UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

THE ADMINISTRATOR

October 14, 2020

Mr. Corey Rosenbusch
President and Chief Executive Officer
The Fertilizer Institute
425 Third Street, SW, Suite 950
Washington, D.C. 20024

Dear Mr. Rosenbusch:

The Fertilizer Institute, on behalf of its members that own or operate phosphogypsum stacks, has asked the U.S. Environmental Protection Agency to approve, under 40 C.F.R. § 61.206, the removal of PG from required stacks for use in government road construction projects. As discussed below, the EPA grants the request subject to certain conditions.

Background

On October 15, 2019, TFI submitted its initial "Request for Approval of Additional Uses of Phosphogypsum Pursuant to 40 C.F.R. § 61.206," requesting that the EPA approve the use of PG in road construction. Subsequently, on April 7, 2020, TFI submitted, on behalf of its members that own or operate PG stacks, a revised request: "Revised Request for Approval of Additional Uses of Phosphogypsum Pursuant to 40 C.F.R. § 61.206: Use in Road Construction Projects Authorized by Federal, State and Local Departments of Transportation or Public Works" (hereinafter the "Revised Request"). In evaluating TFI's submittals, the EPA generally has focused on the revised request, which we understand to be the most recent, complete version of TFI's request. The EPA has, however, evaluated TFI's request in light of all the materials submitted, including information submitted in connection with the initial request, as well as information subsequently submitted. The Revised Request asks the EPA to approve the use of PG in certain road construction projects:

> A determination by EPA, pursuant to 40 C.F.R. § 61.206, that PG containing up to an average of 35 picocuries per gram [pCi/g] may be used in road base, paving, and various combinations of road base and paving in Government Roadway Projects that meet the commitments of this petition and are:
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> 1. Authorized by federal, state and local Departments of Transportation (DOT) or Public Works (PW), and

2. Conducted as part of a government road project using appropriate, generally accepted road construction standards and specifications such as American Society for Testing and Materials (ASTM), Federal Highway Administration (FHWA), federal or state DOT standards and specifications, or standards developed or approved in consultation with the appropriate regulatory DOT or PW authorities.

Revised Request at 23-24.

TFI submitted or resubmitted a number of materials with the Revised Request, including miscellaneous federal and state road construction specifications and requirements; a Summary of the Risk Assessment (previously submitted by TFI); a Radiological Risk Assessment in Support of Petition for Beneficial Use of Phosphogypsum prepared by Arcadis Canada Inc. on behalf of TFI (previously submitted by TFI); a technical memorandum prepared by Exponent on behalf of TFI relating to a chemical risk screening to evaluate potential risks associated with metals/metalloids in PG; responses – apparently prepared by Arcadis Canada Inc. on behalf of TFI – to various questions and comments from the EPA; a discussion by TFI of the results of sampling and radiological testing of samples of PG from 10 stacks in four states; an economic analysis by the Policy Navigation Group, on behalf of TFI, to estimate potential regulatory cost savings associated with using PG in road construction; information on the location of certain PG stacks in Florida, Louisiana, Wyoming and Idaho; a list of materials cited in the Revised Request and other items submitted by TFI. These submissions are identified in TFI's Revised Request as Attachment A and Appendices 1 through 8, respectively. Revised Request at 2-3 and Attachment A and Appendices 1-8.

A significant part of the Revised Request and related information submitted by TFI relates to TFI's assessment of the risks associated with the use of PG in road construction. TFI evaluated the risks under various scenarios, including risks to road construction workers, truck drivers transporting PG, road users, utility workers performing work on utilities at or under roads constructed with PG and residents living near roads constructed with PG. TFI assessed risk based on certain identified assumptions about the amount of PG used in road construction projects and on the amount of radium-226 in the PG used in road construction. With the assumptions used in TFI's risk assessment, TFI's calculated risks for the reasonably maximally exposed individual were no more than 0.5 in 10,000, less than the 3 in 10,000 risk that TFI maintains the EPA uses as the risk of the PG if left in the stack. See, for example, Revised Request, at 16 (Table 1). TFI's risk assessment concluded that the risk of using PG in road construction is low and using PG in road construction would be at least as protective as keeping PG in stacks.

The Revised Request notes the requirements of 40 C.F.R § 61.206, including the information that a request for approval of other uses of PG (other than keeping the PG in stacks) must contain. See, for example, Revised Request at 24-25. The Revised Request asserts that it has provided sufficient information for the EPA to determine whether the proposed use would be at least as protective as disposal of PG in stacks, suggesting that it has provided the information required by 40 C.F.R § 61.206(b)(1), (2), and (6)-(9). Revised Request at 50, footnote 123. The Revised Request essentially acknowledges that it has not provided the information required by 40 C.F.R § 61.206(b)(3)-(5) and (10) but suggests that the EPA approval may be "conditioned upon receipt" of such information. *Id.*

The Revised Request includes discussion of various other considerations that TFI argues weigh in favor of supporting or allowing uses of PG, such as use in road construction, rather than simply requiring that PG be kept in stacks. Among these considerations are the following contentions: there has been significant growth in the industry and resulting significant increases in PG material generated that the EPA did not anticipate when generally requiring that PG be kept in stacks; the number and size of PG stacks have increased, as well as the costs to manage and maintain the stacks; other countries do not strictly require that PG be kept in stacks and more readily allow PG to be used for other purposes; and allowing other uses to be made of PG is consistent with the EPA's interest in "beneficial uses" of materials and with general EPA policies encouraging recycling.

Discussion

The EPA's *Clean Air Act* regulations at 40 C.F.R. Part 61, Subpart R, address concerns about radon emissions from PG. Subpart R generally applies to owners or operators of PG stacks and to "each person who owns, sells, distributes, or otherwise uses any quantity of phosphogypsum." 40 C.F.R. § 61.200. The basic requirement of Subpart R is that PG must be placed in stacks and may not be removed from stacks, except "as expressly provided." 40 C.F.R § 61.202. Subpart R provides three sets of exceptions under which PG may be removed from stacks: PG may be removed from stacks and used "in outdoor agricultural research and development and agricultural field use" under certain circumstances (40 C.F.R § 61.204); PG may be removed from stacks and used "in indoor research and development activities" under certain circumstances (40 C.F.R § 61.205); and, upon request, the EPA may approve the removal of PG from stacks and the use of PG for "other purposes" (40 C.F.R § 61.206). Relying on this "other purpose" approval authority, the Revised Request asks the EPA to approve the removal of PG from stacks for use in government road construction.

As the Revised Request acknowledges, a request for approval of the use of PG for other purposes must contain certain information, including information about the specific location(s) where the PG will be used. 40 C.F.R § 61.206(b)(1)-(10). The procedure also requires that a request be "signed and dated by a corporate officer or public official in charge of the facility." 40 C.F.R § 61.206(b)(10). A request must include, for example, the location – including mailing address – of each "facility" where any use, handling or processing of PG will take place. 40 C.F.R § 61.206(b)(3), (4). The Revised Request has provided the locations of PG stacks owned or operated by TFI member companies, locations where at least some of the use, handling or processing of the PG to be used in road construction may occur. The Revised Request has not, however, provided any specific location information where the ultimate requested use – road construction – will take place. In addition, to the extent that there may be intermediary locations (such as processing facilities or construction yards) between a PG stack and a road under construction with PG, the Revised Request has not identified any such intermediary locations. A request under 40 C.F.R § 61.206 for approval of other use of PG also must include information on the quantity of PG to be used by each "facility." The Revised Request provided information about the percentage of PG likely to be used in either roadbed or pavement but has not provided information on the quantity of PG to be used in each road construction project.

The Revised Request has provided considerable information about the anticipated use of PG in road construction. The Revised Request has, for example, provided information about the types of roads that may be constructed using PG, how PG may be used and the road construction process. The Revised Request has provided information about the proposed average concentration of radium-226 in the PG to be used. Critically, the Revised Request assessed and estimated risks associated with the use of PG in road construction.

The agency may approve a request to use PG for some "other purpose" if the proposed distribution or use is at least as protective of public health, in the short and long term, as disposal of PG in a stack. 40 C.F.R § 61.206(c). In the event the agency approves a request to remove PG from stacks and use PG for other purposes, certain prescribed requirements must be met, including requirements set out in 40 C.F.R. §§ 61.206(d) and 61.209. These include requirements on the owner or operator of a stack from which PG is removed to determine radium-226 concentrations; on stack owners or operators and on PG sellers or resellers, distributors and end users to ensure proper preparation and maintenance of certification documents; and on end users to prepare and maintain various records. 40 C.F.R §§ 61.206(d) and 61.209. In addition, the EPA has the authority to impose additional terms and conditions. 40 C.F.R § 61.206(e).

Although the Revised Request has not provided complete information about the specific locations where roads will be built using PG and has not identified the specific quantity of PG to be used in road construction, the lengthy, detailed information provided by the Revised Request about using PG in road construction and the thorough risk assessment is sufficient information for the agency to determine whether use of PG in road construction is at least as protective as disposal in a stack, at least under the circumstances and conditions described in the Revised Request and reflected in the risk assessment. In light of the information provided by TFI, the nature of the request and the conditions identified below, the agency concludes that the additional information required as part of a request under 40 C.F.R § 61.206(b) – especially information on specific address locations where the PG may be used – is not essential to making the determination of whether the proposed use of PG would be at least as protective of public health as stacking.

In evaluating risks associated with using PG in road construction, the Revised Request used an average radium-226 concentration of 27 pCi/g. Revised Request at 20 and 51. (The Revised Request also extrapolated that, even if the average radium-226 was as high as 148 pCi/g, the use of PG in road construction would be still be sufficiently protective of public health, and the Revised Request requested a "concentration limit" – that is, the limit on the level of radium-226 that may be in PG used in road construction – of 35 pCi/g. See, for example, Revised Request at 28.) The risk assessment was also based on assumptions that, when PG is used in road bed material, it would comprise no more than 50 percent of the road bed material, by weight (the other material would be "soil"), and, when used in road surface material, PG would comprise no more than 2.25 percent, by weight, of the surface pavement. Revised Request at 19. As noted above, the Revised Request evaluated risks from the standpoint of various exposure scenarios, including exposure of: persons engaged in road construction or transportation of PG (truck drivers); nearby residents (residing no closer than 50 feet from the road); and utility workers. At the EPA's request, the Revised Request also addressed risks to persons living on abandoned, reused or reclaimed roads (the "reclaimer scenario"). Revised Request at 22-23. Under all these scenarios, the Revised Request, as calculated in the TFI risk assessment, indicated that the risks associated with using PG in road construction

would be significantly less than a lifetime risk of fatal cancer from radon emissions of 3 in 10,000 and that using PG in road construction would be at least as protective of public health as disposal of PG in stacks. *Id.*

As initially promulgated, Subpart R required "stacking" and did not authorize alternative uses of PG. In 1992, the EPA amended Subpart R to categorically authorize use of PG for agricultural or research and development purposes under certain circumstances and to establish a procedure to request approval of other uses of PG. See 57 Fed. Reg. 23305 (June 3, 1992). At that time, the EPA considered also categorically authorizing the use of PG in road construction, but the EPA decided not to do so because it concluded that "the use of phosphogypsum in road construction presents an unacceptable level of risk to public health." *Id.* That determination largely was based on a concern about the risks to people living in a house constructed on land where roads built using PG once existed. The EPA did not necessarily foreclose any or all use of PG in road construction, but simply declined, at that time, to categorically authorize – as for agricultural or research and development uses – use of PG in road construction.

The EPA agrees that for purposes of assessing whether other uses of PG will be at least as protective as disposing of PG in stacks or a mine (and consistent with the agency's overall risk management policies), the radiation risk associated with phosphogypsum stacks (or disposing of PG in mines) may be numerically interpreted as a lifetime risk of excess mortality no greater than 3 in 10,000 (3×10^{-4}) for any member of the public. The EPA's review of the Revised Request's risk assessment concludes that the use of PG in road construction, when conducted in a manner consistent with the methods and scenarios described in TFI's application and under the conditions stated herein, will not create risks in excess of this threshold.

Because the risks associated with the "reclaimer scenario" previously were of particular concern to the EPA, the EPA asked TFI to address those risks in its analysis, and the Revised Request specifically addressed that scenario. Although the Revised Request regarded such a scenario as "extreme" and "unlikely," it, nonetheless, examined the risk associated with the scenario and concluded that the risk is low and that using PG in road construction still would be at least as protective as stacking. While the TFI risk assessment indicates the risk to the reclaimer could be as protective as leaving the PG in the stack, the EPA has questioned some of the modeling assumptions used by TFI to generate the estimate for the reclaimer. TFI's risk assessment assumed, for example: the PG concentration under a home would be less than that of the road base; there would be a layer of clean soil between the PG and slab of the house; and there would be a vapor barrier. We do not believe that these assumptions can be relied upon to limit potential risks to a future residential reuser of an abandoned road constructed with PG. The EPA has, however, reevaluated the use of PG in road construction in light of the new information and analysis in the Revised Request and now concludes that the risks associated with the "reclaimer scenario" can be addressed with conditions associated with possible future reuse of roads constructed with PG (as noted below).

In accordance with the discussion, above, and subject to certain qualifications and conditions (stated below), the EPA determines that the Revised Request adequately demonstrates that the use of PG in road construction is at least as protective of public health, in the short and long term, as disposal of PG in stacks, and, subject to the same qualifications and conditions, PG

may be removed from stacks and used in government road construction, as requested by TFI. Accordingly, subject to the following conditions, PG may be used in government road projects authorized by federal, state and local departments of transportation or public works, and conducted as part of a government road project using appropriate, generally accepted road construction standards and specifications such as ASTM, FHWA, federal or state DOT standards and specifications or standards developed or approved in consultation with the appropriate regulatory DOT or PW authorities. See Revised Request at 23-24.

This approval to use PG in road construction does not authorize the removal of any PG from any stacks or the use of any PG for road construction unless and until the information required by the "Initial Conditions," below, is provided to the EPA. After such information is provided to the EPA, PG may be removed from stacks and used in road construction, provided that the conditions expressed in "Other Conditions," below, continue to be met.

Initial Conditions

Prior to the distribution and/or use of PG for any government road project, the owner or operator of the stack from which PG is to be distributed or the governmental entity responsible for building and maintaining the road (the "end user"), as appropriate, must submit the following information to the agency, in writing, to the attention of the Director, Radiation Protection Division, U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue, NW, Mail Code 6608T, Washington, D.C. 20460, and by email to radiation.questions@epa.gov:

a) Identification of the project and of the responsible government agency, including an authorized point of contact and complete mailing address;
b) Geospatial information describing the location and extent of the road construction project using PG and the physical address or geospatial coordinates of any facility where intermediate handling or processing of the PG will take place. This information may be provided as map coordinates or computer files compatible with geospatial software (e.g. .kml, .gpx, .shp);
c) The total quantity of PG expected to be used in each project, the source of PG (company and stack) and the average concentration of radium-226 in the PG to be used;
d) A description of the measures which will be taken to prevent the uncontrolled release of PG into the environment during transportation, handling and construction; and
e) Written confirmation that the road construction project (inclusive of supporting contractors) will comply with the following conditions set forth in this approval, signed and dated by the public official responsible for the road construction project.

Other Conditions

In accordance with 40 C.F.R § 61.206(d)(1) and 40 C.F.R § 61.207, the owner or operator of a stack from which PG is removed to be used in road construction must determine annually the average radium-226 concentration at the location in the stack from which the PG is removed.

In accordance with 40 C.F.R § 61.206(d)(2) and 40 C.F.R § 61.208, the owner or operator of a stack from which PG is removed to be used in road construction and any subsequent distributor, retailer or reseller, shall prepare, make available and provide, and retain appropriate certification documentation and any subsequent purchaser or transferee of PG shall receive and retain appropriate certification.

In accordance with 40 C.F.R § 61.206(d)(3) and 40 C.F.R § 61.209, each stack owner or operator and end user facility must maintain appropriate records.

In accordance with the circumstances and qualifications associated with the Revised Request and, especially, the risk assessment performed in connection with the Revised Request, as well as the agency's authority under 40 C.F.R § 61.206(e) to impose terms or conditions:

In addition to other generally applicable engineering specifications, PG may only be used in government road construction (no private road building) of paved roads (no unpaved roads) and the road design must fall within the following limits:

a) Average radium-226 content of PG to be used in road base or pavement must not exceed 35 pCi/g;
b) Pavement may contain no more than 2.25 percent PG by weight;
c) Road base may contain no more than 50 percent PG by weight;
d) Road base containing PG may consist of one lift of up to 25 cm depth and not extend beyond paved areas of the road; and
e) A minimum 50-foot setback is required from the edge of the road to inhabited structures.

Roads constructed with PG may not be abandoned (or otherwise permanently cease to be used as a road) and used for other non-road purposes or uses, including the construction of structures on such former roads.

Any PG that is unused in the road construction or removed as part of road maintenance and not reincorporated into the road base must be returned to the stack.

Records required by 40 C.F.R §61.209(c) must be maintained by the end user facility (i.e. government agency) for the life of the road. The government agency shall make those records available for public review.

Prior to use of PG in a road project, the responsible government agency shall provide public notice that the planned road will use PG. This may occur as part of public outreach processes associated with the road project and must include an opportunity for the public to review road plans and risk assessment materials.

Workers involved in road construction shall be informed that PG contains elevated levels of naturally occurring radionuclides and instructed in proper industrial hygiene.

Any use of PG not consistent with the limitations set forth in this approval shall be construed as unauthorized distribution of PG and may constitute a violation of or noncompliance with 40 C.F.R. Part 61, Subpart R. This approval is pursuant to Subpart R promulgated under the authority of the *Clean Air Act*. This approval does not relieve TFI, phosphogypsum stack owners or operators or resellers, retailers, distributors or end users or other entities handling, processing or using PG of responsibility to comply with other applicable laws and regulations.

If your staff has further questions, please reach out to Lee Ann B. Veal, Director of the Radiation Protection Division, at veal.lee@epa.gov or (202) 343-9448.

Sincerely,

Andrew R. Wheeler