

PUBLIC SUBMISSION

As of: June 03, 2014
Received: May 27, 2014
Status: Pending_Post
Tracking No. 1jy-8cbs-t97p
Comments Due: May 27, 2014
Submission Type: Web

Docket: NRC-2011-0266
Notice of Availability of Draft Interim Staff Guidance

Comment On: NRC-2011-0266-0013
Evaluations of Uranium Recovery Facility Surveys of Radon and Radon Progeny

Document: NRC-2011-0266-DRAFT-0014
Comment on FR Doc # 2014-06785

RECEIVED

2014 JUN -3 AM 9:26

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Submitter Information

Name: Sarah Fields
Address:
P.O. Box 344
Moab, UT, 84532-0344
Email: sarah@uraniumwatch.org

3/27/2014
79FR 17194
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General Comment

See attached file(s)

Attachments

UW-INFORM_Part20GuidanceComments_NRC-2011-0266_140527

SUNSI Review Complete
Template = ADM - 013
E-RIDS= ADM-03
Add=

D. Schmidt (dws2)

Uranium Watch

76 South Main Street, # 7 | P.O. Box 344
Moab, Utah 84532
435-260-8384

May 27, 2014

via Federal Rulemaking Web site

Cindy Bladey, Chief
Rules, Announcements, and Directives Branch (RADB)
Office of Administration
Mail Stop: 3WFN-06-44M
U.S. Nuclear Regulatory Commission
Washington, District of Columbia 20555-0001.

RE: Docket ID NRC-2011-0266. Interim Staff Guidance FSME-ISG-01, "Evaluations of Uranium Recovery Facility Surveys of Radon and Radon Progeny in Air and Demonstrations of Compliance with 10 CFR 20.1301." Revised Draft Report for Comment. March 2014. 79 Fed. Reg. 17194; March 27, 2014.

Below please find comments on the Nuclear Regulatory Commission Interim Staff Guidance FSME-ISG-01, "Evaluations of Uranium Recovery Facility Surveys of Radon and Radon Progeny in Air and Demonstrations of Compliance with 10 CFR 20.1301" (Revised Guidance). These comments are submitted on behalf of Uranium Watch and Information Network for Responsible Mining (INFORM).

Commenters appreciate the thought and work that has gone into the Revised Guidance.

1. General Comments

1.1. It is not clear why the Nuclear Regulatory Commission (NRC) is not also addressing evaluations of Uranium Recovery Facility Surveys of the other radionuclides that must also be included in a determination of compliance with 10 C.F.R. § 20.1301. The NRC should have included methods of surveying other radionuclides to determine compliance with 10 C.F.R. §§ 20.1301 and 20.1101(d).

1.2. In many respects the Revised Guidance only addresses in situ leach (ISL) operations, failing to adequately reference and discuss aspects of conventional and heap-

leach uranium recovery operations. Given that the Part 20 Guidance is relevant to the demonstration of compliance at the only operating conventional mill, though the mill is in the State of Utah (an NRC Agreement State), the NRC should not minimize aspects of the Revised Guidance that apply to conventional mills.

1.3. The various NRC Regulatory Guides referenced in the Part 20 guidance discuss various aspects of determining radiological effluents at mill site, but there is no mention of the measurement of radon emissions from tailings piles after 1989 and the Environmental Protection Agency (EPA) requirements in 40 C.F.R. Part 61, Subpart W.¹ The Revised Guidance should include, or reference another NRC regulatory guidance that includes, a full discussion of the measurement of radon emissions from impoundments containing 11e.(2) byproduct material (no matter what the size, age, contents, or length of service). The same for the measurement of radon and radon progeny from ore pads, stockpiled ore, and other stockpiled materials waiting for processing at conventional mills.

1.4. The NRC has based its standards on certain health and risk assumptions. The NRC does not reference actual health assessments, including a pre-operational assessment, in communities near uranium recovery facilities. Unless there are ongoing assessments of the health of the public exposed to radioactive emissions from these facilities, there is no way to verify those assumptions over the long-term.

2. Notes on Applicability (page 2) states: *This ISG is intended for NRC staff use when performing reviews of uranium recovery licensee surveys of radon-222 (Rn-222) and Rn-222 progeny in air to demonstrate compliance with the public dose limit of 10 CFR 20.1301, "Dose limits for individual members of the public."*

2.1. The Revised Guidance must also address emission of radon-220 (Rn-220) and radon-220 progeny. The NRC approved license amendments that authorized the disposal of tailings and the storage materials containing thorium-232 and progeny at a conventional uranium mill.² The NRC also approved a licensee's plan for the handling of high-thorium content material. Since the NRC specifically authorized the disposal of wastes containing thorium-232 and progeny at a licensed uranium mill, the NRC must also address the emissions of radon-220 at conventional uranium mills.

¹ 54 Fed. Reg. 51654, December 15, 1989. <http://www.epa.gov/radiation/docs/neshaps/subpart-w/historical-rulemakings/december151989finalrule.pdf>

² The NRC staff approved license amendments to the White Mesa Mill, San Juan County, Utah, source material license for the receipt, storage, processing, and disposal of uranium bearing wastes that contained thorium-232 and progeny. That waste will continue to emit radon-220 and the highly radioactive radon-220 progeny.

2.2. Emissions of radon-220 are not captured by the usual method of monitoring radon from tailings impoundments and are not included in MILDOS-AREA calculations. That does not mean radon-220 emissions should be ignored.

3. The guidance (page 2) states: *In this document, the term “radon,” without specifying the isotope, is generally used to mean Rn-222, since that is generally the isotope of concern for currently licensed uranium recovery facilities.*

3.1. Radon-220 should be considered an isotope of concern for the only operating conventional uranium mill in the U.S., the White Mesa Mill in Utah, because the NRC authorized the disposal of waste containing thorium-232, the parent isotope that produces radon-220. Since the licensee has not measured the radon-220 emissions from this facility, the extent to which radon-220 would be a “isotope of concern” is, conveniently, unknown.

4. The table, “Sources of Basic Information on Radon and Radon Progeny (page 3) lists various sources of information, but fails to indicate sources for these documents. It does not appear that any of these referenced sources are readily available to the public, NRC staff, or licensees. If the NRC is going to include references in its Revised Guidance, the NRC should place the referenced documents on ADAMS.

5. The Table, “Regulatory Guidance” (page 3), has a list of applicable regulatory guidances.

5.1. All of the referenced Regulatory Guidances, except NUREG-0859, are available on the NRC Document Collections webpages. NUREG-0859 is available on ADAMS (ML083110475). That documents should be placed in the NUREG Series Publications³ on the NRC website. The Guide should include the URLs for these documents.

6. The Regulatory Guidance, Section 3.3, Transparency and Documentation of Compliance with 10 CFR 20.1301/1302, Licensee Information to Be Reviewed, (pages 8 to 9) states: *Licensees must demonstrate compliance with the public dose limit of 10 CFR 20.1301 (i.e., addressing contributions from effluents and external sources of radiation) annually. Thus, NRC staff expects that licensee demonstrations of compliance with the public dose limit will be performed on an annual basis and that the NRC staff will evaluate compliance on an annual basis.*

6.1. Commenters strongly AGREE with this requirement. The White Mesa Uranium Mill (regulated by the Utah Division of Radiation Control), the only operating conventional uranium mine in the United States, last determined compliance with the State of Utah’s equivalent of 10 C.F.R § 20.1301 in 2007, using the MILDOS AREA

³ <http://www.nrc.gov/reading-rm/doc-collections/#nuregs>

Model for calculation of the dose assessment. Since that time there have been major changes to the White Mesa Mill operation, including the construction of two new tailings impoundments (one receiving solids and one liquids), changes in the amount and nature of stockpiled ore and alternate feed, construction of the alternate feed circuit, construction of an additional bag house, non compliance with 40 C.F.R. § 61.252(a) radon flux standard for one tailings impoundment, and the dispersal of radioactive particulates that contribute to the offsite dose.⁴ In light of these significant changes at the Mill, it is unreasonable to assume that the offsite dose has not changed since 2007 and will not change in the future. The requirement for yearly dose assessments would go a long way to provide timely demonstration of compliance with the Part 20 standard. Also, any change in the operation that would result in a significant change in radiological emissions must trigger a new assessment in the dose to the nearest receptor.

6.2. The Revised Guidance does not explain how measurements of radon would be used to confirm the accuracy of calculations. Section 3.3. of the Revised Guidance does not clearly explain the relevant information required and methodology of using radon monitoring to confirm assumptions and results of radon dose compliance using a method of calculation.

6.3. Documentation of Part 20 compliance should be submitted to the NRC or NRC Agreement State so that the public would be able to evaluate compliance monitoring and calculation. This would include the data and information that was used in demonstrating compliance through calculation. The process of dose calculation to determine compliance should not be a mysterious process unavailable to the public. The public should be able to review and assess the data and assumptions used in the dose model to determine compliance.

7. The Revised Guidance, Section 4.2.2, "Measure Operational Parameters to Calculate Radon Releases" (page 13), states: *Another approach to surveying radon in air is to measure uranium recovery facility operational process parameters. Based on operational parameters, licensees could calculate a radon release rate or source term for vents, stacks, other release points, and wellfields.*

7.1. This section leaves out other types of operational parameters associated with conventional and heap-leach operations. The sentence should be amended to read: "Based on operational parameters, licensees could calculate a radon release rate or source

⁴ *Assessment of Potential Uranium Emissions from a Uranium Mill on Water, Sediments, and Plants Located near the Ute Mountain Ute Reservation, Utah*, David Naftz and Ryan Rowland, USGS, Salt Lake City, Utah; Anthony J. Ranalli, USGS, Lakewood, Colorado; Sam Vance and Robert Duraski, USEPA, Denver, Colorado; Colin Larrick and Scott Clow, Ute Mountain Ute Tribe, Towaoc, Colorado; 2009. http://www.gwpc.org/meetings/forum/2009/proceedings/Rowland_Ryan.pdf.

term for vents, stacks, tailings, ore pads and ore piles, heap leach piles, wellfields, and other release points.” NRC might want to include other specific sources of emissions.

7.2. NRC must address how a licensee would include doses from radioactive material that has migrated off-site from the licensed facility. For example, windblown tailings or ore. Materials have migrated off-site from the White Mesa Mill in Utah.⁵ However, the licensee did not discover these materials, include them in calculation of doses, or take actions to cleanup uranium material that have migrated offsite.

8. The Revised Section 4.2.3, “Measure Radon in Stacks and Other Effluent Points” (page 13), states: *A third approach to surveying radon in air is to measure the radon released at vents or stacks by conventional stack monitoring, and measure the radon from wellfields or other nonpoint sources using passive or dynamic radon monitors. NRC staff is not aware of any licensee currently using this method, but it is included here as a possible approach.*

8.1. This section seems to ignore the possibility of measuring radon emissions at tailings impoundments, ore storage piles, and heap leach piles and other emission sources at conventional and heap-leach uranium recovery operations. This section should discuss the measurement of radon and radon progeny at point and nonpoint sources at conventional mills and heap-leach operations.

8.2. There appears to be a conflict between the NRC and the EPA regarding surveying radon in the air through measurement of radon from point and nonpoint sources at a conventional uranium mill. The conflict is apparent in the provisions in the National Emission Standards for Radon Emissions From Operating Mill Tailings (40 C.F.R. Part 61 Subpart W) and the EPA’s proposed changes in those regulations.⁶ The existing Subpart W requires the measurement of radon-222 emissions from tailings impoundments constructed before December 15, 1989. For the only operational Mill, that has meant measurement of radon-222 emissions from 2 tailings impoundments for over 2 decades.

Now, according to the EPA’s proposed Subpart W regulation, which is currently open for public comment, a uranium mill operator will no longer be required to make any measurements of radon emissions from tailings impoundments. If the proposed changes

⁵ *Assessment of Potential Uranium Emissions from a Uranium Mill on Water, Sediments, and Plants Located near the Ute Mountain Ute Reservation, Utah*, David Naftz and Ryan Rowland, USGS, Salt Lake City, Utah; Anthony J. Ranalli, USGS, Lakewood, Colorado; Sam Vance and Robert Duraski, USEPA, Denver, Colorado; Colin Larrick and Scott Clow, Ute Mountain Ute Tribe, Towaoc, Colorado; 2009. http://www.gwpc.org/meetings/forum/2009/proceedings/Rowland_Ryan.pdf.

⁶ 85 Fed. Reg. 25387-25412, May 2, 2014. <http://www.epa.gov/radiation/neshaps/subpartw/rulemaking-activity.html>

in Subpart W are approved, the only situation that would require the measurement of radon from a tailings impoundment would be during the closure period, when the licensee requests an extension of the milestone for emplacement of the final radon barrier, pursuant to 10 C.F.R. Part 40 Appendix A, Criterion 6A(2). However, there are no enforceable milestones for the placement of the final radon barrier (or interim cover or dewatering) for Cell 2 at the White Mesa Mill and for closed tailings impoundments at the Cotter Mill in Cañon City, Colorado (contrary to the requirements of 10 C.F.R. Part 40 Appendix A, Criterion 6A(1) and the 1981 Memorandum of Understanding between the NRC, EPA, and NRC Agreement States in support of the recession of 40 C.F.R. Part 61 Subpart T⁷). Therefore, there is nothing that would require any annual measurements of radon emissions at uranium mills in Utah and Colorado in support a determination of compliance with 10 C.F.R. § 20.1301.

The EPA (through the proposed changes to Subpart W) and the NRC, EPA, State of Colorado, and State of Utah (through the failure to assure that there are enforceable reclamation milestones for closed uranium mill tailings impoundments in Utah and Colorado) **actively discourage** the measurement of radon emissions from tailings impoundments to compile data that could be used to demonstrate Part 20 compliance. The NRC must address the actions, and inactions, by the EPA, NRC, and Agreement States that actively discourage the measurement of radon emissions from operational and nonoperational tailings impoundments.

8.4. Another Part 20 Revised Guidance issue is the fact that the EPA does not require the measurement of radon emissions from tailings impoundments constructed after 1989. Therefore, a licensee will not be able to use such data to demonstrate compliance with Part 20 or support calculations that are being used to determine compliance. A further issue is that during the time when tailings impoundments are drying out and there is the probability that radon emissions will increase significantly, the EPA does not require monitoring of radon emissions unless an impoundment was constructed before December 1989 and is still authorized to receive tailings. If radon emissions from uranium mill tailings impoundments are never measured, then there is no way to demonstrate that these emissions are as low as reasonably achievable.

An example is Cell 2 at the White Mesa Mill. The licensee has been measuring and reporting the annual radon emissions from this impoundment since 1992. The impoundment is licensed to receive tailings, but no tailings have been placed in the impoundment for several years and there is an interim cover. In 2012, because of an accelerated de-watering program required by the Ground Water Discharge Permit, the reduction of water in the impoundment led to an exceedance of the 40 C.F.R. § 61.252(a) radon emission standard of 20 pCi/m²-sec.⁸ The licensee commenced monthly

⁷ 56 Fed. Reg. 55434, October 25, 1991.

⁸ http://www.uraniumwatch.org/whitemesamill/EFR-DAQ_SupartWAnnualRpt.130329.pdf

monitoring, investigated of the causes of the increase in radon emissions, and determined appropriate corrective actions. Additional material was placed on the impoundment, and windblown tailings that had come from another impoundment were removed. The corrective actions were successful in bringing the impoundment back into compliance with the standard. Under the proposed EPA Subpart W, the licensee will not be required to continue to monitor Cell 2 or monitor Cell 3, which is approaching the end of its life as an active impoundment and will be dewatered. Nor will the licensee be required to measure radon on newer, smaller impoundments. No monitoring means no awareness of the increase in radon emissions and their cause and no requirement to, or knowledge of the need to, take reasonable and feasible actions to reduce the emissions. No data, no problem! During the so-called "closure" period when emissions can increase significantly due to dewatering—again, no monitoring, no reporting, no awareness of need to take mitigative measures, and no mitigative measures. This is the reality of the situation under EPA Subpart W regulation.

8.5. Another concern is that, although the EPA has the authority to regulate the emission of radon (and other radionuclides) from conventional uranium mills, the EPA does not require the measurement or radon emissions from stockpiled ore and other uranium-bearing materials, ore pads, drums of waste waiting to be processed, stacks, or other radon sources.

8.6. It does not make sense to have various radiological effluent regulations and one regulatory agency does not seem to be aware of the other agency's regulations and how those regulations are implemented and enforced. The regulations don't always supplement each other; they can be at odds. Inevitably, things fall through the cracks.

8.7. We are unaware of any data that correlates the emission of radon from tailings impoundments, as monitored and reported to the EPA or authorized state in compliance with Subpart W, with the dose to the nearest receptor, as reported to the NRC or NRC Agreement State. This is the type of data that the NRC should have and make available.

9. Revised Guidance, Section 4.7 Radon Measurement Locations (page 18) states: *In determining monitoring locations, the licensee is also expected to take both point and diffuse or area sources into account. Diffuse sources include, for example, radon emanating from the wellfields at ISR facilities. Point sources may include, for example, radon from the ion exchange column captured by an exhaust system and released through a roof stack.*

9.1. Again, the Revised Guidance's focus is on ISL operations, with no mention of possible measurement locations at conventional and heap-leach operations. The NRC should include examples of diffuse and point sources locations at conventional and heap-leach uranium recovery operations.

10. Site Cleanup During Operation

10.1. The NRC must address the fact that a uranium mill is not required to cleanup radiologically contaminated soils that are above the standard for the cleanup of those soils during site reclamation (40 C.F.R. § 192.32(b)(2)). Soils become contaminated from spills (liquids and solids), windblown tailings, and other site activities. Contaminated materials migrate offsite, as has happened at the White Mesa Mill. Again, no requirement to cleanup this contamination while the mill is operational. An example of extensive soil contamination is the Shootaring Canyon Mill, which last operated in 1982. During decommissioning and reclamation (which has yet to commence), the licensee will have to place approximately 114,000 tons of stockpiled ore and contaminated soils in the single tailings impoundment.⁹ One can only wonder why, since the licensee is supposed to reduce the radiological emissions to as low as reasonably achievable, these materials were not cleaned up and placed in the tailings impoundment and covered by clean soil years ago.

10.2. The NRC regulations that apply to radiological effluents should be used to identify sources of emissions that can should undergo emission reductions and remedial actions. But, it appears that as long as the emissions are below the standard, emissions that can be “reasonably” reduced are not required to undergo any corrective actions to actually reduce the levels of those emissions. The concept of “as low as reasonably achievable” is meaningless if a licensee is not required to actually reduce those emissions, even though they are below various emission standards.

11. References

11.1. Many of the references cited in the Revised Guidance are not readily available to the public. The NRC must consider all referenced materials available on ADAMS, if they are not otherwise available on the World Wide Web.

Thank you for providing this opportunity to comment.

Sincerely,

Sarah M. Fields
Program Director
Uranium Watch

⁹ Tailings Reclamation and Decommissioning Plan for Shootaring Canyon Uranium Project, Garfield County, Utah. License Number SUA-1371 (NRC); UT 0900480 (DAQ). Hydro-Engineering LLC, Environmental Restoration Inc. Revised November 2003. Updated and submitted March 29, 2012. http://www.radiationcontrol.utah.gov/Uranium_Mills/uraniumone/docs/2012/March/DRC-2012-001447.pdf

Cindy Bladey/RADB/NRC
Docket ID NRC-2011-0266
May 27, 2014

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and

Jennifer Thurston
Executive Director
Information Network for Responsible Mining
P.O. Box 27
Norwood, Colorado 81423