**Updated 3/25/03**

**[Source: 54 FR 51701, December 15,1989; Revised to reflect FR 2/3/99, 10/1/00, 10/17/00 Revisions]**

**NESHAP 40 CFR 61 Subpart R- National Emission Standards for Radon Emissions From Phosphogypsum Stacks:**

**§61.200 Designation of facilities.**

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

**§ 61.201 Definitions**.

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

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

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

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

**§ 61.202 Standard.**

Each person who generates phosphogypsum shall place all phosphogypsum in stacks. Phosphogypsum may be removed from a phosphogypsum stack only as expressly provided by this subpart. After a phosphogypsum stack has become an inactive stack, the owner or operator shall assure that the stack does not emit more than 20 pCi/(m $^2$-sec) (1.9 pCi/(ft $^2$-sec)) of radon-222 into the air.

**§61.203 Radon monitoring and compliance procedures**.

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

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

(i) The name and location of the facility;

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

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

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

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

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

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

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

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

**§ 61.204 Distribution and use of phosphogypsum for outdoor agricultural purposes.**

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

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

(b) The average radium-226 concentration at the location in the stack from which the phosphogypsum will be removed, as determined pursuant to § 61.207, shall not exceed 10 pCi/g (4500 pCi/lb).

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

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

(e) Use of phosphogypsum for indoor research and development in a laboratory must comply with § 61.205.

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

(a) Phosphogypsum may be lawfully removed from a stack and distributed in commerce for use in indoor research and development activities, provided that it is accompanied at all times by certification documents which conform to the requirements of § 61.208. In addition, before distributing phosphogypsum to any person for use in indoor research and development activities, the owner or operator of a phosphogypsum stack shall obtain from that person written confirmation that the research facility will comply with all of the limitations set forth in paragraph (b) of this section.

(b) Any person who purchases and uses phosphogypsum for indoor research and development purposes shall comply with all of the following limitations. Any use of phosphogypsum for indoor research and development purposes not consistent with the limitations set forth in this section shall be construed as unauthorized distribution of phosphogypsum.

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

(2) No facility shall purchase or possess more than 3182 kg (7,000 lb) of phosphogypsum for a particular indoor research and development activity. The total quantity of all phosphogypsum at a facility, as determined by summing the individual quantities purchased or possessed for each individual research and development activity conducted by that facility, may exceed 3182 kg (7,000 lb), provided that no single room in which research and development activities are conducted shall contain more than 3182 kg (7,000 lb).

(3) Containers of phosphogypsum used in indoor research and development activities shall be labeled with the following warning: Caution: Phosphogypsum Contains Elevated Levels of Naturally Occurring Radioactivity.

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

(5) Indoor research and development activities must be performed in a controlled laboratory setting which the general public cannot enter except on an infrequent basis for tours of the facility. Uses of phosphogypsum for outdoor agricultural research and development and agricultural field use must comply with § 61.204.

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

**§61.206 Distribution and use of phosphogypsum for other purposes.**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**§ 61.207 Radium-226 sampling and measurement procedures.**

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

(1) A minimum of 30 phosphogypsum samples shall be taken at regularly spaced intervals across the surface of the location on the stack from which the phosphogypsum will be removed. Let $n1$ represent the number of samples taken.

(2) Measure the radium-226 concentration of each of the $n1$ samples in accordance with the analytical procedures described in 40 CFR part 61, appendix B, Method 114.

(3) Calculate the mean, $x$ 1, and the standard deviation, $s1$, of the $n1$ radium-226 concentrations:

$$\overline{x}_1 = \frac{\sum_{i=1}^{n_1} x_i}{n_1},$$

$$s_1 = \sqrt{\frac{\sum_{i=1}^{n_1} \left(x_i - \overline{x}_1\right)^2}{n_1 - 1}},$$

Where $x$ 1 and $s1$ are expressed in pCi/g.

(4) Calculate the 95th percentile for the distribution, $x$ *, using the following equation:

$$\overline{x}^* = \overline{x}_1 + 1.64\left(\frac{s_1}{\sqrt{n_1}}\right),$$

Where $x$ * is expressed in pCi/g.

(5) If the purpose for removing phosphogypsum from a stack is for distribution to commerce pursuant to § 61.206, the owner or operator of a phosphogypsum stack shall report the mean, standard deviation, 95th percentile and sample size. If the purpose for removing phosphogypsum from a stack is for distribution to commerce pursuant to § 61.204, the additional sampling procedures set forth in paragraphs (b) and (c) of this section shall apply.

(b) Based on the values for $x$ 1 and $x$ * calculated in paragraphs paragraphs (a)(3) and (4) of this section, determine which of the following conditions will be met:

(1) If $x$ 1 < 10 pCi/g and $x$ * ≤ 10 pCi/g; phosphogypsum may be removed from this area of the stack for distribution in commerce pursuant to § 61.204.

(2) If $x$ 1, < 10 pCi/g and $x$ * > 10 pCi/g, the owner or operator may elect to follow the procedures for further sampling set forth in paragraph (c) of this section:

(3) If $x$ 1 ≥ 10 pCi/g; phosphogypsum shall not be removed from this area of the stack for distribution in commerce pursuant to § 61.204.

(c) If the owner or operator elects to conduct further sampling to determine if phosphogypsum can be removed from this area of the stack, the following procedure shall apply. The objective of the following procedure is to demonstrate, with a 95% probability, that the phosphogypsum from this area of the stack has a radium-226 concentration no greater than 10 pCi/g. The procedure is iterative, the sample size may have to be increased more than one time; otherwise the phosphogypsum cannot be removed from this area of the stack for distribution to commerce pursuant to § 61.204.

(1) (i) Solve the following equation for the total number of samples required:

$$n_2 = \left(\frac{1.64 s_1}{10 - \overline{x}_1}\right)^2.$$

(ii) The sample size $n$2 shall be rounded upwards to the next whole number. The number of additional samples needed is $n$A = $n$2−$n$1.

(2) Obtain the necessary number of additional samples, $n$A, which shall also be taken at regularly spaced intervals across the surface of the location on the stack from which phosphogypsum will be removed.

(3) Measure the radium-226 concentration of each of the $n$A additional samples in accordance with the analytical procedures described in 40 CFR part 61, appendix B, Method 114.

(4) Recalculate the mean and standard deviation of the entire set of $n$2 radium-226 concentrations by joining this set of $n$A concentrations with the $n$1 concentrations previously measured. Use the formulas in paragraph (a)(3) of this section, substituting the entire set of $n$2 samples in place of the $n$1 samples called for in paragraph (a)(3) of this section, thereby determining the mean, $x$ 2, and standard deviation, $s$2, for the entire set of $n$2 concentrations.

(5) Repeat the procedure described in paragraph (a)(4) of this section, substituting the recalculated mean, $x$ 2, for $x$ 1, the recalculated standard deviation, $s$2, for $s$1, and total sample size, $n$2, for $n$1.

(6) Repeat the procedure described in paragraph (b) of this section, substituting the recalculated mean, $x$ 2 for $x$ 1.

**§ 61.208 Certification requirements.**

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

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

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

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

(iv) The date of sale or transfer;

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

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

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

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

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

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

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

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

(iv) The date of resale or transfer;

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

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

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

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

**§61.209 Required records.**

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

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

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

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

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

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

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

(5) The date of each use of phosphogypsum.

(6) The quantity of phosphogypsum used.

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

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

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

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

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

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

Source: 57 FR 23317, June 3, 1992, unless otherwise noted. CLP 6/9/97
Updated 2/24/99 with FR revision dated 2/3/99. – CLP
Updated 10/5/99 with FR revision dated 10/1/99 - CLP