in APTD-0576.

4.5.4.3 The correction factor nomograph discussed in APTD-0576 and shown on the reverse side of commercial nomographs will not be used. In its place, the correction factor will be calculated using equation 108-2.

$$C = 0.01 \frac{(C_p M_d)^2}{\Delta H_@} \frac{P_s}{P_m} \frac{T_m}{M_d} \qquad \text{eq. 108-2}$$

where:

C = Correction factor.
C_p = Pitot tube coefficient
M_d = Mole fraction dry gas.
P_s = Stack pressure, inHg.
P_m = Meter pressure, inHg.
T_m = Meter temperature, °R
M_d = Molecular weight of stack gas (from 4.6.4), lb lb mole
$\Delta H_@$ = Meter box calibration factor, obtained in step 4.5.4.2.

4.5.4.4 Set the calculated correction factor on the front of the operating nomograph. Select the proper nozzle and set the K-factor on the nomograph as detailed in APTD-0576.

4.5.4.5 Read the velocity head in the stack at each sample point from the manometer in the meter box. Convert the hydrogen ΔP to an equivalent value for air by multiplying by a ratio of the molecular weight of air to hydrogen at the stack moisture content (insert this value of ΔP into the nomograph and read off ΔH. Again, convert the ΔH, which is an air equivalent value to the ΔH for hydrogen by dividing by 13. This factor includes the ratio of the dry molecular weights and a correction for the different orifice calibration factors for hydrogen and air. This procedure is diagrammed below:

Observe ΔP → Multiply by $\left(\frac{MW\ air}{MW\ H_2}\right)_{sat}$ → Set this on nomograph

Record ΔH → Divide by 13 → Will be used on meter box

4.5.4.6 Operate the sample train at the calculated ΔH at each sample point.

4.5.5 Turn off the pump at the conclusion of each run and record the final readings. Immediately remove the probe and nozzle from the stack and handle in accordance with the sample recovery process described in section 4.3.

4.7 Sample recovery.

4.7.1 Add glass storage bottle and the graduated cylinder must be prerinsed as in section 4.5.1.1. This operation should be performed in an area free of possible mercury contamination. Substantial laboratory and ambient air around mercury-using facilities are not normally free of mercury contamination. When the sampling train is moved, care must be exercised to prevent breakage and contamination.

4.7.2 Disconnect the probe from the impinger train. Place the contents (measured to ±1 ml) of the first three impingers into a 500 ml sample bottle. Rinse the probe and all glassware between it and the back half of the third impinger with two 50 ml portions of 0.1M KCl solution. Add these rinses to the first bottle. For a blank, place 300 ml of the 0.1M KCl in a 500 ml sample bottle. Place the filter pot in the plastic jar, seal and secure all containers for shipment. If an additional test is desired, the glassware can be carefully double rinsed with distilled water and reassembled. However, if the glassware is to be out of use more than 2 days, the initial acid wash procedure must be followed.

4.8 Analysis—4.8.1 Apparatus preparation—Clean all glassware according to the procedure of section 4.5.1. Adjust the instrument settings according to the instrument manual, using an absorption wavelength of 253.7 nm.

4.8.2 Analysis preparation. Adjust the air delivery pressure and the [illegible] to obtain a constant air flow of about 1.5 l/min. The aeration tube should be humidified except during aeration. Purge the equipment for 2 min to prepare a sample of mercury in solution (24.4) according to section 4.8.3. Place the analysis tube in the line and aerate until a maximum peak height is reached on the recorder. Remove the aeration tube, rinse the inlet, and rinse the analysis tube with distilled water. Repeat with another sample of the same standard solution. This purging and analysis cycle is to be repeated until peak heights are reproducible.

4.8.3 Sample preparation—Just prior to analysis, transfer a sample aliquot of up to 50 ml to the cleaned 100 ml analysis tube. Adjust the volume to 50 ml with 0.1M KCl if required. Add 5 ml of 10 N sodium hydroxide, cap tube with a clean glass stopper and shake vigorously. Prolonged, vigorous shaking at this point is necessary to obtain an accurate analysis. Add 5 ml of the reducing agent (reagent 3.3.7), cap tube with a clean glass stopper and shake vigorously and immediately place in sample line.

4.8.4 Recovery determination.—After the system has been stabilized, prepare samples from the sample bottle according to section 4.8.3. Assure the sample will a maximum peak height is reached on the recorder. The mercury content is determined by comparing the peak heights of the samples to the peak heights of the calibration solutions. If calibrated samples are out of the linear range, the samples should be diluted. Prepare a blank from the 300 ml bottle according to section 4.8.3 and analyze to determine the reagent blank mercury level.

5. Calibration.—5.1 Sampling Train. 5.1.1 Use standard methods and equipment as detailed in APTD-0576 to calibrate the nozzle meter, pitot tube and dry gas meter. Recalibrate prior to each test series.

5.2 Analysis—5.2.1 Prepare a calibration curve for the spectrophotometer using the standard mercury solutions. Plot the peak heights and on the recorder versus the concentration of mercury in the standard solutions. Standards should be analyzed until the samples show the calibration curve changes slightly with time. A new calibration curve should be prepared for each new set of samples runs.

6. Calculations—6.1 Average dry gas meter temperature, stack temperature, orifice pressure and average meter pressure drop—Use data sheet (fig. 108-6).

6.2 Dry gas volume.—Correct the sample volume measured by the dry gas meter to stack conditions by using equation 108-3.

$$V_{m_s} = V_m \frac{P_s}{P_m} \frac{\left(P_m + \frac{\Delta H}{13.6}\right)}{P_s} \qquad \text{eq. 108-3}$$

where:

V_{m_s} = Volume of gas sample through the dry gas meter (stack conditions), ft³.

V_m = Volume of gas sample through the dry gas meter (meter conditions), ft³.

T_s = Average temperature of stack gas, °R.

T_m = Average dry gas meter temperature, °R.

P_m = Barometric pressure at the orifice meter, inHg.

ΔH = Average pressure drop across the orifice meter, inH₂O.

13.6 = Specific gravity of mercury.

P_s = Stack pressure, $P_m \pm$ static pressure, inHg.

6.3 *Volume of water vapor*

$$V_{w_s} = K_3 V_{l_c} \frac{T_s}{P_s} \qquad \text{eq. 102-4}$$

where

V_{w_s} = volume of water vapor in the gas sample (stack conditions), ft³.

K_3 = constant, $\frac{\text{in. Hg}}{°\text{R}}$, where these units are used.

V_{l_c} = Total volume of liquid collected in impingers and silica gel (see Figure 102-3), ml.

T_s = Average stack temperature, °R.

P_s = Stack pressure, in. Hg.

6.4 *Total gas volume.*

$$V_{mstd} = V_{m_{std}} + V_{w_s} \qquad \text{eq. 102-5}$$

where

V_{mstd} = total volume of gas sample (stack conditions), ft³.

$V_{m_{std}}$ = volume of gas through dry gas meter (stack conditions), ft³.

V_{w_s} = volume of water vapor in gas sample (stack conditions), ft³.

	[illegible]	
[illegible]		
[illegible]		
[illegible]		
[illegible]		

[illegible] sum of units as shown or dividing total weight [illegible] grams

[illegible] = [illegible]

Figure 102-4. Analytical data.

6.5 *Stack gas velocity*—Use equation 102-6 to calculate the stack gas velocity.

$$(v_s)_{avg} = K_p C_p (\sqrt{\Delta P})_{avg} \sqrt{\frac{T_s}{P_s M_s}} \qquad \text{eq. 102-6}$$

Where:

$(v_s)_{avg}$ = Average stack gas velocity, feet per second.

K_p = 85.48 $\frac{\text{ft}}{\text{sec}} \left(\frac{\text{lb}}{\text{lb-mole}(°\text{R})} \right)^{\frac{1}{2}}$ when [illegible] units are used.

C_p = Pitot tube coefficient, dimensionless.

$(T_s)_{avg}$ = Average stack gas temperature, °R.

$(\sqrt{\Delta P})_{avg}$ = Average square root of the velocity head of stack gas (readings from Block 7 of [illegible]).

P_s = Stack pressure, Absolute pressure in in. Hg.

M_s = Molecular weight of stack gas (dry basis), the summation of the products of the molecular weight of each component multiplied by its volumetric proportion in the stream, pounds.

Figure 102-6 shows a suitable recording sheet for velocity traverse data. Use the subparts in the last two columns of Figure 102-6 to determine the average stack gas velocity from equation 102-6.

6.6 *Mercury collected.* Calculate the total weight of mercury collected by using eq. 102-8.

PLANT _____

DATE _____

RUN NO _____

STACK DIAMETER, in. _____

BAROMETRIC PRESSURE, in. Hg _____

STATIC PRESSURE IN STACK (P_g), in. Hg _____

OPERATORS _____

SCHEMATIC OF STACK CROSS SECTION

Traverse point number	Velocity head, in. H_2O	$\sqrt{\Delta_p}$	Stack Temperature (T_s), °F
	REMARKS		

Figure 102-6. Velocity traverse data.

W_s V_{lc} V_{sc} ... eq. 103-7

where:

W_s = Total weight of mercury collected, µg.
V_{lc} = Total volume of condensed moisture and KCl in sample bottle, ml.
C_s = Concentration of mercury measured in sample bottle, µg/ml.
V_a = Total volume of KCl used in sampling (impinger contents and all wash solutions), ml.
C_a = Concentration of mercury in KCl solution, µg/ml.

6.7 *Total mercury emission.* Calculate the total emission of mercury emitted from each stack per day of operation using equation 103-8. This equation is applicable for continuous operation. For discontinuous operation, only the time per day each stack is in operation. The total mercury emission from a source will be the summation of results from all stacks.

$$E = \frac{W_s(p_s)_{std} A_n}{V_{sstd} A_s} \times \frac{86{,}400 \text{ seconds/day}}{10^6 \text{ µg/g}} \quad \text{eq. 103-8}$$

where:

E = Rate of emission, g/day.
W_s = Total weight of mercury collected, µg.
V_{sstd} = Total volume of gas sample (stack conditions), ft³.
$(v_s)_{avg}$ = Average stack gas velocity, feet per second.
A_s = Stack area, ft².

6.8 *Isokinetic variation (comparison of velocity of gas in probe tip to stack velocity).*

$$I = \frac{100 V_{mstd}}{A_n \theta (v_s)_{avg}} \quad \text{eq. 103-9}$$

where:

I = Percent of isokinetic sampling.
V_{mstd} = Total volume of gas sample (stack conditions), ft³.
A_n = Probe tip area, ft².
θ = Sampling time, sec.
$(v_s)_{avg}$ = Average stack gas velocity, feet per second.

7. *Evaluation of results.*—7.1 *Determination of compliance.*—7.1.1 Each performance test shall consist of three repetitions of the applicable test method. For the purpose of determining compliance with an applicable national emission standard, the average of results of all repetitions shall apply.

7.2 *Acceptable isokinetic results.*—7.2.1 The following range sets the limit on acceptable isokinetic sampling results: If $90\% < I < 110\%$, the results are acceptable; otherwise, reject the test and repeat.

8 *References.*—1. Addendum to Specifications for Incinerator Testing at Federal Facilities, PHS, NCAPC, Dec. 6, 1967.

2. Determining Dust Concentration in a Gas Stream, ASME Performance Test Code No. 27, New York, N.Y., 1957.

3. Devorkin, Howard, et al., Air Pollution Source Testing Manual, Air Pollution Control District, Los Angeles, Calif., Nov. 1963.

4. Hatch, W. R. and W. L. Ott, "Determination of Sub-Microgram Quantities of Mercury by Atomic Absorption Spectrophotometry," Anal. Chem., 40: 2085-87, 1968.

5. Mark, L. S., Mechanical Engineers' Handbook, McGraw-Hill Book Co., Inc., New York, N.Y., 1951.

6. Martin, Robert M., Construction Details of Isokinetic Source Sampling Equipment, Environmental Protection Agency, APTD-0581.

7. Methods for Determination of Velocity, Volume, Dust and Mist Content of Gases, Western Precipitation Division of Joy Manufacturing Co., Los Angeles, Calif. Bull. WP-50, 1968.

8. Perry, J. H., Chemical Engineers' Handbook, McGraw-Hill Book Co., Inc., New York, N.Y., 1960.

9. Rom, Jerome J., Maintenance, Calibration, and Operation of Isokinetic Source Sampling Equipment, Environmental Protection Agency, APTD-0576.

10. Shelburne, R. T., W. F. Todd, and W. S. Smith, Evaluation of Errors in Stack Sampling, Paper presented at the Annual Meeting of the Air Pollution Control Association, St. Louis, Mo., June 14-19, 1970.

11. Smith, W. S., et al., Flue Gas Sampling Equipment and Techniques, Paper presented at the Annual Meeting of the Air Pollution Control Association, St. Louis, Mo., June 14-19, 1970.

12. Smith, W. S., R. T. Shelburne, and W. F. Todd, A Method of Investigating Stack Sampling Data, Paper presented at the 63d Annual Meeting of the Air Pollution Control Association, St. Louis, Mo., June 14-19, 1970.

13. Specifications for Incinerator Testing at Federal Facilities, PHS, NCAPC, 1967.

14. Standard Method for Sampling Stacks for Particulate Matter, In: 1971 Book of ASTM Standards, part 23, Philadelphia, 1971, ASTM Designation D-2928-71.

15. Vennard, J. K., Elementary Fluid Mechanics, John Wiley and Sons, Inc., New York, 1947.

METHOD 103—BERYLLIUM SCREENING METHOD

1. *Principle and applicability.*—1.1 *Principle.*—Beryllium emissions are isokinetically sampled from three points in a duct or stack. The collected sample is analyzed for beryllium using an appropriate technique.

1.2 *Applicability.*—This procedure details guidelines and requirements for methods acceptable for use in determining beryllium emissions in ducts or stacks at stationary sources, as specified under the provisions of § 61.14 of the regulations.

2. *Apparatus.*—2.1 *Sampling train.*—A schematic of the required sampling train configuration is shown in figure 103-1. The essential components of the train are the following:

2.1.1 *Nozzle.*—Stainless steel, or equivalent, with sharp, tapered leading edge.

2.1.2 *Probe.*—Sheathed Pyrex[1] glass.

2.1.3 *Filter.*—Millipore AA, or equivalent, with appropriate filter holder that provides a positive seal against leakage from outside or around the filter. It is suggested that a Whatman 41, or equivalent, be placed immediately against the back side of the Millipore filter as a guard against breakage of the Millipore. Include the Whatman 41 in the analysis. Equivalent filters must be at least 99.95 percent efficient (DOP Test) and amenable to the analytical procedure.

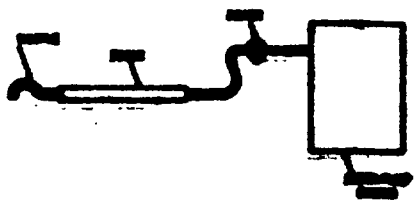

Figure 103-1. Beryllium screening method sampling train.

2.1.4 *Meter-pump system.*—Any system that will maintain isokinetic sampling rate, determine sample volume, and is capable of a sampling rate of greater than 0.5 cfm.

2.2 *Measurement of stack conditions (stack pressure, temperature, moisture and velocity).*—The following equipment shall be used in the manner specified in section 4.2.1.

2.2.1 *Pitot tube.*—Type S, or equivalent, with a coefficient within 5 percent over the working range.

2.2.2 *Differential pressure gauge.*—Inclined manometer, or equivalent, to measure velocity head to within 10 percent of the minimum value.

2.2.3 *Temperature gauge.* Any temperature measuring device to measure stack temperature to within 5° F.

2.2.4 *Pressure gauge.*—Any device to measure stack pressure to within 0.1 in. Hg.

2.2.5 *Barometer.*—To measure atmospheric pressure to within 0.1 in. Hg.

2.3 *Water determination.* Wet and dry bulb temperature, drying tube, or condenser and appropriate system to determine stack gas moisture content to within 1 per cent.

2.4 *Sample recovery.*—2.4.1 *Probe cleaning equipment.*—Probe brush or cleaning rod at least as long as probe or equivalent. Clean solution bottle, equivalent, should be used with the rod.

2.4.2 *Leakless plastic sample bottles.*

2.5 *Analysis.*—2.5.1 Equipment necessary to perform an atomic absorption, spectrographic, fluorometric, chromatographic or equivalent analysis.

3. *Reagents.*—3.1 *Sample recovery.*—3.1.1 *Acetone.*—Reagent grade.

3.1.2 *Water and acid.*—1:1 V/V hydrochloric acid-water.

3.2 *Analysis.*—3.2.1 Reagents as necessary for the selected analytical procedure.

4. *Procedure.*—4.1 *Outline.* Procedures for source testing are detailed in the following sections. These guidelines are generally applicable; however, some sample sites differ to some degree and temporary alterations such as stack extensions or expansions often are required to insure the best possible sample site. Further, since beryllium is hazardous, care should be taken to minimize exposure. Finally, since the total quantity of beryllium to be collected is quite small, the test must be carefully conducted to prevent contamination or loss of sample.

4.2 *Selection of a sampling site and number of runs.*—4.2.1 Select a suitable sampling site that is as close as practicable to the point of atmospheric emission. If possible, stacks smaller than 1 foot in diameter should not be sampled.

4.2.2 The sampling site should be at least eight stack or duct diameters downstream and two diameters upstream from any flow disturbance such as a bend, expansion or contraction. For rectangular cross-section, determine an equivalent diameter using the following equation:

$$D_e = \frac{2LW}{L+W} \quad \text{eq. 103-4}$$

where:

D_e = Equivalent diameter.
L = Length.
W = Width.

4.2.3 Some sampling situations may render the above sampling site criteria impractical. When this is the case, an alternate site may be selected, but must be no less than two diameters downstream and one-half diameter upstream from any point of disturbance. Additional sample runs are recommended at any sample site not meeting the criteria of section 4.2.2.

4.2.4 Three pairs stack traverses a test. The runs shall be conducted at three different points. The three points shall proportionately divide the diameter, i.e. be located at 16.65 and 83 percent of the diameter from the inside wall. For horizontal ducts, the diameter shall be in the vertical direction. For rectangular ducts, sample on a line through the centroid and parallel to a side. If additional runs are required per section 4.2.3, proportionately divide that duct to accommodate the total number of runs.

4.3 *Measurement of stack conditions.* 4.3.1 Measure the stack gas pressure, temperature, and temperature, using the equipment described in § 2.2. Determine the molecular weight of the stack gas. Good engineering estimates may be made in lieu of direct

[1] Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

[illegible] the sampling train [illegible]

4.4 *Preparation of sampling train.*—4.4.1 [illegible] sampling train as shown in figure 104-1. It is recommended that all [illegible] by soaking in wash [illegible] 2 hours.

4.4.2 [illegible] the sampling train at the [illegible] of the desired sample [illegible].

4.5 [illegible]—4.5.1 For [illegible] head and [illegible] at the sampling [illegible] At [illegible] of the sample rate [illegible] head [illegible] percent from that [illegible].

4.5.3 Sample at a minimum rate of 0.5 ft³/min. Samples shall be taken over such a period or periods as are necessary to determine the maximum emissions which would occur in a 24-hour period. In the case of cyclic operations, sufficient tests shall be made so as to allow determination or calculation of the emissions which would occur over the duration of the cycle. A minimum sampling time of 2 hours is recommended.

4.5.4 All pertinent data should be included in the test report.

4.6 *Sample recovery.*—4.6.1 It is recommended that all glassware be precleaned as in [4.4.1]. Sample recovery should also be performed in an area free of possible beryllium contamination. When the sampling train is moved, exercise care to prevent breakage and contamination. Set aside a portion of the acetone used in the sample recovery as a blank for analysis. The total amount of acetone used should be measured for accurate blank correction. Blanks can be eliminated if prior analysis shows negligible amounts.

4.6.2 Remove the filter and any loose particulate matter from filter holder and place in a container.

4.6.3 Clean the probe with acetone and a brush or long rod and cotton balls. Wash into the container. Wash out the filter holder with acetone and add to the same container.

4.7 *Analysis.*—4.7.1 Make the necessary preparation of samples and analyze for beryllium. Any currently acceptable method such as atomic absorption, spectrographic, fluorometric, chromatographic, or equivalent may be used.

5. *Calibration and standards.*—5.1 *Sampling train.*—5.1.1 As a procedural check, sampling rate regulation should be compared with a dry gas meter, spirometer, rotameter (calibrated for prevailing atmospheric conditions), or equivalent, attached to nozzle inlet of the complete sampling train.

5.1.2 Data from this test and calculations should be shown in test report.

5.2 *Analysis.*—5.2.1 Standardization is made as suggested by the manufacturer of the instrument or the procedures for the analytical method.

6. *Calculations.*—6.1 *Total beryllium emission.* Calculate the total amount of beryllium emitted from each stack per day by equation 104-2. This equation is applicable for continuous operations. For cyclic operations, use only the time per day each stack is in operation. The total beryllium emissions from a source will be the summation of results from all stacks.

$R = \frac{W_t (V_s)_{avg} A_s}{t_{total}}$ [illegible]

where:

[illegible]

7. *Test report.*—7.1 A test report shall be prepared which shall include as a minimum: [illegible]

7.1.1 A detailed description of the sampling train used and results of the procedure [illegible] data and calculations made.

7.1.2 All pertinent data taken during the test, the basis for any estimates made, calculations, and results.

7.1.3 A description of the test site, including a block diagram with a brief description of the process, location of the sample points in the cross section, dimensions and distances from any point of disturbance.

METHOD 104—REFERENCE METHOD FOR DETERMINATION OF BERYLLIUM EMISSIONS FROM STATIONARY SOURCES

1. *Principle and applicability.*—1.1 *Principle.*—Beryllium emissions are isokinetically sampled from the source, and the collected sample is digested in an acid solution and analyzed by [illegible] fluorometry.

1.2 *Applicability.*—This method is applicable for the determination of beryllium emissions [illegible] sources. [illegible] method [illegible] stream [illegible] for pre-processing.

2. *Apparatus.*—2.1 *Sampling train.* A schematic of the sampling train used by EPA is shown in figure 104-1. [illegible] commercially [illegible] and [illegible] procedures are described in APTD-0581. [illegible] components [illegible] are the following:

2.1.1 *Nozzle.*—Stainless steel or glass with sharp, tapered leading edge.

2.1.2 *Probe.*—Sheathed Pyrex[2] glass. A heating system capable of maintaining a minimum gas temperature in the range of the stack temperature at the probe outlet during sampling may be used to prevent condensation from occurring.

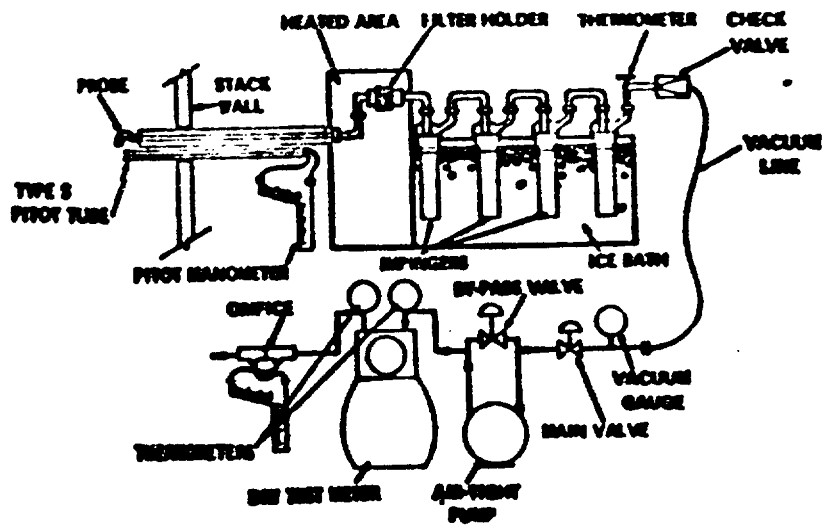

Figure 104-1. Beryllium sampling train

2.1.3 *Pitot tube.*—Type S (figure 104-2), or equivalent, with a coefficient within 5 percent over the working range, attached to probe to monitor stack gas velocity.

2.1.4 *Filter holder.*—Pyrex glass. The filter holder must provide a positive seal against leakage from outside or around the filter. A heating system capable of maintaining the filter at a minimum temperature in the range of the stack temperature may be used to prevent condensation from occurring.

2.1.5 *Impingers.*—Four Greenburg-Smith impingers connected in series with glass ball joint fittings. The first, third, and fourth impingers may be modified by replacing the tip with a ½-inch I.D. glass tube extending to one-half inch from the bottom of the flask.

2.1.6 *Metering system.*—Vacuum gauge, leakless pump, thermometers capable of measuring temperature to within 5° F, dry gas meter with 2 percent accuracy, and related equipment, described in APTD-0581, to maintain an isokinetic sampling rate and to determine sample volume.

2.1.7 *Barometer.*—To measure atmospheric pressure to ± 0.1 in Hg.

2.2 *Measurement of stack conditions (stack pressure, temperature, moisture and velocity).*—2.2.1 *Pitot tube.*—Type S, or equivalent, with a coefficient within 5 percent over the working range.

2.2.2 *Differential pressure gauge.*—Inclined manometer, or equivalent, to measure velocity head to within 10 percent of the minimum value.

[1] These documents are available for a nominal cost from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Va. 22151.

[2] Mention of trade names on specific products does not constitute endorsement by the Environmental Protection Agency.

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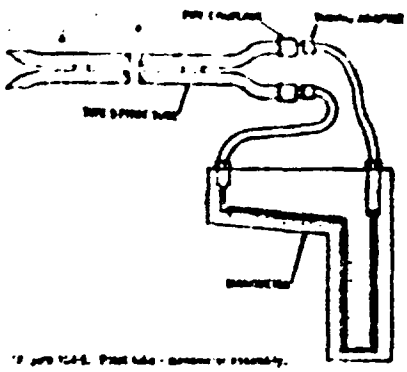


[illegible]

2.2.3 *Temperature gage.*—Any temperature measuring device to measure stack temperature to within 5° F.

2.2.4 *Pressure gage.*—Pitot tube and inclined manometer, or equivalent, to measure stack pressure to within 0.1 in Hg.

2.2.5 *Moisture determination.*—Wet and dry bulb thermometers, drying tubes, condensers, or equivalent, to determine stack gas moisture content to within 1 percent.

2.3 *Sample recovery.*—2.3.1 *Probe cleaning rod.*—At least as long as probe.

2.3.2 *Leakless glass sample bottles.*—500 ml.

2.3.3 *Graduated cylinder.*—250 ml.

2.3.4 *Plastic jar.*—Approximately 300 ml.

2.4 *Analysis.*—2.4.1 *Atomic absorption spectrophotometer.*—To measure absorbance at 234.8 nm. Perkin Elmer Model 303, or equivalent, with H_2O/acetylene burner.

2.4.2 *Hot plate.*

2.4.3 *Perchloric acid fume hood.*

3. *Reagent.*—3.1 *Stock reagents.*—3.1.1 *Hydrochloric acid.*—Concentrated.

3.1.2 *Perchloric acid.*—Concentrated, 70 percent.

3.1.3 *Nitric acid.*—Concentrated.

3.1.4 *Sulfuric acid.*—Concentrated.

3.1.5 *Distilled and deionized water.*

3.1.6 *Beryllium powder.*—99 percent minimum purity.

3.2 *Sampling.*—3.2.1 *Filter.*—Millipore AA, or equivalent. It is suggested that a Whatman 41 filter be placed immediately against the back side of the Millipore filter as a guard against breaking the Millipore filter. In the analysis of the filter, the Whatman 41 filter should be included with the Millipore filter.

3.2.2 *Silica gel.*—Indicating type, 6 to 16 mesh, dried at 350° F for 2 hours.

3.2.3 *Distilled and deionized water.*

3.3 *Sample recovery.*—3.3.1 *Distilled and deionized water.*

3.3.2 *Acetone.*—Reagent grade.

3.3.3 *Wash acid.*—1.1 V/V hydrochloric acid-water.

3.4 *Analysis.*—3.4.1 [illegible] acid, nitric acid, 30 ml.—Reagent grade. [illegible] solution and let it stand overnight.

3.4.2 *Ammonium hydroxide.*—Concentrated.

3.5 *Standard* [illegible] 3.5.1 *Stock solution.* [illegible] 100 mg of beryllium powder, [illegible] and 1000 ml [illegible] 10 ml of this solution to 100 ml with water. Dilute 10 ml of this solution to 100 ml with water. Dilute 10 ml of this solution to 100 ml with water. Prepare a series of 5 [illegible] flask volumetric flasks to contain [illegible] beryllium. Dilute each flask to volume with [illegible] 0.1 N hydrochloric acid. Prepare a blank [illegible] 0.1 N hydrochloric acid.

4. *Procedure.* 4.1 *Cleaning the sampling* [illegible] described in the following sections. These [illegible] are generally applicable, however, most sample sites differ to some degree and temporary alterations such as stack extensions or expansions often are required to insure the best possible sample site. Further, since beryllium is hazardous, care should be taken to minimize exposure. Finally, since the total quantity of beryllium to be collected is quite small, the test must be carefully conducted to prevent contamination or loss of sample.

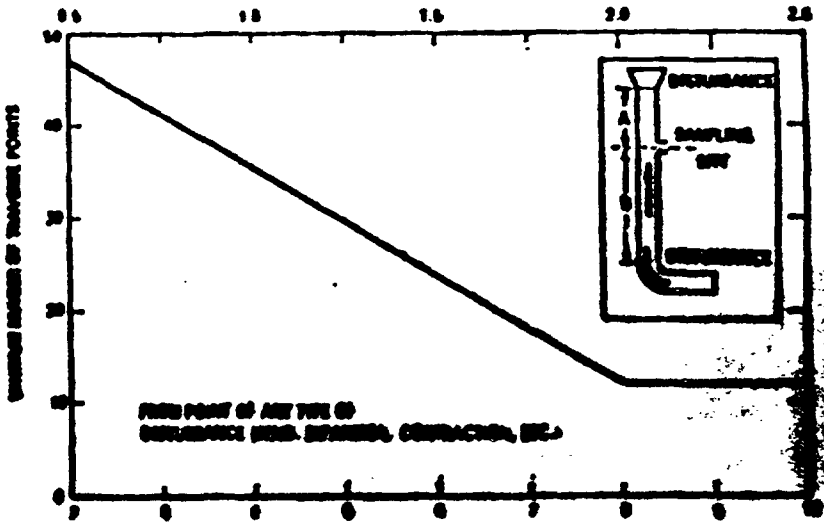
4.2 Selection of a sampling site and minimum number of traverse points.

4.2.1 Select a suitable sampling site that is as close as practicable to the point of atmospheric emission. If possible, stacks smaller than 1 foot in diameter should not be sampled.

4.2.2 The sampling site should be at least 8 stack or duct diameters downstream and 2 diameters upstream from any flow disturbance such as a bend, expansion or contraction. For a rectangular cross-section, determine an equivalent diameter from the following equation:

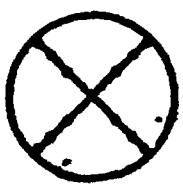
$$D_e = \frac{2LW}{L+W} \qquad \text{eq. 104-1}$$

where:
D_e = equivalent diameter
L = length
W = width

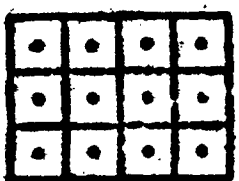


[illegible]

Figure 104-1. [illegible] traverse points.



[illegible]



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[illegible] the stack and handle in [illegible] with the sample recovery [illegible] in § 6.3.

4.2 *Sample recovery*.—4.2.1 [illegible] glass storage bottles and the graduated cylinder must be precleaned as in § 4.3.1. This operation should be performed in an area free of possible beryllium contamination. When the sampling train is moved, care must be exercised to prevent breakage and contamination.

4.2.2 Disconnect the probe from the impinger train. Remove the filter and any loose particulate matter from the filter holder and place in a sample bottle. Place the contents (measured to ±1 ml) of the first three impingers into another sample bottle. Rinse the probe and all glassware between it and the back half of the third impinger with water and acetone, and add this to the latter sample bottle. Clean the probe with a brush or a long slender rod and cotton balls. Use acetone while cleaning. Add these to the sample bottle. Retain a sample of the water and acetone as a blank. The total amount of wash water and acetone used should be measured for accurate blank correction. Place the silica gel in the [illegible] [illegible]

[illegible]

[illegible] ml concentrated perchloric acid. Then proceed with step 4.3.2.4.

4.3.2.3 Weigh the spent silica gel and report to the nearest gram.

4.3.2.4 Samples from 4.3.2.1 and 4.3.2.3 may be combined here for ease of analysis. Replace on a hotplate and evaporate to dryness in a perchloric acid hood. Cool and dissolve the residue in 10.0 ml of 25 percent V/V hydrochloric acid. Samples are now ready for the atomic absorption unit. The beryllium concentration of the sample must be within the calibration range of the unit. If necessary, further dilution of sample with 25 percent V/V hydrochloric acid must be performed to bring the sample within the calibration range.

4.3.3 *Beryllium determination*.—Analyze the samples prepared in 4.3.2 at 234.8 nm using a nitrous oxide/acetylene flame. Aluminum, silicon and other elements can interfere with this method if present in large quantities. Standard methods are available, however, to effectively eliminate these interferences (see Reference 5).

5. *Calibration*.—5.1 *Sampling train*.—5.1.1 Use standard methods and equipment as detailed in APTD-0576 to calibrate the rate meter, pitot tube, dry gas meter and probe heater (if used). Recalibrate prior to each test series.

5.2 *Analysis*.—5.2.1 Standardization is [illegible]

[illegible]

$$V_{m_{std}} = V_m \frac{T_{std}}{T_m}\left(\frac{P_{bar} + \frac{\Delta H}{13.6}}{P_{std}}\right)$$

eq. 104-2

[illegible]

6.3 *Volume of water vapor*.

$$V_{w_{std}} = K_w V_{l_c} \frac{T_{std}}{P_{std}} \qquad \text{eq. 104-3}$$

where

$V_{w_{std}}$ = Volume of water vapor in the gas sample at stack conditions, ft³

K_w = 0.00267 $\frac{\text{in. Hg-ft}^3}{\text{ml-°R}}$, when these units are used

V_{l_c} = Total volume of liquid collected in impingers and silica gel (see figure 104-1), ml

T_s = Average stack gas temperature, °R

P_s = Stack pressure, P_{bar} + static pressure, in. Hg

6.4 *Total gas volume*.

$$V_{total} = V_{m_s} + V_{w_s} \qquad \text{eq. 104-4}$$

where

V_{total} = Total volume of gas sample through stack conditions, ft³.

V_{m_s} = Volume of gas through dry gas meter (stack conditions), ft³.

V_{w_s} = Volume of water vapor in gas sample (stack conditions), ft³.

6.5 *Stack gas velocity*.

Use equation 104-5 to calculate the stack gas velocity.

$$(v_s)_{avg} = K_p C_p (\sqrt{\Delta p})_{avg} \sqrt{\frac{(T_s)_{avg}}{P_s M_s}}$$

eq. 104-5

where

$(v_s)_{avg}$ = Average stack gas velocity, feet per second.

[illegible]

[illegible]	[illegible]	
	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

[illegible]

Figure 104-3. Analytical data.

PLANT _____

DATE _____

RUN NO. _____

STACK DIAMETER, in. _____

BAROMETRIC PRESSURE, in. Hg _____

STATIC PRESSURE IN STACK (P_g), in. Hg _____

OPERATOR _____

SCHEMATIC OF STACK CROSS SECTION

Traverse point number	Velocity head, in. H_2O	$\sqrt{\Delta p}$	Stack Temperature (T_s), °F
	AVERAGE		

Figure 104-6. Velocity traverse data.

Figure 104-6 shows a sample recording sheet for velocity traverse data. Use the average in the last two columns of figure 104-6 to determine the average stack gas velocity from equation 104-5.

6.6 Beryllium collected.—Calculate the total weight of beryllium collected by using equation 104-6.

$$W_s = V_s C_s - V_a C_a - V_{a_2} C_{a_2} \quad \text{eq. 104-6}$$

where:

W_s = Total weight of beryllium collected, µg.

V_s = Total volume of hydrochloric acid from step 6.5.2.4, ml.

C_s = Concentration of beryllium found in sample, µg/ml.

V_a = Total volume of water used in sampling (impinger contents plus all wash contents), ml.

C_a = Blank concentration of beryllium in water, µg/ml.

V_{a_2} = Total volume of acetone used in sampling (all wash contents), ml.

C_{a_2} = Blank concentration of beryllium in acetone, µg/ml.

6.7 Total beryllium emissions.—Calculate the total amount of beryllium emitted from each stack per day by equation 104-7. This equation is applicable for continuous operations. For spoke operations, use only the time per day each stack is in operation. The total beryllium emissions from a complex is the summation of results from all stacks.

$$E = \frac{W_s (P_r)_{sm} A_s}{V_{sm}} \times \frac{86{,}400 \text{ seconds/day}}{760 \text{ mm/m}} \quad \text{eq. 104-7}$$

where:

E = Rate of emission, g/day.

W_s = Total weight of beryllium collected, µg.

V_{sm} = Total volume of gas sample taken, at dry conditions, dscm.

$(P_r)_{sm}$ = Average stack gas velocity, for one round, m/s.

A_s = Stack area, m^2.

6.8 Isokinetic variation [illegible] velocity of gas in probe [illegible]

$$I = \frac{[\text{illegible}]}{A_n [\text{illegible}]} \quad \text{eq. 104-8}$$

where:

I = Percent isokinetic sampling.

V_m = [illegible] at dry conditions, dscm.

A_n = [illegible] area, m^2.

θ = [illegible] time, min.

V_n = Average velocity [illegible], m/s per round.

7. Calculation of results.—7.1 Determination of compliance.—7.1.1 Each performance test [illegible] result of the certification of the [illegible] test method [illegible] of determining compliance with any applicable [illegible] [illegible] prescribed, the average of results of all [illegible] method apply.

7.2 Acceptable isokinetic results.—7.2.1 The isokinetic range is the limit on acceptable isokinetic sampling [illegible] results.

If 90 percent ± 1-110 percent, the results are acceptable, otherwise reject the test and repeat.

7. *References.*—1. Addendum to Specifications for Incinerator Testing at Federal Facilities, PHS, NCAPC, December 6, 1967.

2. Amos, M. D., and Willis, J. B., "Use of High-Temperature Pre-Mixed Flames in Atomic Absorption Spectroscopy," Spectrochim. Acta, 22: 1325, 1966.

3. Determining Dust Concentration in a Gas Stream, ASME Performance Test Code No. 27, New York, N.Y., 1957.

4. Dorrlin, Howard et al., Air Pollution Source Testing Manual, Air Pollution Control District, Los Angeles, Calif., November 1963.

5. Frost, R., Liberty, K. V., and West, P. S., "A Study of Some Matrix Effects in the Determination of Beryllium by Atomic Absorption Spectroscopy in the Nitrous Oxide-Acetylene Flame," Talanta, 17: 309, 1970.

6. Mark, L. S., Mechanical Engineers' Handbook, McGraw-Hill Book Co., Inc., New York, N.Y., 1958.

7. Martin, Robert M., Construction Details of Isokinetic Source Sampling Equipment, Environmental Protection Agency, APTD-0581.

8. Methods for Determination of Velocity, Volume, Dust and Mist Content of Gases, Western Precipitation Division of Joy Manufacturing Co., Los Angeles, Calif., Bulletin WP-50, 1968.

9. Particle Sizes Standard Conditions (Part, March 1971).

10. Perry, J. H., Chemical Engineers' Handbook, McGraw-Hill Book Co., Inc., New York, N.Y., 1963.

11. Smith, Jerome J., Maintenance, Calibration, and Operation of Isokinetic Source Sampling Equipment, Environmental Protection Agency, APTD-0576.

12. Stephens, R. W., W. R. Todd, and W. E. Smith, Significance of Errors in Stack Sampling Measurements, Paper presented at the annual meeting of the Air Pollution Control Association, St. Louis, Mo., June 14-18, 1970.

13. Smith, W. S. et al., Stack Gas Sampling Improved and Simplified with New Equipment, APCA Paper No. 67-119, 1967.

14. Smith, W. S., R. T. Shigehara, and W. F. Todd, A Method of Interpreting Stack Sampling Data, Paper presented at the 63d annual meeting of the Air Pollution Control Association, St. Louis, Mo., June 14-18, 1970.

15. Specifications for Incinerator Testing at Federal Facilities, PHS, NCAPC, 1967.

16. Standard Method for Sampling Stacks for Particulate Matter, Inc 1971 Book of ASTM standards, Part 23, Philadelphia, 1971, ASTM Designation D-2928-71.

17. Vennard, J. K., Elementary Fluid Mechanics, John Wiley and Sons, Inc., New York, 1947.

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Federal Register

TUESDAY, OCTOBER 14, 1975

PART V:

ENVIRONMENTAL PROTECTION AGENCY

■

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Asbestos and Mercury

[illegible]

Amendments to Standards for Asbestos and Mercury

[illegible]

Act, [illegible]

[illegible] Center, Room 202 West Tower, 401 [illegible] Street, SW, Washington, D.C. has [illegible] of the comment letters received [illegible] a summary of the issues and Agency [illegible] available for public inspection. [illegible] addition, copies of the Issue Summary [illegible] Agency responses may be obtained [illegible] written request from the EPA Publication Center (TS-793), 401 M [illegible], SW., Washington, D.C. 20460 [illegible] Public Comment Summary—[illegible] Amendments to National Emission Standards for Hazardous Air Pollutants—Asbestos and Mercury). Where [illegible] by the Administrator to be appropriate, changes have been made to the proposed amendments, and the revised version of the amendments to the national emission standards for asbestos and mercury is promulgated herein. The principal changes to the proposed amendments and the Agency's responses to major comments received are summarized below.

Copies of *Background Information on National Emission Standards for Hazardous Air Pollutants—Proposed Amendments to Standards for Asbestos and Mercury* (EPA-450/2-74-008a) which explains the basis for the proposed amendments are available on request from the Emission Standards and Engineering Division, Research Triangle Park, North Carolina 27711, Attention: Mr. Don R. Goodwin.

Asbestos

CHANGES TO PROPOSED AMENDMENTS

Manufacturing. The Agency received numerous comments stating that the proposed amendments should apply only to asphalt concrete manufacturing plants that use asbestos. This was the Agency's intent. Section 61.22(a) has been revised by the addition of the wording, "that use commercial asbestos."

[illegible] that the proposed frequency [illegible] time to the Agency written notices of intention to perform repetitive renovation work at a single facility was excessive. One commentator suggested that definitions for "emergency renovation" and "routine maintenance renovation" be included, and that a yearly filing of intention to renovate should be allowed for each industrial plant. It is evident from the comments received that some plants perform renovation operations very frequently, such as twice a week. The proposed reporting requirements for such plants would be excessive. The proposed amendment has been changed so that these requirements are reduced, and the applicability of the requirement is more clearly defined by adding more detailed language and definitions for "planned renovation" and "emergency renovation" operations. Additionally, the applicability of the amendment has been clarified by specifying how the quantities of asbestos involved in "planned renovation" and "emergency renovation" are to be determined. The basic characteristic that distinguishes the two types of renovation operations is the degree of predictability of their occurrence. The amount of friable asbestos material that will be removed or stripped within a given period of time can be predicted for planned renovation operations, including both scheduled and non-scheduled operations, whereas no such prediction can be made for emergency renovation operations. The given period of time for predicting purposes has been specified to be between 30 days and one year for planned renovation operations involving individually non-scheduled operations. A reporting time shorter than 30 days would require the submission and review of a large number of reports, and predictions over periods longer than one year could give inaccurate predictions of friable asbestos material to be removed. In emergency renovation operations, the amount of friable asbestos material that is subject to the amendment is the total amount of such mate-

[illegible] exemption [illegible] provisions. Therefore, the minimum quantity of friable asbestos material covered by the demolition and removal provisions is essentially equivalent. The Agency considered applying regulations only to demolition operations in which more than a specified amount of friable asbestos material was involved, prior to promulgation of demolition provisions on April 6, 1973 (38 FR 8820). This approach was rejected primarily because it would complicate enforcement procedures. However, the Agency realizes that certain commercial buildings contain smaller amounts of friable asbestos material than the lower size cutoff limit proposed for renovating operations. On reevaluation, the Agency concluded that the available information justifies changing the proposed amendment to allow exemption of demolition operations involving less than 80 meters of friable asbestos pipe insulation and less than 15 square meters of friable asbestos material used to insulate or fireproof any duct, boiler, tank, reactor, turbine, furnace or structural member. The owner or operator of a demolition operation desiring this exemption must notify the Administrator, at least 20 days prior to beginning demolition, of the measured or estimated amount of friable asbestos material involved in the demolition. This will permit the exception to be implemented without requiring prior inspection of every site by Agency personnel, which would be an excessive enforcement burden. This differs from the reporting requirements of the renovation provisions of the amendments. The nature of renovation operations necessitates a greater familiarity on the part of the operator with the quantities of friable asbestos materials present than for demolition operations. For this reason, the Agency believes that it is not necessary to require reports from all renovation operations in order to ensure effective enforcement of the renovation provisions that apply to only larger renovation operations.

than 50 feet in height. The requirement has been changed so that it applies only to materials that have been removed or stripped at more than 50 feet above ground level.

Several minor changes have been made in response to comments. Language has been added to allow delivery of notices of intention to renovate or demolish to the Administrator by means other than the U.S. mail. There is a minor clarifying language change between § 61.22(d)(2)(i) of the proposed demolition provisions and the corresponding provision, § 61.22(d)(4)(i), of the regulations promulgated herein. A comment suggested the term "adequately wetted" should be defined and differentiated from "thoroughly wetted," since both terms appeared in the proposed amendments. The use of these terms has been reevaluated, and a definition of "adequately wetted" has been added. The term "thoroughly wetted" has been deleted and the term "adequately wetted" has been used throughout.

The Agency has made a revision in the proposed requirement (§ 61.22(d)(1)) for notification of intention to perform renovation or demolition operations. An additional reporting requirement for the name and location of the waste disposal site where demolition and renovation waste will be deposited has been added to assist in enforcing the waste disposal provisions of the amendments.

Sprayed. During review of the amendments within the Agency, a question arose concerning whether the waste generated by operations that use spray-on materials which contain less than one percent of asbestos by weight to insulate or fireproof buildings, structures, pipes and conduits was covered by the asbestos waste disposal amendment (§ 61.22(j)). The spraying provisions do not apply to such operations, though reports of the operations were required by the standard promulgated on April 6, 1973. Therefore, the waste disposal practices associated with these operations are not regulated by the waste disposal amendments.

The number of acceptable waste disposal sites that meet the criteria in § 61.22(j)(3) of the proposed amendments, which are similar to the criteria for sanitary landfills, has increased significantly within the past several years and the trend is continuing in that direction. This trend is noted in a recent publication ("Waste Age," January 1975). This indicates that acceptable sites (i.e., private and municipal sanitary landfills) which follow practices that reduce asbestos emissions will be available for disposal of asbestos-containing waste. Therefore, it was determined that an effective means of reducing emissions from waste disposal sites without undue enforcement burdens would be to require already-regulated asbestos waste generators to dispose of asbestos-containing wastes at properly operated disposal sites. This is provided for in the amendments herein promulgated.

The Agency's greatest concern is with disposal sites which accept large quantities of asbestos waste. In most cases, companies which generate large quantities of asbestos-containing waste also own and operate their own disposal sites because of convenience and economics. For example, all domestic asbestos mills operate their own tailings disposal sites. The Agency anticipates that these large waste generators will operate their disposal sites in the future in compliance with the proposed § 61.22(j) in order to meet the requirement that they dispose of their waste at acceptable sites.

Inactive disposal sites may also be major emission sources if they contain large amounts of asbestos waste. It is likely that at inactive sites containing small amounts of asbestos waste the asbestos is covered by non-asbestos waste, and the chance of significant asbestos emissions is small. It was decided to require that those inactive sites which are known to contain large quantities of asbestos comply with the standards specified in section (j)(3)(i) to reduce asbestos emissions. This category of asbestos waste disposal sites is usually operated by the sources that generate the asbestos-containing waste. [illegible] to do so [illegible] of such [illegible] are [illegible] when active [illegible] terminating [illegible] waste is effectively covered, thereby preventing emissions from it. For these reasons, inactive waste disposal sites that have been used by surveying, renovation and demolition are not regulated.

The amendments promulgated herein will control inactive asbestos waste disposal sites that contain large quantities of asbestos waste. The Agency's enforcement resources will be more effectively utilized since approximately 2000 waste disposal sites will not be directly regulated by the promulgated amendments. This should facilitate enforcement and protection of the public health.

The comment was made that the proposed permanent posting of warning signs at inactive asbestos waste disposal sites would be overly restrictive. The warning signs were intended primarily to warn the general public of the potential hazards that could result from creating dust by such disturbances as walking on exposed asbestos waste. If the disposal site is properly covered over as required by the alternative methods of complying with the proposed amendment for waste disposal sites, such minor disturbances will not generate asbestos emissions. Accordingly, the proposed amendment has been changed, and warning signs are not required if an inactive disposal site applies and properly maintains a covering of compacted non-asbestos-containing material at least 60 centimeters (cm, 2 feet) in depth, or at least 15 centimeters (cm, 6 inches) in depth with a cover of vegetation. The proposed amendment would have also required that active asbestos waste disposal sites post warning signs. The amendments promulgated herein do not apply directly to active disposal sites, and the specified operating practices for acceptable disposal sites do not require the posting of warning signs provided an appropriate cover of at least 15 centimeters (cm, 6 inches) of non-asbestos-containing material is applied to the active portion of the site at the end of each operating day. Comments were received that suggested the Agency should allow the use of existing natural barriers as substitutes for fences that are intended to deter access to some types of asbestos waste disposal sites. The Agency

[illegible]

[illegible] The Agency concluded that the [illegible] that the feed [illegible] to an incinerator will be [illegible] to the combustion chamber temperature and the uncertainty concerning the decomposition temperature of asbestos, and on the results of a [illegible] test that detected emissions of asbestos from a sintering process in which the temperature attained was well above [illegible] C. In evaluating the comment, the Agency concluded that the available data do not justify changing the proposed regulation on grounds that the asbestos is thermally degraded in the combustion process. Another commenter suggested that incineration should be permitted, provided there are no visible emissions of asbestos particulate matter from the incinerator. Information presented to the Agency after proposal indicated that some small incinerators, such as those operated by asbestos manufacturing plants, can be operated with no visible emissions. The proposed prohibition on incineration of containers that previously held commercial asbestos has been deleted. The provisions of the amendments for the disposal of asbestos-containing waste materials apply in particular to the disposal of containers that previously held commercial asbestos. Therefore, these containers can be incinerated under the amendments provided the incineration operation does not discharge visible emissions.

Two commentators suggested that the proposed amendments should not require that EPA warning labels be attached to containers of asbestos waste in addition to the warning labels required in regulations issued by the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA). The Agency agrees that both labels [illegible] convey the desired information. Therefore, the proposed amendment has been changed to allow the OSHA warning label to be used in place of the EPA warning label.

[illegible] that can be [illegible] airborne in the [illegible] and by the wind. The [illegible] of asbestos-containing waste has [illegible] been prohibited from use on roadways.

The proposed amendment for waste disposal at asbestos mills included a provision requiring no visible emissions to the outside air from the deposition of asbestos ore tailings onto a disposal pile. An alternative method of compliance required that the waste be adequately wetted with a dust suppressant agent prior to deposition. Two commentators stated that an exemption from the wetting requirement of the alternative method is needed when the temperature at the disposal site is below freezing, to prevent freezing of the tailings and permit continued operation of the asbestos mill at such low temperatures. The investigation carried out by the Agency prior to proposal of the amendment indicated that wetting of asbestos tailings is the only presently available method for effectively controlling particulate emissions from the deposition operation. In response to the comments received, the Agency further investigated the cold weather operational problems of disposal systems for wetted asbestos tailings. Discussions were held with operators of three Canadian asbestos mills that frequently operate under cold weather conditions and have installed tailings wetting systems, with a firm that is experienced in designing systems to suppress dust generated by materials conveying operations, and with several [illegible] mineral mining facilities that operate wetting systems for crushing and conveying operations. The investigation revealed that several Canadian asbestos mills are presently experimenting with wet tailings disposal systems to extend operation to temperatures substantially below freezing. However, the Agency is aware of no [illegible] that [illegible] in a cold [illegible]

[illegible] 9.5° C [illegible] the Agency [illegible] below [illegible]

9.5° C (15° F) and the proposed amendment [illegible]

[illegible] at [illegible] from [illegible] and milling equipment, are [illegible] by the previously promulgated [illegible] (38 FR [illegible]). The amendments promulgated herein, including an exemption from wetting of asbestos tailings at temperatures below −9.5° C (15° F), together with the standards promulgated on April 6, 1973 (38 FR 8820), represent use of the best available technology for control of emissions from asbestos mills. This is consistent with the determination of the Administrator that best available technology should be used to control major sources of asbestos emissions to protect the public health with an ample margin of safety.

The reporting format of Appendix A has been changed by the addition of paragraphs "C" and "D", to accommodate the addition of disposal of asbestos-containing wastes and certain inactive asbestos waste disposal sites to the amendments. The additional information required is essential for determining compliance with the regulations. Appendix A has also been revised into a new computer format which will promote more effective enforcement of the regulations. Section 61.24 has been revised to reflect the additional reporting information requested in Appendix A.

ADDITIONAL COMMENTS

Manufacturing and Fabrication. One commenter questioned the need for including asphalt concrete manufacturing plants in the proposed amendments. The rationale for including asphalt concrete plants as major sources of asbestos is discussed in the background information document for the proposed amendments (EPA-[illegible] 2-74-009[illegible]). Two commentators suggested that the manufacture of asphalt concrete containing less than 3 to 5 percent asbestos in the total mixture should be exempt from the regulations. However, asbestos asphalt concrete typically contains 1 to 2 percent asbestos, and the Agency determined that asbestos asphalt concrete operations using even these low percentages of asbestos are major sources. No data or information were received that would indicate asphalt concrete plants are not

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major [illegible], and the regulations promulgated herein apply to such sources. The Agency received [illegible] comments that the individual emission sources within an asbestos asphalt concrete plant which are subject to the proposed amendments should be specified. The Agency feels that revisions are not necessary. Only component operations that may emit asbestos are covered by the provisions; for example, if no asbestos is added to the aggregate dryer, the emissions from the dryer alone are not covered.

The possibility that the enforcement of the amendments promulgated herein for asphalt concrete plants may be in conflict with the enforcement of new source performance standards for asphalt concrete plants was raised by one commentator. It is possible that both the new source performance standard and the national emission standard for asbestos will apply simultaneously to emissions from some operations at some new and [illegible] plants. Where this occurs, the [illegible] emission standard promulgated herein applies to asbestos particulate [illegible]

[illegible]

bar [illegible] Agency [illegible] pose a [illegible] in [illegible] [illegible] to [illegible] it is [illegible] that there are no [illegible] [illegible] such a [illegible] and the selection of [illegible] should be [illegible] until [illegible] measuring techniques [illegible].

Demolition and [illegible] Comments were received which suggested that the proposed renovation provisions should not apply to operations carried out within buildings, or to operations regulated by the Occupational Safety and Health Administration (OSHA) for worker exposure to asbestos. The Agency recognizes that there may be less asbestos emissions from stripping of friable asbestos materials within a structure than from stripping at an unenclosed site. However, asbestos from the stripping operation carried out within a building or structure can be discharged into the outside air from building ventilation systems, [illegible]

[illegible]

considered, namely the prohibition of demolition under freezing conditions. The proposed alternative [illegible] only a portion of the wetting requirements under freezing conditions. Pipes, ducts, boilers, tanks, reactors, turbines, furnaces and structural members insulated or fireproofed with friable asbestos materials must be removed from the building in sections, to the maximum extent practicable, before wrecking of the building. The stripping of asbestos materials from the previously removed sections must be accompanied by wetting at all [illegible] resulting asbestos [illegible] wetted at all [illegible] do not [illegible] Therefore, the [illegible] based on [illegible] emission control methods at all temperatures, and these methods are different [illegible] non-freezing and freezing conditions.

Another comment [illegible]

[illegible]

[illegible] that the [illegible] material [illegible] asbestos material [illegible] and remain [illegible] regulation [illegible] proceedings. The Agency recognized the manufacturers and concluded that they are sufficiently clear that the [illegible] operators subject to the amendments can reasonably be expected to understand their terms. Owners or operators should be able to identify covered material and comply with the regulations on the basis of the definitions supplied.

Comments were made suggesting that the Agency describe more specifically a properly wetting operation. The purpose of the wetting requirements is to reduce the amount of asbestos dust generated during demolition operations. Many different procedures would accomplish this; therefore, the Agency believes that specifying such procedures is neither necessary nor appropriate. A new definition of "adequately wetted" was added to the regulations promulgated herein. The Agency believes that owners or operators of demolition operations are familiar with proper wetting procedures.

Some comments were made stating that the proposed demolition and renovation requirements are not emission standards and that asbestos emissions must be considered in determining compliance with the regulations. Congress has specified that EPA should set emission standards for hazardous air pollutants. EPA, charged with implementing this requirement, has determined that the term "emission standard" includes work practice requirements designed to limit emissions. The position taken by the Administrator on this issue in the promulgation of the original regulations on asbestos on April 6, 1973 (38 FR 8820) is maintained here. The demolition and renovation regulations require certain work procedures to be followed. These methods of control are required because the impossibility at this time of measuring and enforcing allowable numerical concentrations or mass emission limitations. One difficulty in prescribing numerical emission standards is the relative inaccuracy of asbestos analytical methods. Dr. Arnold Brown, testifying in a recent court case involving asbestos emissions (*United States et al v Keene Corp*, [illegible]

[illegible] Several commenters suggested that [illegible] should be excluded from the proposed amendments. Decisions upon the [illegible] at which asbestos waste is deposited at the site, the percentage of the total waste that is asbestos, the friability of the asbestos waste, and the extent to which the site is in active operation. These comments were considered, but no changes in the proposed amendments were made as a result of the Agency's reevaluation. It would be extremely difficult to enforce regulations that depend on the rate or asbestos content of waste deposition. Further, the provisions promulgated herein shift the focus of the waste disposal requirements away from the site operator to the generator of the waste. Because of this, the burden of the requirements on a waste disposal site operator who accepts only a very small quantity of asbestos waste, and who the commentators desire to exclude from the regulations, is largely removed.

A comment was made that the proposed amendments could cause considerable hardship to small users of asbestos because some waste disposal sites may no longer accept asbestos wastes. There are an estimated 5,000 waste disposal sites in the U.S. which meet the standards of a sanitary landfill. A properly operated sanitary landfill complies with the soil-covering requirements of the amendments, and therefore will be affected only slightly by handling asbestos wastes. Accordingly, the Agency believes that small manufacturers and users of asbestos will not encounter severe problems in complying with the amendments for waste disposal sites.

Two commentators were concerned that the proposed waste disposal provisions would cause serious problems in contract hauling arrangements, and in the use of private landfills, municipal landfills, and waste disposal sites leased by generators of the asbestos waste. Since the generator of the waste has the direct responsibility for compliance during the transport of waste and for disposing of the waste at a properly operated disposal site, the Agency believes that problems in contract hauling arrangements can be avoided if the generator institutes proper waste handling practices. The Agency also believes that

[illegible] A [illegible] be [illegible] from the amendments promulgated herein.

Comments were received which stated that the proposed use of sludge as a cover would probably preclude the disposal of waste in the cement pipe in commercial facilities. It is the Agency's judgment that commercial facilities which comply with the regulations will be available. Further, the proposed operation that is conventionally carried out during compaction at the disposal site can alternatively be performed and controlled by gas cleaning equipment at a stationary crusher.

Mercury

CHANGES TO PROPOSED AMENDMENTS

The proposed definition of "sludge dryer" has been revised to indicate more clearly that only sludge drying operations that are directly heated by combustion gases are covered by the amendment. The amendment does not apply to devices that are indirectly heated, such as secondary mercury recovery furnaces.

A comment suggested that daily sludge sampling and analysis should be required to reveal potential variations in mercury content of the sludge. The daily averages of sludge mercury content are not expected to vary significantly, and the Agency believes that the added cost to the owners or operators of such sources for daily sampling and analysis of sludge is not justified. Variations in mercury concentration of sludge can occur over longer periods of time, however, and a requirement has been added that all facilities for which emissions are in excess of 1600 grams per day as determined by the initial compliance test must monitor on a yearly basis with the sludge sampling method. In addition, the Agency has authority to require sludge sampling and analysis, of this sampling, and will exercise this authority whenever there are indications that a change in mercury [illegible] sampling devices, glassware and reagents should be ascertained free of significant amounts of mercury." A major source of mercury contamination occurs when sample solutions and reagents come into contact with mercury-contaminated containers. A comment indicated that a specific quantity should be stated to indicate how much mercury is considered "significant." The Agency believes that the specification of an amount of mercury contamination is inappropriate because such an amount would be very difficult to measure. The mercury contamination of containers can be reduced to an insignificant amount by properly cleaning such containers before use. The proposed paragraph has therefore been changed to specify that sample containers shall be properly cleaned before use by rinsing with nitric acid, followed by rinsing with distilled water. Another comment suggested that the possible interferences with the analysis of mercury in sludge should be delineated and that preventative measures should be given. In response, two references in which such interferences are discussed have been added to Method 105.

ADDITIONAL COMMENTS

The Agency has determined that an ambient air mercury concentration of 1 microgram per cubic meter averaged over a 30-day period will protect the public health with an ample margin of safety. The maximum allowable mercury emission for sludge incineration and drying plants was calculated by use of meteorological modeling techniques using restrictive dispersion conditions, that would not result in this ambient concentration being exceeded. The resulting maximum allowable emission is 3200 grams of mercury per day. Numerous comments were received that questioned the methodology used to calculate this emission limitation. Several comments [illegible] A copy of the Agency response to this comment is available for inspection at the Public Information Reference Center, Room 2404 Waterside Mall, [illegible] M St., Wash., D.C. 20460. The Agency knows of no sludge incineration or drying facility where the ambient guideline level of one microgram of mercury per cubic meter, 30-day average, will be exceeded. The following comments support the proposed emission limit as [illegible] or that additional studies [illegible] before promulgation were requested.

1. The proposed emission [illegible] vides an excessive safety factor [illegible] plant locations.

2. The proposed emission [illegible] be based on plant size, allowing [illegible] emissions for larger plants.

3. The intent of the proposed amendment seems to be to limit the size of [illegible] plants and require disposal [illegible] by alternative methods.

4. The regulation seems to be [illegible] sively stringent in order to [illegible] administration of the standard [illegible] tiple sources.

5. There is not enough information justify promulgating the amendment at this time; the promulgation should be delayed until further studies [illegible]

In contrast, several comments suggested that the proposed emission limit was too lenient. Since the emission limitation is related to an ambient concentration, it would be inappropriate to allow higher emissions for [illegible] Concerning plant locations, [illegible] impractical to specify [illegible] sion limitation for each possible plant location which would [illegible] meteorological conditions. Section 112 of the Act provides [illegible] tional standard, and the Administrator has set this standard at a level that will prevent exceeding the [illegible] ambient level at all locations. The Agency determined that there [illegible] cient information to justify [illegible] ing emission regulations for [illegible] sinterators and no data or [illegible] were presented that would justify [illegible] ing the mercury emission limit [illegible] grams per day.

A comment was made that the [illegible] of multiple sources of mercury [illegible] sions was not addressed in the [illegible]

[illegible]

[illegible] that the [illegible] from efficiency of individual water scrubbers should be assumed to be zero for purposes of determining compliance until positively proven otherwise. Another commentator stated that the proposed stack sampling method should take into account the amount of mercury that would be collected by a scrubber. The Agency has determined that the requirements of the standard are adequate. No credit for mercury removed by water scrubbers is allowed when compliance is determined by sludge sampling and analysis; however, if the mercury stack measurement method is used to determine compliance, only the amount of mercury emitted to the outside air is measured and any mercury collection by the system is taken into account. The Agency has determined that sludge sampling and analysis can be used for an alternative method to determine maximum mercury emissions, because it is sufficiently accurate. The method is also inexpensive when compared to a complete stack test.

The following comments were received which suggested changes in Method 105 for sludge sampling:

1. [illegible] potassium permanganate solution is difficult to prepare, and a different solution should be required.

2. [illegible] permanganate, should be used to stabilize mercury solutions.

3. [illegible] hydrochloride, also known as [illegible] should be used in place of this compound with [illegible] potassium permanganate.

4. Solutions of 5 percent potassium permanganate can be prepared at room temperature. The Agency has no experience in using potassium permanganate to stabilize mercury solutions, and has not used hydroxylamine hydrochloride to reduce excess potassium permanganate. The dry acid has proved to be safe to handle, but the use of this reagent [illegible] the Agency believes that the use of these reagents is unnecessary and that method has not been revised to accommodate these suggestions.

Environmental and Energy Impact

Environmental impact statements must accompany national emission [illegible] and fabrication plants. It is estimated that approximately 170 boilers of 1000 acfm capacity will be required to comply with the amendments. The operation of these control devices will require the consumption of 2.9 million kilowatt hours per year, which is equivalent to 2900 barrels per year of Number 6 fuel oil at a power generating station. The energy impact resulting from the NESHAPS amendment is small and is justified by the increased control of asbestos emissions.

There is no energy impact that results from the regulation of mercury emissions from sludge incinerators and dryers.

Effective upon promulgation.

(Secs. 112 and 114 of the Clean Air Act, as amended (42 U.S.C. 1857c-7 and 9))

Dated: October 3, 1975.

John Quarles,
Acting Administrator.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. The table of sections is amended as follows:

Subpart A—General Provisions

Sec.

* * * * *

61.07 Compromise.

* * * * *

Subpart C—National Emission Standard for Beryllium

* * * * *

61.32 Waste disposal site.

* * * * *

Subpart E—National Emission Standard for Mercury

* * * * *

61.52 Sludge incinerators.

61.53 Sludge dryers.

* * * * *

Appendix B—Test Methods

* * * * *

Method 105—Method for determination of mercury in wastewater treatment plant sewage sludges.

2. The authority citation at the end of the [illegible] for Part 61 is [illegible] as follows:

[illegible] Secs. 112 and 301(a) of the Clean Air Act [illegible] 42 U.S.C. [illegible] 1857c-7, 1857g(a) [illegible]

Subpart A—General Provisions

3. Section 61.14 is amended by revising paragraph [illegible] and [illegible] paragraph [illegible] revised and [illegible] paragraphs read as follows:

§ 61.14 Source test and analytical methods.

• • • • •

(c) The Administrator may, after notice to the owner or operator, withdraw approval of an alternative method granted under paragraph (a), (b) or (d) of this section. Where the test results using an alternative method do not adequately indicate whether a source is in compliance with a standard, the Administrator may require the use of the reference method or its equivalent.

(d) Method 105 in Appendix B to this part is hereby approved by the Administrator as an alternative method for sources subject to § 61.52(b).

4. A new § 61.17 is added to subpart A as follows:

§ 61.17 Circumvention.

No owner or operator subject to the provisions of this part shall build, erect, install, or use any article, machine, equipment, process, or method, the use of which conceals an emission which would otherwise constitute a violation of an applicable standard. Such concealment includes, but is not limited to, the use of gaseous diluents to achieve compliance with a visible emissions standard, and the piecemeal carrying out of an operation to avoid coverage by a standard that applies only to operations larger than a specified size.

Subpart B—National Emission Standard for Asbestos

5. Section 61.21 is amended by [illegible] paragraph (j) and adding [illegible] (k), (l), (m), (n), (o), (p), (q), [illegible] (t), (u), (v), and (w). [illegible] added paragraphs read as follows:

§ 61.21 Definitions.

•

(j) "[illegible] or taking [illegible] structural [illegible] moving [illegible] material [illegible]

(k) "[illegible] any material that [illegible] percent [illegible] by [illegible] can be crumbled, pulverized, or reduced to powder, when dry, by hand pressure.

(l) "[illegible] means any [illegible] material that is collected by a pollution control device.

(m) "Renovation" means the removing or stripping of friable asbestos material used to insulate or fireproof any pipe, duct, boiler, tank, reactor, turbine, or structural member. Operations in which load-supporting structural members are wrecked or taken out are excepted.

(n) "Planned renovation" means a renovation operation, or a number of such operations, in which the amount of friable asbestos material that will be removed or stripped within a given period of time can be predicted. [illegible] that are individually nonscheduled are included, provided a number of such operations can be predicted to occur during a given period of time based on operating experience.

(o) "Emergency renovation" means a renovation operation that results from a sudden, unexpected event, and is not a planned renovation. Operations necessitated by non-routine failures of equipment are included.

(p) "Adequately wetted" means sufficiently mixed or coated with water or an aqueous solution to prevent dust emissions.

(q) "Removing" means taking out friable asbestos materials used to insulate or fireproof any pipe, duct, boiler, tank, reactor, turbine, furnace or structural member from any building, structure, facility, or installation.

(r) "Stripping" means taking off friable asbestos materials used for insulation or fireproofing from any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member.

(s) "Fabricating" means any processing of a manufactured product containing commercial asbestos, with the exception of processing at temporary sites for the construction or restoration of buildings, structures, facilities or installations.

(t) "Inactive waste disposal site" means any disposal site or portion thereof where additional asbestos-containing waste material will not be deposited [illegible]

[illegible]

6. Section 61.22 is amended by [illegible]

• • •

(j) Roadways: The surfacing of roadways with asbestos tailings or with asbestos-containing waste that is generated by any source subject to paragraphs (c), (d), (e) or (h) of this section is [illegible]

or [illegible] except for temporary roadways on an area of asbestos ore deposits. The deposition of asbestos tailings or asbestos-containing waste on roadways covered with snow or ice is considered "surfacing."

(e) Manufacturing: There shall be no visible emissions to the outside air, except as provided in paragraph (f) of this section, from any of the following operations if they use commercial asbestos or from any building or structure in which such operations are conducted.

• • • • •

(10) The manufacture of shotgun shells.

(11) The manufacture of asphalt concrete.

(d) Demolition and renovation: The requirements of this paragraph shall apply to any owner or operator of a demolition or renovation operation who intends to demolish any institutional, commercial, or industrial building (including apartment buildings having more than four dwelling units), structure, facility, installation, or portion thereof which contains any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member that is insulated or fireproofed with friable asbestos material, except as provided in paragraph [illegible] of this section; or who intends to renovate any institutional, commercial, or industrial building, structure, [illegible] installation, or portion thereof [illegible] than 80 meters (ca. 260 feet) [illegible]

[illegible]

[illegible] or as early as possible prior to commencement [illegible] demolition [illegible] subject [illegible] the following information:

(i) Name of owner or operator.

(ii) [illegible]

(iii) [illegible]

(iv) [illegible] or [illegible] building.

(v) [illegible] tion dates of [illegible] demolition [illegible]

(vi) Nature of planned demolition or renovation and method(s) to be employed.

(vii) Procedures to be employed to meet the requirements of this paragraph of paragraph (i) of this section.

(viii) The name and address or location of the waste disposal site where the friable asbestos waste will be deposited.

(ix) Name, title, and authority of the State or local governmental representative who has ordered a demolition which is subject to paragraph (d)(6) of this section.

(3) (i) For purposes of determining whether a planned renovating operation constitutes a renovation within the meaning of this paragraph, the amount of friable asbestos material to be removed or stripped shall be:

(A) For planned renovating operations involving individually non-scheduled operations, the additive amount of friable asbestos material that can be predicted will be removed or stripped at a source over the maximum period of time for which a prediction can be made. The period shall be not less than 30 days and no longer than one year.

(B) For each planned renovating operation not covered by paragraph (d)(3)(i)(A), the total amount of friable asbestos material that can be predicted will be removed or stripped at a source.

(ii) For purposes of determining whether an emergency renovating operation constitutes a renovation within the meaning of this paragraph, the amount of friable asbestos material to be removed or stripped shall be the total amount of friable asbestos material that will be removed or stripped as a result of the sudden, unexpected event that necessitated the renovation.

(4) The following procedures shall be used to prevent emissions of particulate asbestos material to outside air:

(i) Friable asbestos materials, used to insulate or fireproof any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member, shall be removed from any building, structure, facility or installation subject to this paragraph. Such removal shall occur before wrecking or dismantling of any portion of such building, structure, facility, or installation that would break up the friable asbestos materials and before [illegible]

[illegible]

(iii) Pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members that are insulated or fireproofed with friable asbestos materials may be taken out of any building, structure, facility, or installation subject to this paragraph as units or in sections provided the friable asbestos materials exposed during cutting or disjointing are adequately wetted during the cutting or disjointing operation. Such units shall not be dropped or thrown to the ground, but shall be carefully lowered to ground level.

(iv) The stripping of friable asbestos materials used to insulate or fireproof any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member that has been removed as a unit or in sections as provided in paragraph (d)(4)(iii) of this section shall be performed in accordance with paragraph (d)(4)(ii) of this section. Rather than comply with the wetting requirement, a local exhaust ventilation and collection system may be used to prevent emissions to the outside air. Such local exhaust ventilation systems shall be designed and operated to capture the asbestos particulate matter produced by the stripping of friable asbestos material. There shall be no visible emissions to the outside air from such local exhaust ventilation and collection systems except as provided in paragraph (f) of this section.

(v) All friable asbestos materials that have been removed or stripped shall be adequately wetted to ensure that such materials remain wet during all remaining stages of demolition or renovation and related handling operations. Such materials shall not be dropped or thrown to the ground or a lower floor. Such materials that have been removed or stripped more than 50 feet above ground level, except those materials removed as units or in sections, shall be transported to the ground via dust-tight chutes or containers.

(vi) Except as specified below, the wetting requirements of this paragraph are suspended when the temperature at the point of wetting is below 0°C (32°F). When friable asbestos materials are not wetted due to freezing temperatures, such materials on pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural [illegible] exhaust ventilation systems shall be designed and operated to capture the asbestos particulate matter produced by the stripping and removal of friable asbestos material. There shall be no visible emissions to the outside air from such local exhaust ventilation and collection systems, except as provided in paragraph (f) of this section.

(5) Sources subject to this paragraph are exempt from the requirements of §§ 61.05(a), 61.07, and 61.09.

(6) The demolition of a building, structure, facility, or installation, pursuant to an order of an authorized representative of a State or local governmental agency, issued because that building is structurally unsound and in danger of imminent collapse is exempt from all but the following requirements of paragraph (d) of this section:

(i) The notification requirements specified by paragraph (d)(2) of this section;

(ii) The requirements on stripping of friable asbestos materials from previously removed units or sections as specified in paragraph (d)(4)(iv) of this section;

(iii) The wetting, as specified by paragraph (d)(4)(v) of this section, of friable asbestos materials that have been removed or stripped;

(iv) The portion of the structure being demolished that contains friable asbestos materials shall be adequately wetted during the wrecking operation.

(e) * * *

(2) Any owner or operator who intends to spray asbestos materials which contain more than 1 percent asbestos on a dry weight basis to insulate or fireproof equipment and machinery shall report such intention to the Administrator at least 20 days prior to the commencement of the spraying operation. Such report shall include the following information: * * *

(f) Rather than meet the no-visible-emission requirements as specified by paragraphs (a), (c), (d), (e), (h), (i), and (j) of this section, an owner or operator may elect to use the methods specified by § 61.23 to clean emissions containing particulate asbestos material before such emissions escape to, or are vented to, the outside air.

(g) Where the presence of uncombined water is the sole reason for failure to meet the no-visible-emission requirement of paragraphs (a), (c), (d), (e),

(3) Rather than meet the requirement of paragraph (j)(1) of this section, an owner or operator may elect to use either of the disposal methods specified under (j)(3)(i) and (ii) of this section, or an alternative disposal method which has received prior approval by the Administrator:

(i) Treatment of asbestos-containing waste material with water:

(A) Control device asbestos waste shall be thoroughly mixed with water into a slurry and other asbestos-containing waste material shall be adequately wetted. There shall be no visible emissions to the outside air from the collection, mixing and wetting operations, except as provided in paragraph (f) of this section.

(B) After wetting, all asbestos-containing waste material shall be sealed into leak-tight containers while wet, and such containers shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(C) The containers specified under paragraph (j)(3)(i)(B) of this section

(2) Warning signs shall be displayed at all entrances and along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material was deposited, at intervals of 100 m (ca 330 ft) or less, except as specified in paragraph (j)(4) of this section. Signs shall be posted in such a manner and location that a person may easily read the legend. The warning signs required by this paragraph shall conform to the requirements of 20" x 14" upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

Legend

Asbestos Waste Disposal Site

Do Not Create Dust

Breathing Asbestos is Hazardous to Your Health

Notation

1" Sans Serif, Gothic or Block

¼" Sans Serif, Gothic or Block

14 Point Gothic

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

(3) The perimeter of the site shall be fenced in a manner adequate to deter access by the general public, except as specified in paragraph (j)(4) of this section.

(4) Warning signs and fencing are not required where the requirements of paragraphs (j)(1)(i) (ii) or (ii) of this section are met or where a natural barrier adequately deters access by the general public. Upon request and supply of appropriate information, the Administrator will determine whether a fence or a natural barrier adequately deters access to the general public.

(5) Rather than meet the requirements of paragraph (j)(1) of this section, an owner may elect to meet the requirements of this paragraph or may use an alternative control method for emissions from inactive waste disposal sites which

be used [illegible] Administrator. For purposes of this paragraph, waste crankcase oil is not considered a dust suppression agent.

7. The first sentence in § 61.23 is revised as follows:

§ 61.23 Air-Cleaning.

If air-cleaning is elected, as permitted by §§ 61.22(f) and 61.22(d)(2)(iv), the requirements of this section must be met.

• • •

8. The first sentence in § 61.24 is revised and redesignated as paragraph (e) and new paragraphs (c) and (d) are added as follows:

§ 61.24 Reporting.

• • • • •

(c) For sources subject to §§ 61.22(j) and 61.22(k):

(1) A brief description of each process that generates asbestos-containing waste material.

(2) The average weight of asbestos-containing waste material disposed of, measured in kg/day.

(3) The emission control methods used in all stages of waste disposal.

(4) The type of disposal site or incineration site used for ultimate disposal, the name of the site operator, and the name and location of the disposal site.

(d) For sources subject to § 61.22(l):

(1) A brief description of the site.

(2) The method or methods used to comply with the standard, or alternative procedures to be used.

(e) Such information shall accompany the information required by § 61.10. The information described in this section shall be reported using the format of Appendix A of this part.

9. A new section 61.25 is added to subpart B as follows:

§ 61.25 Waste disposal sites.

In order to be an acceptable site for disposal of asbestos-containing waste material under § 61.22 (j) and (k), an active waste disposal site shall meet the requirements of this section.

(a) There shall be no visible emissions to the outside air from any active waste

[illegible]

LEGEND

Asbestos Waste Disposal Site

Do Not Create Dust

Breathing Asbestos
Is Hazardous to Your Health

Notation

1" Sans Serif, Gothic or Block

½" Sans Serif, Gothic or Block

14 Point Gothic

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

(c) The perimeter of the disposal site shall be fenced in order to adequately deter access to the general public except as specified in paragraph (d) of this section.

(d) Warning signs and fencing are not required where the requirements of paragraph (a)(1) of this section are met, or where a natural barrier adequately deters access to the general public. Upon request and supply of appropriate information, the Administrator will determine whether a fence or a natural barrier adequately deters access to the general public.

(e) Rather than meet the requirement of paragraph (a) of this section, an owner or operator may elect to meet the requirements of paragraph (e)(1) or (e)(2) of this section, or may use an alternative control method for emissions from active waste disposal sites which has received prior approval by the Administrator.

(1) At the end of each operating day, or at least once every 24-hour period while the site is in continuous operation, the asbestos-containing waste material which was deposited at the site during the operating day or previous 24-hour period shall be covered with at least 15 centimeters (cm. 6 inches) of compacted non-asbestos-containing material.

(2) At the end of each operating day, or at least once every 24-hour period while the disposal site is in continuous operation, the asbestos-containing waste material which was deposited at the site during the operating day or previous 24-hour period shall be covered with a resinous or petroleum-based dust suppression agent which effectively binds dust

[illegible]
for Mercury

[illegible]

§ 61.50 Applicability.

[illegible]

11. Section 61.51 is amended by adding paragraphs (l) and (m) as follows:

§ 61.51 Definitions.

• • • • •

(l) "Sludge" means sludge produced by a treatment plant that processes municipal or industrial waste waters.

(m) "Sludge dryer" means a device used to reduce the moisture content of sludge by heating to temperatures above 65°C (ca. 150°F) directly with combustion gases.

12. Section 61.52 is revised to read as follows:

§ 61.52 Emission standard.

(a) Emissions to the atmosphere from mercury ore processing facilities and mercury cell chlor-alkali plants shall not exceed 2300 grams of mercury per 24-hour period.

(b) Emissions to the atmosphere from sludge incineration plants, sludge drying plants, or a combination of these that process wastewater treatment plant sludges shall not exceed 3200 grams of mercury per 24-hour period.

13. Section 61.53 is amended by adding paragraph (d) as follows:

§ 61.53 Stack sampling.

• • • • •

(d) Sludge incineration and drying plants.

(1) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator of a source subject to the standard in § 61.52(b) shall test emissions from that source. Such tests shall be conducted in accordance with the procedures set forth either in paragraph (d) of this section or in § 61.54.

(2) Method 101 in Appendix B to this part shall be used to test emissions as follows:

(i) The test shall be performed within 90 days of the effective date of these regulations in the case of an existing source or a new source which has an initial startup date preceding the effective date.

(ii) The test shall be performed within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

[illegible] tion by the Administrator for a period of 2 years.

14. Sections 61.54 [illegible] 61.55 are added as follows:

§ 61.54 Sludge sampling.

(a) As an alternative means for demonstrating compliance with § 61.52 (b), an owner or operator may use Method 105 of Appendix B and the procedures specified in this section.

(1) A sludge test shall be conducted within 90 days of the effective date of these regulations in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(2) A sludge test shall be conducted within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(b) The Administrator shall be notified at least 30 days prior to a sludge sampling test, so that he may at his option observe the test.

(c) Sludge shall be sampled according to paragraph (c)(1) of this section, sludge charging rate for the plant shall be determined according to paragraph (c)(2) of this section, and the sludge analysis shall be performed according to paragraph (c)(3) of this section.

(1) The sludge shall be sampled after dewatering and before incineration or drying, at a location that provides a representative sample of the sludge that is charged to the incinerator or dryer. Eight consecutive grab samples shall be obtained at intervals of between 45 and 60 minutes and thoroughly mixed into one sample. Each of the eight grab samples shall have a volume of at least 200 ml but not more than 400 ml. A total of three composite samples shall be obtained within an operating period of 24 hours. When the 24-hour operating period is not continuous, the total sampling period shall not exceed 72 hours after the first grab sample is obtained. Samples shall not be exposed to any condition that may cause [illegible] contamination or loss.

[illegible]

(c) No [illegible] in the operation of a plant [illegible] after a sludge test has been [illegible] which will potentially [illegible] emissions above the level determined by the most recent sludge test, until the new emission level has been estimated by calculation and the results reported to the Administrator.

[illegible]

§ 61.55 [illegible]

(a) [illegible] Section [illegible] 1600 grams, [illegible] tested either by [illegible] according to § 61.54 or sludge sampling necessary to § 61.54, [illegible] at least once per year by use of Method 105 of Appendix B, or the procedures specified in § 61.54(c) and (d). The results of monitoring shall be reported and retained according to § 61.53(d) (5) and (6), or § 61.54(f) and (g).

15. Appendix A is revised to a new reporting format, and sections (I) (C) and (I) (D) are added as follows:

APPENDIX A

National Emission Standards for Hazardous Air Pollutants

Compliance Status Information

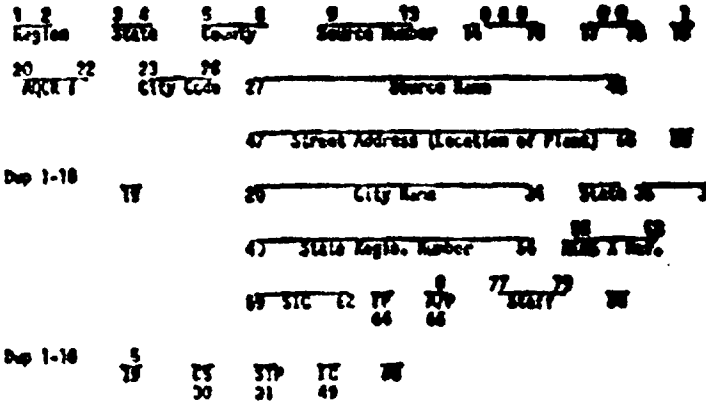
I. SOURCE REPORT

INSTRUCTIONS: Owners or operators of sources of hazardous pollutants subject to the National Emission Standards for Hazardous Air Pollutants are required to submit the information contained in Section I to the appropriate U.S. Environmental Protection Agency Regional Office prior to 90 days after the effective date of any standards or amendments which require the submission of such information.

A list of regional offices is provided in §61.04.

A. SOURCE INFORMATION

1. Identification/location - Indicate the name and address of each source.



2. Contact - Indicate the name and telephone number of the owner or operator or other responsible official whom L/A may contact concerning this report.

(c) The Administrator shall be notified at least 30 days prior to the [illegible] at the option of the Administrator.

[illegible] shall be taken [illegible] a sufficient degree to obtain a representative sample [illegible] the maximum [illegible] during the [illegible] of the [illegible] in the [illegible] of the [illegible] the level determined by the most recent [illegible] test, until the new [illegible] level has been estimated by [illegible] and the results reported to the Administrator.

(d) All [illegible] shall be [illegible] for [illegible] and [illegible] shall be [illegible] for [illegible] by the Administrator, for a minimum of 2 years.

(e) All sample analyses and [illegible] shall be completed within 30 days after the sludge test. Each determination shall be reported to the Administrator by a registered letter postmarked before midnight of the thirtieth day following the end of such determination.

(f) Records of emission test results and other data used to determine total emissions shall be recorded at the source and shall be made available for inspection by the Administrator, for a minimum of 2 years.

14. Sections 61.54 and 61.55 are added as follows:

§ 61.54 Sludge sampling.

(a) As an alternative means for demonstrating compliance with § 61.52 (b), an owner or operator may use Method 105 of Appendix B and the procedures specified in this section.

(1) A sludge test shall be conducted within 90 days of the effective date of these regulations in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(2) A sludge test shall be conducted within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(b) The Administrator shall be notified at least 30 days prior to a sludge sampling test, so that he may at his option observe the test.

(c) Sludge shall be sampled according to paragraph (c)(1) of this section, sludge charging rate of the plant shall be determined according to paragraph (c)(2) of this section, and the sludge analysis shall be performed according to paragraph (c)(3) of this section.

(1) The sludge shall be sampled after dewatering and before incineration or drying, at a location that provides a representative sample of the sludge that is charged to the incinerator or dryer. Eight consecutive grab samples shall be obtained at intervals of between 45 and 60 minutes and thoroughly mixed into one sample. Each of the eight grab samples shall have a volume of at least 200 ml but not more than 400 ml. A total of three composite samples shall be obtained within an operating period of 24 hours. When the 24-hour operating period is not continuous, the total sampling period shall not exceed 72 hours after the first grab sample is obtained. Samples shall not be exposed to any condition that may result in mercury contamination or loss.

(2) [illegible] shall be [illegible] that [illegible] be [illegible] by the incinerator [illegible] OR [illegible] charging rate may be [illegible] recorded [illegible] approval by the Administrator.

(3) The handling, preparation and analysis of sludge samples shall be accomplished in accordance with Method 105 in Appendix B of this part.

(d) The mercury emissions shall be determined by use of the following equation:

$$E_{Hg} = 10^{-6} cQ$$

where

E_{Hg} = mercury emissions, g/day.

c = mercury concentration of sludge on a dry solids basis, g/g (ppm).

Q = sludge charging rate, kg/day.

(e) No changes in the operation of a plant shall be made after a sludge test has been conducted which would potentially increase emissions above the level determined by the most recent sludge test, until the new emission level has been estimated by calculation and the results reported to the Administrator.

(f) All [illegible] shall be [illegible] for [illegible] and [illegible] shall be [illegible] for [illegible] by the Administrator, for a minimum of 2 years.

§ 61.55 Emission monitoring.

(a) Wastewater treatment plant sludge incineration and drying plants: All such sources for which mercury emissions exceed 1600 g/day, demonstrated either by stack sampling according to § 61.53 or sludge sampling according to § 61.54, shall monitor mercury emissions at intervals of at least once per year by use of Method 105 of Appendix B, or the procedures specified in § 61.54(c) and (d). The results of monitoring shall be reported and retained according to § 61.53(d) (5) and (6), or § 61.54(f) and (g).

15. Appendix A is revised to a new reporting format, and sections (D (C) and (I) (D) are added as follows:

APPENDIX A

National Emission Standards for Hazardous Air Pollutants

Compliance Status Information

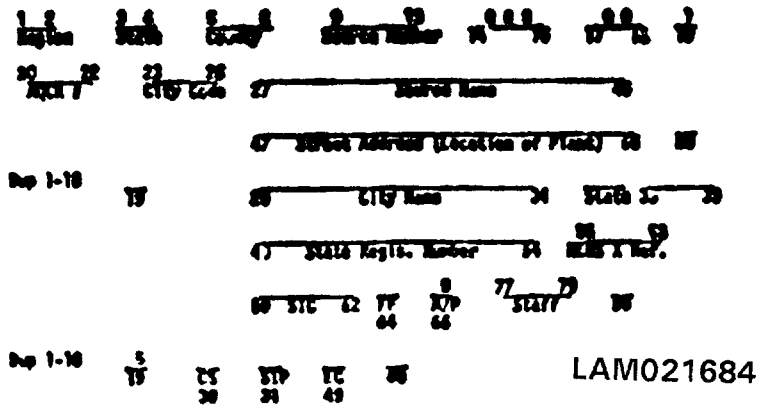
I. SOURCE REPORT

INSTRUCTIONS: Owners or operators of sources of hazardous pollutants subject to the National Emission Standards for Hazardous Air Pollutants are required to submit the information contained in Section I to the appropriate U.S. Environmental Protection Agency Regional Office prior to 90 days after the effective date of any Standards or amendments which require the submission of such information.

A list of regional offices is provided in 61.06.

A. SOURCE IDENTIFICATION

1. Identification/Location - Indicate the name and address of each source.



LAM021684

2. Contact - Indicate the name and telephone number of the owner or operator or other responsible official whom EPA may contact concerning this report.

Dup 1-18 4 1
19 20 21 [redacted] 43

44 46
Area Code 47 [redacted] 54 80

3. Source Description - Briefly state the nature of the source (e.g., "Chlor-alkali Plant" or "Machine Shop").

Dup 1-18 4 2
19 20 21 [redacted] Description [redacted] 50

51 [redacted] Continued [redacted] 79 80

4. Alternative Mailing Address - Indicate an alternative mailing address if correspondence is to be directed to a location different than that specified above.

Dup 1-18 4 3
19 20 21 [redacted] Number Street or Box Number [redacted] 45 80

Dup 1-18 4 4
19 20 21 [redacted] City [redacted] 36 37 38 State 41 Zip 44 80

5. Compliance Status - The emissions from this source ___ can ___ cannot meet the emission limitations contained in the National Emission Standards on or prior to 90 days after the effective date of any standards or amendments which require the submission of such information.

Signature of Owner, Operator or Other Responsible Official

NOTE: If the emissions from the source will exceed those limits set by the National Emission Standards for Hazardous Air Pollutants, the source will be in violation and subject to federal enforcement actions unless granted a waiver of compliance by the Administrator of the U.S. Environmental Protection Agency. The information needed for such waivers is listed in Section II of this form.

---

6. Process Information. Part B should be completed separately for each point of emission for each hazardous pollutant. [Sources subject to 61.22(1) may omit number 4. below.]

Dup 1-13 6 6 1
13 16 17 18 19 [redacted] SCC 32 33 34 35 36 37
HAPs & Ref 38 39

1. Pollutant Emitted - Indicate the type of hazardous pollutant emitted by the process. Indicate "AS" for asbestos, "BE" for beryllium, or "HG" for mercury.

28 29
Pollutant [ ] [ ] Description [ ]

2. Process Description - Provide a brief description of each process (e.g., "hydrogen and [illegible]" in a mercury chlor-alkali plant, "grinding machine" in a beryllium machine shop). Use additional sheets if necessary.

Process Description [ ]

Emp 1-10 [ ]

Emp 1-10 [ ]

3. [illegible]

Rep 1-10 [illegible] SECONDARY CONTROL DEVICE(S):

[illegible] Secondary Device Name [illegible] Percent Removal Efficiency

b. Asbestos Emission Control Devices Only

1. If a baghouse is specified in Item 4a, give the following information:

- The air flow permeability in cubic feet per minute per square foot of fabric area.

  Air flow permeability = _____ cfm/ft²

- The pressure drop in inches water gauge across the filter at which the baghouse is operated.

  Operating pressure drop = _____ inches w.g.

- If the baghouse automatic confirm continuity fill vent, check whether this monitor is / / open / / or not open.

- If the baghouse utilizes a felted fabric, give the minimum thickness in inches and the density in ounces per square yard.

  Thickness = _____ inches, Density = _____ oz/yd²

[illegible]

1. Waste Generation - Provide a brief description of each process that generates asbestos-containing waste (e.g. disposal of control device wastes).

Process Description

2. Asbestos Concentration - Indicate the average percentage asbestos content of these materials.

Asbestos Concentration

3. Amount of Waste - Indicate the average weight of asbestos-containing wastes disposed of, measured in kg/day.

4. Control Methods - Indicate the asbestos control methods used in all stages of waste disposal, from collection, processing, and packaging to transporting and disposition.

Seq 1-10 6 6 OPERATOR:

Seq 1-10 6 7 LOCATION:

B. WASTE DISPOSAL SITES. Part B should be completed separately for each asbestos waste disposal site subject to section 61.[illegible].

Seq 1-10

[illegible]

2. Inactivation - After the site is inactivated, indicate the method or methods used to comply with the standard and send a list of the actions that will be undertaken to maintain the inactivated site.

Rep 1-10 [illegible] COMPLIANCE [illegible] RETAIL/INACTIVE SITE

[illegible]

II. [illegible]

A. WAIVER OF COMPLIANCE - Owners or operators of sources unable to operate in compliance with the National Emission Standards for Hazardous Air Pollutants prior to 90 days after the effective date of any standards or amendments which require the submission of such information may request a waiver of compliance from the Administrator of the U.S. Environmental Protection Agency for the time period necessary to install appropriate control devices or make modifications to achieve compliance. The Administrator may grant a waiver of compliance with the standard for a period not exceeding two years from the effective date of the standard whenever applicable if he finds that such period is necessary for the installation of controls and that steps will be taken during the period of the waiver to assure that the health of persons will be protected from imminent endangerment.

[illegible]

Dup 1-16 0 1 7 17 19 53 54 55 60 61 MO/DY/YR 66 73

* Date of initiation of on-site construction or installation of emission control equipment or process change.

Dup 1-16 0 2 7 17 19 53 54 55 60 61 MO/DY/YR 66 73

* Date by which on-site construction or installation of emission control equipment or process modification is to be completed.

Dup 1-16 0 3 7 17 19 53 54 55 60 61 MO/DY/YR 66 73

* Date by which final compliance is to be achieved.

Dup 1-16 0 4 7 17 19 53 54 55 60 61 MO/DY/YR 66 73

D. WAIVER OF EMISSION TESTS. A waiver of emission testing may be granted to owners or operators of sources of beryllium or mercury pollutants if, in the judgment of the Administrator of the Environmental Protection Agency the emissions from the source comply with the appropriate standard or if the owners or operators of the source have requested a waiver of compliance or have been granted a waiver of compliance.

This application should accompany the report information provided in Section I.

1. Reason - State the reasons for requesting a waiver of emission testing. If the reason stated is that the emissions from the source are within the prescribed limits, documentation of this condition must be attached.

____

____

Date Signature of the owner or operator

APPENDIX B—TEST METHODS

10. Method 105 is added by Appendix B as follows:

* * * * *

METHOD 105. METHOD FOR DETERMINATION OF MERCURY IN WASTEWATER TREATMENT PLANT SEWAGE SLUDGES

1. *Principle and applicability.* 1.1 Principle.—A weighed portion of the sewage sludge sample is digested [illegible] with potassium permanganate. Mercury in the digested sample is then measured by the conventional [illegible] technique. An alternative digestion [illegible] the use of an autoclave is described in paragraph 4.3.2 of this method.

1.2 Applicability.—This method is applicable for the [illegible]

[illegible]

2. Apparatus. 2.1 [illegible] conventional cold vapor [illegible] used to analyze the sample.

2.1.1 Atomic Absorption Spectrophotometer[1].—Any atomic absorption unit having an open sample presentation area in which to mount the absorption cell is suitable. Instrument settings recommended by the particular manufacturer should be followed.

[1] Instruments designed specifically for the measurement of mercury using the cold vapor technique are commercially available and may be substituted for the atomic absorption spectrophotometer.

2.1.2 Mercury Hollow Cathode Lamp—[illegible]

[illegible]

2.1.4 Absorption Cell—Standard spectrophotometer cells 10 cm long, having quartz end windows may be used. [illegible]

[illegible]

2.1.5 Air Pump—Any peristaltic pump capable of delivering 1 liter of air per minute may be used. A [illegible] pump with [illegible] control has been found to be satisfactory. (Regulated compressed air can be used in an open one-pass system.)

2.1.6 Flowmeter—Capable of measuring an air flow of 1 liter per minute.

2.1.7 Aeration Tubing—Tygon tubing is used for passage of the mercury vapor from the sample bottle to the absorption cell and return. Straight glass tubing terminating in a coarse porous frit is used for sparging air into the sample.

2.1.8 Drying Tube—15 cm long x 1.9 cm diameter (ca. 6" long x 3/4" diameter) tube containing 20 grams of the desiccant magnesium perchlorate. The apparatus is assembled as shown in Figure 1. [illegible] in place of the magnesium perchlorate drying tube [illegible] reading lamp with 60W bulb may be used to prevent condensation of moisture inside the cell. The lamp is positioned [illegible] interfere with the measurement [illegible] the absorption cell [illegible] the air temperature about 5°C above ambient.

3. Reagents. 3.1 Analysis.

3.1.1 Aqua Regia. [illegible] immediately before use by carefully adding [illegible] of concentrated HCl to one volume of concentrated HNO_3.

3.1.2 Sulfuric Acid, 0.5N. Dilute 14.0 ml of concentrated sulfuric acid to 1.0 liter.

3.1.3 Stannous Sulfate. Add 25 g stannous sulfate to 250 ml of 0.5N sulfuric acid. This mixture is a suspension and should be stirred continuously during use. Stannous chloride may be used in place of the stannous sulfate.

3.1.4 Sodium Chloride—Hydroxylamine Sulfate Solution.—Dissolve 12 grams of sodium chloride and 12 grams of hydroxylamine sulfate in distilled water and dilute to 100 ml. Hydroxylamine hydrochloride may be used in place of the hydroxylamine sulfate.

3.1.5 Potassium Permanganate—5% solution, w/v. Dissolve 5 grams of potassium permanganate in 100 ml of distilled water.

3.1.6 Stock Mercury Solution.—Dissolve 0.1354 grams of reagent grade mercuric chloride (Assay >99%) in 75 ml of distilled water. Add 10 ml of concentrated nitric acid and adjust the volume to 100.0 ml. 1 ml = 1 mg Hg.

3.1.7 Working Mercury Solution—Make successive dilutions of the stock mercury solution to obtain a working standard containing 0.1 μg per ml. This working standard and the dilutions of the stock mercury solution should be prepared fresh daily. Acidity of the working standard should be maintained at 0.15% nitric acid. This acid should be added to the flask as needed before the addition of the [illegible]

[illegible]

4.1 Sample Handling and Preservation.

4.1.1 [illegible] of the [illegible] should be taken [illegible] Sample containers should be [illegible] sealed before use. These should be stored [illegible] followed by distilled water.

4.1.2 While the sample may be analyzed without drying, it has been found to be more convenient to analyze a dry sample. Moisture may be driven off in a drying oven at a temperature of 60°C. No significant mercury losses have been observed by using this drying step. The dry sample should be pulverized and thoroughly mixed before the aliquot is weighed.

4.2 Interferences.

4.2.1 Interferences that may occur in sludge samples are sulfides, high copper, high chlorides, etc. A discussion of possible interferences and suggested preventative measures to be taken is given in Reference (6) (7).

4.2.2 Volatile materials which absorb at the 253.7 nm will cause a positive interfer-

BC03534

6113
18718

LAM021691

...ple. In order to remove any interfering ... in matrix, the dead air space in the ... shall be purged with nitrogen ... stannous chloride.

4.3 Handling Sample Directly Vapors After Acid Digestion.

4.3.1 Because of the toxic nature of mercury vapor, precaution must be taken to avoid its inhalation. Therefore, a bypass should be included in the aeration system to either vent the mercury vapor to an ...ous chemical such as ...

(a) Equal volumes of 0.15 N $KMnO_4$ and 10% H_2SO_4.

(b) A 25% solution in a 3% KI solution.

A specially treated charcoal that will absorb mercury vapor is also available from Barnebey and Cheney, 835 6th Ave. and North Cassady St., Columbus, Ohio 43219, Catalog No. 580-13 or No. 580-21.*

4.4 Calibration.

4.4.1 Transfer 0, 0.5, 1.0, 2.0, 5.0 and 10 ml aliquots of the working mercury solution containing 0 to 1.0 μg of mercury to a series of 300-ml BOD bottles. Add enough distilled water to each bottle to make a total volume of 10 ml. Add 5 ml of aqua regia and heat 2 minutes in a water bath at 95°C. Allow the sample to cool and add 50 ml distilled water and 15 ml of $KMnO_4$ solution to each bottle and return to the water bath for 30 minutes. Cool and add 6 ml of sodium chloride-hydroxylamine sulfate solution to reduce the excess permanganate. Add 50 ml of distilled water. Treating each bottle individually, add 5 ml of stannous sulfate solution and immediately attach the bottle to the aeration apparatus. At this point, the sample is allowed to stand quietly without manual agitation. The circulating pump, which has previously been adjusted to a rate of 1 liter per minute, is allowed to run continuously. The absorbance, as indicated either on the ... spectrophotometer recorder, will ... and level off in approximately ... minutes. As soon as the ... absorbance has been obtained, ... immediately 2 ml of ... the ... valve and continue the aeration until the absorbance returns to the minimum value. Close the bypass valve, remove the fritted tube from the BOD bottle and continue the aeration process with the atmosphere of the system. A standard curve by plotting peak ... absorbance ... micrograms of mercury.

4.5 Analysis.

4.5.1 Weigh triplicate 0.2g ± 0.001 g portions of dry sample and place in bottom of a BOD bottle. Add 5 ml of distilled water and 5 ml of aqua regia. Heat 2 minutes in a water bath at 95°C. Cool and add 50 ml distilled water and 15 ml potassium permanganate solution to each sample bottle. Mix thoroughly and place in the water bath for 30 minutes at 95°C. Cool and add 6 ml of sodium chloride-hydroxylamine sulfate to reduce the excess permanganate. Add 50 ml of distilled water. Treating each bottle individually, add 5 ml of stannous sulfate and immediately attach the bottle to the aeration apparatus. With each sample, continue as described in paragraph 4.4.1 of this method.

4.5.2 An alternative digestion procedure using an autoclave may also be used. In this method 5 ml of concentrated H_2SO_4 and 2 ml of concentrated HNO_3 are added to the 0.2 grams of sample. 5 ml of saturated $KMnO_4$ solution are added and the bottle is covered with a piece of aluminum foil. The samples are autoclaved at 121°C and 21 kg/cm² (ca. 20 psig) for 30 minutes. Cool, make up to a volume of 100 ml with distilled water, and add 6 ml of sodium chloride-hydroxylamine sulfate solution to reduce the excess permanganate. Purge the dead air space and continue as described in paragraph 4.4.1 of this method.

5. Calculation. 5.1 Locating the peak height of the unknown from the chart and read the mercury value from the standard curve.

5.2 Calculate the mercury concentration in the sample by the formula:

$$\mu g\ Hg/gm = \frac{\mu g\ Hg \text{ in the aliquot}}{\text{wt. of the aliquot in g}}$$

5.3 Report mercury concentrations as follows: Below 0.1 μg/g, between 0.1 and 1 μg/g, to the nearest 0.01 μg/g, between 1 and 10 μg/g, to nearest 0.1 μg; above 10 μg/g, to nearest μg.

6. *Precision and accuracy.* 6.1 According to the precision method in reference number 6, the following standard deviations on replicate sediment samples have been recorded at the indicated levels: 0.70 μg/g ± 0.02 and 0.82 μg/g ± 0.07. Recovery of mercury at these levels, added as methyl mercuric chloride, was 97 and 94%, respectively.

7. *References.*

1. Bishop, J. W. "Mercury in Sediments," Ontario Water Resources Comm., Toronto, Ontario, Canada, 1971.

2. Salma, M. Private communication, EPA Col. New Delta Office, Alameda, California.

3. Hatch, W. R., and Ott, W. L. "Determination of Sub-Microgram Quantities of Mercury by Atomic Absorption Spectrophotometry," Anal. Chem. 40, 2085 (1968).

4. Brandenberger, H. and Bader, H. "The Determination of Nanogram Levels of Mercury in Solution by a Flameless Atomic Absorption Technique," Atomic Absorption Newsletter 6, 101 (1967).

5. Analytical Quality Control Laboratory (AQCL), Environmental Protection Agency, Cincinnati, Ohio, "Mercury in Sediment (Cold Vapor Technique)," Provisional Method, April 1971.

6. Kopp, J. F., Longbottom, M. E., and Lobring, L. B. "Cold Vapor Method for Determining Mercury," Journal AWWA, 64, 1 (1972), pp. 20-26.

7. "Manual of Methods for Chemical Analysis of Water and Wastes," Environmental Protection Agency, [illegible], pp. [illegible].

[illegible] Filed 10-26-73; 8:45 am]

*Mention of trade names or commercial products does not constitute endorsement by the Environmental Protection Agency.

sponsible for promulgating and enforcing occupational safety and health standards and deciding contested cases, subject to judicial review.

(b) The State program will protect all employees within the State, including those employed by the State and its political subdivisions. Public employees are to be granted the same protections as are afforded employees in the private sector. The State plan does not cover employees of the Federal government or those employees whose working conditions are regulated by Federal agencies other than the United States Department of Labor.

(c) The Wyoming Occupational Health and Safety Act gives the State agency full authority to administer and to enforce all laws, rules, and orders protecting employee safety and health in all places of employment in the State. The legislation provides employer and employee representatives an opportunity to accompany inspectors before or during the physical inspection of any workplace for the purpose of aiding such inspection; adequate safeguards to protect trade secrets; effective sanctions against employers; protection of employees against discharge or discrimination; procedures for prompt restraint or elimination of imminent danger situations; the right to notice by employers and employees of alleged violations, abatement periods and proposed penalties; and prompt notice to employers and employees of alleged violations of standards and abatement requirements.

(d) Administrative [illegible]

[illegible]

(e) The State intends [illegible] Federal standards [illegible]

[illegible] by the Federal [illegible] State within six months [illegible] tion by the Secretary of Labor. In the case of product standards the State has provided assurances that any State product standards will be required by compelling local conditions and will not unduly burden interstate commerce.

(f) The plan sets out goals and provides a timetable for bringing it into full conformity with Part 1902 of this chapter. All personnel employed to carry out the plan are to be hired under the Wyoming Personnel Merit System which conforms to standards established by the United States Civil Service Commission. The plan also contains a detailed description of the resources that are to be devoted to it.

§ 1952.341 Where the plan may be inspected.

A copy of the plan may be inspected and copied during normal business hours at the following locations: U.S. Department of Labor, Office of the Associate Assistant Secretary for Regional Programs, Occupational Safety and Health Administration, Room 300, 1726 M Street, NW., Washington, D.C. 20210; Assistant Regional Director, Occupational Safety and Health Administration, U.S. Department of Labor, P.O. Box 3588, Federal Building, 1961 Stout Street, Denver, Colorado 80202; and the Occupational Health and Safety Department, 200 East, 8th Avenue, P.O. Box 2186, Cheyenne, Wyoming 82001.

§ 1952.342 Level of Federal enforcement.

Pursuant to § 1902.20(b)(1)(iii) of this chapter, the present level of Federal enforcement in Wyoming will not be diminished. Among other things, the United States Department of Labor will continue [illegible]

[illegible]

(c) Amendments to the Wyoming Administrative Procedure Act to be submitted to the State Legislature January 1975 and to become effective by May 1, 1975.

(d) Management Information System to be completed August 1, 1974.

(e) Merit staffing for administration of the program to be completed by August 15, 1974.

(f) Amendments to the State's Fair Employment Practices Act to be submitted to the State Legislature which convenes January 14, 1975.

Signed at Washington, D.C., this 25th day of April 1974.

JOHN STENDER,
Assistant Secretary of Labor.

[FR Doc.74-10206 Filed 5-2-74;8:46 am]

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

Additions and Miscellaneous Amendments

Correction

In FR Doc. 74-4784 appearing at page 9307 as the Part II of the issue of Friday, March 8, 1974, and corrected on page 13776 in the issue of Wednesday, April 17, 1974, on page 13776, "paragraph c" should read as follows:

c. The formula in paragraph (d) should read as follows:

(d) Particulate emission [illegible] shall be determined by:

[illegible]

[illegible]

PART [illegible]

[illegible]

A change to Subpart A, General Provisions, which applies to all affected sources, is promulgated. The definition of "alternative method" is revised to indicate more clearly that it is not a "reference method" or "equivalent method" and to make the definition consistent with that used in 40 CFR Part 60, Standards of Performance for New Stationary Sources.

The applicability of the asbestos regulation is discussed in the following documents which are available on request from the Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, North Carolina 27711, Attention: Mr. Don R. Goodwin:

1. Preamble to the proposed regulation (36 FR 23239)
2. Background information document for the proposed regulation (APTD-0753)
3. Preamble to the promulgated regulation (38 FR 8820)
4. Background information document for the promulgated regulation (APTD-1503)

Comments from the owners or operators of affected sources and from Agency regional enforcement personnel have indicated, however, that the intent should be specifically expressed in the text of the regulation. Considering this, the Agency determined that the text of the promulgated regulation should be revised and four definitions are added to clarify the applicability of 40 CFR Part 61, Subpart B, National Emission Standard for Asbestos.

The definition of "commercial asbestos" is added to distinguish between asbestos that is produced as a product and asbestos that occurs as a contaminant ingredient in other materials, and to make it clear that materials that contain asbestos as a contaminant only are not covered. Questions were raised concerning the applicability of the standard to manufacturing operations that use talc and vermiculite. As indicated on page 6 of the background information report for the proposed [illegible] (APTD-0753), talc mines [illegible] covered by the proposed standard [illegible] was also intended to include [illegible] facturing operations that use talc or other materials contaminated with asbestos were not covered by the asbestos standard. In addition, the information available to the Agency at the time of promulgation (April 6, 1973) did not demonstrate that the mining and milling of such materials or manufacturing operations using such materials were major sources of asbestos emissions. [illegible] Department of the Interior and the Department of Health, Education, and Welfare are studying the [illegible] of asbestos in talc. The [illegible] promulgated herein merely [illegible] regulations promulgated April [illegible], and do not involve [illegible] the outcome of investigations now underway.

Asbestos is also a contaminant in taconite ore. EPA at this time believes that asbestos releases from the milling of such ores should be covered by the hazardous air pollutant regulations and intends in the near future to propose for comment regulations which would accomplish this. Because the revisions here being promulgated are only clarifications of the Agency's intentions at the time the initial hazardous air pollutant regulations for asbestos were published and because they are not being proposed for comment, EPA believes that it is not appropriate to include restrictions on release of asbestos from taconite milling operations in these revisions.

The regulation promulgated on April 6, 1973, did not include a definition for "asbestos mill" or "manufacturing" operation, and questions arose concerning whether certain operations at these facilities are covered by the regulation, and whether the regulation applies to all milling and manufacturing operations that process ore or materials that contain asbestos. The definition of "asbestos mill" is added to clarify that the regulation covers ore crushing and conveying of asbestos tailings to disposal piles but does not cover open storage areas and asbestos tailings disposal piles. This was explained in the preamble to the promulgated regulations (38 FR 8821) and on pages 30 and 31 of the background information report (APTD-1503). The definition excludes the milling of ores that contain asbestos minerals only as a contaminant as previously discussed under the definition of "commercial asbestos." As noted earlier, the Agency intends to propose regulations covering taconite milling operations.

The definition of "manufacturing" is added to clarify that the regulation applies to only those sources within the specified categories of affected manufacturing facilities that process commercial asbestos into a product. Operations which process, [illegible]

[illegible]

Some question has arisen [illegible]. The definition of "demolition" is [illegible] only in situations where load-supporting structural members are wrecked or removed. Accordingly, the standard does not apply to remodeling and renovation operations in which load-supporting structural members are not wrecked.

The time allowed owners or operators to notify the Administrator prior to commencement of a demolition operation is changed from 20 days to 10 days, and the time basis for the notification is clarified to be the postmark date of the notice. Experience has shown that 20 days' notice is not necessary to provide sufficient time for effective enforcement of the regulation, and the shorter time will be more convenient to demolition contractors.

Some questions have arisen concerning whether all of the friable asbestos materials on pipes, boilers, or load-supporting structural members had to be wetted and stripped off prior to demolition. The wording in § 61.22(d)(2)(i) of the promulgated regulation states that the friable asbestos material has to be removed, but does not specify the procedure to be used. A statement is added to clarify that it is not necessary for friable asbestos material to be removed or stripped from boilers, pipes, or load-supporting structural members prior to the removal of these items as units or in sections, provided that the asbestos material exposed during removal is wetted. As required in § 61.22(d)(2)(iii), such units or sections must subsequently be carefully lowered or taken to the ground level.

A paragraph is added to clarify that the regulation is not violated when uncombined water is the sole reason a source fails to meet the no-visible-emissions requirement. This makes the no-visible-emissions regulation consistent with other similar Agency regulations.

The Agency is presently studying the extent of asbestos emissions from dumps of asbestos tailings and open storage of asbestos ores, disposal of asbestos waste material, and asbestos fabricating operations. [illegible] it is unnecessary to publish a notice of proposed rulemaking or delay the effective date of this amendment and for the reasons cited has not done so.

The amendment of these regulations is promulgated pursuant to section 112 of the Clean Air Act, as amended (42 U.S.C. 1857c-7), and is effective upon promulgation.

Dated: April 26, 1974.

John Quarles,
Acting Administrator.

Part 61, Chapter I, Title 40, Code of Federal Regulations is amended by revising Subparts A and B as follows:

Subpart A—General Provisions

1. Section 61.02 is amended by revising paragraph (c) to read as follows:

§ 61.02 Definitions.

* * * * *

(c) "Alternative method" means any method of sampling and analyzing for an air pollutant which is not a reference method or an equivalent method but which has been demonstrated to the Administrator's satisfaction to produce, in specific cases, results adequate for his determination of compliance.

* * * * *

Subpart B—National Emission Standard for Asbestos

2. Section 61.21 is amended by adding paragraphs (g), (h), (i), and (j). The added paragraphs read as follows:

§ 61.21 Definitions.

* * * * *

(g) "Asbestos mill" means any facility engaged in the conversion or any intermediate step in the conversion of asbestos ore into commercial asbestos. Outside storage of asbestos materials is not considered a part of such facility.

(h) "Commercial asbestos" means any variety of asbestos which is produced by extracting asbestos from asbestos ore.

(i) "Manufacturing" means the combining of commercial asbestos, or in the case of woven friction products the combining of textiles containing commercial asbestos, with any other material(s) [illegible]

[illegible]

§ 61.22 Emission standard.

(a) Asbestos mills. [illegible] any asbestos mill [illegible] paragraph [illegible]

* * * * *

(d) * * *

(1) Written notice of intention to demolish [illegible]

[illegible]

(i) Name of owner or operator.

(ii) Address of owner or operator.

(iii) Description of the building, structure, facility, or installation to be demolished.

(iv) Address or location of the building, structure, facility or installation.

(v) Scheduled starting and completion dates of demolition.

(vi) Method of demolition to be employed.

(vii) Procedures to be employed to meet the requirements of this paragraph.

(2) * * *

(i) Friable asbestos materials, used to insulate or fireproof any boiler, pipe, or load-supporting structural member, shall be wetted and removed from any building, structure, facility, or installation subject to this paragraph before wrecking of load-supporting structural members is commenced. Boilers, pipe, or load-supporting structural members that are insulated or fireproofed with friable asbestos materials may be removed as units or in sections without stripping or wetting, except that where the boiler, pipe, or load-supporting structural member is cut or dismantled, the exposed friable asbestos materials shall be wetted. Friable asbestos debris shall be wetted adequately to insure that such debris remains wet during all stages of demolition and related handling operations.

* * * * *

(4) Any owner or operator of a demolition operation who intends to demolish a building, structure, facility, or installation to which the provisions of this paragraph would be applicable but which has been declared by proper State or local authority to be structurally unsound and which is in danger of imminent collapse is exempt from the requirements of this paragraph other than the reporting requirements specified by paragraph (d)(1) of this section and the wetting of friable asbestos debris as specified by paragraph (d)(2)(iii) of this section.

* * * * *

[illegible] entire regulation as promulgated.

Dated: April 26, 1974.

John Quarles,
Acting Administrator.

Sec.
108.1 Applicability.
108.2 Definitions.
108.3 Request for investigation.
108.4 Investigation by Regional Administrator.
108.5 Procedure.
108.6 Recommendations.
108.7 Hearing before Administrator.

AUTHORITY: Sec. 507(e), Pub. L. 92-500, 86 Stat. 816 (33 U.S.C. 1251 et seq.)

§ 108.1 Applicability.

This part shall be applicable to investigations and hearings required by section 507(e) of the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq. (Pub. L. 92-500).

§ 108.2 Definitions.

As used in this part, the term:

(a) "Act" means the Federal Water Pollution Control Act, as amended;

(b) "Effluent limitation" means any effluent limitation which is established as a condition of a permit issued or proposed to be issued by a State or by the Environmental Protection Agency pursuant to section 402 of the Act; any toxic or pretreatment effluent standard established under section 307 of the Act; any standard of performance established under section 306 of the Act; and any effluent limitation established under section 302, section 316, or section 318 of the Act.

(c) "Order" means any order issued by the Administrator under section 309 of the Act; any order issued by a State to secure compliance with a permit, or condition thereof, issued under a program approved pursuant to section 402 of the Act; or any order issued by a court in an action brought pursuant to section 309 or section 505 of the Act.

(d) "Party" means an employee filing a request under § 108.3, any employer [illegible]

[illegible]

[illegible] the Regional Administrator shall notify the employee requesting the investigation or the employee's representative and the employer of such employee, in writing, of his preliminary findings and conclusions. The employee, the representative of such employee, or the employer may within fifteen days following receipt of the preliminary findings and conclusions of the Regional Administrator request a hearing under this part. Upon receipt of such a request, the Regional Administrator, with