ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[FRL-4103-2]

National Emission Standards for Hazardous Air Pollutants; National Emissions Standards for Radon Emissions from Phosphogypsum Stacks

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: This final rule announces the Administrator's final decision on reconsideration of 40 CFR part 61, subpart R, National Emission Standards for Radon Emissions from Phosphogypsum Stacks. EPA previously announced it would reconsider that portion of subpart R that required that all phosphogypsum be disposed in stacks or mines (55 FR 13480, April 10, 1990). The disposal requirement precluded the distribution and use of phosphogypsum for agriculture, construction, and research and development activities. The form of the final rule adopted by the Agency is a combination of the options proposed for public comment on April 10, 1990 (55 FR 13482) and is based on the various risks presented by the radionuclides contained in the phosphogypsum. First, distribution of phosphogypsum for use in agriculture will be permitted provided that the certified average concentration of radium-226 in the phosphogypsum does not exceed 10 pCi/g. This limit is intended to assure that the risks from indoor radon and direct gamma radiation exposure in residences constructed on land previously treated with phosphogypsum do not exceed an acceptable level. Second, distribution of phosphogypsum for use in research and development (R&D) will be permitted so long as affected facilities do not use more than 700 pounds of phosphogypsum for a particular R&D activity and warning labels are placed on containers used to store phosphogypsum for R&D purposes. Third, other uses of phosphogypsum will be permitted on a case-by-case basis with prior EPA approval. EPA approval will be granted only if EPA finds that the proposed use of the phosphogypsum will be at least as protective of public health, in the short term and the long term, as disposal in a stack or mine.

DATES: June 3, 1992.

Judicial review: Under section 307(b)(1) of the Clean Air Act (CAA), judicial review of decisions under section 112 is available only by filing a petition for review in the United States Court of Appeals for the District of Columbia Circuit within 60 days of today's publication of this rule. Under section 307(b)(2) of the CAA, the requirements that are the subject of today's notice may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements.

FOR FURTHER INFORMATION CONTACT: William C. Conklin, Air Standards and Economics Branch, Criteria and Standards Division (ANR-460W), Office of Radiation Programs, Environmental Protection Agency, Washington DC 20460, (703) 308-8755.

SUPPLEMENTARY INFORMATION:

Motion for Reconsideration

For any party who wishes to present new information to EPA regarding the appropriateness of this revised regulation, a Petition for Reconsideration may be filed under section 307(d)(7)(B) of the Clean Air Act.

Docket

The rulemaking record is contained in Docket No. A-79-11 and contains information considered in determining the health effects associated with uses of phosphogypsum, estimating the impact of the revised standard, and establishing the format of the final rule. It also contains all comments received from the public during the comment period. This docket is available for public inspection and copying between 8 a.m. and 3 p.m. on weekdays. A reasonable fee may be charged for copying.

A single copy of the Background Information Document (BID) has been placed in the docket. Copies of the Background Information Document may be obtained by writing to: Director, Criteria and Standards Division (ANR-460W), Office of Radiation Programs, Environmental Protection Agency, Washington, DC 20460.

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I. Definitions

A. Terms

Activity—The amount of a radioactive material. It is a measure of the transformation rate of radioactive nuclei at a given time. The customary unit of activity, the curie, is 3.7×10^{10} nuclear transformation per second.

Effective Dose of Equivalent (EDE)—The sum of the risk-weighted organ dose equivalent commitments. The effective dose equivalent has the same risk (for the model used to derive the weighting factors) as a uniform dose equivalent to all organs and tissues. For the purposes of these standards, "effective dose equivalent" means the result of the calculation used to determine the dose equivalent to the whole body, by taking into account the specific organs receiving radiation, the dose each organ receives, and the risk per unit dose to that organ. The system for calculation of the EDE and the weighting factors used for purposes of this rule is described in detail in the International Commission on Radiological Protection's Publication No. 26, Pergamon Press, New York (1982).

Flux standard—A regulatory standard that limits the amount of radon that can emanate per square meter of regulated material per second, averaged over a single source.

Half-Life—The time it takes half the atoms of a particular radioactive material to transform, or decay, to another nuclear form.

Incidence—The predicted number of fatal cancers in a population resulting from exposure to a pollutant. Other health effects (non-fatal cancers, genetic, and developmental) are noted separately.

Maximum Individual Risk—The maximum additional cancer risk imposed on a person due to exposure to a pollutant for a 70-year lifetime.

Pathway—The route through which radionuclides might contaminate the

environment or reach people, e.g. air, water, food.

Radionuclide—A type of atom which spontaneously undergoes radioactive decay.

B. Acronyms

CAA—The Clean Air Act, 42 U.S.C. Sec. 7401 *et seq.*
CAAA—The Clean Air Act Amendments of 1991
CERCLA—The Comprehensive Environmental Response Compensation and Liability Act, 42 U.S.C. 9601 *et seq.*
CFR—Code of Federal Regulations
CMI—Consolidated Minerals, Inc.
BID—The Background Information Document prepared in support of this rulemaking
EPA—United States Environmental Protection Agency
mrem—millirem, 1×10^{-3} rem
MIR—Maximum Individual Risk
NESHAP—National Emission Standard for Hazardous Air Pollutants
NRDC—Natural Resources Defense Council, Inc.
pCi—picocurie, 1×10^{-12} curie
pCi/g—picocurie per gram
pCi/m^2–s—picocurie per square meter per second
RCRA—The Resource Conservation and Recovery Act
TFI—The Fertilizer Institute
TSCA—The Toxic Substances Control Act
USG—United States Gypsum Company

II. Background

A. Standard Setting Under Section 112

On December 15, 1989, EPA promulgated under section 112 of the Clean Air Act, 42 U.S.C. 7412, National Emission Standards for Hazardous Air Pollutants (NESHAPs) to control radionuclide emissions to the ambient air from a number of different source categories, 40 CFR part 61. This rule was published in the Federal Register on December 15, 1989 (54 FR 51654). The NESHAPS were promulgated pursuant to a voluntary remand granted by the U.S. Court of Appeals for the DC Circuit. The purpose of the remand was to enable EPA to implement the Court's earlier ruling in *NRDC, Inc.* v. *EPA*, 824 F.2d 1146 (D.C. Cir. 1987) ("the Vinyl Chloride decision"), which articulated specific legal requirements for promulgation of standards under Section 112.

The Vinyl Chloride decision set forth a decision-making framework for promulgation of NESHAPs in which the Administrator makes a determination under section 112 in two steps: First, determine a "safe" or "acceptable" level of risk considering only health-related factors, and second, set a standard that provides an "ample margin of safety," in which costs, feasibility, and other relevant factors in addition to health may be considered.

After proposing and receiving comments on several options by which to define "safe", the Administrator selected an approach, first announced in the final NESHAPs for certain benzene source categories (54 FR 38044 September 14, 1989). Under this approach, the Administrator established a presumption of acceptability for a risk of approximately one in ten thousand to the maximally exposed individual, and a goal to protect the greatest number of persons possible to a lifetime risk level no higher than approximately one in one million. After evaluating existing emissions against this benchmark, other risk information is then considered and a final decision is made about what risk is acceptable. The Agency then considers other information, including economic costs and technical feasibility, along with all of the health-related factors previously used to determine the "safe" level, to set a standard which protects public health with an ample margin of safety.

B. The NESHAP for Phosphogypsum Stacks

Phosphogypsum stacks are large piles of waste from wet acid phosphorus production. These are approximately 66 stacks of phosphogypsum located in 12 different states. Two-thirds of these stacks are located in Florida, Texas, Illinois, and Louisiana. Because the phosphate ore used to produce the phosphoric acid contains relatively high concentrations of uranium and radium, phosphogypsum stacks also contain high concentrations of these elements. The presence of radium in the stacks causes them to release radon gas into the atmosphere.

During the rulemaking that resulted in promulgation on December 15, 1989, of the final 40 CFR part 61, subpart R, NESHAP for radon emissions for phosphogypsum stacks, EPA performed a pile-by-pile assessment of radon releases from 58 phosphogypsum stacks located at 41 different facilities. Radon emissions were based on radon flux measurements from stacks in Florida and Idaho which, combined with the radium content of the phosphate rock, allowed EPA to estimate emissions from the other stacks. The maximum individual risk estimates were based on the locations of nearby residents obtained from industry or topographical maps. Where information was unavailable, people were assumed to be 800 meters from the site boundary. Population information within 80 km was taken from census tract data.

The estimated maximum individual lifetime risk of fatal cancer from radon emissions from phosphogypsum stacks is 9×10^{-5}. The radon emissions are estimated to cause 0.95 fatal cancers and 0.047 non-fatal cancers per year to the 95 million people within 80 km. Approximately 90% of the risk to the population is borne by people whose risk is less than 1×10^{-5}, and 33% of the risk is borne by people whose risk is less thatn 1×10^{-6}.

As stated earlier, the maximum individual risk to any individual is 9×10^{-5} which is less than the benchmark of approximately 1×10^{-4} and is therefore presumptively acceptable. The incidence of 0.95 results from the low levels of risk to the millions of persons included within the modelling radius, with the bulk of the incidence from people whose individual risk is less thatn 1×10^{-5}. Over 77% of the population is exposed to risks of less than 1×10^{-6}. EPA, therefore, concluded that the risk associated with baseline emissions was acceptable.

In addition to re-examining all of the health-related factors discussed above, EPA also examined the cost, scientific certainty, and technological feasibility of control technology necessary to lower radon emissions from phosphogypsum stacks. The results of this examination indicated that the small reductions in incidence and maximum individual risk would be achieved at relatively large costs. Therefore, EPA determined that baseline emissions provided an ample margin of safety and established a NESHAP requiring that all phosphogypsum be disposed of in stacks or mines and that such stacks or mines not emit more than a flux of 20 pCi/m^2-s radon into the ambient air.

EPA settled on this form of a standard pursuant to its authority under CAA section 112(e) to set a work practice standard when it is "not feasible to prescribe or enforce an emission standard" because the hazardous air pollutant cannot be emitted through a conveyance designed or constructed to emit or capture such air pollutant. Given the size of the stacks, use of a conveyance to capture the radon emitted by the stacks is utterly impractical. Without requiring the radium-rich phosphogypsum to be first disposed into large, manageable stacks or mines, which is generally what has been done with the existing phosphogypsum, the phosphogypsum could have been incorporated into other products or otherwise diffused throughout the country, such that the

Agency would be unable to ensure that the phosphogypsum's radon emissions do not present an unacceptable risk to public health. EPA concluded that, once the phosphogypsum is deposited in stacks, an additional requirement limiting radon-222 emissions to 20 pCi/m^2-s would be sufficient to ensure an ample margin of safety.

Because the final phosphogypsum NESHAP was promulgated and became effective on December 15, 1989, it became applicable to existing phosphogypsum sources on March 15, 1990. Clean Air Act section 112(c)(1)(B)(i), 42 U.S.C. 7412(c)(B)(i).

C. Petitions for Reconsideration

EPA received petitions from The Fertilizer Institute ("TFI"), Consolidated Minerals, Inc. ("CMI"), and U.S. Gypsum Co. ("USG") to reconsider the portion of the phosphogypsum NESHAP, 40 CFR part 61, subpart R, which requires disposal into stacks or mines of all phosphogypsum, thereby preventing alternative uses of the material. In pertinent part, TFI contended that this provision (1) was adopted without proper notice and comment, (2) was contrary to the national policy favoring recycling and reuse of secondary materials, (3) effectively prevented any amount, no matter how small, from being used in the research and development of beneficial uses of the material, (4) was unnecessary because certain uses of phosphogypsum such as mixing with soil as a calcium replenisher do not cause significant risks, and (5) would cause irreparable harm to thousands of farmers.

CMI stated that this portion of the phosphogypsum NESHAP was arbitrary and capricious because it prevented the use or sale of any of the phosphogypsum produced by CMI's particular industrial process. CMI contended that the EPA prohibition was unreasonable because the CMI method allegedly reduces the radium concentration in much of the resultant phosphogypsum such that "safe" levels of radon gas emissions to ambient air are ensured.

U.S. Gypsum's petition supported the phosphogypsum NESHAP only insofar as it pertained to untreated phosphogypsum. USG stated that phosphogypsum that is treated so as to achieve "safe" levels of radium (the material that ultimately results in radon gas emissions to ambient air) should be allowed for agricultural use. USG stated that there are safer alternative products available in the agricultural gypsum market that are economically viable, and because the technology to treat phosphogypsum is also available and viable, alternative use of untreated phosphogypsum was properly prohibited by the NESHAP. Therefore, USG requested reconsideration as to the ban on use of treated phosphogypsum and, additionally, to allow research and development of phosphogypsum purification technologies.

In accordance with section 307(d)(7)(B) of the Clean Air Act, 42 U.S.C. 7607(d)(7)(B), EPA granted limited reconsideration of the portion of the phosphogypsum NESHAP, 40 CFR part 61, subpart R, which required disposal of phosphogypsum in stacks or mines. Although the Agency concluded that several of the issues raised by the petitioners merit reconsideration, EPA did not agree with all of the arguments or assertions raised. For example, EPA believes that its proposal, published at 54 FR 9612, *et seq.* (March 7, 1989), which included explicit regulatory language requiring that phosphogypsum be disposed in stacks or mines (implicitly prohibiting alternative uses), provided adequate public notice for the final rule. Indeed, comments from both industry and environmental groups on this very issue were submitted to EPA in response to that proposal.

EPA granted limited reconsideration in order to receive more information on the following: (1) The specific types of proposed alternative uses of phosphogypsum; (2) the current or anticipated feasibility of those alternative uses; (3) the research and development of processes which remove radium from phosphogypsum; (4) the health risks associated with either research and development or alternative uses, (5) the availability, cost, and effectiveness of substitutes for phosphogypsum, and (6) the proper definition of "phosphogypsum" in terms of its origin and its radium content.

D. Limited Class Waiver from Compliance

Pursuant to the Agency's authority under Clean Air Act section 112(c)(1)(B)(ii), 42 U.S.C. 7412(c)(1)(B)(ii), and 40 CFR parts 61.10–61.11, EPA granted a limited waiver from compliance with the work practice portion of the phosphogypsum NESHAP, 40 CFR part 61, subpart R, for the 1990 growing season for those owners engaged in the distribution or use of phosphogypsum for agricultural purposes. This limited waiver was based upon the finding of the Administrator that such activity presented no imminent endangerment to public health, that the immediate prohibition of such use would cause great injury to many small farmers who rely upon phosphogypsum, and that it would be burdensome and impracticable to issue limited waivers to each affected farmer. The limited compliance waiver was extended to June 1, 1991, (55 FR 40834 October 5, 1990) and to October 1, 1991 (56 FR 23519 May 22, 1991). EPA permitted the compliance waiver to expire on October 1, 1991, in order to facilitate an orderly transition to the provisions of the revised Subpart R.

E. Proposed Rule

In accordance with the subjects being reconsidered, EPA simultaneously proposed four options to maintain or amend the phosphogypsum NESHAP.

1. Option A

EPA proposed making no change to the phosphogypsum NESHAP, 40 CFR part 61, subpart R, as promulgated on December 15, 1989 at 54 FR 51653 (December 15, 1989).

2. Option B

EPA proposed to amend the definition of "phosphogypsum" to add a requisite threshold concentration level in terms of picocuries of radium per gram of phosphogypsum. EPA considered for this threshold level a range of values up to 10 picocuries of radium per gram. EPA also proposed to amend the present definition of phosphogypsum from the "waste which results from the process of wet acid phosphorus fertilizer production" to "the waste or other form of byproduct which results from the process of wet acid phosphorus production."

3. Option C

EPA proposed allowing the use of phosphogypsum for the limited purpose of researching and developing processes that remove radium-226 from phosphogypsum. Under this option, an owner desiring to make such use must first receive permission from EPA. Permission would be granted only upon a finding by the Administrator that the proposed project is at least as protective of public health, in the short and long term, as would be disposal into a stack or mine, and upon such other factors as the Administrator in his discretion deems appropriate.

4. Option D

EPA proposed allowing any alternative use of phosphogypsum for which the owner has first received permission from EPA. Permission would be granted by the Administrator upon finding that the proposed use is at least as protective of public health, in the short and long term, as would be disposal into a stack or mine, and upon

such other factors as the Administrator in his discretion deems appropriate.

III. Reconsideration of Standard

A. Analytic Methodology

The PATHRAE dose assessment model was utilized to evaluate the incremental increases in the maximum individual lifetime risk (MIR) associated with the uses of phosphogypsum in agriculture, road construction, and research and development activities. (See Reference (1).) The PATHRAE model was initially developed as an analytical tool to assist the EPA in developing standards for low-level radioactive waste and below regulatory concern waste disposal. The PATHRAE model estimates the potential health effects which could occur if radioactive wastes were disposed of in a near surface facility, sanitary landfill, or other geologic setting.

Although PATHRAE models up to ten different off-site and on-site pathways through which persons may come in contact with radioactivity from disposed material, this analysis only utilized eight pathways: Groundwater migration to a river, groundwater migration to a well, erosion and transport to a river, food grown on site, direct gamma radiation, on-site dust inhalation, inhalation of radon in structures, and atmospheric transport of contaminants. Maximum individual lifetime risks from one year of exposure were obtained from the PATHRAE dose assessment results using the risk conversion factors in EPA's Environmental Impact Statement for radionuclide NESHAPS. (See Reference (2).)

Where PATHRAE did not model the exposure scenario (e.g., direct gamma exposure to a person performing experimental analyses on phosphogypsum contained in metal drums), the MICROSHIELD computer code was used to augment the results of the PATHRAE analyses. (See Reference (3).) MICROSHIELD is a microcomputer adaptation of the ISOSHLD mainframe code for analyzing gamma radiation shielding. (See Reference (4).) MICROSHIELD has solution algorithms for 14 different geometries and performs dose rate calculations by one of three geometry-based calculational routines which include analytical expressions, Simpson's rule integration, and point-kernel integration.

Twelve scenarios were developed to evaluate the radiological risks associated with the use of phosphogypsum in agriculture (Scenarios 1–7), road construction (Scenarios 8–11), and research and development activities (Scenario 12). The purpose of these scenarios was to identify the greatest maximum individual lifetime risk of fatal cancer from several exposed groups: members of critical population groups, members of the general public, people living on contaminated land, and workers. Given the uncertainties associated with characterizing a population that might occupy the treated land 100 years in the future, the risk distribution and incidence in a hypothetical population was not estimated. Because these scenarios were designed to be as realistic as possible, the assumptions used relied on survey data and widely accepted scientific information whenever possible. For example, the build-up of radium-226 in the soil takes into consideration removal mechanisms such as radioactive decay, plant uptake, leaching, and wind erosion. In order to minimize the uncertainty of the risk estimates, assumptions with large uncertainties that would not provide any significant clarification of the exposure scenarios, such as the impacts of natural events (e.g. 100 year floods, tornadoes, and hurricanes), were not included in the analyses.

Ra-226 concentrations of 26 pCi/g, 10 pCi/g, 7 pCi/g, 5 pCi/g, and 3 pCi/g in the phosphogypsum were used to determine the significance of varying the level of radioactivity on the risk associated with use. As a result of the number of scenarios, pathways, and Ra-226 concentration levels utilized, over 670 individual risk estimates were generated. The risks provided in Section B are individual lifetime risks based on a 70 year exposure period unless noted otherwise. These risks represent the incremental increase in risk above that presented by exposure to natural background radiation. (Refer to the Background Information Document, Reference (5), for additional details on the exposure scenarios.)

B. Risk Estimate Results

1. Risks from Agricultural Applications

Seven scenarios involving the agricultural application of phosphogypsum were evaluated. Scenarios 1, 3, and 5 assume a clay soil with the exposed individual being 890 meters from the site boundary. Scenarios 2, 4, and 6 assume a sandy soil with the exposed individual being 100 meters from the site boundary. Scenario 7 evaluated the effect of using phosphogypsum containing a range of radium-226 concentrations with different application rates. In each scenario the phosphogypsum was applied biennially over a 100 year period. At the end of the 100 year period the land was coverted to other uses which resulted in increased risks to the users of the treated land. The exposure pathways evaluated in Scenarios 1 through 6 included: Direct gamma exposure and inhalation of contaminated dust by agricultural workers; direct gamma exposure, indoor radon inhalation, and ingestion of contaminated well water by individuals living on the treated land; inhalation of contaminated dust, ingestion of contaminated well water, ingestion of foodstuffs contaminated by well water, and ingestion of foodstuffs grown on treated soil by members of the critical population group; and ingestion of river water contaminated by groundwater or surface water runoff by off-site individuals. Scenario 7 evaluated only the direct gamma exposure and indoor radon pathways for the on-site individual. The risks that occur result from the accumulation of radium-226 activity in the treated soil. For Scenarios 1 and 2, 3 and 4, and 5 and 6, a radium-226 concentration of 26 pCi/g in phosphogypsum is estimated to cause increases in the soil activity of 0.60, 0.88, and 2.70 pCi/g respectively after 100 years of use.

For phosphogypsum with lower radium-226 concentrations, the soil activity can be estimated by ratioing the radium-226 concentration in the phosphogypsum and multiplying by the increased soil activity for the scenario of interest. For example, if the radium-226 concentration in the phosphogypsum is 10 pCi/g, the increased soil activities for the scenarios listed above are estimated to be 0.23, 0.34, and 1.0 pCi/g. Naturally occurring radium-226 soil activities range from 0.5 to 3 pCi/g.

The largest increases in the maximum individual lifetime risks (MIR) for agricultural applications of phosphogypsum, Scenarios 1–6, resulted from the direct gamma radiation and indoor radon inhalation exposure pathways for people living in a house built on phosphogypsum treated land. These incremental risk increases and the sums of these increased risks are presented in Table 1. The sum of the gamma radiation and indoor radon inhalation risks for these six agricultural scenarios ranges from 4.5×10^{-5} to 1.8×10^{-3}. The gamma radiation and radon inhalation risks in Scenarios 1 & 2, 3 & 4, and 5 & 6 are the same because the differences between the scenarios only affected those pathways associated with the migration of radionuclides in water. As Table 1 illustrates, the increased risks appear to be approximately proportional to the concentration of radium-226 in the phosphogypsum.

Scenario 7 was developed to determine how the sum of the gamma radiation and radon inhalation risks could be kept below the presumptively safe level of approximately 1×10^{-4} by varying the phosphogypsum application rate and radium-226 concentration in the phosphogypsum. These results are presented in Table 2. The sum of the maximum lifetime risks to the on-site individual from 70 years of exposure to gamma radiation and indoor radon ranges from 1.5×10^{-5} for 3 pCi/g phosphogypsum applied at a rate of 500 lbs/acre to 1.5×10^{-3} for 15 pCi/g phosphogypsum applied at a rate of 10,000 lbs/acre.

TABLE 1.—GAMMA AND RADON RISKS FOR AGRICULTURAL APPLICATIONS

Scenarios	Pathway	Maximum individual lifetime risk				
		26 pCi/g	10 pCi/g	7 pCi/g	5 pCi/g	3 pCi/g
1 and 2	Direct Gamma	2.1 E-4	8.4 E-5	5.6 E-5	4.0 E-5	2.4 E-5
	Indoor Radon	1.8 E-4	7.0 E-5	4.8 E-5	3.5 E-5	2.1 E-5
	Sum	3.9 E-4	1.5 E-4	1.0 E-4	7.5 E-5	4.5 E-5
3 and 4	Direct Gamma	3.2 E-4	1.3 E-4	9.1 E-5	6.1 E-5	3.6 E-5
	Indoor Radon	4.8 E-4	1.8 E-4	1.3 E-4	9.1 E-5	5.3 E-5
	Sum	8.0 E-4	3.1 E-4	2.2 E-4	1.5 E-4	8.9 E-5
5 and 6	Direct Gamma	9.8 E-4	3.7 E-4	2.7 E-4	1.9 E-4	1.1 E-4
	Indoor Radon	8.4 E-4	3.3 E-4	2.3 E-4	1.7 E-4	9.8 E-5
	Sum	1.8 E-3	7.0 E-4	5.0 E-4	3.6 E-4	2.1 E-4

Note: 1.0 E-4 equals 1×10^{-4}

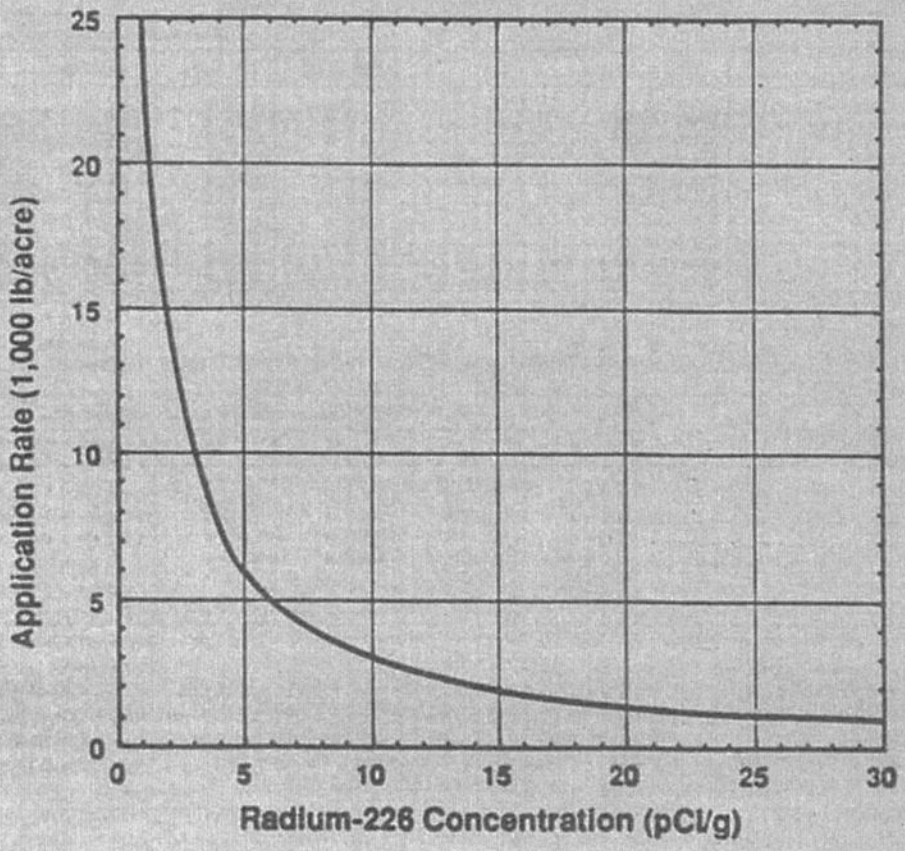
TABLE 2.—GAMMA AND RADON RISKS FROM AGRICULTURAL APPLICATIONS (SCENARIO 7)

Application rate (lbs/acre)	Ra-226 Concentration in phosphogypsum (pCi/g)						
	3	7	15	20	30	45	60
500	1.5 E-5	3.6 E-5	7.7 E-5	9.8 E-5	1.5 E-4	2.3 E-4	3.1 E-4
1,000	3.1 E-5	7.0 E-5	1.5 E-4	2.0 E-4	3.1 E-4	4.6 E-4	
1,500	4.6 E-5	9.8 E-5	2.3 E-4	3.1 E-4	4.6 E-4		
2,500	7.7 E-5	1.8 E-4	3.8 E-4	5.0 E-4			
5,000	1.5 E-4	3.6 E-4	7.7 E-4				
10,000	3.1 E-4	7.0 E-4	1.5 E-3				

Figure 1 presents the curve that is generated when the combinations of Ra-226 content and application rate that yield an estimated maximum lifetime individual risk of 3×10^{-4} are plotted. If the point representing a given Ra-226 content in phosphogypsum and a given application rate for phosphogypsum is located within or on this curve, the corresponding lifetime individual risk from exposure to gamma radiation and radon inhalation will not exceed the presumptively safe level.

FIGURE 1

APPLICATION RATE OF PHOSPHOGYPSUM AS A FUNCTION OF RA-226 CONCENTRATION FOR A LIFETIME RISK OF 3 X 10^{-4}



Because PATHRAE does not estimate the radiological risks associated with the direct ingestion of phosphogypsum treated soil by children, separate risk estimates using the International Commission on Radiological Protection methodology were performed. Depending on the radiological content of the phosphogypsum and the number of years that the soil is assumed to be ingested, the risks range from approximately 3.7×10^{-7} to 7.4×10^{-6}. However, the radiological risks associated with exposure scenarios that are more realistic are at the lower end of this range. (Refer to the Background Information Document, Reference 5, for additional details on these risk estimates.)

2. Risks From Road Construction

Scenarios 8, 9, 10, and 11 were used to estimate the radiological hazard associated with using phosphogypsum to construct asphalt and concrete roads. Scenarios 8 and 9 were used for risks from asphalt roads and Scenarios 10 and 11 were used for concrete roads. The primary difference between these two is that phosphogypsum is used in the concrete road surface and in the road base for the concrete roads but only in the road base for asphalt roads. The exposure pathways evaluated for these scenarios include: Direct gamma exposure and dust inhalation by construction workers; direct gamma exposure of persons driving on the road; direct gamma exposure, inhalation of indoor radon, ingestion of contaminated well water, and ingestion of foodstuffs grown on-site by individuals living on the treated land; direct gamma exposure, ingestion of contaminated well water, and ingestion of foodstuffs contaminated by well water by members of the critical population group; and ingestion of river water contaminated by groundwater or surface water runoff by off-site individuals.

The largest increases in the maximum individual lifetime risks are associated with the gamma radiation and indoor radon inhalation exposure pathways for people living in a house constructed on land where roads built using phosphogypsum once existed. These incremental risk increases and the sums of these risk are presented in Table 3. The gamma radiation and radon inhalation risks in Scenarios 8 & 9 and 10 & 11 are the same because the differences between the scenarios only affected those pathways associated with

the migration of radionuclides in water. As illustrated in Table 3, the increases in the maximum individual lifetime risks from gamma radiation and indoor radon exposure are proportional to the concentration of the Ra-226 in the phosphogypsum. The sums of the incremental increases in the maximum individual lifetime risks from the direct gamma and indoor radon exposures ranged from 7.5×10^{-4} to 9.3×10^{-3}.

TABLE 3.—GAMMA AND RADON RISKS FOR ROAD CONSTRUCTION SCENARIOS

Scenarios	Pathway	Maximum individual lifetime risk				
		26 pCi/g	10 pCi/g	7 pCi/g	5 pCi/g	3 pCi/g
8 and 9	Direct gamma	1.8 E-3	7.0 E-4	5.0 E-4	3.7 E-4	2.2 E-4
	Indoor radon	4.3 E-3	1.7 E-3	1.2 E-3	8.4 E-4	5.3 E-4
	Sum	6.1 E-3	2.4 E-3	1.7 E-3	1.2 E-3	7.5 E-4
10 and 11	Direct gamma	3.6 E-3	1.3 E-3	9.8 E-4	7.0 E-4	4.1 E-4
	Indoor radon	5.7 E-3	2.2 E-3	1.5 E-3	1.1 E-3	6.5 E-4
	Sum	9.3 E-3	3.5 E-3	2.5 E-3	1.8 E-3	1.1 E-3

3. Risks from Research and Development Activities

Scenario 12 was developed to estimate the maximum individual lifetime risks associated with conducting research and development activities with phosphogypsum. In this scenario, exposures are estimated for a worker who spends four hours per day, 250 days per year, in a laboratory within one meter of an open 55 gallon drum of phosphogypsum. One 55 gallon drum of phosphogypsum equals approximately 700 pounds of phosphogypsum. The lab undergoes two air exchanges per hour. The worker is exposed via direct gamma radiation, dust inhalation, and radon inhalation pathways. The radon inhalation pathway resulted in the highest maximum individual lifetime risk. Table 4 presents the radon inhalation risks for 5 and 10 year time periods. As Table 4 shows the increase in the maximum individual lifetime risk ranges from 1.2×10^{-5} to 2.2×10^{-4}. Although longer time periods would result in higher risks, the Agency believes that these exposure periods are representative of likely time periods for performing research and development activities.

TABLE 4.—RADON RISKS FOR RESEARCH AND DEVELOPMENT ACTIVITIES

Years of exposure	Maximum individual risk				
	26 pCi/g	10 pCi/g	7 pCi/g	5 pCi/g	3 pCi/g
5	1.1 E-4	4.1 E-5	2.8 E-5	2.0 E-5	1.2 E-5
10	2.2 E-4	8.2 E-5	5.6 E-5	4.0 E-5	2.4 E-5

C. Decision on Acceptable Risk

In the first step of the two-step approach for establishing standards to control risks to public health from hazardous air pollutants, the Agency determines what level of exposure presents an "acceptable risk." The EPA believes that the level of the maximum individual lifetime risk, the distribution of risks in the exposed population, incidence, the science policy assumptions and uncertainties associated with the risk measures, and the weight of evidence that a pollutant is harmful to health are all important factors that may be considered in the acceptability judgment. Under the policy established by the Administrator in the benzene decision and implemented in a number of subsequent standards, there is a presumption of acceptability for a risk of approximately one in ten thousand to the maximally exposed individual.

In each of the scenarios used to estimate the risk from using phosphogypsum, the principal MIRs were derived from exposures to the radon gas resulting from the radioactive decay of radium-226 and the direct gamma radiation resulting from the increase in radon-222 decay products. The sums of the MIRs ranged from 1.5×10^{-5} to 1.5×10^{-3}, 7.5×10^{-4} to 9.3×10^{-3}, and 1.2×10^{-5} to 2.2×10^{-4} for agriculture, road construction and research and development activities, respectively. These results clearly indicate that the risks to public health from the radiological hazards associated with uses of phosphogypsum depend on the amount of phosphogypsum used, the radium-226 concentration in the phosphogypsum, and the exposure pathway. Thus, while the unrestricted use of phosphogypsum in agriculture could result in maximum individual lifetime risks exceeding the presumptively safe level of approximately 1×10^{-4}, limitations on the amount of phosphogypsum applied, the radium-226 concentration in the phosphogypsum, or both of these factors could reduce the risks associated with agricultural use to an acceptable level. In contrast, regardless of the radium-226 concentration in phosphogypsum, the use of phosphogypsum in road construction always resulted in a MIR significantly greater than the presumptively safe level. Because of the uncertainties associated with characterizing a population that might occupy land previously treated with phosphogypsum 100 years in the future, the distribution of risk and incidence of fatal cancer in a hypothetical exposed population was not estimated.

After examining the factors identified above, EPA has determined that the risks represented by uses of phosphogypsum in which the MIR does not exceed the presumptively safe level of approximately 1×10^{-4} are acceptable. In earlier radionuclide NESHAP rulemakings implementing the criteria in the Administrator's benzene decision, EPA determined that in some instances that emissions corresponding to estimated maximum individual lifetime risks as high as 3×10^{-4} were acceptable. In the case of phosphogypsum, considering all of the information available on potential

exposures and the associated risks, as well as the uncertainties inherent in deriving risk estimates, EPA has concluded that certain uses of phosphogypsum may be considered acceptable so long as those uses are restricted to limit the estimated lifetime risk to any individual to no more than 3 in 10 thousand.

In evaluating work practice restrictions for agricultural use which would correspond to an acceptable risk level, EPA estimated the upper 95th percentile of the phosphogypsum application rates. This estimate was based on the application rates reported for various crops in California and for peanut crops in Georgia. The curve in Figure 1 was then used to identify the radium-226 concentration in phosphogypsum that, when applied at the upper 95th percentile application rate, would result in a maximum individual risk from indoor radon inhalation and direct gamma exposure of 3×10^{-4}. Based on information submitted during the public comment period, the Agency estimates that the 95th percentile of the application rates for phosphogypsum in the United States is approximately 2,700 pounds per acre. Applying this value to the curve in Figure 1, the radium-226 concentration that would result in a MIR of 3×10^{-4} is approximately 10 pCi/g. Therefore, EPA has determined that limiting the average radium-226 concentration in phosphogypsum used in agriculture to 10 pCi/g or less would result in a maximum individual lifetime risk that could be deemed acceptable.

An acceptable risk level for agricultural use of phosphogypsum could also be achieved by a limit on the amount of phosphogypsum which could be applied during agricultural use which varies dependent on the radium-226 concentration in the phosphogypsum. While hypothetically acceptable, this approach would involve greater regulatory complexity, increase recordkeeping burdens on agricultural users, and complicate enforcement activities. Accordingly, EPA has concluded that a single limit on the radium-226 concentration in phosphogypsum removed from phosphogypsum stacks and used in agriculture would be a more practicable approach to achieving an acceptable risk level than a variable limit on application rates.

In the risk estimates for the research and development scenario, EPA determined that limiting the amount of phosphogypsum utilized in any research and development activity to 700 pounds (one 55 gallon drum) would correspond to a maximum individual risk to researchers over the time periods evaluated to 2.1×10^{-4}. This is within the range of risks that has been determined to be acceptable for other radionuclide NESHAP categories. Therefore, EPA has concluded that modest work practice requirements, including a limit of 700 pounds on the amount of phosphogypsum which may be utilized in a given research and development activity, will achieve an acceptable level of risk.

For the road construction scenarios analyzed, the use of phosphogypsum always resulted in a MIR greater than the outer bound of the presumptively safe level of approximately 1×10^{-4}. Therefore, EPA has determined that the use of phosphogypsum in road construction presents an unacceptable level of risk to public health.

D. Decision on Ample Margin of Safety

Under the two-step process established by the Vinyl Chloride decision, the second step determines an "ample margin of safety," the level at which the standard is set. The first step determination of acceptability is only a starting point for the analysis, in which a ceiling for the ultimate standard is set. This second step establishes the legally enforceable limit that must be met by a regulated activity.

In the ample margin decision, the Agency again considers all of the health risk and other health information considered in the first step. Beyond that information, additional factors relating to the appropriate level of control will also be considered, including costs and economic impacts of controls, technological feasibility, uncertainties, and any other relevant factors. In the second step, EPA typically strives to protect the greatest number of persons possible to an individual lifetime risk level no higher than approximately 1 in 1 million. After considering all of these factors, the Agency then establishes the standard at a level that provides an ample margin of safety to protect the public health.

In evaluating the risks to future populations associated with alternative uses of phosphogypsum, EPA concluded it was not feasible to characterize future exposures or a hypothetical exposed population sufficiently to enable estimates of the distribution of risk or total incidence of fatal cancer. Therefore, the cost incurred in reducing the incidence of fatal cancer or maximizing the number of people with an individual lifetime risk level no higher than approximately 1 in 1 million also could not be estimated. However, for agricultural uses, the Agency did attempt to estimate the cost per life saved based on the reduction in the risk and the increase in cost on a per acre basis.

Because the potential benefits of research and development are extremely difficult to quantify, the Agency concluded that it could not perform meaningful cost analyses for this use pattern. Also, because the MIRs for the use of phosphogypsum in road construction always exceed the upper limit of the presumptively safe level of approximately 1×10^{-4}, the Agency concluded it was not necessary to perform any additional analysis for this use pattern.

In the ample margin of safety decision step for agricultural uses of phosphogypsum, EPA has re-examined all the health-related factors considered in the first step, in addition to examining the availability and cost of substitute materials which can be used to reduce the risk associated with agricultural uses of phosphogypsum. The Agency has also attempted to estimate the range of the cost per life saved associated with a decision to prohibit use of phosphogypsum use in agriculture (or to reduce the permissible radium-226 concentration in a manner which results in use of alternate materials.)

EPA has already determined that continued agricultural use of phosphogypsum will only be acceptable if the average radium-226 concentration is no greater than 10 pCi/g. Therefore, EPA attempted as part of establishing an ample margin of safety to estimate the cost per life saved associated with further hypothetical reductions in the risks associated with agricultural use. EPA could not estimate the costs per life saved associated with reductions from 10 pCi/g to specific lower concentrations because present information is insufficient to predict the effect of further reductions in the required concentration on the market price or availability of the material. The available information is sufficient to conclude that a 10 pCi/g limit will substantially reduce the supply of untreated phosphogypsum available for agricultural use, and that further reductions in the permissible limit would entail further reductions in the potential supply of conforming material. EPA realizes that technology is available to treat phosphogypsum to reduce the radium-226 content, but EPA does not believe that it can assess the cost effectiveness of such technology or the likelihood it will be utilized to achieve a particular limit.

EPA did estimate the cost per life saved of a prohibition on agricultural

use, or of a further reduction in the permissible limit for radium-226 sufficient to eliminate phosphogypsum use. This analysis was performed by analyzing the potential reductions in risk and increases in cost on a per acre basis. In the analysis, EPA compared use of phosphogypsum in peanut production to use of natural gypsum. The analysis assumes that the land to be treated with phosphogypsum or natural gypsum will remain in peanut production for 100 years and then be converted to residential use, and that the land is treated biennially over the entire 100 year period. A natural gypsum product was used as the substitute material because: (1) It is the substitute material most likely to be available, (2) it is the substitute material most likely to be cost effective, (3) the range of radium-226 concentrations in natural gypsum and the ratio of the application rates for natural gypsum and phosphogypsum are known. The analysis also assumes that the phosphogypsum contains 10 pCi/g of radium-226 and is applied at a rate of 900 pounds per acre, and that the natural gypsum contains approximately 3 pCi/g of radium-226 and is applied at the rate of 675 pounds/acre. Natural gypsum has more calcium in it than phosphogypsum, therefore, it takes less natural gypsum to achieve the same nutritional result.

Table 5 presents the results of the analysis of the cost per life saved. The undiscounted cost per life saved ranges from a low value of $520,000 for land that is converted to residential use with 3 houses per acre to a high value of $220M for land that has one residence per 138 acres. Each residence is assumed to contain the national average of 2.7 occupants. This extremely wide range is a direct result of the difficulties associated with characterizing the conversion of phosphogypsum treated land into residential developments. Since EPA cannot reliably predict where residential development will occur in the future, EPA cannot make regulatory distinctions on this basis. It is possible that the actual cost to save a particular life could be as small or as great as the extremes of this range. However, the average cost per life saved resulting from a prohibition on agricultural use of phosphogypsum will certainly be substantially greater than $520,000 and substantially less than $220M.

TABLE 5.—COSTS PER LIFE SAVED

	MIR	ΔMIR reduction	Material cost (dollar/acre)	ΔMaterial cost (dollar/acre)	Cost/life saved (dollar/death)	
					1 House per 138 acres	3 Houses per acre
Phosphogypsum	9.0×10^{-5}	7.0×10^{-5}	10.67	5.90	220,000,000	520,000
Natural gypsum	2.0×10^{-5}		16.57			

EPA has also examined the cost of available substitute materials. The first analysis evaluated the relative differences in the total cost per ton, material cost plus transportation cost, between phosphogypsum and eight substitute materials. With the exception of one substitute material, which had a cost index of 1.28, phosphogypsum appeared to enjoy a distinct competitive advantage over the other seven substitute materials which had cost indices ranging from 1.86 to 2.78. However, this analysis did not take into consideration the differences in application rates between the phosphogypsum and the substitutes. Three substitute materials were selected from the eight substitutes evaluated in the first analysis to evaluate the differential in the cost per acre for growing peanuts. These substitutes were selected because of the availability of information on the suggested application rates for peanuts. The increased cost per acre of using the substitutes instead of the phosphogypsum ranged from $6.56 to $17.81 per acre. This increased cost can represent a significant operating cost for many farmers. For this analysis the distance to Tifton was selected because it is located in the middle of the Georgia peanut growing district. Actual distances between farm locations, phosphogypsum suppliers, and suppliers of substitute materials; material application rates; and transportation costs vary to such an extent that other similar analyses will sometimes show that the competing products are less costly than the phosphogypsum. A third analysis was performed to evaluate the cost to increase yield by using three phosphogypsum substitute materials as sources of calcium for growing peanuts. The results of this analysis show that differences in the cost per pound increase in yield between phosphogypsum and the substitutes ranges from 2.5 to 61.6 cents per pound. This represents 7.9% to 195% of the 1990 quota support price of 31.6 cents per pound. These analyses show that, of all the materials evaluated, phosphogypsum is the most cost effective means of increasing peanut yield.

Based on the significant costs associated with prohibiting agricultural use of phosphogypsum or substantially reducing the radium-226 concentration in the phosphogypsum below the acceptable level of 10 pCi/g, the fact that phosphogypsum is the most cost effective material analyzed for increasing peanut yield, and the scientific uncertainties associated with the assumptions used in the Agency's estimates, the Administrator has determined that limiting the average radium-226 concentration in phosphogypsum used in agriculture to 10 pCi/g will protect the public with an ample margin of safety. Therefore, EPA is amending the work practice portion of subpart R to allow phosphogypsum to be removed from phosphogypsum stacks and distributed for use in agriculture if certain procedures and restrictions are followed.

IV. Responses to Public Comments

On April 10, 1990, the EPA proposed in the **Federal Register** four options to maintain or modify 40 CFR part 61, subpart R (55 FR 13482 April 10, 1990). The **Federal Register** notice requested public comments on the proposed options, and (1) the specific types of proposed alternative uses of phosphogypsum; (2) the current or anticipated feasibility of those alternative uses; (3) the research and development of processes which remove radium from phosphogypsum; (4) the health risks associated with either research and development or alternative uses, (5) the availability, cost, and effectiveness of substitutes for phosphogypsum, and (6) the proper definition of "phosphogypsum" in terms of its origin and its radium content. An informal public hearing was held in Atlanta, Georgia to provide interested parties an opportunity to present their views, and written comments were

solicited. Comments were received from over 300 individuals and organizations representing government agencies, industry and other members of the regulated community, environmental and public interest groups, and the general public. This section of the preamble discusses the comments received during the public comment period.

A. Legal and Policy Oriented Comments

There were several significant legal and policy oriented comments that appeared in numerous letters and petitions for reconsideration to the Agency prior to the beginning of this rulemaking effort. The Agency believes that each one of these issues should be addressed as part of this final decision. The following paragraphs contain the Agency's responses to these comments. These comments were raised primarily by industry, academia, and research and development organizations that are opposed to any regulation of the alternative uses of phosphogypsum.

Comment: Several commenters stated that the prohibition on phosphogypsum use and research is impermissible under the Clean Air Act.

Response: EPA disagrees with this comment. The Agency has a Congressionally-mandated responsibility under section 112(a) of the Clean Air Act to control air emissions from a hazardous air pollutant which "causes or contributes to air pollution which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness." In 1979, EPA determined that radionuclide emissions to the air constituted hazardous air pollutants which might be regulated under section 112. Because phosphate ore contains above average concentrations of the radionuclides uranium and radium, phosphogypsum also contains these elements. In 1989, EPA determined that it could best control radon emissions and the associated risks to an acceptable level by requiring the placement of the phosphogypsum in stacks, thereby, preventing alternative uses of the material. This work practice requirement was adopted pursuant to the authority provided by section 112(e).

The Agency has just completed approximately 700 risk estimates on various commercial applications of phosphogypsum. The results of these estimates indicate that some restricted use of phosphogypsum in agriculture and research and development activities may pose levels of risk deemed safe under section 112 of the Clean Air Act, but that other uses pose higher, unacceptable risks. Accordingly, the revisions of the work practice standard for phosphogypsum establish specific conditions under which distribution and use of phosphogypsum will be permitted. These restrictions are necessary to achieve the level of public health protection required by the Clean Air Act and are a lawful extension of the work practice requirements in the original standard.

Comment: One commenter suggested that the prohibition on use and research is not supported by the rulemaking record.

Response: The Agency has agreed to reconsider the risks associated with the alternative uses of phosphogypsum which were prohibited by the final rule as originally promulgated on October 31, 1989. As part of its reconsideration, the Agency has performed estimates of the risks associated with agricultural, road construction, and research and development applications of phosphogypsum. These risk estimates were designed to be best estimates of risks to the maximum exposed individual and incorporate data from industry surveys, scientific studies, previous EPA risk estimates, and nationally recognized radiation protection organizations. In light of the small risks involved in conducting such limited scale research, and in light of EPA's policy of waste minimization and material recycling, EPA has decided to remove its original blanket prohibition on research and development activities.

Comment: The prohibition on phosphogypsum use and research is contrary to other contemporaneous EPA regulatory actions concerning phosphogypsum.

Response: The Agency disagrees with this comment. Specifically, the Office of Solid Waste, in 40 CFR part 261, Special Wastes from Mineral Processing (Mining Waste Exclusion); Final Regulatory Determination and Final Rule, (56 FR 27300 June 13, 1991) stated that current management of phosphogypsum and process wastewater poses potential health and environmental problems. However, due to the enormous cost of regulating these wastes under subtitle C of the Resource Conservation and Recovery Act (RCRA), the Agency will investigate the use of the Toxic Substances Control Act (TSCA) to control the threats to human health and the environment presented by these wastes. This investigation will, at a minimum, address the risk reduction potential and associated costs for such regulatory options as restrictions on manufacturing, processing, or disposal. To conduct this investigation, the Phosphoric Acid Wastes Workgroup has been established and is co-chaired by the Office of Solid Waste and Office of Pesticides and Toxic Substances. Considering these efforts, the Agency believes that its actions are totally consistent with one another.

B. Comments on Rule Options

The comments on the four options proposed by EPA for maintaining or modifying the disposal requirement were generally polarized: Approach A was favored largely by environmental organizations and private citizens; Approach B received very little support; Approach C was criticized by industry, academia, private citizens, and public interest groups; Approach D received some support from industry but was criticized by environmental groups and private citizens. Most industry comments stated that the disposal requirement should be eliminated, but this was not a part of any of the proposed options.

The EPA considered all of these comments in formulating the final rule for subpart R. The EPA response to these comments are presented below.

The following sections are split into discussions of the four alternative options presented in the April 10, 1990, **Federal Register** notice, and ancillary issues that were relevant to formulating the final rule for phosphogypsum. The main position and concerns presented by commenters are followed by an EPA response to the comments in the context of the final rule.

Option A Comments: The commenters who favored this approach fell into two groups: environmental organizations, that felt that any additional exposure of humans to radiation or contamination of land by radioactive material is unacceptable because there is no safe threshold level for radiation exposure; and private citizens, environmentalists and public organizations opposed to Consolidated Minerals proposed Pine Level Project in DeSoto County, Florida. Many commenters from industry and academia opposed Option A because they thought it was contrary to the national policy favoring the recycling and reuse of secondary or byproduct materials.

Response: The D.C. Circuit decision in *Natural Resources Def. Council, Inc.* v. *EPA*, 824 F.2d 1146 (1987) ("*Vinyl Chloride*") recognizes that EPA may deem some level of cancer risk as acceptable, in light of the fact that many carcinogenic substances are assumed not to have a threshold value below which they pose no risk. In the context of the *Vinyl Chloride* decision, the issue is whether "acceptable" risk is equated

with *de minimis* risk, and is thereby defined as "trivial" or "of no value," or whether some higher level of risk is considered acceptable under the court's ruling.

The court explained that the Congressional mandate to provide "an ample margin of safety" to "protect the public health" requires the Administrator to make an initial determination of what is "safe." This determination must be based exclusively upon the Administrator's determination of the risk to health at a particular emission level. The Administrator's decision does not require a finding that "safe" means "risk free." 824 F.2d at 1164.

The court also declined to restrict the Administrator to any particular method of determining what constitutes an acceptable risk but explained simply that "the Administrator must determine what inferences should be drawn from available scientific data and decide what risks are acceptable in the world in which we live." 824 F.2d at 1166.

While it is true that there is no threshold level below which there is no cancer risk from exposure to radiation, the EPA has concluded that there are levels of radiation exposure that do present acceptable risks. The final rule allows uses of phosphogypsum which pose estimated risks that EPA has found to be acceptable.

With respect to the comment that Option A is contrary to the national policy of recycling, the EPA disagrees. The EPA is a world leader in the effort to establish recycling programs and promote the virtues of recycling. However, the global trend toward recycling waste and byproduct materials does not mean that public health and ecological risks are ignored. Quite the contrary. The recycling of waste and byproduct materials requires us to compare the health and ecological risks associated with past disposal practices to the risks associated with proposed recycling practices, along with any benefits to be gained from the recycling activity. Clearly, the risks associated with recycling activity should not be significantly greater than the risks associated with the disposal practices nor should they outweigh the benefits achieved from recycling.

Option B Comments: The few supporters of Option B suggested that a radium-226 threshold level of 5 pCi/g would adquately protect public health and safety and the environment. Commenters opposed to Option B noted that the intent of the rule was to regulate radon emissions and not radium content and that a threshold level would discriminate against processes that could be employed to reduce radon emissions but not the radium content.

Response: The Agency does not believe that restricting the radium-226 concentration in phosphogypsum in commerce will adequately protect public health and safety and the environment with an ample margin of safety for all possible phosphogypsum applications. The level of risk presented by a particular application depends not only upon the radium-226 concentration in the phosphogypsum but also the nature of the application, the exposure scenario, the exposure pathway, the amount of phosphogypsum used, and other factors too numerous to list. As shown in our risk estimates for road construction applications, even at radium-226 concentrations 3 pCi/g, the risk to the maximum exposed individual is well above the acceptable level. However, the Agency's estimates for agricultural applications of phosphogypsum indicate that a threshold concentration of 10 pCi/g will protect public health with an ample margin of safety.

The Agency agrees that there are several proven mechanisms which can be utilized to reduce the risk associated with radon exposure that do not affect the radium concentration of the material from which the radon emanates. The Agency also believes that these exposure control mechanisms should be instituted, as needed and where possible, to ensure that the risks presented by a particular application are acceptable. For these reasons the Agency has included a mechanism for applicants to obtain EPA approval for uses of phosphogypsum not explicitly addressed in the revised final rule.

Option C Comments: Several commenters were opposed to Option C because they felt that limiting the research and development activities to finding ways to remove the radium from the phosphogypsum was too restrictive. Other commenters were opposed to this option because they felt that adequate Agency oversight and monitoring procedures are not available to ensure that the public health is protected with an ample margin of safety.

Response: The Agency agrees with these comments. In its original rulemaking, the Agency underestimated the extent of research and development activities involving phosphogypsum. Currently there are several hundred million tons of phosphogypsum stored in stacks around the country. Restricting research and development activities to radium removal ignores the potentially large recoverable mineral values, such as sulfur, contained in the phosphogypsum and impedes the use of phosphogypsum in applications which may not present themselves until some time in the future. The final rule explicitly allows research involving a limited quantity of phosphogypsum. The Agency believes that the conditions imposed on this use of phosphogypsum will ensure protection of public health with an ample margin of safety.

Option D Comments: A few industry commenters opposed to any disposal requirement believe that if alternative uses of phosphogypsum must be controlled, then Option D is preferred. Commenters from academia and industry stated that any restrictions imposed on research and development activities as part of this option should be minimized when such activities do not pose significant risks to public health or the environment.

Response: The Agency agrees with many of these comments. Option D not only provides the Agency the flexibility to deal with requests to use phosphogypsum in applications that are in place today but also provides a framework in which to evaluate requests to use phosphogypsum in future applications. The Agency believes that the level of restrictions placed on a particular application should be commensurate with the level of risk associated with the application. Therefore, any request to use phosphogypsum must contain an estimate of the risks that may be associated with the particular use.

V. Final Rule to Amend Subpart R

A. Description of Final Rule

The amended subpart R will remain in the form of a work practice standard that directs that all phosphogypsum be placed initially in stacks or mines. The 20 pCi/m^2—s flux standard, as originally promulgated on December 15, 1989, remains in effect for all inactive phosphogypsum stacks. By requiring that radium-rich phosphogypsum be first disposed into large, manageable stacks or mines, which is generally what has been done with the existing phosphogypsum, the revised subpart R assures that any subsequent distribution or use of phosphogypsum will be controlled to assure radon emissions from the phosphogypsum do not present an unacceptable risk to public health. If an owner or operator removes phosphogypsum from an inactive stack, the stack must be retested for conformity to the 20 pCi/m^2—s flux standard within ninety days, and at least once every calendar year thereafter that additional phosphogypsum is removed.

All phosphogypsum stack owners or operators engaged in the distribution of phosphogypsum will be required to prepare and maintain certification documents containing the name and address of each purchaser or recipient of phosphogypsum, the quantity sold or transferred, the date of sale or transfer, the intended use of the material (e.g. agricultural, research and development), the average Ra-226 concentration at the location in the stack from which phosphogypsum was removed, and the signature of date of the person preparing the records. Distributors, retailers, and resellers who purchase or receive phosphogypsum for subsequent resale or transfer must also prepare and maintain certification documents. Except for agricultural end-users, a copy of the certification documents must be provided to each purchaser or transferee.

The use of phosphogypsum in agriculture will be permitted. However, phosphogypsum intended for agricultural use must have a certified average concentration of radium-226 no greater than 10 pCi/g. There is no limitation on the amount of material that can be applied and farmers do not have to maintain certification or application records.

The use of phosphogypsum in research and development will also be permitted. However, no facility may purchase or possess more than 700 pounds of phosphogypsum (approximately the amount in one 55 gallon drum) for a particular research and development activity. Containers of phosphogypsum utilized in research and development activities must be labeled with a specific warning. Facilities utilizing phosphogypsum in research and development activities will also be required to maintain detailed records.

Other uses of phosphogypsum will be prohibited without prior EPA approval. A request that EPA permit distribution or use for purposes other than agriculture or research and development may be approved only if EPA finds that the proposed distribution and/or use of phosphogypsum is at least as protective of the public health, in both the short term and the long term, as is disposal of phosphogypsum in a stack or a mine. Applications for EPA approval must include, as a minimum, the following information:

(1) The name and address of the person(s) making the request.

(2) A description of the proposed use, including any handling and processing that the phosphogypsum will undergo.

(3) The location of each facility, including suite and/or building number, street, city, county, state, and zip code, where any use, handling, or processing of the phosphogypsum will take place.

(4) The mailing address of each facility where any use, handling, or processing of the phosphogypsum will take place, if different from (3).

(5) The quantity of phosphogypsum to be used by each facility.

(6) The average concentration of radium-226 in the phosphogypsum to be used.

(7) A description of any measures which will be taken to prevent the uncontrolled release of phosphogypsum into the environment.

(8) An estimate of the maximum individual risk, risk distribution, and incidence associated with the proposed use, including the ultimate disposition of the phosphogypsum or any product in which the phosphogypsum is incorporated.

(9) A description of the intended disposition of any unused phosphogypsum.

(10) Each request shall be signed and dated by a corporate officer or public official in charge of the facility.

EPA will develop a guidance document to assist in the implementation of this revised regulation. This guidance document will discuss the process for evaluating requests to distribute or use phosphogypsum for purposes other than agriculture and research and development. The guidance document will also discuss inspections and other compliance monitoring activities.

B. Legal Authority

At the outset, it should be noted that section 112(q)(2) of the 1990 Clean Air Act Amendments provides that section 112, as in effect prior to the 1990 Amendments, continues to govern the promulgation of any NESHAP for phosphogypsum stacks. The procedures to be utilized to modify or revise a NESHAP under the old section 112 are the same as the procedures used to promulgate the NESHAP in the first place.

The existing subpart R was promulgated in the form of a work practice standard under section 112(e) becuase it would be utterly impractical to require that the radon released by phosphogypsum stacks be emitted through a conveyance designed to and constructed to emit or capture such pollutant. The work practice standard required that all phosphogypsum be disposed in stacks or mines and that such stacks or mines be managed to emit no more than 20 pCi/m^2-s. The requirement of disposal in stacks or mines was intended to assure that the emissions from phosphogypsum would not escape regulatory scrutiny.

The revisions to subpart R are a logical extension of the original work practice standard. EPA has determined that other uses of phosphogypsum can provide an ample margin of safety, but only under certain conditions. No owner or operator is required to remove phosphogypsum from a stack, but he must satisfy additional work practice requirements if he does. If phosphogypsum could be removed from a stack or mine and disseminated in commerce without any restrictions, this would frustrate the basic objective of subpart R, to assure that emissions from phosphogypsum do not jeopardize public health.

C. Effective Date

The revisions to the NESHAP for radionuclide emissions from phosphogypsum stacks adopted by this rule are effective immediately upon publication. Under section 112(c)(1)(B)(i) of the Clean Air Act, activities by existing sources which would violate a newly promulgated or revised NESHAP are not prohibited until 90 days after the effective date of the standard. However, in this instance, EPA has decided that it will apply the provisions of the revised NESHAP immediately to all facilities including existing sources.

EPA believes that the evident purpose of the 90 day delay for compliance by existing sources embodied in section 112(c)(1)(B)(i) is to afford such sources time to prepare for the imposition of new requirements. Indeed, section 112 (c)(1)(B)(i) is phrased as an exception to a general prohibition on emissions violative of a NESHAP. Therefore, EPA doubts that it was intended to apply to those revisions of a standard which relax existing requirements rather than creating new requirements. Although the Administrative Procedure Act (APA) does not formally apply in this instance, an analogous provision in the APA provides support for this interpretation. The general requirement that a substantive rule must be published or served 30 days before its effective date, which is also intended to afford affected parties time to prepare for imposition of the rule, does not apply to "a substantive rule which grants or recognizes an exception or relieves a restriction." 5 U.S.C. 553(d)(1).

In this case, any facility which would be in compliance with the original standard for phosphogypsum stacks would also be in compliance with the revised standard. The revisions simply offer facilities additional options for distribution and use of phosphogypsum

which were not available under the original standard. Facilities who elect to remove phosphogypsum from stacks and distribute it in commerce pursuant to the provisions of this rule, or to distribute or use phosphogypsum removed from stacks, must meet certain requirements. However, under the original standard, none of these activities were legally permissible. Moreover, the revised standard does not require any facility to engage in any of these activities.

Since the revisions of subpart R impose no new binding requirements and constitute a substantive relaxation of the original standard, there is no reason to interpret section 112 as requiring a delay in their applicability. Indeed, any delay in implementation of the revised standard could unnecessarily impede agricultural use of phosphogypsum during the 1992 growing season. Therefore, EPA will apply the revisions of subpart R incorporated in this rule immediately to all facilities including existing sources.

VI. Miscellaneous

A. Docket

The docket is an organized and complete file of all information considered by EPA in the development of the standards. The docket allows interested persons to identify and locate documents so they can effectively participate in the rulemaking process. It also serves as the record for judicial review.

Transcripts of the hearings, all written statements, the Agency's response to comments, and other relevant documents have been placed in the docket and are available for inspection and copying during normal working hours.

B. General Provisions

Except where otherwise specifically stated, the general provisions of 40 CFR part 61, subpart A, apply to all sources regulated by this rule.

C. Paperwork Reduction Act

The information collection requirements in this final rule have been submitted for approval to the Office of Management and Budget (OMB) under the *Paperwork Reduction Act*, 44 U.S.C. 3501 *et seq.* The information collection requirements were approved by OMB on May 6, 1992. The OMB Control Number is 2060–0191.

D. Executive Order 12291

This action was submitted to the Office of Management and Budget (OMB) for review as required by Executive Order 12291. Any written comments from OMB to EPA and any EPA written response to those comments are available for public inspection at Docket A–79–11.

EPA has determined that this action does not constitute a major rule within the meaning of Executive Order 12291 since it is not likely to result in (1) a nationwide annual effect on the economy of $100 million or more; (2) a major increase in costs or prices for consumers, individual industries, Federal, State or local government agenices, or geographic regions; or (3) significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets. Accordingly, a Regulatory Impact Analysis is not being prepared for this action. The distribution of phosphogypsum is currently prohibited by the existing rule. Because this revised rule is a relaxation of the existing requirements, it will upon promulgation permit the distribution of phosphogypsum on a controlled basis.

E. Regulatory Flexibility Analysis

Section 603 of the Regulatory Flexibility Act, 5 U.S.C. 603, requires EPA to prepare and make available for comment an "initial regulatory flexibility analysis" in connection with any rulemaking for which there is a statutory requirement that a general notice of proposed rulemaking be published. The "initial regulatory flexibility analysis" describes the effect of the proposed rule on small business entities. However, section 604(b) of the Regulatory Flexibility Act provides that section 603 "shall not apply to any proposed * * * rule if the head of the Agency certifies that the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities."

Because the use of phosphogypsum is currently prohibited and this revised rule permits restricted phosphogypsum use, EPA believes that the proposed changes ease the regulatory burdens associated with provisions of the existing final rule. Therefore, this rule will have no adverse effect on small businesses. For the preceding reasons, I certify that this rule will not have significant economic impact on a substantial number of small entities.

F. References

(1) U.S. Environmental Protection Agency, "PATHRAE-EPA: A Performance Assessment Code for the Land Disposal of Radioactive Wastes, Documentation and User's Manual", EPA 520/1–87–028, Washington, DC, December 1987.

(2) U.S. Environmental Protection Agency, "Risk Assessment Methodology, Environmental Impact Statement for NESHAPS Radionuclides, Volume 1, Background Information Document", EPA 520/1–89–005, Washington, DC, September 1989.

(3) GROVE Engineering, Inc., "MICROSHIELD, User's Manual", Washington Grove, Maryland, 1985.

(4) Engel, R. L., et al., "ISOSHLD, A Computer Code for General Purpose Isotope Shielding Analysis", BNWL–2316, U.S. Department of Energy, Richland, Washington, June 1966.

(5) U.S. Environmental Protection Agency, "Alternative Uses of phosphogypsum and Associated Risks, Background Information Document", EPA 520/1–91–029, Washington, DC, September, 1991.

List of Subjects in 40 CFR Part 61

Air pollution control, Hazardous materials, Asbestos, Beryllium, Mercury, Vinyl Chloride, Benzene, Arsenic, and Radionuclides.

Dated: May 20, 1992.

William K. Reilly,

Administrator.

Part 61 of chapter I of title 40 of the Code of Federal Regulations is amended as follows:

PART 61—[AMENDED]

1. The authority citation for part 61 continues to read as folllows:

Authority: Secs. 101, 112, 114, 116, 301, Clean Air Act as amended (42 U.S.C. 7401, 7412, 7414, 7416, 7601].

2. Part 61 is amended by revising Subpart R to read as follows:

Subpart R—National Emission Standards for Radon Emissions From Phosphogypsum Stacks.

Sec.

Subpart R—National Emission Standards for Radon Emissions From Phosphogypsum Stacks

§ 61.200 Designation of facilities.

The provisions of this subpart apply to each owner or operator of a phosphogypsum stack, and to each person who owns, sells, distributes, or otherwise uses any quantity of phosphogypsum which is produced as a result of wet acid phosphorus production or is removed from any existing phosphogypsum stack.

§ 61.201 Definitions.

As used in this subpart, all terms not defined here have the meaning given them in the Clean Air Act or subpart A of part 61. The following terms shall have the following specific meanings:

(a) *Inactive stack* means a stack to which no further routine additions of phosphogypsum will be made and which is no longer used for water management associated with the production of phosphogypsum. If a stack has not been used for either purpose for two years, it is presumed to be inactive.

(b) *Phosphogypsum* is the solid waste byproduct which results from the process of wet acid phosphorus production.

(c) *Phosphogypsum stacks* or *stacks* are piles of waste resulting from wet acid phosphorus production, including phosphate mines or other sites that are used for the disposal of phosphogypsum.

§ 61.202 Standard.

Each person who generates phosphogypsum shall place all phosphogypsum in stacks. Phosphogypsum may be removed from a phosphogypsum stack only as expressly provided by this subpart. After a phosphogypsum stack has become an inactive stack, the owner or operator shall assure that the stack does not emit more than 20 pCi/m^2-s of radon-222 into the air.

§ 61.203 Radon monitoring and compliance procedures.

(a) Within sixty days following the date on which a stack becomes an inactive stack, or within ninety days after the date on which this subpart first took effect if a stack was already inactive on that date, each owner or operator of an inactive phosphogypsum stack shall test the stack for radon-222 flux in accordance with the procedures described in 40 CFR part 61, appendix B, Method 115. EPA shall be notified at least 30 days prior to each such emissions test so that EPA may, at its option, observe the test. If meteorological conditions are such that a test cannot be properly conducted, then the owner or operator shall notify EPA and test as soon as conditions permit.

(b)(1) Within ninety days after the testing is required, the owner or operator shall provide EPA with a report detailing the actions taken and the results of the radon-222 flux testing. Each report shall also include the following information:

(i) The name and location of the facility;

(ii) A list of the stacks at the facility including the size and dimensions of each stack;

(iii) The name of the person responsible for the operation of the facility and the name of the person preparing the report (if different);

(iv) A description of the control measures taken to decrease the radon flux from the source and any actions taken to insure the long term effectiveness of the control measures; and

(v) The results of the testing conducted, including the results of each measurement.

(2) Each report shall be signed and dated by a corporate officer in charge of the facility and contain the following declaration immediately above the signature line: "I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and based on may inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment. See, 18 U.S.C. 1001."

(c) If the owner or operator of an inactive stack chooses to conduct measurements over a one year period as permitted by Method 115 in appendix B to part 61, within ninety days after the testing commences the owner or operator shall provide EPA with an initial report, including the results of the first measurement period and a schedule for all subsequent measurements. An additional report containing all the information in § 61.203(b) shall be submitted within ninety days after completion of the final measurements.

(d) If at any point an owner or operator of a stack once again uses an inactive stack for the disposal of phosphogypsum or for water management, the stack ceases to be in inactive status and the owner or operator must notify EPA in writing within 45 days. When the owner or operator ceases to use the stack for disposal of phosphogypsum or water management, the stack will once again become inactive and the owner or operator must satisfy again all testing and reporting requirements for inactive stacks.

(e) If an owner or operator removes phosphogypsum from an inactive stack, the owner shall test the stack in accordance with the procedures described in 40 CFR part 61, appendix B, Method 115. The stack shall be tested within ninety days of the date that the owner or operator first removes phosphogypsum from the stack, and the test shall be repeated at least once during each calendar year that the owner or operator removes additional phosphogypsum from the stack. EPA shall be notified at least 30 days prior to an emissions test so that EPA may, at its option, observe the test. If meteorological conditions are such that a test cannot be properly conducted, then the owner shall notify EPA and test as soon as conditions permit. Within ninety days after completion of a test, the owner or operator shall provide EPA with a report detailing the actions taken and the results of the radon-222 flux testing. Each such report shall include all of the information specified by §61.203(b).

§ 61.204 Distribution and use of phosphogypsum for agricultural purposes.

Phosphogypsum may be lawfully removed from a stack and distributed in commerce for use in agriculture if each of the following requirements is satisfied:

(a) The owner or operator of the stack from which the phosphogypsum is removed shall determine annually the average radium-226 concentration at the location in the stack from which the phosphogypsum will be removed, as provided by § 61.207.

(b) The average radium-226 concentration at the location in the stack from which the phosphogypsum will be removed, as determined pursuant to § 61.207, shall not exceed 10 picocuries per gram (pCi/g).

(c) All phosphogypsum distributed in commerce for use in agriculture by the owner or operator of a phosphogypsum stack shall be accompanied by a certification document which conforms to the requirements of § 61.208(a).

(d) Each distributor, retailer, or reseller who distributes phosphogypsum for use in agriculture shall prepare certification documents which conform to the requirements of § 61.208(b).

§ 61.205 Distribution and use of phosphogypsum for research and development.

(a) Phosphogypsum may be lawfully removed from a stack and distributed in commerce for use in research and development activities if each of the following requirements is satisfied:

(1) The owner or operator of the stack from which the phosphogypsum is removed shall determine annually the average radium-226 concentration at the location in the stack from which the phosphogypsum will be removed, as provided by § 61.207.

(2) All phosphogypsum distributed in commerce for use in research or development by the owner or operator of a phosphogypsum stack or by a distributor, retailer, or reseller shall be accompanied at all times by certification documents which conform to the requirements of § 61.208.

(b) Phosphogypsum may be purchased and used for research and development purposes if the following requirements are satisfied:

(1) Each quantity of phosphogypsum purchased by a facility for a particular research and development activity shall be accompanied by certification documents which conform to the requirements of § 61.208.

(2) No facility shall purchase or possess more than 700 pounds of phosphogypsum for a particular research and development activity.

(3) Containers of phosphogypsum used in research and development activities shall be labeled with the following warning:

Caution: Phosphogypsum Contains Elevated Levels of Naturally Occuring Radioactivity

(4) For each research and development activity in which phosphogypsum is used, the facility shall maintain records which conform to the requirements of § 61.209(c).

(c) Phosphogypsum not intended for distribution in commerce may be lawfully removed from a stack by an owner or operator to perform laboratory analyses required by this subpart or any other quality control or quality assurance analyses associated with wet acid phosphorus production.

§ 61.206 Distribution and use of phosphogypsum for other purposes.

(a) Phosphogypsum may not be lawfully removed from a stack and distributed or used for any purpose not expressly specified in § 61.204 or § 61.205 without prior EPA approval.

(b) A request that EPA approve distribution and/or use of phosphogypsum for any other purpose must be submitted in writing and must contain the following information:

(1) The name and address of the person(s) making the request.

(2) A description of the proposed use, including any handling and processing that the phosphogypsum will undergo.

(3) The location of each facility, including suite and/or building number, street, city, county, state, and zip code, where any use, handling, or processing of the phosphogypsum will take place.

(4) The mailing address of each facility where any use, handling, or processing of the phosphogypsum will take place, if different from paragraph (b)(3) of this section.

(5) The quantity of phosphogypsum to be used by each facility.

(6) The average concentration of radium-226 in the phosphogypsum to be used.

(7) A description of any measures which will be taken to prevent the uncontrolled release of phosphogypsum into the environment.

(8) An estimate of the maximum individual risk, risk distribution, and incidence associated with the proposed use, including the ultimate disposition of the phosphogypsum or any product in which the phosphogypsum is incorporated.

(9) A description of the intended disposition of any unused phosphogypsum.

(10) Each request shall be signed and dated by a corporate officer or public official in charge of the facility.

(c) The Assistant Administrator for Air and Radiation may decide to grant a request that EPA approve distribution and/or use of phosphogypsum if he determines that the proposed distribution and/or use is at lease as protective of public health, in both the short term and the long term, as disposal of phosphogypsum in a stack or a mine.

(d) If the Assistant Administrator for Air and Radiation decides to grant a request that EPA approve distribution and/or use of phosphogypsum for a specified purpose, each of the following requirements shall be satisfied:

(1) The owner or operator of the stack from which the phosphogypsum is removed shall determine annually the average radium-226 concentration at the location in the stack from which the phosphogypsum will be removed, as provided by § 61.207.

(2) All phosphogypsum distributed in commerce by the owner or operator of a phosphogypsum stack, or by a distributor, retailer, or reseller, or purchased by the end-user, shall be accompanied at all times by certification documents which conform to the requirements § 61.208.

(3) The end-user of the phosphogypsum shall maintain records which conform to the requirements of § 61.209(c).

(e) If the Assistant Administrator for Air and Radiation decides to grant a request that EPA approve distribution and/or use of phosphogypsum for a specified purpose, the Assistant Administrator may decide to impose additional terms or conditions governing such distribution or use. In appropriate circumstances, the Assistant Administrator may also decide to waive or modify the recordkeeping requirements established by § 61.209(c).

§ 61.207 Radium-226 sampling and measurement procedures.

(a) Before removing phosphogypsum from a stack for distribution to commerce pursuant to § 61.204, § 61.205, or § 61.206, the owner or operator of a phosphogypsum stack shall measure the average radium-226 concentration at the location in the stack from which phosphogypsum will be removed. Measurements shall be performed for each such location prior to the intitial distribution in commerce of phosphogypsum removed from that location and at least once during each calendar year while distribution of phosphogypsum removed from the location continues.

(b) The radium-226 concentration shall be determined in accordance with the analytical procedures described in 40 CFR part 61, appendix B, Method 114.

(c) Phosphogysum samples shall be taken at regularly spaced intervals across the surface of the location in the phosphogypsum stack from which phosphogypsum will be removed.

(d) The minimum number of samples considered necessary to determine a representative average radium-226 concentration for the location on the stack to be analyzed shall be calculated as follows:

(1) Obtain the measured mean and standard deviation of 30 regularly spaced phosphogypsum samples.

(2) Solve the following equation for the number of samples required to achieve a 95% confidence interval:

$$e > \frac{\tau(n)s}{x\sqrt{n}}$$

where:

τ is the students – τ distribution,

s = measured standard deviation of the radium-226 concentration,

x = measured mean of the radium-226 concentration,

e = allowable error (expressed as a fraction), and
n = number of samples.

See Reference 1 of Method 115 in appendix B to part 61 for a detailed discussion of this statistical technique.

(3) If the number of samples required is greater than 30, then obtain and analyze the necessary number of additional samples and recalculate the average radium-226 concentration using the combination of the results of the original 30 samples and additional samples. The additional samples shall also be regularly spaced across the surface of the location in the phosphogypsum stack from which phosphogypsum will be removed.

§ 61.208 Certification requirements.

(a)(1) The owner or operator of a stack from which phosphogypsum will be removed and distributed in commerce pursuant to § 61.204, § 61.205, or § 61.206 shall prepare a certification document for each quantity of phosphogypsum which is distributed in commerce which includes:

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

(ii) The name and address of the purchaser or recipient of the phosphogypsum;

(iii) The quantity (in pounds) of phosphogypsum sold or transferred;

(iv) The date of sale or transfer;

(v) A description of the intended end-use for the phosphogypsum;

(vi) The average radium-226 concentration, in pCi/g, of the phosphogypsum, as determined pursuant to § 61.207; and

(vii) The signature of the person who prepared the certification.

(2) The owner or operator shall retain the certification document for five years from the date of sale or transfer, and shall produce the document for inspection upon request by the Administrator, or his authorized representative. The owner or operator shall also provide a copy of the certification document to the purchaser or recipient.

(b)(1) Each distributor, retailer, or reseller who purchases or receives phosphogypsum for subsequent resale or transfer shall prepare a certification document for each quantity of phosphogypsum which is resold or transferred which includes:

(i) The name and address of the distributor, retailer, or reseller;

(ii) The name and address of the purchaser or recipient of the phosphogypsum;

(iii) The quantity (in pounds) of phosphogypsum resold or transferred;

(iv) The date of resale or transfer;

(v) A description of the intended end-use for the phosphogypsum;

(vi) A copy of each certification document which accompanied the phosphogypsum at the time it was purchased or received by the distributor, retailer, or reseller; and

(vii) The signature of the person who prepared the certification.

(2) The distributor, retailer, or reseller shall retain the certification document for five years from the date of resale or transfer, and shall produce the document for inspection upon request by the Administrator, or his authorized representative. For every resale or transfer of phosphogypsum to a person other than an agricultural end-user, the distributor, retailer, or reseller shall also provide a copy of the certification document to the purchaser or transferee.

§ 61.209 Required records.

(a) Each owner or operator of a phosphogypsum stack must maintain records for each stack documenting the procedure used to verify compliance with the flux standard in § 61.202, including all measurements, calculations, and analytical methods on which input parameters were based. The required documentation shall be sufficient to allow an independent auditor to verify the correctness of the determination made concerning compliance of the stack with flux standard.

(b) Each owner or operator of a phosphogypsum stack must maintain records documenting the procedure used to determine average radium-226 concentration pursuant to § 61.207, including all measurements, calculations, and analytical methods on which input parameters were based. The required documentation shall be sufficient to allow an independent auditor to verify the accuracy of the radium-226 concentration.

(c) Each facility which uses phosphogypsum pursuant to § 61.205 or § 61.206 shall prepare records which include the following information:

(1) The name and address of the person in charge of the activity involving use of phosphogypsum.

(2) A description of each use of phosphogypsum, including the handling and processing that the phosphogypsum underwent.

(3) The location of each site where each use of phosphogypsum occurred, including the suite and/or building number, street, city, county, state, and zip code.

(4) The mailing address of each facility using phosphogypsum, if different from paragraph (c)(3) of this section.

(5) The date of each use of phosphogypsum.

(6) The quantity of phosphogypsum used.

(7) The certified average concentration of radium-226 for the phosphogypsum which was used.

(8) A description of all measures taken to prevent the uncontrolled release of phosphogypsum into the environment.

(9) A description of the disposition of any unused phosphogypsum.

(d) These records shall be retained by the facility for at least five years from the date of use of the phosphogypsum and shall be produced for inspection upon request by the Administrator, or his authorized representative.

§ 61.210 Exemption from the reporting and testing requirements of 40 CFR 61.10.

All facilities designated under this subpart are exempt from the reporting requirements of 40 CFR 61.10.

Appendix B—[Amended]

3. By amending Table 1 in Method 114 in appendix B to part 61 by inserting in alphabetical order the following entry:

Ra–226
A–1, A–2, G–1, G–2

[FR Doc. 92–12640 Filed 6–2–92; 8:45 am]
BILLING CODE 6560–50–M

INTERNATIONAL DEVELOPMENT COOPERATION AGENCY

Agency for International Development

48 CFR Parts 710 and 752

[AIDAR Notice 92–3]

Metric System

AGENCY: Agency for International Development, IDCA.

ACTION: Final rule.

SUMMARY: The Agency for International Development Acquisition Regulation (AIDAR) is being amended to implement the Agency's Metric Transition Plan that was issued pursuant to the Metric Conversion Act and Executive Order 12770.

EFFECTIVE DATE: July 6, 1992.

FOR FURTHER INFORMATION CONTACT: Ms. Kathleen J. O'Hara, FA/PPE, room 1600I, SA–14, Agency for International Development, Washington, DC 20523–1435. Telephone: (703) 875–1534.

SUPPLEMENTARY INFORMATION: A new part 710 is added which sets out the criteria and authority for waiving the requirement to use the metric system of