UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
WASHINGTON, D.C. 20555

April 4, 1989

NRC INFORMATION NOTICE NO. 89-37: PROPOSED AMENDMENTS TO 40 CFR PART 61, AIR EMISSION STANDARDS FOR RADIONUCLIDES

Addressees:

All U.S. Nuclear Regulatory Commission (NRC) licensees.

Purpose:

This information notice is provided to inform licensees that the Environmental Protection Agency (EPA) has published a proposed rule (53 FR 9612) to amend the air emission standards for radionuclides in 40 CFR Part 61. Licensees may wish to review this information for applicability to their programs, distribute the notice to responsible radiation safety staff, and consider actions, if appropriate, to assess the impact of the proposed rule on licensee operations and the need for comments to EPA. However, suggestions contained in this information notice do not constitute new NRC requirements, and no written response is required.

Description of Circumstances:

On March 7, 1989, a proposed rule on radionuclide emissions under the authority of the Clean Air Act was published in the Federal Register, Vol. 54, No. 43, pp. 9612 to 9668. NRC licensees constitute one category of sources covered by the proposed rule. A copy of that portion of the statement of considerations dealing with NRC-licensed, Agreement State-licensed, and non-DOE Federal facilities (including fuel cycle facilities) is provided as Attachment 1 of this information notice. The proposed rule also sets standards for mill tailings sites.

Comments on the proposed rule must be received by EPA on or before May 15, 1989. Public hearings will be held in Washington, D.C. on April 10 and 11, 1989, and in Las Vegas, Nevada on April 13 and 14, 1989. Comments should be submitted (in duplicate, if possible) to: Central Docket Section (A-130), Environmental Protection Agency, Attn: Docket No. A-79-11, Washington, D.C., 20460.

Discussion:

The Federal Register Notice discusses four approaches to establish a health and safety standard for radionuclide air emissions. The final standard will be determined after public comments have been considered. Proposed procedures for determining compliance may require historical meteorological data, emissions

IDAK-11C

sampling, and use of computer codes developed by EPA. Licensees should consider obtaining a complete copy of the proposed rule and assessing the impact of ensuring compliance on their operations.

Licensee comments on the potential impact of the various options under consideration and the methods for determining and demonstrating compliance would be of use to EPA. For more information, contact: James M. Hardin, Environmental Standards Branch, Criteria and Standards Division (ANR-460), Office of Radiation Programs, Environmental Protection Agency, Washington, D.C., 20460, (202) 475-9610.

No written response is required by this information notice. If you have any questions about this matter, please contact the appropriate NRC Regional Offices or this office.

Richard E. Cunningham

Richard E. Cunningham, Director
Division of Industrial and
Medical Nuclear Safety, NMSS

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Attachments:
1. Pages 9628-9632 of 54 FR 9612
2. List of Recently Issued NMSS Information Notices
3. List of Recently Issued NRC Information Notices

acceptable level of emissions is the amount that shall not cause any member of the public to receive an effective dose equivalent of more than 3 mrem/y.

Decision on Ample Margin of Safety. After comparing the benefits and costs of reducing risks below the safe level, EPA has determined that no further reductions below the level of 3 mrem/y EDE are needed. Therefore, EPA is proposing a NESHAP of 3 mrem/y which protects public health with an ample margin of safety.

Approach D: 1×10^{-6} or Less Maximum Individual Risk Approach. Decision on Acceptable Risk. The use of dose based standards makes it simple to determine the correct standard under this approach. When the dose is evenly distributed to all organs, an effective dose equivalent of 0.03 mrem/y for 70 years equals a risk of 1×10^{-6}. Therefore, under this approach an acceptable level of emissions is the amount that shall not cause any member of the public to receive an effective dose equivalent of more than 0.03 mrem/y.

Decision on Ample Margin of Safety. After comparing the benefits and cost of reducing risks below the safe level, EPA has determined that no further reductions below the level of 0.03 mrem/y EDE are needed to protect public health with an ample margin of safety. Therefore, EPA is proposing a NESHAP of 0.03 mrem/y protects public health with an ample margin of safety.

4. Implementation

a. Introduction. ORP's experience in implementing the existing radionuclide NESHAP covering DOE facilities has shown that implementation of the current standard has several problems. EPA is proposing a new system for implementing the proposed NESHAP designed to overcome some of the limitations in the present standard. This system will be used regardless of the specific level of standard that is chosen.

b. Yearly reports. The implementation system for the NESHAP is designed to provide EPA with yearly reports on the levels of emissions from regulated facilities and resulting doses. Presently, DOE facilities monitor their emissions and make annual reports to EPA. These reports should continue under the new NESHAP. Although the report is based on a calendar year the dose standard applies to any year, i.e. any period of 12 consecutive months. Since these reports provide EPA with the information it needs, DOE facilities are exempted from the requirements of 61.10.

c. Definition of a facility. A problem in implementing the current standard is the ambiguity associated with the present definition of a facility. All the buildings, structures and operations within one contiguous site shall be considered a single facility. For example, the entire DOE facility at Oak Ridge, Tennessee must meet the current standard of 25 mrem/y, instead of each individual building getting its own 25 mrem/y standard.

d. Distinction between construction and modification. Since EPA takes the position that a facility is all the buildings within a given plant site, there can be confusion over whether the construction of a new building constitutes an existing facility, is new construction, or is a modification of an existing facility. It is proposed that the new NESHAP will specify that the construction of a new building is new construction at the facility and not a modification of the facility. This distinction is important because all new construction needs to be checked to see whether or not it needs prior approval but modifications which do not cause a net increase in the rate of emissions from the facility do not need prior approval.

e. Prior approval of new construction or modification. EPA will not change the basic definition of modification that exists at 40 CFR 61.15. A change that causes any increase in the rate of emissions is a modification, no matter how small that increase is. To reduce unnecessary paperwork, it is appropriate to avoid applications in cases of small changes.

EPA proposes a system under which DOE facilities will use AIRDOS to determine the dose to the most exposed individual due to the modification or new construction. If the estimated maximum individual dose added by the new construction or modification is less than 1% of the standard, then the modification or new construction does not need prior approval.

In making the determination of dose, for this purpose DOE must use the emission factors and source term determination from "BID: Procedures Approved for Demonstrating Compliance with the Dose Limits Established by 40 CFR Part 61, subpart I." (BID: Compliance).

B. Nuclear Regulatory Commission Licensed and Non-DOE Federal Facilities

1. Introduction

NRC-licensed, Agreement state-licensed, and non-DOE federal facilities include over 6,000 different facilities. These facilities include research and test reactors, hospitals, clinics, the radiopharmaceutical industry, low level nuclear waste facilities, and other research and industrial facilities. These facilities are located in all fifty states. EPA estimates that virtually every American lives within 80 km of an NRC licensee.

The facilities in this category emit a large number of radionuclides. These radionuclides affect individuals by inhalation, ingestion, ground deposition and immersion pathways. Individual facilities may emit only one or two radionuclides affecting only one or two pathways.

Emissions from this source category are presently covered by a radionuclide NESHAP which mandates that emissions do not cause any individual to receive a whole body dose of more than 25 mrem/y or receive a dose of 75 mrem/y to any organ. Two categories of NRC-licensees have been exempted from coverage by the existing NESHAP: High-level nuclear waste (HLW) facilities and uranium fuel cycle (UFC) facilities. There are two types of HLW facilities, management and disposal facilities. The disposal of HLW, which occurs at a few unique facilities, is considered as a separate source category. The management, processing and storage of HLW that occurs at a NRC-licensee is included in the estimate of emissions of the licensee used in the analysis that underlies today's proposal for this category. Most of the NRC-licensees that manage, process or store HLW do so because it is related to their other operations. For radionuclide NESHAPs, EPA has determined that it is impractical to separately analyze and regulate two different emissions from the same facility. UFC facilities, which are distinctly different facilities, are being analyzed as a separate source category.

2. Estimates of Exposure and Risk.

EPA's risk assessment of this category combined an analysis of the nine sub-categories that make up this category. Due to the wide scope of this category, EPA's risk assessment of this source category is based on large emitters and model facilities with model populations. The assessment included both analysis of those facilities believed to be the largest emitters and model facilities within each sub-category. The estimates of maximum individual risk are based on the site-by-site assessment of the largest known emitters.

The analysis of the largest sources was based on information compiled from previously existing data bases and information received from some of the sources themselves. The model facilities were developed after reviewing data from surveys conducted by the NRC and

the Conference of Radiation Control Program Directors. The use of model facilities increases the uncertainty of the risk assessment. Especially uncertain are estimates of the population within given risk ranges. EPA requests that commentors provide any additional information concerning emissions from this source category that might change EPA's estimate of maximum individual risk or population incidence.

The estimates of population risks are based on extrapolations from model facilities using census tract data. Frequency distributions do not take into account overlapping sources.

The results of this analysis are a maximum individual risk of 1.8×10^{-4}. EPA estimates that this category results in 0.13 fatal cancers per year. EPA's analysis shows that less than 0.5% of the U.S. population receives a lifetime fatal cancer risk greater than 1×10^{-6}. Some of the larger NRC-licensees do release small amounts of iodine-125 and iodine-131; these radionuclides can cause thyroid cancer.

Table 6 presents example scenarios to show how different emission levels would result in different health risk profiles. The table presents the risk estimates at baseline in terms of estimated annual fatal cancer incidence, maximum individual lifetime risk, total population exposed at or above particular risk levels (i.e., risk distribution), and annual incidence attributable to the population exposed at each risk level. The table also presents available estimates of annual incidence and maximum individual lifetime risk for a lower emission level identified as alternatives 2 and 3.

3. Application of Alternative Policy Approaches

The decisions that would result from the application of the four policy approaches described in Section VI to the NRC-licensees source category are described below.

Approach A: Case-by-Case Approach. Decision on Acceptable Risk. The maximum individual risk to any individual is approximately 1.8×10^{-4} which is higher than the level preferred under the case-by-case approach. The estimated annual incidence is 0.13 fatal cancers per year; virtually all of that risk is borne by people whose risk is less than 1×10^{-5}, and over 80% of the risk is borne by individuals whose risk is less than 10^{-6}. Most NRC-licensees have much smaller emissions and do not contribute significantly to the total risk.

EPA examined several alternatives before determining the acceptable level. Those alternatives and the risks they present are illustrated in Table 6. After examining these different options, the Administrator proposes to determine that 10 mrem/y ede, which represents the baseline, is acceptable under the case-by-case approach. A maximum individual risk higher than the preferred level is acceptable in this case because only a few individuals incur this level of risk and because the risk distribution is such that incidence is only 0.13 per year.

TABLE 6.—ALTERNATIVES FOR ACCEPTABLE RISK FROM NRC LICENSEES

	Alternative 1 (baseline)	Alternative 2	Alternative 3
Maximum individual risk (lifetime)	1.8×10^{-4}	1.0×10^{-4}	3.0×10^{-5}
Incidence within 80 km (death/y)	0.13	0.13	0.12
Risk individual:			
E-2 to E-1	0	0	0
E-3 to E-2	0	0	0
E-4 to E-3	(1)	(1)	0
E-5 to E-4	2,600	2,600	800
E-6 to E-5	720,000	720,000	400,000
Less E-6	240M	240M	240M
Risk incidence:			
E-2 to E-1	0	0	0
E-3 to E-2	0	0	0
E-4 to E-3	(1)	(1)	0
E-5 to E-4	0.00054	0.00054	0.00025
E-6 to E-5	0.024	0.024	0.011
Less E-6	0.11	0.11	0.11

Other Health Impacts: Total cancers may be as much as 9 times higher than the number of fatal cancers because risks from some of the largest facilities in this source category are caused predominately by iodine which causes thyroid cancer.

[1] We believe there are some individuals at this risk level but all 6,000 facilities in this category have not been characterized.

Decision on Ample Margin of Safety. EPA has examined the control technology necessary to lower emissions from NRC-licensees. To reduce the complexity of studying the costs and benefits of all different control options, EPA has concentrated on the facilities with the largest emissions. The costs and benefits of controlling emissions can be seen in Table 7.

Based on the costs of achieving alternative 2 and the very small reductions of incidence and the small decreases in risk that would result, EPA has determined that it is not necessary to further reduce risks below their current level. Therefore, EPA believes that limiting emissions to their current level, represented by a level of 10 mrem/y ede, will protect public health with an ample margin of safety. No further reduction below the safe level is required. However, EPA believes that the risks are high enough, and have the potential to go higher, that the protection of public health requires that a NESHAP be promulgated to insure that the current levels of emissions which are safe with an ample margin of safety are not increased. Therefore, EPA is proposing a NESHAP mandating that radionuclide emissions from NRC-licensees shall not cause any individual to receive a dose of greater than 10 mrem/y ede.

Approach B: Incidence Based Approach. Decision on Acceptable Risk. EPA has determined that emissions from NRC-licensees cause less than one fatal cancer per year. Therefore, under this approach, current emissions are acceptable.

Decision on Ample Margin of Safety. EPA has examined the control technology necessary to lower emissions from NRC-licensees. To reduce the complexity of studying the costs and benefits of all different control options, EPA has concentrated on the facilities with the largest emissions. The costs and benefits of controlling emissions to various levels can be seen in Table 7.

TABLE 7.—ALTERNATIVES FOR AMPLE MARGIN OF SAFETY FOR NRC FACILITIES

Alternative	MIR	Incidence	Incremental incidence reduction	Total incidence reduction	Incremental capital cost	Incremental annualized cost	Total annualized cost
1	1.6×10^{-4}	0.13					
1-A	1.6×10^{-4}	0.13					
2	1.0×10^{-4}	0.13	<0.01	<0.01	$5M	$2.4M	$2.4M
3	3.0×10^{-5}	0.12	0.1	0.1	$20M	$9.6M	$12M
4	1.0×10^{-5}	0.07	0.05	0.06	$35M	$23M	$35M

Regulatory Status: Currently we have a NESHAP limiting air emissions to 25 mrem/y whole body and 75 mrem/y any organ (equivalent to a MIR of 7×10^{-4}).
Comments: For this category, non-fatal cancer risk is appreciably higher than the fatal cancer risk because most of the risk is due to I-131 and I-125 exposure (thyroid).
Alternative 1: Baseline, no rule—Some facilities may cause higher risks. All 6000 facilities have not been characterized. The current NESHAP would be vacated. Based on a low-LET risk factor of 400 fatal cancers per million person-rad, ranging from 120 to 1200 fatal cancers per million person-rad, the Alternative 1 risk may range from 4.8×10^{-5} to 4.8×10^{-4}.
Alternative 1-A: Baseline rule, 10 mrem/y ede (equivalent to a MIR of 3×10^{-4})—As a practical matter, this alternative is the same as the current NESHAP.
Alternative 2: Emission limit of 3 mrem/y ede (equivalent to a MIR of 1×10^{-4})—cost estimates are very uncertain. Several hundred facilities would install controls or measure emissions to demonstrate compliance.
Alternative 3: Emission limit of 1 mrem/y ede (equivalent to a MIR of 3×10^{-5})—cost estimates are very uncertain; estimates are not site specific.
Alternative 4: Emission limit of 0.3 mrem/y ede (equivalent to a MIR of 1×10^{-5})—compliance procedures have been developed to reduce the burdens to the regulated community. At this level many facilities will have difficulty demonstrating compliance.
Alternative 5: Table does not contain alternative to bring the MIR to 1×10^{-6} because it is not possible to predict the impact. Many additional controls would be needed. Implementation would be burdensome as most facilities would now have to demonstrate compliance with an emission limit in rigorous fashion.

Based on the costs of achieving alternative 2 and the very small reductions of incidence and the small decreases in risk that would result, EPA has determined that it is not necessary to further reduce risks below their current level. Therefore, EPA believes that limiting emissions to their current level, represented by a level of 10 mrem/y EDE, will protect public health with an ample margin of safety. No further reduction below the safe level is required. However, EPA believes that the risks are high enough, and have the potential to go higher, that the protection of public health requires that a NESHAP be promulgated to insure that the current levels of emissions are not increased. Therefore, EPA is proposing a NESHAP mandating that radionuclide emissions from NRC-licensees shall not cause any individual to receive a dose of greater than 10 mrem/y EDE.

Approach C: 1×10^{-4} or Less Maximum Individual Risk Approach. Decision on Acceptable Risk. The use of dose-based standards makes it simple to determine the correct standard under this approach. When the dose is evenly distributed to all organs, an effective dose equivalent of 3 mrem/y for 70 years equals a risk of 1×10^{-4}. Therefore, under this approach, an acceptable level of emissions is the amount that shall not cause any member of the public to receive an effective does equivalent of more than 3 mrem/y.

Decision on Ample Margin of Safety. After comparing the benefits and costs of reducing risks below the safe level, EPA has determined that no further reductions below the level of 3 mrem/y EDE are needed. Therefore, EPA will propose a NESHAP of 3 mrem/y which protects public health with an ample margin of safety.

Approach D: 1×10^{-6} or Less Maximum Individual Risk Approach. Decision on Acceptable Risk. When the dose is evenly distributed to all organs, an effective dose equivalent of 0.03 mrem/yr for 70 years equals a risk of 1×10^{-6}. Therefore, under this approach, an acceptable level of emissions is the amount that shall not cause any member of the public to receive an effective dose equivalent of more than 0.03 mrem/y.

Decision on Ample Margin of Safety. After comparing the benefits and costs of reducing risks below the safe level, EPA has determined that no further reductions below the level of 0.03 mrem/y EDE are needed to protect public health with an ample margin of safety. Therefore, EPA will propose a NESHAP of 0.03 mrem/y which protects public health with an ample margin of safety.

4. Implementation

a. Introduction. The system for implementing this NESHAP is described in "A Guide for Determining Compliance with Clean Air Act Standards for Radionuclide Emissions From NRC-Licensed and Non-DOE Federal Facilities." The Agency has also developed the COMPLY Computer Code (described earlier), for IBM and IBM-compatible computers, to assist the regulated community in determining compliance with the standard.

b. Yearly reports. The implementation system for the NESHAP is designed to provide EPA with yearly reports on the levels of emissions and the dose caused by those emissions from regulated facilities. There are over 6,000 NRC-licensees, many of whom have very small amounts of radionuclides. EPA considers that the emissions from most sources in this category are so low that reporting should not be necessary. EPA has developed a system to determine whether or not reporting is required by estimating the dose caused by a facility's emissions. As long as the dose to the maximum individual is 10% of the standard or less, then the facility does not have to report. EPA currently estimates that if the cutoff is 1 mrem/yr, then less than 300 facilities would have to report to EPA.

The Agency has developed a system for dose determination that is based on screening models originally developed by the NCRP. This system is a series of screening tests each more complicated and more realistic than the next. Using this system, each affected facility will, annually, have to check to see whether or not it needs to report to EPA. Even in it does not have to report, it must keep records of the results for 5 years to demonstrate that it has checked to see whether or not it needs to report. Although the report is based on a calendar year the dose standard applies to any year, i.e. any period of 12 consecutive months.

In order to simplify calculation of the source term, the Agency will allow the use of generic emission factors. The derivation of these emission factors is explained in BID: Compliance. These factors are applied to the quantity of radionuclides used annually at the facility. Radionuclides in sealed containers are excluded. The results of these calculations are used as the input of emissions for the screening model mentioned above.

Since these reports will provide EPA with the information it needs, NRC-licensees are exempted from the requirements of 61.10.

c. Prior approval for modification or new construction. EPA proposes that the system discussed for DOE facilities also be used for this source category except that the sources will not use AIRDOS to

calculate the doses. Instead they will use the screening models and measured emissions or emission factors described above.

C. Uranium Fuel Cycle Facilities

1. Introduction

Uranium Fuel Cycle (UFC) facilities are the facilities used in the conversion of uranium ore to electric power. They include uranium mills and tailings (non-radon emissions), hexafloride conversion plants, fuel fabrication plants and commercial nuclear power plants. These facilities are licensed by the NRC. (Uranium fuel enrichment facilities are not included in this category because they are covered as DOE facilities.) These facilities are large sophisticated operations with the potential for large releases of radionuclides.

These facilities are not covered by a NESHAP. However, all releases from these facilities (air, water and direct gamma radiation) are covered under the Uranium Fuel Cycle Standard, 40 CFR 190. This standard was promulgated by EPA under the authority of the AEA and is enforced by NRC. Under the standard, the combined releases of all UFC facilities must not cause any individual to receive a dose of more than 25 mrem/y to the whole body or to any organ except the thyroid (which can receive 75 mrem/y). This standard has been implemented and enforced by the NRC. In the past, the Administrator has decided not to regulate this category under section 112, because he determined that the AEA standard protected public health with an ample margin of safety. EPA's decision not to regulate this category is one of the issues in the current litigation. After reconsidering this issue, EPA has decided to analyze UFC facilities using the same four regulatory options used for other categories.

2. Estimates of Exposure and Risk

EPA's risk assessment for this category is the combination of the results of the assessments of the different types of facilities included in this category. The source term for emissions from uranium mill tailing piles is estimated from a model mill using NRC methodology. The estimate does not include radon releases which are covered by a separate NESHAP. Meteorological and population data are based on typical mill sites. The assessment of the two uranium hexafluoride conversion plants is based on reported emissions and census population distributions using nearby meteorological da a.

The assessment for fuel fabrication plants is based on reported emissions and census population distributions from large facilities. The emission estimate for nuclear power plants is based on actual releases from operating plants. Population data is taken from NRC reference populations for coastal, river and lake sites. Assessments consider effects of multiple reactors at a site, but not the overlap of multiple sites. Virtually the entire U.S. population lives within 80 km of at least one UFC facility.

The results of the analysis show that the most exposed individual receives a dose associated with an increased risk of fatal cancer of 2.2×10^{-4}. There is less than 0.1 fatal cancer per year in the population, and virtually all the population risk is received by people with a lifetime risk of less than 1×10^{-6}.

Table 8 presents example scenarios to show how different emission levels would result in different health risk profiles. The table presents the risk estimates at baseline in terms of estimated annual fatal cancer incidence, maximum individual lifetime risk, total population exposed at or above particular risk levels (i.e., risk distribution), and annual incidence attributable to the population exposed at each risk level. The table also presents available estimates of annual incidence and maximum individual lifetime risk for a lower emission level identified as alternatives 2 and 3.

3. Application of Alternative Policy Approaches

The decisions that would result from the application of the four policy approaches described in Section VI, to the UFC facilities source category are described below.

Approach A: Case-by-Case Approach. Decision on Acceptable Risk. As stated earlier, the maximum individual risk to any individual is approximately 2.2×10^{-4} which is higher than the level preferred under the case-by-case approach. The estimated annual incidence is 0.1 fatal cancers per year, and almost all of that risk is borne by people whose risk is less than 1×10^{-6}.

EPA examined several alternatives before determining the acceptable level. Those alternatives and the risks they present are illustrated in Table 8. After examining these different options, the Administrator proposes to determine that Alternative 1 (baseline emissions) is acceptable under the case-by-case approach. A maximum individual risk higher than the preferred level is acceptable in this case because the risk distribution is such that incidence is only 0.1 per year.

TABLE 8.—ALTERNATIVES FOR ACCEPTABLE RISK FROM URANIUM FUEL CYCLE FACILITIES

	Alternative 1 (baseline)	Alternative 2	Alternative 3
Maximum individual risk (lifetime)	2.2×10^{-4}	1.4×10^{-4}	3.0×10^{-5}
Incidence within 80 km (death/y)	0.10	0.10	0.10
Risk individual			
E-2 to E-1	0	0	0
E-3 to E-2	0	0	0
E-4 to E-3	95	[1]	0
E-5 to E-4	13,000	13,000	4,000
E-6 to E-5	190,000	190,000	190,000
Less E-6	240M	240M	240M
Risk incidence			
E-2 to E-1	0	0	0
E-3 to E-2	0	0	0
E-4 to E-3	0.00024	[1]	0
E-5 to E-4	0.0024	0.0024	0.001
E-6 to E-5	0.0093	0.0093	0.0093
Less E-6	0.091	0.091	0.091

Other Health Impacts: Total cancers no more than twice fatal cancers.

[1] At least one person may be at this risk level, total number of people unknown because site visit has not been made.

Decision on Ample Margin of Safety. EPA has examined the control technology necessary to lower emissions from UFC facilities. To reduce the complexity of studying the costs and benefits of all different control options, EPA has concentrated on the facilities with the largest emissions. The costs and benefits of controlling emissions can be seen in Table 9.

Based on the costs of achieving alternative 2 and the fact that it would reduce the incidence of fatal cancer by less than one case every 100 years, and considerating the small decreases in individual risk that would result, EPA has determined that it is not necessary to further reduce risks below their current level. Therefore, EPA believes that limiting emissions to their current level, represented by a level of 10 mrem/y ede, will protest public health with an ample margin of safety. No further reduction below the safe level is required. However, EPA believes that the risks are high enough, and have the potential to go significantly higher, that the protection of public health requires that a NESHAP be promulgated to insure that the current levels of emissions which are safe with an ample margin of safety are not increased. Therefore, EPA is proposing a NESHAP mandating that radionuclide emissions from UFC facilities shall not cause any individual to receive a dose of greater than 10 mrem/y ede.

Approach B: Incidence Based Approach. Decision on Acceptable Risk.

EPA has determined that emissions from UFC facilities cause less than one fatal cancer per year. Therefore, under this approach, current emissions are acceptable.

TABLE 9.—ALTERNATIVES FOR AMPLE MARGIN OF SAFETY FOR URANIUM FUEL CYCLE FACILITIES

Alternative	MIR	Incidence	Incremental Incidence Reduction	Total Incidence Reduction	Incremental Capital Cost	Incremental Annualized Cost	Total Annualized Cost
1	2.2×10^{-4}	0.10					
1-A	2.2×10^{-4}	0.10					
2	1.4×10^{-4}	0.10	<0.01	<0.01	$5M	$5.4M	$5.4M
3	3.0×10^{-5}	0.10	<0.01	<0.01	$75M	$31M	$36M

Regulatory Status: Current AEA standard limits total emissions to 25 mrem/y whole body; 25 mrem/y any organ. Previously, we deferred to this AEA standard and did not propose a NESHAP for this source category.

Comments:

Alternative 1: Baseline, no rule—AEA rule limits risk to a maximum value of 7×10^{-4}.

Based on a low-LET risk factor of 400 fatal cancers per million person-rad, ranging from 120 to 1200 fatal cancers per million person-rad, the Alternative 1 risk may range from 6.6×10^{-5} to 6.6×10^{-4}.

Alternative 1-A: Baseline rule—10 mrem/y ede. The dose from one uranium mill is of this magnitude. CAA rule allows citizen suits not allowed under the AEA.

Alternative 2: Emission limit of 5 mrem/y ede (equivalent to a MIR of 1.4×10^{-5})—Particulate controls added to uranium mills. 5 mrem/y is the NRC design goal for nuclear power reactors.

Alternative 3: Emission limit of 1 mrem/y ede (equivalent to a MIR of 3×10^{-6})—Most of the incidence is due to power reactors and only a few are affected by this alternative, so there is little reduction in incidence. Additional controls are required for uranium mills and uranium conversion plants.

Alternative 4: Table does not contain alternative to bring the MIR to 1×10^{-6} because of the difficulty in estimating impacts. About half of the operating nuclear plants would add additional controls. Most supporting facilities would add additional controls. Cost would be large.

Decision on Ample Margin of Safety. EPA has examined the control technology necessary to lower emissions from UFC facilities. To reduce the complexity of studying the costs and benefits of all different control options, EPA has concentrated on the facilities with the largest emissions. The costs and benefits of controlling emissions to various levels can be seen in Table 9.

Based on the costs of achieving alternative 2 and the small associated decreases in individual risk, and the fact that virtually no reduction in incidence would result, EPA has determined that it is not necessary to further reduce risks below their current level. Therefore, EPA believes that limiting emissions to their current levels, represented by a level of 10 mrem/y ede, will protect public health with an ample margin of safety. No further reduction below the safe level is required. However, EPA believes that the risks are high enough, and have the potential to go significantly higher, that the protection of public health requires regulation under section 112 to insure that the current levels of emissions which are safe with an ample margin of safety are not increased. Therefore, EPA is proposing a NESHAP mandating that radionuclide emissions from UFC facilities shall not cause any individual to receive a dose of greater than 10 mrem/y ede.

Approach C: 1×10^{-4} or Less Maximum Individual Risk Approach. Decision on Acceptable Risk. When the dose is equally distributed to all organs, an effective dose equivalent of 3 mrem/y for 70 years equals a risk of 1×10^{-4}. Therefore, under this approach, an acceptable level of emissions is the amount that shall not cause any member of the public to receive an effective dose equivalent of more than 3 mrem/y.

Decision on Ample Margin of Safety. After comparing the benefits and costs of reducing risks below the safe level, EPA has determined that no further reductions below the level of 3 mrem/y EDE are needed. Therefore, EPA is proposing a NESHAP of 3 mrem/y which protects public health with an ample margin of safety.

Approach D: 1×10^{-6} or Less Maximum Individual Risk Approach. Decision on Acceptable Risk. When the dose is equally distributed to all organs, an effective dose equivalent of 0.03 mrem/y for 70 years equals a risk of 1×10^{-6}. Therefore, under this approach, an acceptable level of emissions is the amount that shall not cause any member of the public to receive an effective dose equivalent of more than 0.03 mrem/y.

Decision on Ample Margin of Safety. After comparing the benefits and cost of reducing risks below the safe level, EPA has determined that no further reductions below the level of 0.03 mrem/y EDE are necessary to protect public health with an ample margin of safety. Therefore, EPA is proposing a NESHAP of 0.03 mrem/y which protects public health with an ample margin of safety.

4. Implementation

For each approach proposed today, EPA has independently decided that the same level of regulation is appropriate for both UFC facilities and NRC-licensees. Therefore, EPA proposes to remove the exemption for UFC facilities in the NRC-licensee NESHAP and regulate them exactly the same as other licensees, including reporting and recordkeeping requirements.

D. Elemental Phosphorus Plants

1. Introduction

Elemental phosphorus plants extract pure phosphorus from ore for use in the chemical industry. These facilities emit radionuclides into the air because phosphate ore is high in uranium and its decay products. These decay products, especially polonium-210 and lead-210, become volatilized during the extraction process and are released into the atmosphere. There are eight (5 operational, 3 standby) elemental phosphorus plants located in four different states. However, most of the emissions come from two plants in Idaho.

Due to the types of radionuclides emitted by these plants, virtually all the dose is received by the lung through the inhalation pathway causing an increased risk of lung cancer. This risk can be controlled through the use of a standard which directly limits emissions of polonium-210 (control measures which limit polonium-210 also limit emissions of lead-210). There is no need to write dose standards.

Elemental phosphorus plants are currently regulated by a NESHAP that limits their emissions to no more than 21 curies of polonium-210 annually.

2. Estimates of Exposure and Risk

EPA's risk assessment of elemental phosphorus plants is a site-by-site assessment of operating and standby plants, based on monitored data and throughput. Meteorological data was taken from nearby stations. Maximum

LIST OF RECENTLY ISSUED NMSS INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
89-35	Loss and Theft of Unsecured Licensed Material	03/30/89	All U.S. NRC byproduct, source and special nuclear material licensees
89-34	Disposal of Americium Well-Logging Sources	03/30/89	All holders of U.S. NRC specific licenses authorizing well-logging activities.
89-25	Unauthorized Transfer of Ownership or Control of Licensed Activities	03/07/89	All NRC source, byproduct, and special nuclear material licensees.
89-24	Nuclear Criticality Safety	03/06/89	All fuel cycle licensees and other licensees possessing more than critical mass quantities of special nuclear material.
89-13	Alternative Waste Management Procedures in Case of Denial of Access to Low-Level Waste Disposal Sites	02/08/89	All holders of NRC specific licenses.
89-12	Dose Calibrator Quality Control	02/09/89	All NRC medical licensees.
89-03	Potential Electrical Equipment Problems	01/11/89	All fuel cycle and major nuclear materials licensees.
89-02	Criminal Prosecution of Licensee's Former President, for Intentional Safety Violations	01/09/89	All holders of NRC specific licenses.

LIST OF RECENTLY ISSUED
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
89-36	Excessive Temperatures in Emergency Core Cooling System Piping Located Outside Containment	4/4/89	All holders of OLs or CPs for nuclear power reactors.
88-86, Supp. 1	Operating with Multiple Grounds in Direct Current Distribution Systems	3/31/89	All holders of OLs or CPs for nuclear power reactors.
89-35	Loss and Theft of Unsecured Licensed Material	3/30/89	All U.S. NRC byproduct, source and special nuclear material licensees.
89-34	Disposal of Americium Well-Logging Sources	3/30/89	All holders of an NRC specific license authorizing well-logging activities.
89-33	Potential Failure of Westinghouse Steam Generator Tube Mechanical Plugs	3/23/89	All holders of OLs or CPs for PWRs.
89-32	Surveillance Testing of Low-Temperature Overpressure-Protection Systems	3/23/89	All holders of OLs or CPs for PWRs.
89-31	Swelling and Cracking of Hafnium Control Rods	3/22/89	All holders of OLs or CPs for PWRs with Hafnium control rods.
89-30	High Temperature Environments at Nuclear Power Plants	3/15/89	All holders of OLs or CPs for nuclear power reactors.
89-29	Potential Failure of ASEA Brown Boveri Circuit Breakers During Seismic Event	3/15/89	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
CP = Construction Permit

sampling, and use of computer codes developed by EPA. Licensees should consider obtaining a complete copy of the proposed rule and assessing the impact of ensuring compliance on their operations.

Licensee comments on the potential impact of the various options under consideration and the methods for determining and demonstrating compliance would be of use to EPA. For more information, contact: James M. Hardin, Environmental Standards Branch, Criteria and Standards Division (ANR-460), Office of Radiation Programs, Environmental Protection Agency, Washington, D.C., 20460, (202) 475-9610.

No written response is required by this information notice. If you have any questions about this matter, please contact the appropriate NRC Regional Offices or this office.

Original signed by

Richard E. Cunningham, Director
Division of Industrial and
Medical Nuclear Safety, NMSS

Technical Contact: Kevin M. Ramsey, NMSS
(301) 492-0534

Attachments:
1. Pages 9628-9632 of 54 FR 9612
2. List of Recently Issued NMSS Information Notices
3. List of Recently Issued NRC Information Notices

Editor
EKraus
3/28/89

OFC:	IMOB	IMOB	IMOB	LLWM	NRR	OGC	IMNS	IMNS
NAME:	KRamsey/ll	DCool	RWilde	KDragonette telcon	TEssig telecon	PCrane telecon	GSjoblom	RECunningham
DATE:	3/27/89	3/ /89	3/ /89	3/27/89	3/28/89	3/27/89	3/ /89	3/29/89

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	KMR			telcon KMR	telecon KMR	telecon KMR		
DATE:	3/27/89	3/29/89	3/29/89	3/27/89	3/28/89	3/27/89	3/ /89	3/29/89

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