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# Environmental Protection Agency

40 CFR Part 61

## National Emission Standards for Hazardous Air Pollutants (NESHAPs); Standards for Radon-222 Emission From Licensed Uranium Mill Tailings; Final Rule

**ENVIRONMENTAL PROTECTION AGENCY**

**40 CFR Part 61**

**[AO-FR-3060-7]**

# National Emission Standards for Hazardous Air Pollutants (NESHAPs); Standards for Radon-222 Emissions From Licensed Uranium Mill Tailings

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Final rule.

**SUMMARY:** This final rule establishes work practices that apply to tailings at licensed uranium mill sites. Radon-222 is emitted from these tailings in amounts sufficient to produce a risk to public health. The work practices established here will limit the emissions of radon-222 in accordance with Section 112 of the Clean Air Act.

**EFFECTIVE DATE:** The final rule is effective on September 24, 1986.

**ADDRESSEES:** The rulemaking record is contained in Docket No. A-79-11. This docket is available for public inspection between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery One, Waterside Mall, 401 M Street, SW., Washington, DC 20460. A reasonable fee may be charged for copying.

**FOR FURTHER INFORMATION CONTACT:** Terrence A. McLaughlin, Chief, Environmental Standards Branch, Criteria and Standards Division (ANR-460), Office of Radiation Programs, U.S. Environmental Protection Agency, Washington, DC 20460, (202) 475-9610.

**SUPPLEMENTARY INFORMATION:**

## I. Supporting Documents

The draft background information document and draft economic analysis issued in support of the proposed rule have been revised in response to public comments and are now issued in final form titled, respectively, "Background Information Document—Final Rule for Radon-222 Emissions from Licensed Uranium Mill Tailings" (EPA 520/1-86-009) and "Economic Analysis—Final Rule for Radon-222 Emissions from Licensed Uranium Mill Tailings" (EPA 520/1-86-010).

The documents contain projections of radon emissions and the resulting risks to nearby individuals and to populations due to the operation of the uranium milling industry, a description of radon control technology and associated costs, and an environmental and economic analysis of the effects of alternative control strategies on the industry.

In addition, the Agency's summary of public comments on the proposed rule, together with the Agency's reply to these comments, are contained in the document "Response to Comments—Final Rule for Radon-222 Emissions from Licensed Uranium Mill Tailings" (EPA 520/1-86-011).

Single copies of these documents may be obtained from the Program Management Office (ANR-459), Office of Radiation Programs, Environmental Protection Agency, Washington, DC 20460, (202) 475-8386.

## II. Basic Terms Used in the Notice

Definitions of basic terms used in this notice are given below:

1. *ALARA*—A practice in radiation protection that encourages radionuclide emissions to be kept "as low as reasonably achievable."

2. *Continuous disposal*—A method of tailings management and disposal in which tailings are dewatered by mechanical methods soon after generation. The dried tailings are then placed in trenches or other disposal areas and immediately covered.

3. *Covered*—Disposal of tailings in accordance with specifications required by regulations appearing at 40 CFR Part 192 and issued under the Uranium Mill Tailings Radiation Control Act (UMTRCA).

4. *Mill tailings*—The waste resulting from conventional milling of uranium ore. Tailings are classified as either sands or slimes depending on particle size. Processing 1 ton of ore produces approximately 1 ton of tailings.

5. *Phased disposal*—A method of tailings management and disposal that uses a series of small impoundments. Tailings are pumped to one impoundment until it is filled and then pumped to the next impoundment. The filled impoundment is actively dewatered, or allowed to dry naturally, and then immediately reclaimed.

6. *Radon*—Radon-222; an inert radioactive gas.

7. *Radon decay products*—The seven principal radionuclides that are produced as radon-222 decays to nonradioactive lead. Radon-222 short-lived decay products means the four radionuclides with half-lives less than 20 minutes produced as radon-222 decays to lead-210.

8. *Single cell disposal*—A method of tailings management that uses a large impoundment designed to contain all tailings generated during the lifetime of the mill. At the end of the mill life the impoundment is actively dewatered or allowed to dry and is then immediately reclaimed.

9. *Tailings pile*—The on-site waste impoundment in which tailings are deposited.

## III. Background

### *A. Industry Description*

Uranium milling involves the handling of large quantities of ore containing uranium and its decay products. In this ore, the concentration of uranium and its decay products is about one thousand times greater than in other rocks and soils. Uranium milling recovers the uranium in the ore by mechanical and chemical processes that generate waste tailings. The ore is first crushed, blended, and ground to the proper size for the leaching process, which extracts uranium. Several leaching processes are used, including the use of acid, alkali, and a combination of the two. After uranium is leached from the ore, it is concentrated from the leachate through ion exchange or solvent extraction. The concentrated uranium is then extracted from the concentrating medium, precipitated, dried, and packaged. The depleted ore, in the form of tailings, is pumped to a tailings pile as a slurry.

Since ore generally contains less than 0.5 percent uranium by weight, every ton of ore processed results in almost a ton of tailings. The tailings contain virtually all of the uranium decay products present in the ore, including thorium-230 and radium-226, which decay to radon. Previous risk analyses have shown that radon presents the highest risk of any radionuclide released to air at uranium mills and that the tailings pile is the most significant source of radon.

The 26 licensed uranium mills in the United States are located in Colorado, New Mexico, South Dakota, Texas, Utah, Washington, and Wyoming. In addition, four mills have been licensed but not built. The milling industry is depressed due to a decline in the demand for uranium and competition from low-cost foreign sources. Three mills are actively processing ore, 17 are on standby and could process ore in the future if market conditions improve, and 6 are being decommissioned and will no longer process ore. The 20 licensed mills that are actively processing ore or on standby were considered in the analyses reported in the supporting documentation. These 20 mills have about 35 tailings impoundments associated with them. Recently, three of these mills have indicated to the NRC that they will no longer process ore and intend to reclaim the sites.

Past milling activities have generated about 200 million tons of tailings. Production at conventional mills peaked

in 1980, when 21 mills recovered more than 17 thousand tons of uranium and generated more than 14 million tons of tailings. The industry is currently operating at about 10 percent of capacity due to the depressed market. At this level of production, the industry is recovering about 1.8 thousand tons of uranium and generating about 1.4 million tons of new tailings annually. At full capacity, the industry could generate approximately 14 million tons of tailings a year.

*B. Estimates of Exposure and Risk*

Exposure estimates are based on radon emissions from tailings piles, since emissions and risks from other parts of a uranium mill are small in comparison. Radon emission rate estimates are based on the radium-226 concentration in the tailings using the relationship of 1 picocurie of radon emitted per square meter per second for each picocurie of radium-226 per gram of tailings. It is assumed that the radium-226 is evenly mixed throughout the tailings and that radon is emitted from all dry exposed surfaces of tailings. The radium-226 content of the tailings is derived from the relationship of one-tenth of one percent of uranium in ore equalling 280 picocuries of radium-226 per gram of ore and the assumption that all the radium-226 in the ore finds its way into the tailings pile.

Standard meteorological transport models are used to estimate radon concentrations in air at various distances from the piles. Exposure to radon decay products is then estimated from the radon concentration in air. The final risk estimates are a product of the units of radon decay product exposure levels and a risk factor that relates risk to a single unit of exposure.

Two measures of human exposure are of particular interest: "nearby individual risk" and "total population impact". The former refers to the estimated increased lifetime risk to individuals who spend their entire life at the location of existing residences where predicted concentrations of the pollutant are highest. Nearby individual risk is expressed as a probability; for example, a risk of one in one thousand means that a person spending his lifetime at the point of maximum exposure has an estimated increased risk of one in one thousand of developing a fatal cancer. Estimates of nearby individual risk are best estimates, and are not upper bound estimates.

The second measure, "total population impact", considers people exposed at all concentrations, low as well as high, and it considers people exposed throughout the United States, as appropriate. It is expressed in terms of annual number of fatal cancer cases and provides a measure of the overall impact on public health. For example, a total population impact of 0.5 fatal cancer cases per year means that emissions of the specific pollutant are predicted to cause one case of cancer every 2 years. As distance from a source increases, risks to specific persons decrease and become extremely small; but, considering the total population exposed, the sums of these risks may be significant.

The two estimates together provide a better description of the magnitude and distribution of risk than either number alone. "Nearby individual risk" gives an estimate of the highest risk, but not how many people may bear that risk. "Total population impact" describes the overall estimated health impact on the entire exposed population, but not how much risk the most exposed persons may bear. For example, two sources of radionuclide or chemical emissions could have similar population impacts but very different maximum individual risks, or vice versa. Both estimates are important and both are used in making risk management decisions. The risk estimates should not be viewed as precise determinations of likely health damage, but rather as a general indication of estimated health risk.

EPA's analysis of risks due to radon emissions from existing uranium tailings piles concluded:

1. Lung cancer, which is caused by the short-lived decay products of radon, is the dominant health hazard from tailings. Estimated effects of gamma radiation and of long-lived decay products of radon are less significant, although high gamma radiation exposures may sometimes occur.

2. Individuals living near an uncontrolled tailings pile are subject to high risks due to radon emitted from tailings. Radon contained in the ambient air enters homes and other structures built near the mill through doors and other openings in the structure. The resulting radon decay products tend to concentrate indoors, thus exposing the occupants to potentially harmful levels of these radionuclides. The EPA estimates that, at present, some persons may be exposed to risks that are as high as one in one hundred. This estimate is based on median risk estimates and an assumed exposure of 70-years during which emission levels remain the same as present values. Of course, this time period is longer than assumed in EPA's "40-year" analysis. Using the 40-year analysis, an exposure posing this level of risk could only occur if an individual remained at that location for the full 70-year period, and the pile presenting that risk was replaced after closure by another pile presenting the same risk factors.

3. Based on models for the risk to all exposed populations (local, regional, and national), about one to five fatal cancers per year are estimated from emissions of radon from tailings at the 20 mill sites being considered here, if no controls are present. If the tailings at all sites were to dry out, it is estimated that the risk could rise to about two to nine fatal cancers per year. However, not all of the piles are expected to dry out at the same time. Approximately one half of these deaths are estimated to occur within 80 kilometers of the tailings piles.

There is substantial uncertainty in these estimates because of uncertainties in the emission rates of radon from tailings sites, in the exposure people will receive from its decay products, and from incomplete knowledge of the effects on people due to these exposures. The values presented here represent best estimates based on current knowledge. Examples of factors leading to possible underestimation of risk include: the use of median rather than upper bound risk factors, ignoring radon sources at a mill site other than the tailings pile, and not considering piles where owners have indicated intent to reclaim their pile but have not done so for long periods. Risks could be overestimated if owners reclaim piles faster than EPA assumes, if radon emissions are smaller due to less radium-226 in a pile than is estimated, or if the radon emanation rate is lower than EPA estimates it to be. Additionally, since these estimates are based on current pile sizes and population distributions, as nearby populations increase or decrease in the future, the estimated impacts would vary. If specific information indicates radon emissions rates were lower, then risk estimates could be lower.

In general, much more is known about the risks from exposure to radiation than exposure to most chemicals. While there is uncertainty in risk estimates from assessments of chemical emissions and radionuclide emissions, there is much less uncertainty in estimates of risk from radionuclide emissions because of the extensive data base on the effects of human exposure to radiation. Therefore, a risk estimate resulting from exposure to radionuclides is likely to be more accurate than the same estimate for chemical exposures.

*C. History of Standard Development*

The Agency's standards for Nuclear Power Operation (40 CFR Part 190)

issued under the Atomic Energy Act (42 FR 2858 (January 13, 1977)) limit the total individual radiation dose caused by emissions from facilities that make up the uranium fuel cycle, including licensed uranium mills. However, when 40 CFR Part 190 was promulgated, considerable uncertainty existed about the public health impact of existing levels of radon in the air, as well as uncertainty about the best method for management of new man-made sources of radon. The EPA exempted radon from coverage under 40 CFR Part 190 since the problems associated with emissions of this radionuclide were sufficiently different from those of other radioactive materials associated with the fuel cycle to warrant separate consideration.

EPA has also issued standards (48 FR 45926 (October 7, 1983)) for uranium and thorium mill tailings at commercial processing licensed sites under the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA), which amends the Atomic Energy Act (AEA). These standards for disposal of tailings require stabilization of tailings on final disposal so that the associated health hazards will be controlled and limited for 1000 years to the extent reasonably achievable, in any case, for at least 200 years. The standards limit releases of radon to the air after disposal, and require measures to limit releases of radionuclides and other hazardous substances to water (40 CFR Part 192, Subparts D and E). In the preamble to these standards, the Agency discussed the relationship between UMTRCA and the Clean Air Act (CAA) and indicated its intent to publish an Advanced Notice of Proposed Rulemaking (ANPR) to consider additional control of radon emissions during the operational phase of mills.

Section 122 of the CAA required EPA to determine whether or not to regulate radioactive pollutants based on an assessment of risks to public health. After seeking public comment (44 FR 21704 (April 11, 1979)), EPA listed airborne emissions of radionuclides as hazardous air pollutants under section 112 of the CAA (44 FR 76738 (December 27, 1979)). Based on that listing, EPA subsequently promulgated standards under section 112 for Department of Energy (DOE) facilities, Nuclear Regulatory Commission (NRC) licensed facilities and non-DOE Federal facilities, elemental phosphorus plants, and underground uranium mines (50 FR 5190 (February 6, 1985 and 50 FR 15386 (April 17, 1985)).

On October 31, 1984, EPA issued its ANPR to inform interested parties that the Agency was considering issuing standards under the CAA to limit radon emissions from licensed uranium mills (49 FR 43916 (October 31, 1984)). Subsequently, EPA entered into a stipulation with the Sierra Club to promulgate such standards, or delist radionuclides, by May 1, 1986. This agreement was entered as a consent order by the United States District Court for the Northern District of California (Civil No. C-84-0656 WHO).

On February 21, 1986, EPA issued proposed standards for radon emissions from licensed uranium mills and announced a public hearing (51 FR 6382 (February 21, 1986)). The hearing was held in Denver, Colorado, on March 25, 1986 (51 FR 8205 (March 10, 1986)). A transcript of the hearing was placed in the Docket and the comment period was extended to April 28, 1986.

Due to the complexity of the proposed rule and the need for an extended comment period, EPA and the Sierra Club entered into a second stipulation to extend the deadline to August 15, 1986. The district court granted the extension on motion of the parties.

## IV. Summary of Proposed Standards

As noted earlier, EPA published a proposed rulemaking regarding control of radon-222 emissions from tailings piles at licensed sites on February 21, 1986 (51 FR 6382). That notice announced that EPA was considering various work practice standards for limiting such emissions based on its preliminary conclusions that it is not feasible to set an emissions standard, and that the nature of the risk involved warrants a regulatory response.

In its proposal, EPA presented three work practices, including improved methods for disposal of newly generated tailings, various timing requirements for use of these improved methods, and interim covers. The improved methods of disposal of newly generated tailings were a large, single pile with immediate closure, phased disposal, and continuous disposal involving dewatering and covering of tailings. EPA also stated it was considering alternatives of allowing new tailings to be added to existing piles over a range of times, including 5 years, 10 years, 15 years and an undefinite period of time into the future. (An exception from the latter requirements was proposed where existing tailings impoundments were lined.)

That proposal also discussed two available options for controlling radon-222 emissions from existing piles. It concluded that earthen covers might be placed over dry tailings beaches and embankments constructed of sand tailings. It noted that dry beaches typically cover 60 percent of the total tailings area during the operational phase of a mill and that this percentage could be significantly larger during periods of extended shutdown. It also noted that use of existing tailings piles could be terminated. While a dry out period would ensue during which emissions would unavoidably increase prior to disposal in accordance with Federal standards under UMTRCA, this is an unavoidable result of disposal.

## V. Summary of Responses To Comment

The Agency has reviewed all submittals to the docket and testimony given at the public hearing. A complete discussion of all substantive comments and the Agency's response to them appears in "Response to Comments—Proposed Rule for Radon-222 Emissions from Licensed Uranium Mills Tailings" (EPA 500/1-86-011); the document may be obtained from the Program Management Office (ANR-459), Office of Radiation Programs, Environmental Protection Agency, Washington, DC 20460. A summary of major concerns, together with the Agency's responses, are presented below.

### *Legal and Procedural*

Many commenters stated that there is no need for regulation under the CAA because existing regulations developed under the AEA and the UMTRCA and license conditions administered by the NRC and its agreement States adequately protect the public from risk due to radon. The Agency estimates the individual lifetime risk may be as high as 1 in 100, assuming 70 years of exposure. The population risk is estimated to be 1 to 5 deaths per year under current industry and regulatory conditions. The Agency believes that these risks are significant and that there is a need for standards under the CAA to protect public health with an ample margin of safety.

A number of commenters addressed ground water quality and stated that it should not be considered in regulating radon under the CAA. The Agency has not developed this rule to regulate ground water. Ground water protection standards are currently in force and being implemented under the UMTRCA standards (40 CFR Part 192). However, potential effects of various alternatives on ground water were considered as part of the analysis of the impacts of this rule, since EPA has a responsibility to consider the impacts that its rules may have on the total environment. In part, this is done to ensure that regulations do not control pollution in one environmental medium only to degrade

another. Consequently, there may be some additional ground water protection incidental to these standards.

Some commenters stated that EPA should not consider cost and technical feasibility of regulation under section 112 of the CAA. They maintain that the Congressional mandate directs EPA to adopt standards based exclusively on protection of public health. The EPA interprets the requirement of section 112 to establish emission standards at a level which "provides an ample margin of safety" as not implying that these standards must ensure that there is no remaining level of risk. Consequently, the standard being adopted today requires the use of work practices that will reduce radionuclide emissions and therefore risks to the practical minimum. The standard reflects consideration of the magnitude of the risks, the costs and availability of further controls and associated risk reduction potential, and the potential societal impacts of regulatory alternatives. The Agency, in considering the impacts, weighed the estimated risks achieved by and remaining after application of controls and their uncertainties against the costs to achieve the emission reduction and the potential for widespread closure.

Some commenters stated that the Agency must promulgate an emission standard to be consistent with the mill tailings disposal standards (40 CFR Part 192), which are partly in the form of a design standard; an emission rate limit per square meter of pile surface. These comments are based on a misconception of the disposal standards. The disposal standards had multiple environmental goals including preventing misuse of tailings, reducing radon emissions for a long period of time, and protecting ground water. The Agency determined that the best way to accomplish these goals is through the use of a design standard based on a thick barrier. The Agency found that a design standard limiting the rate of radon release was most appropriate given the many variables of location, tailings and earth characteristics. For example, a minimum thickness of barrier might not provide adequate protection under all conditions. The prescribed standard, which requires the release of radon not to exceed an average of 20 picocuries per square meter per second, is a design standard requiring a certain effectiveness from a cover. The Agency stated that the standard was not to be construed as an emission standard, "(T)he standard applies to design. Monitoring for radon after installation of an appropriately designed cover is not required," making it analogous to a work practice standard or design standard authorized under section 112(e). The Agency, thus, finds no inconsistency between the work practice standards for operations and the design standards for disposal.

The NRC questioned why EPA did not issue an emission standard, such as already exists in NRC and State regulations, instead of proposing a work practice standard. The Agency judges that it is not feasible to prescribe an emission standard since most of the radon emitted by a uranium mill comes from the surface of mill tailings piles. A typical pile may be from a few to hundreds of acres in area, and emissions from its surface cannot be controlled through a conveyance designed and constructed to emit or capture radon. It is also not practical to accurately and consistently measure emissions because of the large size of the tailings pile and the continued modifications of the pile that take place during operations. For these and other reasons, a work practice standard is being promulgated. It should be noted that the NRC and State regulations establish a concentration limit at the site boundary in units of quantity per cubic meter of air, but do not directly limit the quantity or rate of radon emissions.

A commenter argued that EPA may not use a phased application of the work practice requirements, since section 112 of the CAA permits only a two-year compliance waiver for the installation of technology to meet an emission standard. However, the two-year compliance waiver discussed by the commenter is not applicable to the standard adopted in this rulemaking. The Administrator has concluded that neither of the available interim work practices, wetting or interim cover, is an appropriate measure to be imposed generally under section 112. Also, as discussed in this notice, the requirements for new tailings impoundments cannot be implemented within two years. Consequently, the two-year period that section 112(c)(1)(b)(ii) provides "for the installation of controls" has no meaning or applicability here. As a result, the Agency has adopted a comprehensive set of risk management requirements for limiting radon emissions that fall under the general category of "design, equipment, work practice, or operational standard[s] . . ." section 112(e). These requirements were designed as an integrated program to require the maximum reduction of long-term cancer incidence attributable to uranium mill tailings piles that can be reasonably achieved. These standards operate in phases. During the first six-year phase, the operator may continue to place tailings on existing piles. In the second phase, this practice is terminated except for certain small piles and for those operators that make a satisfactory, individualized showing of low interim risk. In the third phase, without exception, tailings may only be placed in impoundments meeting size and operating limitations designed to minimize exposed area and associated radon emissions. Taken as a whole, this scheme provides protection of public health that meets the Act's requirements of "an ample margin of safety".

*Technical*

Several commenters, in commenting on the continuous disposal method, stated that the industry has minimal experience with dewatering sands and no experience with dewatering slimes. The Agency has found that although continuous disposal has never been actually practiced on uranium mill tailings in the United States, it has been proposed by industry as the preferred method of tailings disposal at three sites. These proposals were never put into practice because of the downturn in uranium production. The EPA believes that these proposals, submitted by industry, adequately demonstrate that continuous disposal can be a viable option. It should be noted that the method has been included as an allowable alternative for industry, but is not the sole practice required for new piles. It was included to provide industry with flexibility in the management of new tailings.

Several commenters said that technology to dewater tailings exists, but increased energy and manpower to accomplish this are probably not economically feasible. The Final Background-Information Document and the Economic Analysis reflect the additional costs and uncertainties in dewatering tailings for the continuous disposal option. The method has been selected as a suitable work practice that an operator may choose in lieu of phased disposal.

Several commenters stated that EPA's assumption of 40 years of standby is excessive. One commenter stated that the assumption of a 40-year period between the end of an impoundment's useful life and compliance with UMTRCA requirements is reasonable. The EPA judges that a 40-year standby period (which in practice could be several different periods totaling 40 years) before reclamation to Federal standards is a "worst-case" scenario. The Agency has estimated the fatal lung

cancers committed under this scenario to serve as a point of reference and has also evaluated a 20-year standby period scenario. Both periods were considered when the final rule was selected.

Several commenters stated that it would take about 6 years to design, license and construct a new tailings management process. One commenter said it could take more than 10 years, and one commenter said 5 years was sufficient. The EPA agrees that, based on the comments received from the NRC, States, and individual companies, a 3-year period to design, license, and construct a new tailings impoundment is unrealistically short. The Agency judges that a period of 6 years is the time needed to design, permit, and construct a new tailings impoundment. Extensions to allow more time will be available, if due to circumstances beyond their control, mill operators are unable to complete a new impoundment within that period.

Several commenters stated that more accurate site-specific emanation factors should be used as opposed to using the relationship of 1 pCi/m²-s per pCi Ra-226/g tailings. The Agency used a factor of 1 pCi/m²-s per pCi Ra-226/g of tailings for all dry areas and a factor of zero for wet areas. This same factor was used for the UMTRCA rulemaking and is the factor used by NRC. An attempt was made to develop a formula, using site specific characteristics, that would provide a more precise estimate of emissions. However, the formula has not been verified by the Agency's internal review process or by independent experts and data on the site-specific characteristics needed to derive such estimates are not available. For these reasons, the Agency decided to continue the use of the previously accepted factor.

The NRC stated that recent literature indicates that a water cover may not be as effective in reducing radon emissions as previously thought. Recent technical assessments of radon emissions from tailings covered with water are less than 2 percent of emissions from dry tailings. The Agency believes that assuming no emissions from wet tailings as compared to the more accurate 2 percent emission rate is an insignificant error in the context of this rulemaking. The Agency assumed an emission rate of zero for all tailings covered with water or saturated with water in estimating radon emissions.

*Risk*

A commenter stated that a site-specific rule based on a lifetime risk of one in a million should be set for each mill to determine the allowable exposed surface area. The EPA has not accepted the proposition that the standard must reduce risk to a predefined value, such as a level of one in a million. The EPA believes that it must protect the public with an ample margin of safety and that this requirement provides the Agency with flexibility to consider the magnitude of the risks, the practicality of measures to reduce risks, and other relevant factors. This is a judgment based on many factors specific to the source category under consideration.

Several commenters stated that radon exposure from mill tailings on a regional and national level is overshadowed by background radon sources. Therefore, regional and national risk estimates are meaningless. The EPA agrees that radon exposures due to mill tailings, at locations distant from mill tailings sites, are small compared to exposures from some other large sources. However, it does not follow that it is meaningless to calculate exposure and risk due to emissions from such sites. These calculations are based on procedures generally regarded as sufficiently accurate to support the setting of regulatory standards. The significance of the risk is judged based on the value of the individual and population risk, and the regulatory options are assessed based on the degree of risk reduction and the practicality and reasonableness of control measures.

Many commenters stated that the significance of effects of radon from mill tailings on total population is negligible because there are no proven adverse health effects. The Agency agrees that the adverse health effects due to radon emissions from mill tailings piles cannot be directly measured due to the high incidence of lung cancer from other causes. However, it would be imprudent to use this as a reason not to regulate exposure to carcinogens. The risk estimates were derived from relative risk coefficients, the use of which was recommended by the Agency's Science Advisory Board and represent current scientific knowledge. It is EPA's position that, based on current scientific evidence, excess lung cancers result from radon emitted by tailings piles and that the projected numbers of cancers calculated in the support documents are sufficient to support a rulemaking.

*Economic*

Several commenters said that the proposed rules will have significant adverse effects on industry's ability to contain costs and will threaten the industry's future. EPA's analysis shows that the control measures for new tailings disposal practices required in this rulemaking are similar in cost to alternative practices already required by existing regulations and, therefore, the control measures required by this rule are not expected to affect the industry's viability. With respect to existing tailings, the major cost of this rule to industry is moving the timetable for final cover for existing piles forward in time because the sooner new work practices are implemented, the sooner industry must undertake the expense of reclamation. Additional costs may arise in those cases where new capacity for tailings disposal will have to be created to replace the capacity lost during disposal of the existing piles. As indicated in the Economic Analysis for this rulemaking, EPA projects that this impact will not threaten the viability of this industry. The Agency concluded that the costs are reasonable in relation to the benefits derived and that this action is consistent with previous Agency actions.

## VI. Summary and Rationale of Final Rule

### *A. Summary*

Based on currently available information, EPA has determined that it is not feasible to prescribe an emission standard for radon emissions from uranium mills. Radon is emitted from the surfaces of tailings piles in a manner analogous to fugitive dust emissions and cannot be emitted through a conveyance designed and constructed to capture such radon emissions. Instead, EPA is requiring an improved work practice for the disposal of newly generated tailings and is specifying a date by which all newly generated tailings must be managed by this work practice.

EPA expects that, when tailings can no longer be placed on an existing pile, Federal and State regulatory agencies will promptly move to require disposal of the piles to Federal standards established by the EPA and implemented by the NRC under the AEA as amended by UMTRCA.

This work practice requires that new tailings be disposed of either in impoundments that are no larger than 40 acres or by the use of continuous disposal in which no more than 10 acres of tailings are exposed at any one time. All new tailings impoundments must be designed and constructed to meet this work practice. Using the first alternative would require a series of impoundments, each constructed with earthen dikes or in a excavated pit and each having a liner as required by 40 CFR 192. As each impoundment is filled, it would be dried out and covered with earthen materials immediately. This design permits the use

of a water cover over all tailings during operations without risk of contaminating ground water. The water cover seals in the radon, greatly reducing radon emissions to air. Also, a series of impoundments significantly reduces the amount of unreclaimed tailings at the end of a mill's lifetime because only one or two impoundments would still require closure. By making final reclamation easy, the potential for larger areas of dry tailings to remain uncovered is avoided, and this too, greatly reduces radon emissions.

The second procedure, continuous disposal, is similarly effective. If tailings are dewatered and immediately buried on a continuous basis, radon emissions during the operational phase of the mill are greatly reduced. At the end of the mill's lifetime, only about 10 acres of tailings require final reclamation. There is, thus, no potential for large areas of tailings to remain dry and uncovered as a source of radon emissions. A liner is used to protect ground water.

At mill sites where there are existing tailings piles, this work practice is to be phased in on a reasonable schedule. No later than 2 years after the effective date of this rule, all owners will either certify to the Administrator that they do not intend to build a new tailings impoundment, or if they wish to build new tailings impoundments they must apply to the Administrator for approval to construct. Within 60 days following the Administrator's approval, the owner must apply to the NRC for a license to construct. Following the granting of a license by NRC, construction must begin promptly and must be completed in not less than 30 months. The entire process must be completed by December 31, 1992. If the owner is in compliance with this schedule, new tailings can continue to be placed on existing piles until the new impoundments are ready. Those owners not building new impoundments may also continue to use their existing piles until December 31, 1992.

An exception from the preceding schedule allowing for continued use of an existing tailings pile will be granted upon petition to the Administrator, provided the existing pile meets one of the following conditions: (1) The existing pile is 40 acres or less and is lined or, (2) the combined area of all piles at the site is less than 20 acres. Each exception will last for five years, at which time the owner may request a new exception.

A discretionary extension for all or some of the milestones on the preceding schedule, allowing for continued use of an existing tailings pile, may be granted upon application to the Administrator for one of the following reasons: (1) The owner demonstrates it cannot, due to circumstances beyond its control, complete a new impoundment before a construction schedule milestone date or (2) the owner or operator demonstrates that an extension is consistent with the CAA. To make such a demonstration, the owner must certify that the mill is in compliance with applicable EPA standards and NRC regulations and license conditions, and makes a submittal showing that the public is protected with an ample margin of safety taking into account the size and condition of the pile, risks to nearby individuals and population, length of extension requested, risk reduction practices in effect, and the expected level of future mill activity. An extension may be granted for a period not to exceed 5 years, although the mill owner will be able to apply for more than one extension.

No exception or extension is effective after December 31, 2001 and no new tailings may be placed on any existing tailings pile after that date.

*B. Options Considered*

In developing this rule, EPA reviewed a variety of options in the light of comments received on its proposal. A fundamental step in this process was recognizing that the opportunities for regulatory response to the risks involved were different for existing tailings and for new tailings. EPA's analysis of regulatory options proceeded on the basis of this recognition.

With respect to tailings that would be generated in the future, EPA recognizes that improved work practices were available that could limit the period during which tailings were exposed prior to disposal. Limiting this exposure would correspondingly limit risk to health. The work practices that EPA examined reduced this exposure in two ways: first, by placing the tailings on sites smaller than is now the practice; second, by placing cover on the tailings continuously or at intervals. EPA analyzed options for new tailings that varied both as a function of size and as a function of time.

With respect to tailings that already existed, EPA's ability to identify work practice improvements that would limit emissions was more limited. The most direct means for reducing exposures, i.e., a permanent thick earth cover or water cover, could conflict with continued use of the pile or exacerbate ground water problems. Measures involving interim or partial use of earth or water covers were also evaluated. These options are described elsewhere in this notice. Indirect means of reducing exposures were also explored. These basically involve limiting the use of the existing pile for deposition of new tailings by limiting the period during which new tailings could be placed on the piles. On analysis, EPA concluded that volume restrictions would prove difficult to administer and that a more feasible approach would be to limit the future use of existing piles. In the end, EPA decided that risk reductions should be reconciled with continuity of mill operations by phasing in the transition to new disposal methods. The best currently available information indicates that it will require about six years for a source to phase in new capacity. The specific options considered are discussed below.

Interim Cover for Existing Piles

The Agency's proposed rule contained an alternative work practice for existing tailings piles consisting of interim earth covers placed on the sides and tops of dry tailings piles. An interim cover on dry tailings acts to reduce emissions of radon. In a wet pile, water acts to prevent radon emissions so that interim covers are not needed for the wet surfaces. Upon reexamination of the interim cover alternatives and after consideration of the comments received on that issue, the Agency has determined that such covers are not an appropriate work practice to be required under this generally applicable rule.

EPA's model of the interim cover alternative used in the analysis of the proposed rule was overly simplistic. Sources of error included the following factors:

1. The model did not consider tailings piles that go on and off standby repeatedly. In these situations, the interim cover is buried under new tailings followed by application of a new interim cover.

2. The model assumed the dry areas of the pile are covered immediately and that the pile remained on standby for an extended period of time. This is unlikely, because regulatory agencies would require the operator to reclaim sooner than 40 years.

3. Maintenance costs for interim covers were ignored.

4. Covering high, steep slopes with 1 meter of earth is a difficult engineering feat and may be more expensive and impractical than the model assumed it to be, and in practice may endanger workers.

5. Slimes may underlie tailings considered to be dry, making such tailings uncoverable because heavy equipment necessary to apply the cover would sink into the pile. If dry tailings cannot be covered, this would reduce benefits.

The Final Background Information Document and Economic Assessment contains a revised model that attempts to account for these factors. The Agency now believes that interim cover is inappropriate as a generally applicable work practice.

The appropriateness of interim cover can only be evaluated on a site-by-site basis. Though its use in some cases would be practicable and could lead to significant risk reduction, in others it would have dubious risk reduction benefits, costs that appear unwarranted in relation to those benefits, and would present hazards to the safety of workers. Moreover, enforcement of a requirement for interim covers would be difficult and controversial because it would not be obvious which parts of the pile are dry enough to cover and whether future operational plans are firm enough so that it is reasonable to delay application of an interim cover.

The Agency believes that in establishing generally applicable standards it should seek permanent solutions rather than temporary ones. Interim earth covers are temporary because they are often covered by new tailings when the mill returns to operation. The new tailings on top of the interim cover release radon, removing the beneficial effect of the cover. The value of the interim earth cover is also lost when the final cover required by Federal Regulations is put in place. Final reclamation normally requires piles with steep sand dams to be recontoured to a more stable shape. Any interim cover would be lost due to mixing with the tailings during the recontouring. A better use for the limited resources available to the producers of uranium would be final disposal consistent with federal standards.

The State of New Mexico expressed concern about severe additional environmental impacts due to the disruption of many additional acres of land to obtain cover material. The NRC raised serious safety concerns for interim covers. The NRC stated that interim covers on dams would interfere with important safety practices, such as movement monitors for tailings dams. They also stated that covering of certain drain portions of the dams could seriously reduce their stability.

In summary, the Agency concluded that requiring operators of existing tailings piles to immediately add and maintain interim earth covers on all dry surfaces is not an appropriate generally applicable work practice.

Phased Disposal

The Agency is selecting phased disposal for new tailings impoundments as one of two alternative work practices required by the final rule because it reduces health risks due to radon from tailings, providing public health protection with an ample margin of safety during the operating lifetime of a uranium mill tailings impoundment. In this disposal scheme, a series of small impoundments is constructed over the lifetime of a mill. Each small impoundment would be constructed with earthen dikes or in an excavated pit and, under existing Federal regulations, must be lined to prevent ground water contamination. After each impoundment fills, it will be dried out and covered with earth as soon as practical. Disposal costs will be spread over the operating life of the mill. The design permits the use of a water cover over most of the tailings, with only a small risk of contaminating ground water.

An important benefit of phased disposal is that it eliminates the difficulties and expense of reclaiming large tailings piles at the end of the impoundment life. By limiting the size of the piles, very large areas of tailings are prevented from becoming exposed to air, drying out, and emitting radon during extended standby periods. At the end of the mill's lifetime, only one or two impoundments will still require reclamation.

These characteristics of phased disposal combine to reduce radon emissions. The liner under the tailings pile helps maintain wetness of the tailings by preventing water from leaching into the ground. This not only protects ground water, but also greatly reduces radon emissions by keeping the tailings wet. Experience with phased disposal shows that the tailings often stay so wet that water must be pumped out of the impoundments.

Since control of radon emissions is achieved by keeping the tailings saturated or covered with water, it is important that impoundment liners have water retention capability. In most cases eligible for this exception, impermeable synthetic liners will be required. However, UMTRCA standards (40 CFR Part 192) allow an exception from the synthetic liner requirement if it is demonstrated that ground water contamination will not occur.

The size of the pile also helps reduce emissions. It does so by reducing the time for the dry out and standby periods that precede final closure, when radon emissions are at their highest. Since the piles are smaller, they dry sooner, and the exposed surface area is reduced. Closure is relatively easy and inexpensive, reducing the incentive for the owner to delay disposal. To further reduce the time before closure, this rule allows a company to operate a maximum of two tailings impoundments at once. Companies can legitimately need two operating piles to work most efficiently (especially when one pile is almost full), but by limiting an owner to only two operating piles, an owner must close its first pile before it opens its third pile (or close its second before it opens the fourth, etc.). This incentive will work to reduce standby periods.

Phased disposal, therefore, is a tailings management system in which tailings are kept wet until they are dried and disposed. Radon emissions are reduced while the pile is in use and while the pile is on standby. This results in a large reduction of the total emissions from mill tailings pile and, therefore, protects public health with an ample margin of safety.

Constructing, filling, and reclaiming tailings impoundments in series costs *less than using a single, large* impoundment when a reasonable (5%) discount rate is used. This lower cost reflects the lower initial capital expenditures for phased disposal. Further cost savings may be realized in phased disposal by using excavated earth from future impoundments to reclaim filled, dry impoundments.

Phased disposal is the best available demonstrated technology for uranium mill tailings management. The two mills most recently licensed by the Nuclear Regulatory Commission use phased disposal designs.

The Agency also considered a 20-acre limit for each phased disposal impoundment in the proposal (51 FR 6382). One commenter found a 20-acre limit acceptable but stressed the need for economic assessment of size limits. Several commenters argued that the Agency should allow flexibility for site-specific considerations and should not dictate a specific limitation. The Agency evaluated both 20- and 40-acre phased disposal options. It found that the 40-acre impoundment provides about the same health protection as the 20-acre impoundment, but at a slightly lower cost. The Agency concludes that a 40-acre size limit for phased disposal protects health with an ample margin of safety, as required by section 112. The 40-acre impoundment is the maximum size allowed under the rule; an operator can choose to build a smaller one.

The 40-acre phased disposal work practice provides considerable flexibility for construction and operation of tailings impoundments, although all existing rules (including 10 CFR Part 40 and 40 CFR Part 192) must still be followed. For example, under this work

practice, impoundments can be constructed in hollows by building a dam across the hollow and storing the tailings on the upstream side. The standard only limits the total area of any impoundment used for storage of uranium mill tailings; other site-specific design considerations are not affected.

Liners are required at all new uranium tailings impoundments under existing rules (40 CFR Part 192). The tradeoffs between potential problems and the advantages of liners were considered in that previous rulemaking (48 FR 45926).

Continuous Disposal

The Agency selected continuous disposal as an alternative work practice under the final rule because it reduces health risks from radon from tailings to the same extent as phased disposal and provides quick reclamation of the site. This disposal method calls for tailings to be dewatered as they are generated, placed in pits or on pads, and covered with about 3 meters of earthen materials on a continuous basis. Disposal pits or pads would be constructed with impermeable liners. This method would rely on a thick earth cover to reduce radon emissions rather than on water as in the phased method disposal. During operation, no more than 10 acres of tailings could be uncovered at any given time. To assure that the water remaining in the tailings after dewatering (which is never completely effective) and rain water does not seep through the tailings and contaminate ground water, a continuous disposal impoundment is lined in accordance with 40 CFR 192.32. The potential for ground water contamination is negligible.

A second important benefit of continuous disposal is that it would eliminate the difficulties of reclaiming large tailings piles at the end of the impoundment life. By requiring disposal of tailings as they are generated, very large areas of tailings are prevented from being exposed to air, drying out, and emitting radon during extended standby periods.

The technology of continuous disposal has not been demonstrated for uranium mill tailings in the United States. However, the industry has proposed this method for use at three sites. The decline in uranium demand is one of the major reasons why none of these proposals was put into practice. Tailings dewatering systems have been used successfully at nonferrous ore beneficiation mills. The Agency believes that these proposals and experiences demonstrate that continuous disposal can be a viable work practice.

Flexibility is provided to allow designs that can take advantage of site-specific characteristics. For example, there is no requirement that tailings be disposed of below surface level and no restrictions that limit the use of topographical features of a site as tailings dams. However, all existing regulations still apply.

Although the industry commented that continuous disposal is not practical, this is not a persuasive argument, since at least three companies have chosen this method as their preferred disposal method in detailed site design plans and applications. Also, as noted above, dewatering tailings has been performed in other extraction industries. The Agency decided to allow the industry to select either continuous or phased disposal because both methods provide similar levels of radon reduction and either method could be preferable to the other, depending on the specific physical, environmental, or economic conditions that exist at the site.

*C. Existing Piles*

The regulation of uranium mill tailings disposal piles requires different approaches to new and existing tailings impoundments. From the standpoint of risk reduction, new impoundments can readily be designed and operated in order to achieve substantial reduction of risk at a reasonable cost. EPA, thus, has adopted standards that have the effect of limiting the total exposed surface area during the active phase of an impoundment's existence. Existing impoundments present more difficult regulatory problems. They were constructed over a thirty year period, range in size from a few acres to several hundred acres, and are located in different areas with different topography, soil characteristics, tailings characteristics, and other factors affecting health risks. Consequently, they are not susceptible to a single regulatory scheme of the sort adopted here for new impoundments. In addition, the NRC and their agreement States regulate practices at these sites on a site-by-site basis. For example, the NRC has stated in comments that it typically requires interim cover for the purpose of dust control on appropriate portions of existing piles.

EPA investigated work practices that might be imposed generally upon existing tailings piles that would reduce risks until they are closed and replaced with new piles. As discussed previously, the Agency found that the two principal options, wetting and interim cover, made no sense to impose as across-the-board requirements. While interim cover has theoretical applicability, its risk reduction is not great in many situations, and costs are disproportionate to that limited reduction of risk. Wetting, particularly in unlined impoundments in arid areas of the Southwest, yields some risk reduction but again at a disproportionate cost. Moreover, wetting at unlined impoundments can lead to ground water contamination, exacerbating a problem that several operators are now trying to remedy.

EPA believes that the reasonable course to deal with these impoundments is to adopt requirements that will encourage their closure, in the long term, in accordance with requirements set by EPA and the NRC. At the same time, these requirements must be tempered with flexibility for the particular circumstances of individual impoundments. It is reasonable to do this in light of the wide disparity in risk from different existing impoundments, and the small number of those impoundments.

Accordingly, the final rule generally requires the cessation of disposal of tailings at existing impoundments six years after promulgation of these regulations. The requirement for cessation of disposal will remove any obstacle for the NRC or an agreement state to require, after an appropriate dry out period, final closure of the impoundment, since it can no longer be used for disposal of newly generated tailings. In EPA's view, the risk that will result from this phase in period of continued disposal at existing impoundments is consistent with the protection of public health with an ample margin of safety.

Exception for Existing Lined Impoundments

The Agency has determined that certain existing tailings management impoundments presently meet the requirements of the new work practice standards. Therefore, the Agency is providing an exception from the schedule requirements, which are specified below, for impoundment designs that are no larger than 40 acres and have a liner meeting the specifications of 40 CFR 192.32. This requirement assures that the impoundment has the capability to retain water, thereby keeping tailings wet and greatly reducing radon emissions.

Exception for Small Tailings Piles

The Agency, in its examination of the uranium milling industry, has discovered that each mill is unique and that not all mills present a significant health risk to the public. The Agency found that one of the most important mill characteristics

that affect risk is the size of the mill tailings pile. The Agency also found that mills having combined pile areas smaller than 20 acres have very small radon emissions. The Agency believes that such a mill does not threaten public health. Therefore, the Agency has decided to except them from the 6-year schedule. Such an exception is consistent with protection of public health with an ample margin of safety.

*D. Schedule for Standards Implementation*

The Agency is requiring that all tailings generated at existing mill sites after December 31, 1992, be managed by one of the work practices specified in the final rule. By phasing out existing tailings piles and requiring new tailings generated at existing mill sites to be placed in impoundments subject to the new work practice, risks to individuals and populations are reduced and the public is protected with an ample margin of safety. The Agency is assuming that, when tailings can no longer be placed on existing piles, Federal and State regulatory agencies will promptly move to require reclamation of the piles to Federal standards established under the AEA through UMTRCA.

The Agency is aware that section 112 has provided for only a 2-year compliance waiver. However, it is impossible to design, license, and build a new tailings impoundment in that short period of time. The operators of existing mills are given the time necessary to install new impoundments. To assure that new tailings impoundments are built and used as soon as practical, the Agency has established a strict schedule with milestones for meeting regulatory requirements and construction of the facility. Industry is provided with sufficient time to prepare new impoundments while, simultaneously, there is a strict timetable that must be met. This timetable is designed to be flexible to assure that if time is saved in one part of the process the impoundment will be ready sooner. The rule also provides an extension mechanism to give operators a chance to have more time if, due to circumstances beyond their control, they are unable to meet the schedule.

The Agency has examined the effect from the continued use of existing piles during the 6 years required for the construction of new tailings impoundments. In performing the analysis of the effect of allowing all mills to operate for 6 years, relevant radon emissions come only from some of the mills. Since EPA's original analysis, 3 of the 20 mills have stated an intent to go to closure and, therefore, are not effected by this standard. The resulting risk from radon emissions in allowing all other mills to operate for 6 years is not significant. The use of these mills for this short time period represents a marginal risk that does not justify the economic waste of requiring a mill owner to build an impoundment that the owner has no intention of using. Because of these low risks, operators of existing piles who want to continue to use their existing piles may do so for the 6-year period.

Any owner or operator of a licensed uranium mill who wishes to continue to use existing tailings impoundments must submit an application to the Administrator for approval to construct a new impoundment or certify that they do not intend to build a new impoundment. This should be done as soon as possible, but no later than 2 years after the effective date of this rule. This period is necessary to provide the time needed for owners to decide whether or not to build a new impoundment and, if they decide to build a new impoundment, it also provides the time needed for the purchase of a site, for the collection of site data and for the design and preparation of licensing material for EPA and NRC. Owners not building new impoundments may continue to use their existing piles until December 31, 1992.

The Agency anticipates an internal review and decision period following submittal of a complete application. After the Agency's approval to construct, the owner or operator must apply to the NRC within 60 days for a license to construct a new tailings impoundment under 10 CFR 40. The Agency anticipates that NRC will act promptly on the application. Following the receipt of a license from the NRC, the owner or operator must then start construction of an impoundment within 90 days, weather permitting, and must complete construction within 30 months.

The Agency proposed alternative schedules of immediate, 10 years, 15 years, and no time limit for mandatory use of work practice standards. Comments from the NRC and the industry agreed that new impoundments probably could be built in 6 years. Although one industry commenter estimated that it would take more than 10 years to finish new impoundments, in general, the record did not support a 10-year option.

*E. Schedule Extension*

The Agency recognizes that strict adherence to the schedule may not always be possible or reasonable. The Agency may grant an extension for any schedule milestone for certain reasons.

The first reason for the extension is practicality. The Agency is allowing mill owners 6 years to build new impoundments, because it is the Agency's estimate, supported by the record, that 6 years is normally a sufficient time to design, license and build a new uranium mill tailings impoundment. But the Agency recognizes that, due to circumstances beyond the mill owner's control, situations can arise that delay completion. In these situations, the mill owner can apply for a schedule extension to provide him with sufficient time to complete the new impoundment.

There are other reasons why an extension may be required. For example, as previously noted, each mill is unique and individual mills may present small risks to public health. To take care of any of these situations, the Agency may grant an extension, provided that the mill owner can demonstrate that the extension, under conditions existing at the time of the request, is consistent with protection of public health with an ample margin of safety as specified in § 61.252(e). This extension may be granted for any schedule milestone. For example, the Agency expects that extensions would be granted for mills with moderately sized piles and that have no people living nearby. Such mills present small risks to maximally exposed individuals and small risks to regional and national populations. The Agency may grant an extension, conditionally if required, only upon finding that this extension protects public health with an ample margin of safety.

The Agency may grant these extensions based on an examination of factors relating to the overall remaining health risk, including the size, condition, and location of the pile, the length of extension requested, the expected level of future activity, and any risk reduction practices the mill owner has undertaken or pledges to undertake.

## VII. Implementation of the Final Rule

Operators of new tailings impoundments constructed after the promulgation date of this rule must apply to the Administrator of EPA for approval to construct a new impoundment pursuant to section 61.07 of the Clean Air Act.

Operators of existing tailings impoundment should follow the implementation plan detailed in § 61.252 (b) or (c). If the Administrator finds, on the basis of any available information that there is a violation of any

requirement of an applicable implementation plan, the Administrator will enforce with remedies described in section 113 of the Act.

Operators of existing tailings piles who wish an exception listed in § 61.252(d) from the schedules listed in § 61.252 (b) or (c) in order to continue to use a pile should write to the Administrator, providing the reason why the exception is warranted. The Administrator will grant, grant with conditions, or deny the exception. If granted, the owner must reapply to EPA every 5 years that it still meets the criteria for exception. If at anytime neither of the exceptions criteria apply, the owner must notify the Agency and immediately cease use of the pile.

Operators of existing tailings piles who wish extensions from the schedule milestones listed in § 61.252 (b) or (c) in order to continue to use an existing tailings pile should write to the Administrator providing the reasons why an extension should be granted, taking care to provide the information requested in § 61.252(e). This must be done at least 1 year before the milestone date for which the extension is requested. The Administrator will grant, grant with conditions, or deny the extension within 9 months. Although multiple extensions may be granted, each extension will last no more than 5 years.

All requests should be sent to the Assistant Administrator for Air and Radiation (ANR-443), U.S. Environmental Protection Agency, 401 M Street, Washington, DC 20460.

No exception or extension will be effective after December 31, 2001. This deadline allows owners of existing tailings impoundments a chance to use those impoundments in those cases where to do so would not endanger public health, while assuring that the system of exceptions and extensions will not be subject to any potential abuse by mill owners. In this way, the rule will cause even greater reduction in radon emissions as phased or continuous disposal methods are implemented.

Nothing in this rule is intended to affect the existing regulatory authority of the NRC. EPA hopes that it will be able to reach an agreement with NRC to allow NRC to take an important role in the implementation and enforcement of this rule. This would allow EPA to take full advantage of NRC's expertise in this field and help minimize the duplication of effort and conserve administrative resources in accord with § 122 of the Clean Air Act.

## VIII. Miscellaneous

### *A. Docket*

The docket is an organized and complete file of all information considered by EPA in the development of this proposed standard. The docket allows interested persons to identify and locate documents so they can participate effectively 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 are placed in the docket and are available for inspection and copying during normal working hours.

### *B. Executive Order 12291*

Under Executive Order 12291, issued February 17, 1981, EPA must judge whether a rule is a "major rule" and, therefore, subject to the requirement of a Regulatory Impact Analysis. The EPA has determined that this rule is not a major rule as defined in section 1(b) of the Executive Order because the annual effect of the rule on the economy will be less than $100 million per year. Also, it will not cause a major increase in costs or prices for any geographic region. Further, it will not result in any significant adverse effects on competition, employment, investment, productivity, innovation, or the ability of the United States enterprises to compete with foreign enterprises in domestic or foreign markets. Under Executive Order 12291, this rule was submitted to the Office of Management and Budget (OMB) for review. Any comments from OMB to EPA and any response to those comments are included in the docket.

### *C. Paperwork Reduction Act*

The final rule does not impose any reporting or recordkeeping requirements on operators of uranium mills and associated tailings piles.

### *D. 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.

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."

The EPA believes this final rule will have little or no impact on small business because the total costs associated with the standards will have relatively little impact on the total cost of producing uranium oxide.

For the preceding reasons, I certify that this rule will not have a significant economic impact on a substantial number of small entities.

### *E. General Provisions*

The general provisions of 40 CFR Part 61, Subpart A apply to all sources regulated by this rule, except as otherwise noted.

### *F. State Implementation and Enforcement of Emission Standards*

Under section 112(d)(1) of the CAA, any State may develop and submit to the Administrator a procedure for implementing and enforcing emission standards for hazardous air pollutants for stationary sources located in such State. If the Administrator finds a State's procedure for implementing the standard is adequate, the Federal authority then is delegated to the State. To streamline this procedure, some of EPA's Regional offices have entered into agreements with certain States for "automatic" delegation of new section 112 standards. Under this arrangement, States are delegated authority to implement and enforce all new section 112 standards when they are issued.

The Agency has decided that "automatic" delegation shall not be made for the radionuclide NESHAPs. When EPA entered into these agreements, the State's capabilities and expertise with respect to radionuclides were not considered. Therefore, States must reapply for delegation in the case of radionuclide NESHAPs.

### *G. Relationship to Other Programs*

It is important to note that EPA has authority to regulate mining wastes under the Resource Conservation and Recovery Act (RCRA), as well as the CAA and UMTRCA. Since the considerations under each statute may vary, the regulatory program for uranium mill tailings under the CAA and UMTRCA might well differ from the program EPA intends to develop for mining waste under RCRA. The RCRA program will be tailored to the risks associated with mining wastes and the technical feasibility of various control options (see 51 FR 24496; July 3, 1986).

### *H. Communications*

Communications with the Administrator regarding the reporting and recordkeeping requirements of this

rule, as well as requests for waivers, shall follow the provisions of Part 61.10, except as otherwise noted in this rule.

This rule is effective immediately for new sources and existing facilities. Those facilities that are not in compliance with the final rule based on information currently available to them, may request a compliance waiver from the Administrator under the provisions of section 112(c)(1).

**List of Subjects in 40 CFR Part 61**

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

Dated: August 15, 1986.

**Lee M. Thomas,**

*Administrator.*

## PART 61—[AMENDED]

Part 61 of Chapter 1 of Title 40 of the Code of Federal Regulations is amended as follows:

1. The authority citation for Part 61 continues to read as follows:

**Authority:** Secs. 112 and 301(a) Clean Air Act, as amended [42 U.S.C. 7412 (a)].

2. By adding a new Subpart W to read as follows:

**Subpart W—National Emission Standard for Radon-222 Emissions From Licensed Uranium Mill Tailings**

Sec.



## Subpart W—National Emission Standard for Radon-222 Emissions From Licensed Uranium Mill Tailings

### § 61.250 Applicability.

This subpart applies to licensed sites that manage uranium byproduct materials during and following the processing of uranium ores, commonly referred to as uranium mills and their associated tailings. This subpart applies during the period of operation.

### § 61.251 Definitions.

As used in this subpart, all terms not defined here shall 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) "Area" means the area covered by the vertical projection of the pile upon the earth's surface.

(b) "Commission" means the Nuclear Regulatory Commission or its Agreement States (where applicable).

(c) "Continuous disposal" means a method of tailings management and disposal in which tailings are dewatered by mechanical methods immediately after generation. The dried tailings are then placed in trenches or other disposal areas and immediately covered to Federal standards.

(d) "Covered" means to cover with earth sufficient to meet Federal standards for the management of uranium byproduct materials pursuant to 40 CFR 192.32.

(e) "Dewatered" means to remove the water from recently produced tailings by mechanical or evaporative methods such that the water content of the tailings does not exceed 30 percent by weight.

(f) "Existing tailings pile" means a tailings pile that is in operation on the effective date of this rule.

(g) "Licensed site" means the area contained within the boundary of a location under the control of persons generating or storing uranium byproduct materials under a license issued by the Commission. This includes such areas licensed by Agreement States, i.e., those States which have entered into an effective agreement under Section 274(b) of the Atomic Energy Act of 1954, as amended.

(h) "New tailings" means uranium tailings produced after the effective date of this rule.

(i) "New tailings impoundment" means any location or structure at which uranium mill tailings are temporarily or permanently stored and which is placed in operation after the promulgation of this rule.

(j) "Operation" means that an impoundment is being used for the continued placement of new tailings or is in standby. An impoundment is in operation from the day that tailings are first placed in the impoundment until the day that final closure begins.

(k) "Owner" means any person who owns or operates a uranium mill or an existing tailings pile or a new impoundment.

(l) "Phased disposal" means a method of tailings management and disposal which uses lined impoundments meeting the requirements of 40 CFR Part 192.32, no greater than 40 acres in area, which immediately filled, upon becoming dried, and covered to Federal standards.

(m) "Uranium byproduct material" or "tailings" means the wastes produced by the extraction or concentration of uranium from any ore processed primarily for its source material content. Ore bodies depleted by uranium solution extractions and which remain underground do not constitute byproduct material for the purposes of this subpart.

### § 61.252 Standard.

(a) All new tailings impoundments built after the effective date of this rule shall be designed and constructed to meet one of the two following work practice standards and in the following manner:

(1) Phased disposal in lined tailings impoundments that are no more than 40 acres in area and meet the requirements of 40 CFR 192.32(a). The owner shall have no more than two impoundments in operation at any one site at any one time.

(2) Continuous disposal of tailings such that the tailings are dewatered and immediately disposed with no more than 10 acres of tailings being uncovered at any time and operated in accordance with 40 CFR 192.32(a).

(b) Owners who build new tailings impoundments may continue to place new tailings or waste water associated with milling or mining activities on existing tailings piles only until new tailings impoundments are constructed, and only if the owner is in the process of designing, licensing, and constructing new tailings impoundments in accordance with the following schedule:

(1) As soon as practical, but no later than 2 years after the effective date of this rule, all owners who wish to build new tailings impoundments shall apply to the Administrator for approval to construct under section 61.07. The Administrator shall make a determination to grant or deny any application for approval in accordance with section 61.08, except that the time limitations of subsections (a) and (d) shall not apply.

(2) Within 60 days following the Administrator's approval to construct a new tailings impoundment, the owner shall apply to the Commission for a license to construct a new tailings impoundment.

(3) Following the granting of a license by the Commission, the owner shall begin construction of the new tailings impoundment within 90 days unless seasonal conditions do not permit, in which case construction shall begin at the start of the next construction season. This impoundment shall be completed and shall be ready to receive new tailings within 30 months of the date of licensing by the Commission.

(4) In no event shall new tailings be placed on existing tailings piles after December 31, 1992, unless the owner has received an exception or extension from the Administrator in accordance with paragraphs (d) or (e) of this section.

(c) Owners who do not intend to build a new tailings impoundment must certify to the Administrator as soon as

possible, but no later than 2 years following the effective date of this rule, that they do not intend to build a new impoundment at the mill site. Owners who make this certification will be able to use their existing tailings piles for the deposition of new tailings or waste water associated with milling and mining activities until December 31, 1992, unless they receive an exception or extension from the Administrator in accordance with paragraph (d) or (e) of this section, in which case the owner may continue to use the existing tailings piles as permitted by the terms of the exception or extension.

(d) An exception for continued use of an existing tailings pile shall be granted upon application for approval to the Administrator provided that:

(1) The existing tailings pile is 40 acres or smaller in area and meets the requirements of 40 CFR 192.32(a)(1), or

(2) The combined area of all piles at a licensed site is less than 20 acres.

The Administrator will grant, grant with conditions, or deny the application. If granted, the owner must certify to the Administrator every 5 years that it still meets at least one of the preceding criteria. Following this certification, the Administrator will grant, grant with conditions or deny the exception. At any such time as neither of the two criteria continue to apply, the owner shall so notify the Administrator, and the exception shall terminate.

(e) An owner may apply to the Administrator on an impoundment-by-impoundment basis, for an extension to continue using an existing tailings pile.

(1)(i) An extension may be granted upon a showing that, despite a good faith effort by the owner, it cannot, due to circumstances beyond its control, meet any paragraph (b) schedule deadline.

(ii) An extension may be granted, for any paragraph (b) or (c) schedule deadline at the Administrator's discretion, upon a showing by the owner that the extension is consistent with protection of the public health with an ample margin of safety. To make this showing, the owner must first certify that it is in compliance with applicable existing NRC regulations and license conditions. In addition, the Administrator will also take into account: the size and condition of the pile, the size and location of the nearby population, the length of extension requested, the existence and effectiveness of any risk reduction practices that are or will be taken, and the expected level of future mill activity.

(2) The owner may apply for an extension at any time up to 1 year before the cease-use date. The Administrator will have 9 months from the date of application to grant, grant with conditions or deny the extension. Subject to paragraph (g) of this section, no extension will be granted for longer than 5 years, and no extension pursuant to paragraph (e)(1)(i) shall be granted for any period longer than necessary for the owner to meet applicable paragraph (b) requirements.

(3) The owner may apply for as many extensions as needed. Each extension must be applied for and proven separately.

(4) The Administrator will provide for public notice and comment on all applications for approval of extensions.

(f) All applications for approval of exceptions or extensions shall be sent to the Assistant Administrator for Air and Radiation (ANR-443), U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460.

(g) New tailings shall not be placed on any existing tailings pile after December 31, 2001, and no exception or extension shall be effective after that date.

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