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Uranium Watch

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U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
<http://www.regulations.gov>.

12/18/2014
79 FR 75597
(3)

Dear Ms. Bladey:

RE: Comments on Nuclear Regulatory Commission *Standard Review Plan for Conventional Uranium Mill and Heap Leach Facilities*: Draft Report for Comment, NUREG-2126; November 2014. Docket ID NRC-2014-0178.

Below please find comments on the Draft *Standard Review Plan for Conventional Uranium Mill and Heap Leach Facilities* (SRP). These comments are submitted by Uranium Watch and on behalf of Information Network for Responsible Mining, Living Rivers, Advocacy Coalition of Telluride, Grand Valley Peace and Justice, and Citizens for Alternatives to Chemical Contamination.

1. General Comments

A. The SRP should contain a complete list of the applicable regulatory guides.

B. The SRP should include the possibility of vat heap leaching, a process that has been used in the past and was recently mentioned as a possibility in a Anfield Resources Inc. news release. Anfield is in the process of purchasing the Shootaring Canyon Mill.

C. There should be more information on the operation of conventional mills and heap or vat leach operations and how initial design and operational decisions will impact public the health and safety and the environment.

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D. The Nuclear Regulatory Commission (NRC) has not regulated an operating uranium mill for over a decade. There have been no operational heap or vat leach operations for even longer. The NRC made hundreds of documents related to the regulation uranium mills in Utah disappear from their Agencywide Documents Access and Management System (ADAMS) in response to 9/11. Other uranium recovery licensing documents were removed from ADAMS. The NRC does not have the all the licensing documents for uranium mills in Colorado readily available. It is unlikely that the NRC reviewed the recent publicly available documents for mills in Utah and Colorado.

This means that thousands of records related to the regulation and management of conventional mills are not readily available to the public and, importantly, to NRC staff to review. This means that the current NRC staff does not have information readily available regarding the current and historical problems associated with the construction, operation, and reclamation of a uranium mills and heap or vat leach operations. This information is relevant to the development of a comprehensive SRP and a regulatory program that is protective of public health and safety in perpetuity.

E. The Environmental Protection Agency (EPA) is currently in a rulemaking to amend the EPA 40 C.F.R. Part 192 "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings." However, the rulemaking does not apply to conventional and heap and vat leach operations. The EPA has differed a rulemaking to update the decades-old regulations that apply to conventional mills and (maybe) heap and vat leach operations. Part 192 is outdated, incomplete, relies on unsupported assumptions, does not take into consideration the experience of the past decades, and is not protective of public health and safety and the environment. The NRC must work with the EPA to update Part 192 for conventional mills and heap and vat leach operations as soon as possible.

F. The SRP must include more details on the information required and the challenges that would be encountered for development of a uranium mill in an area, such as Coles Hill in southern Virginia, with a high water table, nearby streams and rivers, precipitation greater than evaporation, and a great potential for severe storms, hurricanes, and tornadoes.

2. SRP, Executive Summary (page xi) states: "For license renewals and amendments, the licensee's (hereafter referred to as an applicant) focus should be on changes in proposed operations that NRC has not previously reviewed."

COMMENT:

A. There is a concern that it can be an extraordinarily long time between the submittal of a timely license renewal application and any decision on such an application by the agency. What this means is that there are issues, data, and information that accumulate after the submittal of the license renewal application and the environmental

analysis and draft renewed license that were not included in the license renewal application. This can include changes in the mill operation, compliance issues, and reclamation plans.

An example of this is the White Mesa Mill, San Juan County, Utah. The Mill is regulated by the Utah Division of Radiation Control (DRC) under an NRC Agreement State program. The Mill has been in timely renewal since 2007. The term of the license is 10 years, and for an additional 8 years there has been no renewed license. This extends the term of the license to 18+ years. Some of the information in the license renewal application submitted in 2007 has become outdated or is incomplete. There was one round of comments on the license renewal in 2011. The license renewal will now include an updated Reclamation Plan and issues related to a July 2014 Order imposing a radon emission limit on an impoundment in closure. At some time in the future (maybe in 2015—maybe later) the DRC will provide an opportunity for public comment on the draft renewed license; the environmental analysis, which was not available for the first round of comments, as required by the Atomic Energy Act (42 U.S.C. § 2021(o)(3)(C)); responses to first round of comments; technical analyses; the latest reclamation plan, recent conditions imposed on the licensee by a 2014 Order, and other information. This is a lot of information for the public to review and comment on and a lot of the DRC staff to consider. This is an unwieldily and unreasonably long process.

B. The NRC should require more timely reviews and decisions regarding license renewal applications. The NRC should require a license renewal application at least one year, and preferably longer, before the license expires. The licensee, NRC, or Agreement State should not be allowed to keep adding additional substantive licensing actions, such as (in the case of the White Mesa Mill) a Reclamation Plan¹ and an Order² (which modified the license in a substantive way, but was not a license amendment), to the license renewal process. Eight years is an unacceptable amount of time for a license renewal process. Adding additional licensing actions that are really separate from the license renewal process makes the license renewal process more complex and causes extended delays.

3. SRP, Section 1.3(e) (page 1-1).

COMMENT:

A. The note in this section lists federal agencies that regulate mining. The US Department of Agriculture, US Forest Service (USFS), should be added to that list. There are uranium mines, parts of uranium mines, or proposed uranium mines on lands administered by the USFS in Utah, Arizona, Colorado, and New Mexico.

4. SRP, Section 1.3 Acceptance Criteria (pages 1-1 to 1-2) lists various acceptance criteria for an application.

¹ <http://www.deq.utah.gov/businesses/E/energyfuels/permits/denisonlicensereapp.htm>

² <http://www.deq.utah.gov/businesses/E/energyfuels/docs/2014/07Jul/EnergyFuels072814.pdf>

COMMENT:

A. The Acceptance Criteria must include plans for extended periods non-operation, known as standby. Two mills has been on standby for over 30 years, having last operated in the early 1980s: Shootaring Canyon Mill (Utah) and Sweetwater Mill (Wyoming). The White Mesa Mill has had a cycle of operational and non-operational periods for over 30 years.

B. The Acceptance Criteria must include plans for both the closure period of individual impoundments and the operation itself. During the lifetime of a mill, one or more tailings impoundments or heap-leach pads may be in closure. The closure period for a single impoundment or heap leach pile can last for decades and includes dewatering, settlement of tailings or depleted ore, and significant increase in radon emissions. The handling of the closure period, including requirements for a closure plan (radon) and reclamation milestones, is one of the most important aspects of the life of a conventional mill or heap leach operation.

C. The Acceptance Criteria must include plans for the cleanup and disposal of offsite and onsite contaminated soils and materials in a timely manner, during the life of the operation. The NRC must adopt a cleanup-as-you-go requirement. Soils that have been contaminated to levels above the site cleanup standard must not be left for the final reclamation of the site. Thousands of tons of contaminated soils have sat outside the tailings impoundments at the Shootaring Canyon and Sweetwater Mills for decades, waiting for eventual closure of the mill sites.

Any surface and subsurface contamination, either onsite or offsite, must be addressed on a yearly basis.

5. SRP, Section 2.1, Site Characterization, Site Location and Layout (pages 2-1 to 2-4). This section lists and discusses the various types of site characterization information that must be submitted to the NRC or Agreement State.

COMMENT:

A. There are several types of information regarding the site that must also be included in the application:

i. The application must include data and information regarding the archeological resources at the site. The NRC must determine whether Section 106 consultation is warranted.

ii. The application must include information on the water rights associated with the proposed operation, so that the NRC or Agreement State can evaluate the adequacy of legally available water throughout the life of the project.

iii. The application must include documents regarding the ownership of the surface and subsurface estate for the mill or heap leach operation. Issues regarding

possible subsurface ownership or responsibility on the part of other entities must be addressed and resolved.

iv. Section 2.1(g) requires information regarding uranium ore mines within a 50-miles radius of the site. However, uranium mines that have and will continue to provide ore to the White Mesa Mill that are beyond a 50-mile radius. Some of these are more than 100 miles away. Information regarding all uranium mines or resources that the licensee owns or has control of and other mines that are expected to provide ore to the mill or leach operation, no matter how far away, should be included in an application.

v. Information must be provided that describes the flora and fauna of the site. Information should include any possible endangered species that could be impacted by the operation, birds that could be impacted by the presence of open water at the site, and other data and information related to the natural and domestic plants and animals at or in the vicinity of the site.

vi. The application must include information regarding tribal consultation with respect the proposed project.

6. SRP, Section 2.3, Site Characterization, Meteorology, (pages 2-6 to 2-7). This section states, in part: “The meteorology program—which is part of the site monitoring programs required by 10 CFR Part 40, Appendix A, Criterion 7—needs to be sufficiently complete to allow for estimating maximum potential annual radiation doses to workers and members of the public resulting from the routine releases of airborne radioactive materials in gaseous and particulate effluents to demonstrate compliance with 10 CFR 20.1101, 10 CFR 20.1302, 40 CFR 190.10, and 40 CFR Part 192.

COMMENT:

A. The Guidance should explain what is meant by “routine releases of airborne radioactive materials in gaseous and particulate effluents.” The guidance should identify the sources of these effluents and how those radioactive releases will be monitored. The Guidance should explain the difference between “routine” and “non-routine” releases of these effluents.

B. Meteorological data is also needed to determine the radon emissions from impoundments or ponds containing liquid effluents or tailings with liquid covers. The EPA has developed a formula for determining radon emissions based on the radium content of the effluents and meteorological data.³ This formula and data on the radium content of the liquid effluents in three (3) impoundments (a total of ~ 135 acres) demonstrates that the average radon emissions from these effluents in 2014 were ~ 1,740

³ Risk Assessment Revision for 40 CFR Part 61 Subpart W — Radon Emissions from Operating Mill Tailings Task 5 – Radon Emission from Evaporation Ponds; S. Cohen and Associates, November 9, 2010; Table 6, page 17. <http://www.epa.gov/radiation/docs/neshaps/subpart-w/riskassessmentrevision.pdf>

pico Curies per square meter per second ($\sim 1,740$ pCi/m²-sec).⁴ The Ute Mt. Ute Tribe has come up with slightly different numbers, based on their meteorological data for the Mill site.⁵

The EPA has claimed for decades that radon emissions from water covers were “zero.”⁶ The radon emission standard for the “existing” (pre-December 1989) tailings impoundments is 20 pCi/m²-sec.⁷ This is a standard that EPA adopted to protect public and environmental health; any exceedance—much less an exceedance of over 100 times the radon emission standard—is a threat to the residents and environment. The EPA determined that the radon emissions from liquid effluents did not need to be regulated for “existing” or “new” impoundments, or accounted for in calculating the radon emissions from the “existing” impoundments to demonstrate annual compliance with the standard. Therefore, accurate site-specific meteorological data is required for the model used to determine radon emissions from radium-laden liquid effluents in evaporation and holding ponds, impoundments, and water covers.

C. Data on precipitation, drainage area, and evaporation rates are required. This information is necessary to make various findings related to the evaporation of liquid effluents at the facility. The operation of a conventional mill is based, in part, on certain assumptions regarding the evaporation of liquid effluents in holding ponds and water covers on solid tailings. The design and operation of such impoundments would be influenced by rates of evaporation and precipitation.

D. If precipitation and drainage is greater than annual evaporation, a licensee would be able to treat and discharge processing fluids offsite, pursuant to 40 C.F.R. § 440.34(b)(2), which states:

(2) In the event that the annual precipitation falling on the treatment facility and the drainage area contributing surface runoff to the treatment facility exceeds the annual evaporation, a volume of water equivalent to the difference between annual precipitation falling on the treatment facility and the drainage area contributing surface runoff to the treatment facility and annual evaporation may be discharged subject to the limitations set forth in paragraph (a) of this section.

E. Data on precipitation and evaporation is required in order to determine

⁴ The Ute Mountain Ute Tribe has used site-specific meteorological data, rather than the data used by the EPA from nearby Blanding, Utah, resulting in slightly different results.

⁵ EPA Subpart W Rulemaking, Non-Privileged Records (July-Sept 2014, Part 1), pages 405-416. <http://www.epa.gov/radiation/docs/neshaps/npr/2014-july-sept-part1.pdf>
EPA Subpart W Rulemaking, Non-Privileged Records (July-Sept 2014, Part 2), pages 1-3. <http://www.epa.gov/radiation/docs/neshaps/npr/2014-july-sept-part2.pdf>

⁶ 40 C.F.R. Part 61, Appendix B, Method 115, Subsection 2.13(a).

⁷ 40 C.F.R. Part 61 Subpart W, § 61.252(a).

whether a tailings impoundment would ever be able to dry out and settle prior to the placement of the final radon barrier.

F. Meteorological data is needed to determine the extent to which liquid and solid tailings impoundments and the mill itself could be impacted by extreme storm events such as hurricanes and tornadoes.

G. Meteorological data is needed to determine the adequacy of design of impoundments, liquid effluent holding and evaporation ponds, storm water run off retention and protection systems, heap leach piles, treatment ponds, and other aspects of site design and operation.

7. SRP, Section 2.6.3(4), Site Characterization, Geotechnical, Acceptance Criteria, (page 2-20). Section 2.6.3(4) states, in part:

The geotechnical site characterization is acceptable if it provides the needed input for the design and analysis of these facilities and meets the following criteria:

(4) Physical and engineering properties of the tailings, leachable ore, underlying materials at the site(s), borrow materials, and other materials determined from laboratory and field tests are properly presented using appropriate plots and graphs. The parameters for evaluation of heap leach operations, mill tailings, borrow materials, other materials, and underlying soil and rock include, but are not limited to, the following:

COMMENT:

A. The initial conventional mill application should contain information regarding the physical and engineering properties of materials other than tailings from the processing of "ore." The non-ore materials may include 1) processing fluids and other liquid effluents; 2) in situ leach (ISL) waste that the licensee anticipates disposing of in a tailings impoundments; 3) alternate feed material that the licensee anticipates disposing of in a tailings impoundment with physical properties different than tailings from the processing of "ore" (e.g., waste, soils, sludges, rock, concrete, asphalt, and other debris that has been "processed" for its source material content⁸); 4) laboratory wastes; 5) debris from the dismantling and disposal of other uranium recovery facilities;⁹ 6) contaminated

⁸ Thousands of tons of cement, asphalt, and other debris were "processed" by spraying with enhanced water at the White Mesa Mill, and the debris then disposed of in the tailings.

⁹ Waste and debris from the dismantling of the Hydro Jet heap leach operation was disposed on in the Shootaring Canyon Mill (Ticaboo, Utah) impoundment.

soils from site reclamation;¹⁰ 7) structural components and waste from the final reclamation of the mill and mill site.

8. SRP, Section 2.7.2.2, Site Characterization, Hydrology, Surface Water Hydrology, Review Procedures (page 2-28). Section 2.7.2.2(3) states, in part: “(3) Evaluate the applicant’s assessment of the potential for erosion or flooding. Information regarding acceptable models for use in calculating the design storm for a 1,000-year design life for large surface impoundments may be found in NUREG-1623, “Design of Erosion Protection for Long-Term Stabilization” (NRC, 2002).”

COMMENT:

A. Although there is supposedly a 1,000-year “design life,” the impoundment will be under government control in perpetuity, which is far longer than 1,000 years. The impoundment will need to be protected from erosion from floods, precipitation, and other natural forces for thousands and millions of years. Therefore, the licensee and regulatory agency must also consider a design storm and impacts that will cause erosion beyond the 1,000-year time frame. The data must also be used to determine the potential recharge of a tailings impoundment during closure and after placement of a final radon barrier. The licensee must not be able to get approval for a site where a facility cannot reasonably be expected to be protected from erosion from floods, precipitation, and other natural forces for thousands of years. For example, a mill site that is located on the flood plain of a river or in an area where there is a high potential for large storms, hurricanes, or tornados.

9. SRP, Section 3.1, Description and Design of Proposed Facility, Conventional Uranium Mill Facilities (page 3-1).

COMMENT: The application should include data and information regarding materials other than “ore” that the licensee intends to process at the mill. This would include wastes from other mineral processing operations, debris, and other materials that will be disposed of in a tailings impoundment after so-called “processing.”

10. SRP, Section 3.1.3, Description and Design of Proposed Facility, Conventional Uranium Mill Facilities, Acceptance Criteria (page 3-2). Section 3.1.4.3(3) requires the submittal of Proposed operating plans and schedules include timetables for conventional uranium mill operation.

COMMENT:

A. Given the erratic nature of the uranium economy and other factors that may impact operational plans and schedules, it is doubtful that a licensee will be able to predict with any meaningful degree of accuracy the operational plans and schedules for a uranium mill operation over the long-term. However, any plans and schedules must

¹⁰ Over 420,000 tons of contaminated soil will be disposed of at the Shootaring Canyon Mill. Therefore, there will only be a small amount of tailings from the processing of ore at the Mill in the existing impoundment.

include the various phases of the mill and impoundments, including construction, use of conventional impoundments (used for perpetual storage of tailings) as liquid holding ponds, operational impoundment phase, closure phase, and other aspects of the operation of a conventional mill. Operational plans must also take into consideration the restriction on the number of operating tailings impoundments in 40 C.F.R. § 61.252(b)(1) for phased disposal. The NRC, Utah as an Agreement State, and the EPA have ignored, and continue to ignore, the 2-impoundment limit on the number of operational impoundments.

Information should be provided on all timetables for all phases of a heap or vat leach operation. This includes plans for temporary suspension of operations.

11. SRP, Section 3.3, Design of Surface Impoundments (pages 3-6 to 3-38). This section references the regulations in 10 C.F.R. Part 40, Appendix A.

COMMENT:

A. In addition to the requirements in 10 C.F.R. Part 40, Appendix A, a Surface Impoundment must be designed to meet the requirements of 40 C.F.R. Part 61 Subpart W, § 61.252(b), for phased or continuous disposal of tailings.¹¹ Compliance with these requirements must be part of the SRP.

B. Also, Section 61.252(b) references 40 C.F.R. § 192.32(a), which references the requirements for construction of lined impoundments at 40 C.F.R. § 264.221. The EPA, or an EPA delegated state for the administration and enforcement of 40 C.F.R. Part 61 Subpart W (only Utah, thus far), must approve the licensee's application to construct an impoundment, pursuant to 40 C.F.R. §§ 61.07 and 61.08. Therefore, the SRP should reference the EPA Liner System requirements, discuss the EPA impoundment design requirements, and require the submittal of the information that demonstrates compliance with the EPA construction requirements.

C. The SRP indicates that a clay liner or a single synthetic liner would be an acceptable liner design. However, 40 C.F.R. § 264.221 clearly requires a double synthetic liner system for new tailings impoundments and solution impoundments or ponds. Any references to or consideration of a clay or single liner system must be deleted from the SRP. All discussion of the liner systems must assume the construction of a

¹¹ 40 C.F.R. §61.252(b):

(b) After December 15, 1989, no new tailings impoundment can be built unless it is designed, constructed and operated to meet one of the two following work practices:

(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) as determined by the Nuclear Regulatory Commission. The owner or operator shall have no more than two impoundments, including existing impoundments, in operation at any one time.

(2) Continuous disposal of tailings such that tailings are dewatered and immediately disposed with no more than 10 acres uncovered at any time and operated in accordance with §192.32(a) as determined by the Nuclear Regulatory Commission.

double synthetic system and evaluation a system that is compliant with 40 C.F.R. § 264.221.

D. The EPA is in the process of revising the Subpart W requirements for tailings impoundments, liquid effluent holding ponds at conventional mills and ISLs, and heap leach pads.¹² The SRP must include and reference any changes or additions to the requirements for the construction of Surface Impoundments that are in the Final Rule.

E. Any discussion of the Acceptance Criteria for Liner Design (Section 3.3.3) must include compliance with the EPA Liner Design criteria.

F. The liner systems for the various solution holding and evaporation ponds at conventional mills and heap leach operations must also meet the EPA 40 C.F.R. § 264.221 design criteria. Information regarding compliance with the 40 C.F.R. § 264.221 design criteria for all solution holding and evaporation ponds must be included in the SRP.

G. The discussion of the Cover Design must also include a discussion of an interim cover system that is placed on solid tailings during and after the operational phase. The purpose of the interim cover is to reduce the radon emissions during the operational and closure phases of an impoundment. Information regarding the type of interim cover material and the placement of the material on an impoundment during operation and closure must be part of any application and agency review.

H. The longer a tailings impoundment is in operation (that is, prior to dewatering and closure), the greater the potential for leaks in the liner system. There is data that shows that the liner system in the older impoundments at White Mesa are leaking, in part, due to inadequate quality assurance when the liners were constructed in the early 1980s. The NRC and licensee must address the eventual failure of the liner system to contain the liquid effluents in the impoundment.

12. SRP, Section 3.3, Design of Surface Impoundments, Site Specific Information (pages 3-7). Section 3.3.2(3) states: "For an existing facility, verify that the applicant has provided adequate information on sand and slime tailings. Ensure that this information includes the sand and slime tailings characteristics, spatial extent, and spatial variation of depth and thickness of each layer."

COMMENT:

A. The information for an existing facility or impoundment should include information on other materials that have been disposed of in the tailings impoundment (for example, ISL waste, soils, debris, and the dismantled mill itself).

¹² EPA Subpart W Rulemaking Activity:
<http://www.epa.gov/radiation/neshaps/subpartw/rulemaking-activity.html>

B. The method used to place the tailings in the impoundment can impact the time needed for dewatering, the time before a partial interim cover can be placed on exposed tailings, the radon emissions from the impoundment, and other operational and health and safety parameters. The NRC must have sufficient data and information to be able to evaluate the proposed methods for tailings placement in the impoundment and other aspects of the handling of the tailings.

13. SRP, Section 3.5.3(5), Waste Management, Acceptance Criteria, For process effluent control systems (page 3-46).

COMMENT:

A. The NRC should not permit the land application of uranium mill or heap leach liquid effluents. There is not sufficient data on the long-term impacts of land disposal of these effluents.

14. SRP, Section 3.5.3, Waste Management, Acceptance Criteria, For gaseous and airborne particulate effluent control systems (page 3-48 to 3-49).

COMMENT:

A. The SRP should require more specifics regarding the information the licensee must submit about the gaseous and particulate effluents over the life of a mill. It is doubtful that at the application phase, the licensee can accurately estimate all of the gaseous and airborne particulate effluents over the life of a Mill and that must be acknowledged and taken into consideration.

B. This section fails to discuss the radon emissions from the tailings impoundments, which are regulated by the EPA or, for the State of Utah, the Utah Division of Air Quality. Of concern is that the current EPA regulations at 40 C.F.R. Part 61 Subpart W do not contain a radon emission standard for impoundments constructed after December 1989 (whether for tailings or the holding of solutions), nor requirements for monitoring and reporting the radon emissions and keeping the emissions As Low As Reasonably Achievable (ALARA). The SRP fails to discuss the high radon emissions from conventional mill impoundments that store and evaporate processing solutions and the water covers on the tailings. Current data from the White Mesa Mill shows that the radon emissions from a water cover and three liquid impoundments are not the “zero” emissions that the EPA has claimed for several decades.¹³ Based on an EPA formula¹⁴

¹³ 40 C.F.R. Part 61, Appendix B, Method 115-Monitoring for Radon-222 Emissions, Radon-222 Emissions from Uranium Mill Tailings Piles, Section 2.1.3(a).

¹⁴ Risk Assessment Revision for 40 CFR Part 61 Subpart W — Radon Emissions from Operating Mill Tailings Task 5 – Radon Emission from Evaporation Ponds; S. Cohen and Associates, November 9, 2010; Table 6, page 17. <http://www.epa.gov/radiation/docs/neshaps/subpart-w/riskassessmentrevision.pdf>

and 2014 data¹⁵ on the radium content of the liquid impoundments at the White Mesa Mill, the radon emissions from 3 fluid impoundments (about 135 acres) are over 1,700 pCi/m²- sec.

The SRP makes no mention of the need for information regarding how a conventional mill licensee will reduce the radon emissions from tailings and solution impoundments and water covers so they will meet the ALARA standard. There is no mention of how the licensee will be required to determine the radon emissions from tailings impoundments constructed after December 1989, water covers, solution holding and evaporation ponds, and tailings impoundments during closure. There is no mention of the need for a licensee to evaluate the expected radon flux from solution ponds and impoundments on a site specific basis.

The EPA has developed site-specific formulas, base on local meteorological data, that can be used to determine the radon emissions from radium-laden effluents. Therefore, similar site-specific formulas must be developed for each site. Information about the estimated radium content of effluents over time, radon emissions, and methods to control and reduce the radon emissions from liquid effluents must to submitted as part of a license application and must be evaluated by the NRC or Agreement State.

Since 1989 the EPA has claimed that the radon emissions from radium-laden solutions at conventional mills were "zero." NRC Agreement States, the licenses, and probably the NRC have assumed likewise. Therefore, without any data on these radon emissions, no effort was made to keep them ALARA. Similarly, if there is no data regarding the radon emissions from new impoundments and impoundments during closure, there will be nothing to base any determination that the emissions are ALARA. There will be nothing that demands action to reduce the emissions to the ALARA standard, because no one will know what the emissions actually are or what is "reasonably achievable." There will be nothing on which to base a determination that the radon emissions from mill tailings impoundments and liquid effluents during operation and closure are ALARA. This is now it is now, how it has been, and how it will continue to be under NRC and EPA regulation of uranium mills.

C. If the EPA does not establish a limit on radon emissions from impoundments constructed after December 1989, solution ponds and liquid covers, tailings impoundments during closure, the reporting of the radon emissions from tailings and liquid effluents, and corrective actions if the radon emissions exceed 20 pCi/m²- sec or other emission limit under the current 40 C.F.R. Part 61 Subpart W Rulemaking, then the NRC must require that the radon emissions from these ponds and impoundments be determined at least on an annual basis and corrective actions to undertaken if those emission exceed 20 pCi/m²-sec. The NRC and Agreement States can no longer be indifferent to the unregulated emission of radon and radon progeny from new impoundments, liquid effluent ponds and impoundments, and from tailings during closure, when radon emissions increase as a result of dewatering. There must be license

¹⁵ 2014 Annual Wastewater Monitoring Report; Groundwater Quality Discharge Permit UGW370004, White Mesa Uranium Mill, November 24, 2014. <http://www.deq.utah.gov/businesses/E/energyfuels/docs/2014/12Dec/TailingsReport2014Annual.pdf>

conditions that require the monitoring of radon and placement of adequate interim covers during closure. There must be ways and means to assure that these radon emissions are kept ALARA.

In July 2014, the DRC determined that Cell 2 at the White Mesa Mill was finally in "closure."¹⁶ Therefore, the DRC believed that Cell 2 no longer fell under the EPA Subpart W emission standard for "existing" impoundments. The DRC determined that, for a limited period of time, the licensee would need to comply with a DRC-established 20 pCi/m²-sec standard and would monitor the radon flux from Cell 2 twice a year. The licensee measured the radon emissions in July 2014.¹⁷ The flux was 20.4 pCi/m²-sec, above the limit. In response, the licensee added additional material on the impoundment, as they had done earlier when the radon emissions exceeded the standard in 2012. The flux was monitored again in September, and was within the standard. However, it is likely that, as dewatering continues, the radon flux will increase again.

This experience with Cell 2 demonstrates the necessity of continued radon monitoring during closure and the feasibility of keeping the radon emissions within 20 pCi/m²-sec limit during closure.

D. The licensee must submit information about the release of gaseous and particulate radionuclides and non-radioactive hazardous constituents from the ore stored at a mill or heap leach facility and how those releases will be monitored and kept ALARA.

E. A heap leach operation must be required to monitor and/or calculate the radon emissions from solid tailings, liquid covers, solution holding and evaporation ponds, solution treatment ponds, ore pads, and other radon emission sources throughout the life of the operation.

F. Radon emission monitoring and exposure must include radon-220, in addition to radon-222. Thousands of tons of wastes containing thorium-232 (the source of radium-224 and radon-220 progeny) have been disposed at the White Mesa Mill, yet the NRC, EPA, and DRC have ignored the emissions from this waste.

15. SRP, Section 5.3, Operational Air Monitoring, Operational Airborne Monitoring (pages 5-11 to 5-14).

COMMENT:

A. Thousands of tons of mineral processing wastes containing thorium-232 and progeny have been processed at the White Mesa Mill. The NRC approved a licensee plan to handle high thorium content material at the Mill. Yet, there were no requirement to monitor for radon-220 or radon-220 progeny at White Mesa or any other uranium mill.

¹⁶ <http://www.deq.utah.gov/businesses/E/energyfuels/docs/2014/07Jul/EnergyFuels072814.pdf>

¹⁷ http://www.deq.utah.gov/businesses/E/energyfuels/docs/2014/09Sep/SAERJan_June2014.pdf

A uranium mill licensee must be required to monitor for gaseous and particulate progeny from thorium-232.

16. SRP, Section 6.1, Radiation Safety Controls and Monitoring, External Radiation Exposure Monitoring Program (pages 6-1 to 6-4).

COMMENT:

A. The external radiation exposure monitoring program must also include exposure to radon and radon progeny from tailings impoundments and processing solutions. Since the EPA's decades-long assumption has been that the radon emissions from solution holding and evaporation ponds and water covers at conventional mills, it is likely that licensees have not considered worker exposure to these emissions in their external exposure monitoring program.

17. SRP, Section 6.2, Radiation Safety Controls and Monitoring, Airborne Radioactivity Monitoring Program (pages 6-4 to 6-9).

COMMENT:

A. This section should specifically discuss the safety controls and monitoring of the radon emissions from the tailings impoundments and the determination of the radon emissions from solid and liquid effluents in solution holding and evaporation ponds and water covers at conventional mills.

18. SRP, Section 6.3, Exposure Calculations, Airborne Radioactivity Monitoring Program (pages 6-10 to 6-13).

COMMENT:

A. The methodologies proposed to calculate the exposures to radioactive materials by personnel in work areas where airborne radioactive materials could exist must include the tailings impoundments and solution holding and evaporation ponds.

19. SRP, Section 7(iii), Reclamation and Decommissioning Plan (page 7-2).

Section 7(iii) states (in part): "The preliminary decommissioning plan contained in the reclamation plan should include commitments to provide a detailed plan and cost estimate for NRC approval at least 9 months before decommissioning is expected to begin."

COMMENT:

A. The SRP must consider the fact that decommissioning and reclamation is a process that takes place over decades. It includes decommissioning and reclamation of single tailings impoundment or heap leach pads and the decommissioning and reclamation of the whole mill facility and operation. Decommissioning includes activities that take place during operation, such as placement of an interim cover over part of an impoundment when it starts to dry or when dewatering commences. Plans for all decommissioning and reclamation activities must include activities that take place

during the operational phase, in addition to the closure phase and placement of the final radon barrier and dismantling of the mill facility.

B. Reclamation should also include requirements to cleanup contaminated materials on site and off site during mill operation. The licensee must have a plan to remove contaminated soils and windblown tailings during the mills operational phase when contaminated materials have been identified. The materials must then be placed in an impoundment in a timely manner, rather than waiting decades for final mill reclamation.

C. It takes a lot longer than 9 months to approve a detailed decommissioning plan for a uranium mill, so it is ridiculous to assume that 9 months is sufficient for agency review and approval of a reclamation plan. After the submittal of the plan, there is a review to determine whether it is complete; requests for additional information; submittal of additional information; meetings; public comments on the scope of the Environmental Impact Statement (EIS) and draft EIS for NRC licensed facilities; public comments on the application, draft license, technical reports, and other related documents; public hearings; possible administrative proceedings; and other steps.

The only operating conventional mill in the US, the White Mesa Mill, has no Reclamation Plan incorporated into the license, even though the mill has been in operation for about 35 years and has one tailings impoundment in “closure”—when the reclamation process is supposed to begin. The White Mesa Mill license¹⁸ mentions an approved reclamation plan in 2008, but that approval did not include a license amendment and a public notice and comment process.

With a White Mesa tailings cell in “closure,” there is no approved closure plan for that tailing impoundment and no reclamation milestones, as required by 10 C.F.R. Part 40 Appendix A, Criterion 6A(1). The most recent version of the proposed Reclamation Plan¹⁹ is going to be reviewed and approved as part of the Mill License Renewal process. The License Renewal process started in 2007 and it is doubtful that it will be completed in 2015.

In sum, the process to approve an initial reclamation plan and later plans for a specific impoundment or at the end of the life of a mill is a lengthy process, so NRC’s assumption that a 9-month time frame for review and approval (which include a public participation and environmental analysis) is sufficient has no basis in fact.

D. The SRP must include a discussion of what exactly is required with respect reclamation plan timing, reclamation milestones, and approval of plans and milestones prior to a determination that a tailings impoundment is no longer in “operation,” but is in “closure.” The SRP must discuss whether a tailings impoundment is in closure if a

¹⁸ <http://www.deq.utah.gov/businesses/E/energyfuels/docs/2010/06Jun/4BER%20UT1900479%20061410.pdf>

¹⁹ <http://www.deq.utah.gov/businesses/E/energyfuels/permits/denisonlicensereapp.htm>

closure plan and reclamation milestones for that impoundment are incorporated into the license.

E. The NRC must determine the type of reclamation milestones that are appropriate for heap leach and vat leaching operations.

F. The SRP must include a discussion of whether decommissioning and reclamation work can commence if there is no reclamation plan that describes and evaluates that reclamation work. The issue is whether a licensee can undergo reclamation work without a reclamation plan and without an opportunity for the public to review and comment on that plan.

20. SRP, Section 7, Reclamation and Decommissioning Plan (page 7-2).

COMMENT:

A. During the reclamation process when an impoundment is in closure, the dewatering process will probably cause an increase in radon emissions. The reclamation plan for the closure of a specific tailings impoundment must include plans for monitoring the radon emissions and keeping those emissions ALARA. The Reclamation Plan must include plans for taking corrective actions, such as placement of additional material on the interim cover or cleanup of windblown tailings, so that the radon emissions will meet the ALARA standard.

B. The Reclamation Plan must require the reclamation of individual phased-disposal impoundments (including placement of the final radon barrier) once it is feasible to do so, rather than the reclamation of all of the impoundments (if there are more than one) at the end of the mills operational period. Currently, the proposed Reclamation Plan for the White Mesa Mill anticipates the placement of the final radon barrier over all of the impoundments after closure of the mill, not after closure of the individual impoundment. That is not in keeping of current EPA and NRC requirements.

C. The SRP should require the submittal and approval of a supplementary Reclamation Plan prior to the commencement of operation of a new tailings impoundment, whether for disposal of tailings or for storage and evaporation of liquid effluents.

D. Regarding reclamation sureties: The surety amount must take into consideration the cost of administering the reclamation of a mill or heap leach facility if the licensee goes bankrupt. This would include legal costs. The NRC must outline the process used by the NRC to make use of reclamation surety funds to reclaim a facility after the surety bond has been called in. The NRC must take a hard look at the experience at the Moab Uranium Mill: 1) Atlas Corporation filed for bankruptcy; 2) the surety amount approved by the NRC (and never updated) did not begin to cover the costs of on-site reclamation; 3) the NRC was only able to recover 80% of the \$6.5 million bond, because the company had used the same collateral for 2 completely different

reclamation bonds; 4) the trustee retained by the NRC charged a lot for administering the Reclamation Trust; 5) a large chunk of the bond was spent on legal fees; 6) only about 50% of the bond was spent on actual reclamation of the site; 7) the Trustee failed to provide the NRC with reports and documentation of their work (as-built plans and the last 6-month progress plan; 8) money was frittered away on seeding part of the tailings pile, but without watering the seeds in the desert, the plants just died; 9) the surety could not have paid for minimal site remediation; 10) and other egregious agency and industry mistakes and failures.

21. SRP, Appendix A, Appendix A, Guidance for Reviewing Historical Aspects of Site Performance for License Renewals and Amendments.

COMMENT:

A. All of the applications and submittals that are incorporated into the license by reference must be made readily available to the public. A member of the public should not have to go through boxes of documents at an Agreement State office to try to find an application that is referenced in a uranium mill license condition. The Agreement State must have all documents referenced in a material license readily available for public (and staff) review.

B. The NRC or Agreement State should review documents related to compliance with 40 C.F.R. Part 61 Subpart W, National Standards for Radon Emissions From Operating Mill Tailings.

C. The historical documents that the NRC or Agreement State reviews as part of the License Renewal or Amendment process should be readily available to the public on an NRC or Agreement State website.

Thank you for providing this opportunity to comment.

Sincerely,

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