Thornton, Marisa

From: Thornton, Marisa on behalf of Collections.SubW
Sent: Wednesday, March 25, 2015 10:33 AM
To: Thornton, Marisa
Subject: Fw: Heart Response

From: Rosnick, Reid
Sent: Tuesday, March 3, 2015 6:34 AM
To: Collections.SubW
Subject: FW: Heart Response

From: Gillam, Connie
Sent: Wednesday, February 25, 2015 12:34 PM
To: Rosnick, Reid
Cc: Ferguson, Rafaela
Subject: RE: Heart Response

Reid, I just showed the highlighted version to Jon and he "okayed" the changes. I am about to put the document into CMS.

From: Rosnick, Reid
Sent: Wednesday, February 25, 2015 12:31 PM
To: Gillam, Connie
Cc: Ferguson, Rafaela
Subject: RE: Heart Response

Thanks, Connie. I'm good as long as Jon is OK with the changes.

Reid

From: Gillam, Connie
Sent: Wednesday, February 25, 2015 12:28 PM
To: Rosnick, Reid
Cc: Ferguson, Rafaela
Subject: Heart Response

Reid,

I am about to enter the Heart response into CMS. Before doing so, I wanted you to see the edits I did to the letter.

There are no substantive changes. With one exception ("had" to "held,"), the changes that were made conform to the requirements of the EPA Correspondence Manual. The changes are highlighted in color in the attachment.

Manuel Heart, Chairman
Ute Mountain Ute Tribe
P.O. Box 248
Towaoc, Colorado 81334-0248

Dear Chairman Heart:

Thank you for your letter to Administrator McCarthy of January 13, 2015, discussing the possibility of a second consultation regarding the proposed National Emission Standards for Hazardous Air Pollutants (NESHAP) Subpart W regulation. Administrator McCarthy has asked that I respond to your letter on her behalf.

On January 30, 2015, staff from my office and the Office of General Counsel held a conference call with Mr. Scott Clow and members of the Tribal Air Programs staff. They discussed a number of issues, among them the best time for a second consultation between the U.S. Environmental Protection Agency and the Tribe. We understand your desire to have the EPA respond to your public comments on the proposal, including the questions you submitted prior to the July 2014 consultation. We are happy to discuss your comments and questions in further meetings prior to and/or after publication of the final rule. However, while we can discuss your comments with you, we will be unable to provide you with a final resolution on them until after the final rule has been published. As EPA staff discussed with Mr. Clow and members of his staff on our January 30 call, the Agency received numerous comments from other entities on the same issues raised by the Tribe, and we are currently evaluating all of these comments and the information provided in them as we develop a final rule.

We value the input from the Ute Mountain Ute Tribe, and will work with your staff to identify a convenient time for a follow-up meeting. We will continue to work through Mr. Clow; please have your staff contact Reid Rosnick at 202-343-9563 or rosnick.reid@epa.gov for comments or questions.

Sincerely,

Janet G. McCabe
Acting Assistant Administrator

Thornton, Marisa

From: Thornton, Marisa on behalf of Collections.SubW
Sent: Wednesday, March 25, 2015 10:34 AM
To: Thornton, Marisa
Subject: Fw: Heart Response
Attachments: ORIA Response to Heart 02252015.pdf

From: Rosnick, Reid
Sent: Tuesday, March 3, 2015 6:34 AM
To: Collections.SubW
Subject: FW: Heart Response

From: Gillam, Connie
Sent: Wednesday, February 25, 2015 12:28 PM
To: Rosnick, Reid
Cc: Ferguson, Rafaela
Subject: Heart Response

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Thornton, Marisa

From: Thornton, Marisa on behalf of Collections.SubW
Sent: Wednesday, March 25, 2015 10:35 AM
To: Thornton, Marisa
Subject: Fw: Ute Mountain Ute Response

From: Rosnick, Reid
Sent: Tuesday, March 3, 2015 6:34 AM
To: Collections.SubW
Subject: FW: Ute Mountain Ute Response

From: Stahle, Susan
Sent: Wednesday, February 25, 2015 10:00 AM
To: Rosnick, Reid
Cc: Edwards, Jonathan; Perrin, Alan; Peake, Tom; Harrison, Jed
Subject: RE: Ute Mountain Ute Response

Hi Reid –

The letter looks good, no comments from me.

Thanks,

Susan Stahle
Attorney-Advisor
Air and Radiation Law Office
Office of General Counsel
U.S. Environmental Protection Agency
202-564-1272 (ph)
202-564-5603 (fax)
stahle.susan@epa.gov

From: Rosnick, Reid
Sent: Wednesday, February 25, 2015 9:34 AM
To: Stahle, Susan
Cc: Edwards, Jonathan; Perrin, Alan; Peake, Tom; Harrison, Jed
Subject: Ute Mountain Ute Response
Importance: High

Hi Sue,

Mike has made some changes to our response to the Tribe regarding a second consultation. Mike would like your comments on the revised letter. I have made the changes (attached), along with the proposed letter, also attached. Please let me know if you have any questions or comments. Thanks

Reid

_____

Reid J. Rosnick
US Environmental Protection Agency
Radiation Protection Division

202.343.9563
rosnick.reid@epa.gov

Thornton, Marisa

From: Thornton, Marisa on behalf of Collections.SubW
Sent: Wednesday, March 25, 2015 10:35 AM
To: Thornton, Marisa
Subject: Fw: Ute Mountain Ute Response

From: Rosnick, Reid
Sent: Tuesday, March 3, 2015 6:34 AM
To: Collections.SubW
Subject: FW: Ute Mountain Ute Response

From: Harrison, Jed
Sent: Wednesday, February 25, 2015 10:02 AM
To: Rosnick, Reid
Subject: RE: Ute Mountain Ute Response

Thanks for the cc, Reid. I like the overall tone. Looks good to me, too.

Jed Harrison SENIOR ADVISOR FOR TRIBAL AFFAIRS
U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RADIATION & INDOOR AIR
(702) 784 8218 MOBILE: (702) 494 7050

4220 S. MARYLAND PARKWAY
BLDG. D, SUITE 800
LAS VEGAS, NEVADA 89119

From: Rosnick, Reid
Sent: Wednesday, February 25, 2015 6:34 AM
To: Stahle, Susan
Cc: Edwards, Jonathan; Perrin, Alan; Peake, Tom; Harrison, Jed
Subject: Ute Mountain Ute Response
Importance: High

Hi Sue,

Mike has made some changes to our response to the Tribe regarding a second consultation. Mike would like your comments on the revised letter. I have made the changes (attached), along with the proposed letter, also attached. Please let me know if you have any questions or comments. Thanks

Reid

_____
Reid J. Rosnick
US Environmental Protection Agency
Radiation Protection Division

202.343.9563
rosnick.reid@epa.gov

Thornton, Marisa

From: Thornton, Marisa on behalf of Collections.SubW
Sent: Wednesday, March 25, 2015 10:35 AM
To: Thornton, Marisa
Subject: Fw: Ute Mountain Ute Response

From: Rosnick, Reid
Sent: Tuesday, March 3, 2015 6:34 AM
To: Collections.SubW
Subject: FW: Ute Mountain Ute Response

From: Edwards, Jonathan
Sent: Wednesday, February 25, 2015 10:02 AM
To: Gillam, Connie
Cc: Rosnick, Reid; Peake, Tom; Perrin, Alan; Cherepy, Andrea
Subject: FW: Ute Mountain Ute Response

Connie—looks like we are "good" to get this into CMS and up to Janet's level. --Jon

---

From: Stahle, Susan
Sent: Wednesday, February 25, 2015 10:00 AM
To: Rosnick, Reid
Cc: Edwards, Jonathan; Perrin, Alan; Peake, Tom; Harrison, Jed
Subject: RE: Ute Mountain Ute Response

Hi Reid –

The letter looks good, no comments from me.

Thanks,

Susan Stahle
Attorney-Advisor
Air and Radiation Law Office
Office of General Counsel
U.S. Environmental Protection Agency
202-564-1272 (ph)
202-564-5603 (fax)
stahle.susan@epa.gov

From: Rosnick, Reid
Sent: Wednesday, February 25, 2015 9:34 AM

To: Stahle, Susan
Cc: Edwards, Jonathan; Perrin, Alan; Peake, Tom; Harrison, Jed
Subject: Ute Mountain Ute Response
Importance: High

Hi Sue,

Mike has made some changes to our response to the Tribe regarding a second consultation. Mike would like your comments on the revised letter. I have made the changes (attached), along with the proposed letter, also attached. Please let me know if you have any questions or comments. Thanks

Reid

_____

Reid J. Rosnick
US Environmental Protection Agency
Radiation Protection Division

202.343.9563
rosnick.reid@epa.gov

Thornton, Marisa

From: Thornton, Marisa on behalf of Collections.SubW
Sent: Wednesday, March 25, 2015 10:35 AM
To: Thornton, Marisa
Subject: Fw: Supplemental Information to Comments by Ute Mountain Ute Tribe on NESHAPS Subpart W - calculations of radon flux from uranium tailings impoundments
Attachments: Calculation Brief Supplement 2 10 15.pdf

From: Rosnick, Reid
Sent: Tuesday, March 3, 2015 6:34 AM
To: Collections.SubW
Subject: FW: Supplemental Information to Comments by Ute Mountain Ute Tribe on NESHAPS Subpart W - calculations of radon flux from uranium tailings impoundments

---

From: Scott Clow [mailto:sclow@utemountain.org]
Sent: Wednesday, February 11, 2015 11:50 AM
To: Rosnick, Reid
Cc: Celene Hawkins; tnatori@utemountain.org; Michael King; H. Michael Keller; clarrick@utemountain.org; Leland Begay; Malcolm Lehi; Manuel Heart; Deanne Wall; Regina Lopez-Whiteskunk; Priscilla Blackhawk; Gary Hayes; Juanita PlentyHoles
Subject: Supplemental Information to Comments by Ute Mountain Ute Tribe on NESHAPS Subpart W - calculations of radon flux from uranium tailings impoundments

Dear Reid,
I have attached a supplemental brief regarding the Tribe's calculations and interpretations of the proposed NESHAP Subpart W Rule. Please consider this as we continue to work on effective Tribal Consultation on this matter.
Sincerely,
Scott Clow
Ute Mountain Ute Tribe

February 10, 2015

Air and Radiation Docket
Environmental Protection Agency
1200 Pennsylvania Ave., NW
Washington D.C. 20460

SUPPLEMENT TO CALCULATION BRIEF (JULY 7, 2014)

INTRODUCTION

On July 7, 2014, the Ute Mountain Ute Tribe (Tribe) submitted a Calculation Brief to the Environmental Protection Agency (EPA) as part of a larger effort to prepare for a government-to-government consultation meeting regarding the EPA's 40 C.F.R. Part 61, Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings (Proposed Rule). In the Calculation Brief, the Tribe discussed its initial radon flux calculations for Tailings Cell 1 at the White Mesa Mill using the actual radium pond concentration reported to the Utah Division of Radiation Control in 2013. The Tribe initially determined that Tailings Cell 1 at the White Mesa Mill is a significant source of radon-222 emissions and expressed concern that the EPA was proposing to use a 1 meter liquid cover as the only control on radon-222 emissions from non-conventional impoundments based on a finding that keeping 1 meter of liquid on existing impoundments "has been sufficient to limit the amount of radon emitted from the ponds, in many cases, to almost zero." 79 Fed. Reg. at 25,398. At the July 10, 2014 consultation meeting between the Tribe and the EPA, the EPA was not prepared to substantively respond to issues raised in the Calculation Brief.

On October 29, 2014, the Tribe submitted written comments on the Proposed Rule. The Tribe's comments included a section regarding the EPA's proposed use of a 1-meter cover as the sole work practice standard to control radon emissions from non-conventional impoundments. In that Section, the Tribe used the site-specific analysis at the White Mesa Mill (from the Calculation Brief) to demonstrate that the placement of a 1-meter liquid cover (especially if that liquid is radium-laced process water from conventional milling activities) will not sufficiently control radon-222 emissions from non-conventional impoundments to near zero, and it may allow some non-conventional impoundments to exist with annual mean radon flux numbers that grossly exceed the 20 pCi/(m^2s) numerical flux standard.

The purpose of this Supplement to the July 7, 2014 Calculation Brief is to update the Tribe's July 2014 calculation work using the 2014 Annual Tailings Wastewater Monitoring Report (which reflects the most recent tailings cell chemistry data—collected in August of 2014).

SUMMARY OF THE 2014 ANNUAL TAILINGS WASTEWATER MONITORING REPORT

The 2014 Annual Tailings Wastewater Monitoring Report (2014 Report) shows a large increase in the Gross Radium Alpha content in Tailings Cells 1, 4A, and 4B, and a decrease in the Gross Radium Alpha content in Tailings Cell 3. *See* Table 1.

TABLE 1: Increase in Gross Radium Alpha, 2013-2014

Cell	**2013 Gross Radium Alpha**	**2014 Gross Radium Alpha**
Cell 1	32,700 pCi/L	331,000 pCi/L
Cell 3	81,900 pCi/L	19,700 pCi/L
Cell 4A	15,800 pCi/L	240,000 pCi/L
Cell 4B	14,600 pCi/L	148,000 pCi/L

Source: 2013 Annual Wastewater Monitoring Report; Groundwater Quality Discharge Permit UGW370004, White Mesa Uranium Mill, November 2013. Web Access 2013; 2014 Annual Wastewater Monitoring Report; Groundwater Quality Discharge Permit UGW370004, White Mesa Uranium Mill, November 24, 2014. Web Access 2014.

In the 2014 Report, the White Mesa Mill owner explained the observed increase in Gross Radium Alpha activity by correlating it to an increase in total dissolved solids (TDS) and asserting that the increase in both TDS and Gross Radium Alpha were caused by drought conditions and a decrease in the amount of fresh water added to the Mill process. However, past increases in measured concentration of TDS in the White Mesa Mill tailings impoundments have not resulted in the kind of increases in Gross Radium Alpha that were observed between 2013 and 2014, and the White Mesa Mill owner's explanation for the marked increase in Gross Radium Alpha remains speculative.

UPDATED CALCULATION OF ANNUAL MEAN RADON FLUX, WHITE MESA MILL

Using the Gross Radium Alpha content from the 2014 Report, the Tribe was able update its July 2014 initial calculation of the annual mean radon flux for Tailings Cell 1. Using the 2010 EPA Risk Assessment formulas for determining radon emissions and an annual wind speed of 2.7 m/sec collected at the White Mesa Air Monitoring Station, the Tribe also calculated the annual mean radon flux for Tailings Cells 3, 4A, and 4B.

TABLE 2 Initial Calculations of Annual Mean Radon Flux Using 2014 Data

Cell	**2013 Calculated Annual Mean Radon Flux (Initial)**	**2014 Calculated Annual Mean Radon Flux (Initial)**
Cell 1	125.8 pCi/(m^2s)	1,257.4 pCi/(m^2s)
Cell 3	311.1 pCi/(m^2s)*	74.8 pCi/(m^2s)*
Cell 4A	60.0 pCi/(m^2s)*	911.7 pCi/(m^2s)*
Cell 4B	55.5 pCi/(m^2s)	562.2 pCi/(m^2s)

* Calculated Radon Flux for liquid-covered regions of these impoundments

The Tribe believes that additional work assessing the radon flux of these Tailings Cells will likely yield even higher annual mean radon flux numbers for the reasons noted in Section 1.3 of the Calculation Brief.

UPDATED CALCULATED ANNUAL MEAN RADON FLUX AND NON-CONVENTIONAL IMPOUNDMENTS

In the Calculation Brief and in the October 29, 2014 comments, the Tribe urged the EPA to reconsider its finding that a 1-meter liquid cover will reduce radon emissions from liquid covered impoundment "in many cases to almost zero." The Tribe's revised calculations using the 2014 tailings cell chemistry data more clearly demonstrate why the EPA cannot move forward with the Proposed Rule without evaluating control technologies or emissions limits other than a 1-meter liquid cover to address significant emissions off liquid-covered impoundments at the White Mesa Mill.

UPDATED CALCULATED ANNUAL RADON FLUX AND CONVENTIONAL IMPOUNDMENTS

The Tribe's calculations for Tailings Cells 3 and 4A at the White Mesa Mill also raise additional concerns about the efficacy of Method 115 Monitoring for conventional impoundments and about the EPA's assumption that the acreage limitations in the phased disposal work practice standards are adequately controlling radon emissions for conventional impoundments.

Concerns Regarding Method 115 Monitoring for Conventional Impoundments

When facilities like the White Mesa Mill use Method 115 to monitor the radon flux from "existing impoundments", *see* 40 C.F.R. §§ 61.252(a), 61.253, those facilities are currently allowed to assume that the radon flux from liquid-covered regions of the existing, conventional impoundments is zero. Method 115, 2.1.3(a). Section 2.1.7 of Method 115 allows those facilities to calculate the mean radon flux of the conventional impoundment using the total area of the impoundment (including the area of the liquid-covered regions). Section 2.1.3(a)'s assumption of a zero radon flux and 2.1.7's calculation equation including the total impoundment area result in the dilution of the radon flux measured in other regions of the impoundment. When the emissions from the liquid-covered areas of the impoundment are above zero, Sections 2.1.3(a) and 2.1.7 of Method 115 also result in a dilution or a decrease in the mean radon flux for the entire impoundment.

The Tribe's calculation of the radon emissions from the liquid-covered region of Tailings Cell 3 demonstrates that the actual radon emissions from this Tailings Cell, taking into account the measured emissions from the other (dry or saturated) areas of this impoundment and the calculated emissions from any liquid-covered region of the impoundment, are much higher than the emissions reported by the White Mesa Mill owner to the Utah Division of Air Quality. Accordingly, the Tribe requests that, as a part of the EPA's evaluation of emissions from liquid-

covered regions of tailings impoundments, the EPA reconsider Method 115's assumption that liquid-covered regions of conventional impoundments are assumed to have zero emissions.[1]

Concerns Regarding Phased Disposal Work Practice Standard Efficacy

In the Proposed Rule, the EPA assumed that the phased disposal work practice standard acreage limitation was working to control radon emissions from newer conventional impoundments like Tailings Cell 4A at the White Mesa Mill. *See* October 29, 2014 Comments at 17. In the October 2014 Comments, the Tribe asserted that the EPA could not determine whether the 40-acre limitation on tailings impoundments was working to control radon-222 emissions because the current work practice standard does not require Method 115 or other monitoring on these impoundments. However, the Tribe was able to calculate the annual mean radon flux from the liquid in Cell 4A, and that calculation shows that the anticipated annual mean radon flux, at least from the liquid-covered areas of the impoundment, is 911.7 pCi/(m^2s). Accordingly, the Tribe requests that, as a part of the EPA's evaluation of emissions from liquid-covered tailings impoundments, the EPA reconsider whether the 40-acre limitation on tailings impoundments is sufficient—without additional monitoring or measurement of radon emissions—to control radon emissions to 20 pCi/(m^2s) and to control adverse impacts to the environment and human health near these tailings impoundments.

IMMEDIATE CONCERNS ABOUT PUBLIC HEALTH NEAR THE WHITE MESA MILL

When the Tribe performed its initial calculation of the annual radon flux from Tailings Cell 1 using the 2013 tailings cell chemistry data, the Tribe immediately expressed its concern to the EPA that the radon emissions from the White Mesa Mill were at unsafe levels for White Mesa community members and to human health in other areas of southeastern Utah. The drastic increase in the calculated emissions between 2013 and 2014 has elevated the Tribe's concerns about the health and safety of Ute Mountain Ute Tribal members living close to the White Mesa Mill, and the Tribe believes that the EPA should consider taking emergency actions to protect human health and the environment in southeastern Utah.

CONCLUSION

On January 13, 2015, the Tribe sent the EPA administrator a request for a second government-to-government consultation meeting regarding the Subpart W rulemaking activity. At that consultation meeting, the Tribe will expect the EPA to substantively respond to the Tribe's Calculation Brief and to this Supplement. The Tribe looks forward to communicating at a government-to-government level about the important issues raised in the Calculation Brief, the October 2014 Comments, and this Supplement.

[1]The Tribe recognizes that the EPA has proposed removing the 40 C.F.R. § 252(a) "existing impoundment" standard and the 40 C.F.R. § 253 requirement to use Method 115 monitoring. The Tribe has provided public comments urging the EPA to reconsider removing the "existing impoundment" standard and to consider imposing Method 115 monitoring and an emissions standard for conventional tailings impoundments. The Tribe also notes here that the State of Utah is currently requiring the White Mesa Mill to use Method 115 monitoring on Tailings Cell 2, and that this deficiency in Method 115 monitoring may impact monitoring efforts during impoundment and facility closure.

Thornton, Marisa

From: Thornton, Marisa on behalf of Collections.SubW
Sent: Wednesday, March 25, 2015 10:35 AM
To: Thornton, Marisa
Subject: Fw: Oscar Paulson Comments - Subpart W (Rn flux from liquid impoundments)
Attachments: Comment_with_out_copyright_pages.pdf

From: Rosnick, Reid
Sent: Tuesday, March 3, 2015 7:41 AM
To: Collections.SubW
Subject: FW: Oscar Paulson Comments - Subpart W (Rn flux from liquid impoundments)

From: Diaz, Angelique
Sent: Thursday, February 12, 2015 5:03 PM
To: Patefield, Scott
Cc: Rosnick, Reid
Subject: Oscar Paulson Comments - Subpart W (Rn flux from liquid impoundments)

Scott, the attached document has more information on radon flux from liquid impoundments. Check out Appendices 6-8.

I really do wish I could be more involved in helping out on this, but will be having a way better time on maternity leave and when I return I will likely be consumed with NEPA projects.

I'm available until the baby decides otherwise though. ☺

-Angelique

Angelique D. Diaz, Ph.D., P.E.
NEPA Lead Reviewer
USEPA Region 8 (EPR-N)
1595 Wynkoop Street, Denver, CO 80202

(303) 312-6344

Kennecott Uranium Company
42 Miles NW of Rawlins
P.O. Box 1500
Rawlins, WY 82301-1500
USA
T +1 (307) 328 1476
F +1 (307) 324 4925

October 29, 2014

Air and Radiation Docket
Attention: Docket ID No. EPA–HQ–OAR–2008–0218
Environmental Protection Agency
Mail Code: 2822T
1200 Pennsylvania Avenue Northwest
Washington, DC 20460

Gentlemen:

RE: Docket ID No. EPA–HQ–OAR–2008–0218 - Kennecott Uranium Company Comments on Revisions to National Emission Standards for Radon Emissions from Operating Mill Tailings - Federal Register / Volume 79, Number 85 / Friday, May 2, 2014 / Proposed Rules

Kennecott Uranium Company is a uranium recovery licensee (Source Material License SUA-1350) and the owner and operator/ manager of the Sweetwater Uranium Project located in the Great Divide Basin in Sweetwater County, Wyoming. The project contains the Sweetwater Mill (one of only three (3) remaining conventional uranium recovery facilities in the United States) and an associated tailings impoundment, regulated under 40 CFR Part 61 Subpart W, that was constructed prior to December 15, 1989. A Google Earth image of the facility is provided in Appendix 1. The Sweetwater Mill possesses an operating performance based license enabling it to resume operations upon construction of a new tailings impoundment or rehabilitation of the existing one, and construction of up to eight (8) evaporation ponds to manage process water.

Kennecott Uranium Company has reviewed the proposed rule and has the following comments:

Prior Comments

Upon announcement of the rulemaking process to revise 40 CFR Part 61 Subpart W by the Environmental Protection Agency (EPA) on April 28, 2008 at the Joint National Mining Association (NMA)/Nuclear Regulatory Commission (NRC) Uranium Recovery Workshop, Kennecott Uranium Company has participated extensively in the rulemaking process. Specifically, Kennecott Uranium Company has participated in the quarterly conference calls regarding the rulemaking and has submitted extensive comments (842 pages) dated April 25, 2012. These comments are included by reference and are linked to the Environmental Protection Agency's (EPA's) Subpart Part W Rulemaking page, http://www.epa.gov/radiation/neshaps/subpartw/rulemaking-activity.html.

In addition, the Facility Supervisor of the Sweetwater Uranium Project has, at the behest and on behalf of the National Mining Association (NMA), discussed the proposed rulemaking and issues regarding radon emissions from tailings impoundments and fluid retention impoundments with members of Office of Management and Budget (OMB) staff at a meeting in Washington, D.C. that was attended by the General Counsel of the National Mining Association (NMA), outside counsel for the National Mining Association (NMA) and members of Environmental Protection Agency (EPA) staff.

The Facility Supervisor of the Sweetwater Uranium Project also prepared the protocols for and analyzed and presented the data on radon flux rates from research work conducted by a contract laboratory that was funded by the National Mining Association (NMA) on radon fluxes from fluid surfaces. The result of this research work was presented at the 2012 National Mining Association (NMA)/Nuclear Regulatory Commission (NRC) Uranium Recovery Workshop held in Denver, Colorado, and is available on the Environmental Protection Agency's (EPA's) Subpart Part W Rulemaking page, http://www.epa.gov/radiation/neshaps/subpartw/rulemaking-activity.html and is included in Appendix 9.

The Facility Supervisor has also testified regarding the above described research at the 40 CFR Part 61 Subpart W hearing in Denver, Colorado on Wednesday, September 7, 2014.

Specific Regulatory History Regarding the Sweetwater Uranium Project and the Associated Tailings Impoundment

The Sweetwater Uranium Project has a pre December 15, 1989, partially below grade, grandfathered tailings impoundment that exceeds forty (40) acres in surface area at the top of the embankment. It is depicted in the Google Earth image, panoramas and the drawing provided in Appendix 2.

The Sweetwater Uranium Project possesses an operating performance based source material license SUA-1350 ADAMS (Accession Number: ML13217A065) http://www.nrc.gov/site-help/search.cfm?q=ML13217A065&s for the Sweetwater Mill and tailings impoundment. A current copy of this license is included in Appendix 3.

This license (License Condition 10.3) permits the immediate construction of one (1) new forty (40) acre tailings impoundment and up to eight (8) ten (10) acre evaporation ponds, and the eventual construction of up to five (5) additional forty (40) acre tailings impoundments and two (2) additional ten (10) acre evaporation ponds, as stated below:

> *The licensee is currently authorized to construct up to eight evaporation ponds and one new impoundment. An additional two evaporation ponds and an additional five impoundments, as described in the above documents, may be constructed after: 1) notification of NRC; 2) submittal of data confirming the proposed design; and 3) an increase in the surety amount, based on the NRC approved cost estimate for reclaiming the additional structures.*

In addition, this license permits the facility to resume operations upon a ninety (90) day notice to the Nuclear Regulatory Commission (NRC). License Condition 9.4 that states in part:

> *The NRC shall be notified at least ninety (90) days prior to any planned resumption of uranium milling operations.*

The facility is in its fourth, five (5) year term of the suspension of imposition of the requirements of Timeliness in Decommissioning (as per *10 CFR Part 40.42 Expiration and termination of licenses and decommissioning of sites and separate buildings or outdoor areas*). In a letter approving one of the five (5) year terms of suspension of the requirements of Timeliness in Decommission it was stated that:

> *"Maintaining the standby status of the Sweetwater mill is in the public interest, because it is the only conventional mill in Wyoming and only one of four conventional mills in the United States." USNRC, October 4, 2011*

At this point in time only three (3) conventional uranium mills, including the Sweetwater Mill remain in the United States.

The existing pre December 15, 1989 impoundment, which at the embankment crest encompasses an area larger than forty (40) acres, may be used in the future for the disposal of 11(e).2 byproduct material including uranium mill tailings as per the letter from the Environmental Protection Agency (EPA) dated March 21, 1996 included in Appendix 4.

This letter specifically allows the existing impoundment to be used in the future in spite of the fact that its area at the embankment crest exceeds forty (40) acres and a second forty (40) acre impoundment to be constructed and operated concurrently with it, when it states:

> *Your September 15, 1995, correspondence proposes to level tailings within the existing impoundment, install a new liner system with leak detection capability, and then place the impoundment back into use upon the commencement of milling operations. Your interpretation of 40 CFR Part 61 Subpart W would retain this unit under the definition of "Existing impoundment" as referenced by 61.250(d). This interpretation would allow of the construction and use of one additional impoundment per 61.252(b) (1).*
>
> *This office concurs with your interpretation of the referenced regulations.*

The Sweetwater Uranium Project possess prior valid approvals, from both the Nuclear Regulatory Commission (NRC) in the form of a license amendment permitting the immediate construction in accordance with already approved designs of one new forty (40) acre tailings impoundment and eight (8) ten (10) acre evaporation ponds, and from the Environmental Protection Agency (EPA) to use the existing tailings impoundment which exceeds forty (40) acres at the embankment crest upon regrading and relining in addition to a newly constructed forty (40) acre impoundment. Kennecott Uranium Company also wants to state that the tailings in the existing impoundment have already been regraded in 2007 and 2008 in anticipation of future use of the facility.

Kennecott Uranium Company (KUC) is relying upon these existing valid approvals. KUC is requesting that in any final rule, clear and unambiguous language be included to ensure that such pre-existing approvals and commitments remain valid and will be honored.

Appendix 5 - *Application of United States Environmental Protection Agency 40 CFR Part 61, Subpart W Regulations to Uranium Recovery Facilities*

Included in Appendix 5 is a document entitled *Application of United States Environmental Protection Agency 40 CFR Part 61, Subpart W Regulations to Uranium Recovery Facilities* prepared by the law firm of Thompson and Pugsley, PLLC. Kennecott Uranium Company has thoroughly reviewed this document and conferred with those responsible with its preparation. Kennecott Uranium Company concurs with the conclusions of this document, specifically that this rulemaking is unnecessary. However, if the Environmental Protection Agency chooses to proceed with this rulemaking Kennecott Uranium Company offers the comments provided below.

Definition of 11(e).2 Byproduct Material

While the above comments relate to prior comments of Kennecott Uranium Company and the Sweetwater Uranium Project, the following comment is the first of several additional comments related to the proposed rule.

The current version of 40 CFR Part 61 Subpart W defines 11(e).2 byproduct material as follows. 40 CRFR § 61.251 Definitions (g) states:

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

The current version of 40 CFR Part 192 Subpart D *(STANDARDS FOR MANAGEMENT OF URANIUM BYPRODUCT MATERIALS PURSUANT TO SECTION 84 OF THE ATOMIC ENERGY ACT OF 1954, AS AMENDED) 40 CFR § 192.31 Definitions and cross-references*, states:

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

The Environmental Protection Agency's (EPA's) definitions in 40 CFR Part 61 Subpart W and 40 CFR Part 192 Subpart D are not identical. One definition (the one in 40 CFR part 61 Subpart W) appears to equate byproduct material and tailings as being the same thing while the one in 40 CFR Part 192 does not.

Nuclear Regulatory Commission (NRC) regulations define 11(e).2 byproduct material as follows:
10 CFR § 40.4 Definitions states:

> Byproduct Material *means the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content, including discrete surface wastes resulting from uranium solution extraction processes. Underground ore bodies depleted by such solution extraction operations do not constitute "byproduct material" within this definition.*

Neither Environmental Protection Agency (EPA) definition is identical to the Nuclear Regulatory Commission's (NRC's) definition.

The Uranium Mill Tailings Radiation Control Act (UMTRCA) *PUBLIC LAW 95-604—NOV. 8, 1978 (Title II Uranium Mill Tailings Licensing and Regulation), Definitions*, defines byproduct material as follows:

> *The term 'byproduct material' means (1) any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material, and (2) the tailings or wastes produced by the extraction or concentration or uranium or thorium from any ore processed primarily for its source material content*

Kennecott Uranium Company recommends that the definition of 11(e) 2 byproduct material used in 40 CFR Part 61 Subpart W be identical to the Nuclear Regulation Commission's regulation at10 CFR § 40.4 since that definition clearly and appropriately and includes *discrete surface wastes resulting from uranium solution extraction processes* and specifies *thorium.*

40 CFR Part 192 is also undergoing revision and the proposed rule has completed mandatory review by the Office of Management and Budget (OMB) on September 26, 2014. (http://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201404&RIN=2060-AP43), However, a proposed rule has not been released for public comment. Kennecott Uranium Company also recommends that the definition in the proposed rulemaking for 40 CFR Part 192 be identical to the Nuclear Regulatory Commission's definition at 10 CFR § 40.4 as well.

Kennecott Uranium Company maintains that regulations must be clear, consistent and unambiguous. Different agencies should not have different definitions for the same material nor should a material be defined differently in two (2) different regulations prepared by the same agency.

Jurisdictional Authority of the Environmental Protection Agency (EPA) over Fluid Retention Impoundments at Licensed Uranium Recovery Facilities

Included in Appendix 5 is a document entitled *Application of United States Environmental Protection Agency 40 CFR Part 61, Subpart W Regulations to Uranium Recovery Facilities* prepared by the law firm of Thompson and Pugsley, PLLC. Kennecott Uranium Company has thoroughly reviewed this document and conferred with those responsible with its preparation and agrees with its conclusions.
The proposed 40 CFR Part 61 Subpart W rulemaking's preamble states with regard to fluid retention impoundments:

> *"... that these impoundments meet the design and construction requirements of 40 CFR 192.32(a)(1), with no size/area restriction, and that during the active life of the pond at least one meter of liquid be maintained in the pond. "*
> Source: Federal Register / Volume 79, Number 85 / Friday, May 2, 2014 / Proposed Rules page 25398

Kennecott Uranium Company does not believe that the Environmental Protection Agency has the legal authority to regulate fluid retention impoundments at licensed uranium recovery facilities. Appendix 5 contains a document entitled *Application of United States Environmental Protection Agency 40 CFR Part 61, Subpart W Regulations to Uranium Recovery Facilities***.** This document was prepared for the National Mining Association (NMA) by the law firm of Thompson and Pugsley and has been submitted previously to the Environmental Protection Agency (EPA). Kennecott Uranium Company concurs with the conclusions of this document. This document reviews the history of 40 CFR Part 61 Subpart W and concludes by stating:

> *Therefore, based on the foregoing discussion, it appears that EPA's 40 CFR Part 61, Subpart W work practice standards do not apply to evaporation ponds at uranium recovery facilities.*

Kennecott Uranium Company concurs with this interpretation.

40 CFR Part 61 Subpart W is a National Emission Standard for a Hazardous Air Pollutant (NESHAP) promulgated under the clean air act. The preamble to the proposed rule states:

> *EPA promulgated 40 CFR part 61, Subpart W, ''National Emission Standards for Radon Emissions From Operating Mill Tailings,'' (''Subpart W'') on December 15, 1989. EPA is conducting this review of Subpart W under CAA section 112(q)(1) to determine what revisions, if any, are appropriate. Section 112(d) of the CAA requires EPA to establish emission standards for major and area source categories that are listed for regulation under CAA section 112(c). A major source is any stationary source that emits or has the potential to emit 10 tons per year (tpy) or more of any single hazardous air pollutant (HAP) or 25 tpy or more of any combination of HAP. An area source is a stationary source of HAP that is not a major source. For the purposes of Subpart W, the HAP at issue is radon 222 (hereafter referred to as ''radon'').*

The inclusion of the reference to 40 CFR Part 192.32(a) in the proposed rule does not in any way impact the emission of a hazardous air pollutant from an area source under Section 112(d) of the CAA. It is related to groundwater protection and as such is not appropriate in the preamble to 40 CFR Part 61 Subpart W.

In addition, the preamble states:

> *The HAP emissions from any type of uranium recovery facility that manages uranium byproduct material or tailings is subject to regulation under Subpart W.*
> Source: Federal Register / Volume 79, Number 85 / Friday, May 2, 2014 / Proposed Rules page 25390

The inclusion of the reference to 40 CFR Part 192.32(a) in the proposed rule to fluid retention impoundments exceeds the mandate of addressing the "…*HAP emissions from any type of uranium recovery facility that manages uranium byproduct material or tailings…"*

Kennecott Uranium Company questions the appropriateness of including groundwater protection requirements in a National Emission Standard for a Hazardous Air Pollutant (NESHAP) promulgated under the Clean Air Act (CAA) section 112(q)(1) since it does not affect air pollution.

Need for a Revised Rule

This rulemaking proposes revisions to the existing rule (40 CFR Part 61 Subpart W. Kennecott Uranium Company questions the need to retain 40 CFR Part 61 Subpart W at all.

As per *Application of United States Environmental Protection Agency 40 CFR Part 61, Subpart W Regulations to Uranium Recovery Facilities* prepared by the law firm of Thompson and Pugsley and included in Appendix 5:

> *"…NRC has preemptive regulatory authority to address the potential radiological hazards associated with AEA licensed facilities, including uranium recovery facilities, their tailings impoundments, evaporation ponds, and other site facilities."*

It continues by stating:

> *"…in 2000, the Commission determined that the OELD opinion should be overturned and that the Commission, indeed, exercises exclusive jurisdiction over both the radiological and non-radiological aspects of 11e. (2) Byproduct material. As a result, implementation and enforcement of relevant AEA regulatory programs for licensed uranium recovery operations is under the exclusive authority of NRC and it's Agreement States, including mill facility construction and operations, tailings impoundment construction, operations, and final closure, and associated uranium recovery facilities such as evaporation ponds."*

STAFF REQUIREMENTS – SECY-99-0277 – CONCURRENT JURISDICTION OF NON-RADIOLOGICAL HAZARDS OF URANIUM MILL TAILINGS is included in Appendix 10 and unambiguously states:

> *The Commission has determined that NRC has exclusive jurisdiction over both the radiological and non-radiological hazards of such material.*

Given that "…*the Commission, indeed, exercises exclusive jurisdiction over both the radiological and non-radiological aspects of 11e.(2) byproduct material…",* the content of this rulemaking, if indeed required and promulgated, could be included in current Nuclear Regulatory Commission (NRC) regulations. There is adequate precedent to do precisely this and is as follows:

40 CFR Part 61 Subpart I

40 CFR Part 61Subpart I was a subpart of the National Emissions Standards for hazardous Air pollutants (NESHAPS) that was rescinded on Monday, December 30, 1996 (Federal Register / Volume 61 Number: 251 / Monday, December 30, 1996 / Rules and Regulations). This rule was rescinded because the Nuclear Regulatory Commission (NRC) instituted a constraint limit that afforded similar levels of protection in:

10 CFR 20.1101(d) which states:

> *d) To implement the ALARA requirements of § 20.1101 (b), and notwithstanding the requirements in § 20.1301 of this part, a constraint on air emissions of radioactive material to the environment, excluding Radon-222 and its daughters, shall be established by licensees other than those subject to § 50.34a, such that the individual member of the public likely to receive the highest dose will not be expected to receive a total effective dose equivalent in excess of 10 mrem (0.1 mSv) per year from these emissions. If a licensee subject to this requirement exceeds this dose constraint, the licensee shall report the exceedance as provided in § 20.2203 and promptly take appropriate corrective action to ensure against recurrence.*

This simple addition to 10 CFR Part 20 enabled an entire subpart (Subpart I) of the National Emissions Standards for Hazardous Air Pollutants (NESHAPS) to be rescinded. This change occurred almost eighteen (18) years ago and has been a success.

40 CFR Part 61 Subpart T

40 CFR Part 61 Subpart T was a subpart of the National Emissions Standards for Hazardous Air Pollutants (NESHAPS) that was also rescinded. It set radon emission (flux) standards for reclaimed conventional uranium mill tailings impoundments. It was rescinded on Friday, July 15, 1994 (Federal Register/ Volume 59, Number: 135/Friday, July 15, 1994/Rules and Regulations) and replaced with additional regulations in 10 CFR part 40 Appendix A Criterion 6.

This subpart was rescinded because:

> *Overall, NRC's implementation criteria set forth a rigorous program governing the reclamation of the disposal sites so that closure will (1) last for 1,000 years to the extent reasonable, but in any event at least 200 years, and (2) limit radon release to 20 pCi/m 2-s throughout that period. The design must be able to withstand extreme weather and other natural forces. Upon review, EPA believed the NRC criteria comprise a comprehensive response to EPA's general standards at 40 CFR Part 192, subpart D.*

and because the Nuclear Regulatory Commission (NRC):

> *"... approved final amendments conforming 10 CFR part 40, appendix A to 40 CFR part 192, subpart D. The final regulations adopted by NRC amend Criterion 6, add a new Criterion 6A and new definitions contained in the Introduction to appendix A. Criterion 6 was revised to provide for appropriate verification that the "final" (or "permanent" as defined by EPA) radon barrier, as designed and constructed, is effective in controlling releases of radon-222 to a level no greater than 20 pCi/m 2-s when averaged over the entire pile or impoundment. Criterion 6(2) (59 FR 8220, June 1, 1994). The licensee must use EPA Method 115, or another method approved by the NRC as being at least as effective in demonstrating the effectiveness of the "final" radon barrier."*

As with the rescission of 40 CFR Part 61 Subpart I, this rescission has worked well for the past twenty (20) years.

It appears that given the limited scope of 40 CFR Part 61 Subpart W (uranium recovery), the presence of a comprehensive Nuclear Regulatory Commission (NRC) regulation scheme for uranium recovery 40 CFR Part 61 and that "…*the Commission, indeed, exercises exclusive jurisdiction over both the radiological and non-radiological aspects of 11e.(2) byproduct material",* Subpart W could be rescinded as well upon promulgation of Nuclear Regulatory Commission (NRC) conforming regulations especially given the fact that the requirement for annual Method 115 Testing for pre-December 15, 1989 impoundments has been eliminated simplifying the regulation .

Conflicts with Existing Nuclear Regulatory Commission (NRC) Regulations

The Nuclear Regulatory Commission (NRC) is a risk informed agency that promulgates its rules upon careful consideration of the facts as well as the incorporation of the As Low As Reasonably Achievable (ALARA) principal. These proposed revisions conflict with existing Nuclear Regulatory Commission (NRC) regulations.

Specifically, the proposed regulations for fluid impoundments contain requirements that concern compliance with 40 CFR Part 192.32. Specifically the preamble to the rulemaking states:

"... that these impoundments meet the design and construction requirements of 40 CFR 192.32(a)(1), with no size/area restriction, and that during the active life of the pond at least one meter of liquid be maintained in the pond."

Current Nuclear Regulatory Commission (NRC) regulations (10 CFR Part 40 Appendix A Criterion 5) requires surface impoundments to have a liner, stating:

5A(1)—The primary ground-water protection standard is a design standard for surface impoundments used to manage uranium and thorium byproduct material. Unless exempted under paragraph 5A(3) of this criterion, surface impoundments (except for an existing portion) must have a liner that is designed, constructed, and installed to prevent any migration of wastes out of the impoundment to the adjacent subsurface soil, ground water, or surface water at any time during the active life (including the closure period) of the impoundment. The liner may be constructed of materials that may allow wastes to migrate into the liner (but not into the adjacent subsurface soil, ground water, or surface water) during the active life of the facility, provided that impoundment closure includes removal or decontamination of all waste residues, contaminated containment system components (liners, etc.), contaminated subsoils, and structures and equipment contaminated with waste and leachate. For impoundments that will be closed with the liner material left in place, the liner must be constructed of materials that can prevent wastes from migrating into the liner during the active life of the facility.

5A(2)—The liner required by paragraph 5A(1) above must be—

(a) Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the waste or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation;

(b) Placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression, or uplift; and

(c) Installed to cover all surrounding earth likely to be in contact with the wastes or leachate.

40 CFR Part 192.32(a)(1) differs in that it states:

(a) Standards for application during processing operations and prior to the end of the closure period. (1) Surface impoundments (except for an existing portion) subject to this subpart must be designed, constructed, and installed in such manner as to conform to the requirements of § 264.221 of this chapter, except that at sites where the annual precipitation falling on the impoundment and any drainage area contributing surface runoff to the impoundment is less than the annual evaporation from the impoundment, the requirements of § 264.228(a)(2) (iii)(E) referenced in § 264.221 do not apply

40 CFR Part 264.221(c) states:

(c) The owner or operator of each new surface impoundment unit on which construction commences after January 29, 1992, each lateral expansion of a surface impoundment unit on which construction commences after July 29, 1992 and each replacement of an existing surface impoundment unit that is to commence reuse after July 29, 1992 must install two or more liners and a leachate collection and removal system between such liners.

"Construction commences" is as defined in § 260.10 of this chapter under "existing facility".

(i) The liner system must include:

(A) A top liner designed and constructed of materials (e.g., a geomembrane) to prevent the migration of hazardous constituents into such liner during the active life and post-closure care period; and

(B) A composite bottom liner, consisting of at least two components. The upper component must be designed and constructed of materials (e.g., a geomembrane) to prevent the migration of hazardous constituents into this component during the active life and post-closure care period. The lower component must be designed and constructed of materials to minimize the migration of hazardous constituents if a breach in the upper component were to occur. The lower component must be constructed of at least 3 feet (91 cm) of compacted soil material with a hydraulic conductivity of no more than 1×10−7 cm/sec.

(ii) The liners must comply with paragraphs (a) (1), (2), and (3) of this section.

Kennecott Uranium Company does not believe that the additional requirements for fluid retention impoundments imposed by the imposition of 40 CFR Part 192.32(a)(1) and by extension, 40 CFR part 264.221(c), are justified. Certainly the Nuclear Regulatory Commission (NRC) does not believe so or they would explicitly reference 40 CFR Part 192.32(a)(1) and by extension 40 CFR part 264.221(c) in 10 CFR 40 Appendix A. They do not.

Radon Releases for Fluid Retention Impoundments

Kennecott Uranium Company agrees with the statement in the preamble that states:

"Our survey of existing ponds shows that they contain liquids, and, as such, this general practice has been sufficient to limit the amount of radon emitted from the ponds, in many cases, to almost zero. Because of the low potential for radon emissions from these impoundments, we do not believe it is necessary to monitor them for radon emissions".

This is clearly demonstrated in the following documents:

- Appendix 38 of Kennecott Uranium Company's previously submitted Comments on the Review of 40 CFR Part 61 Subpart W – April 25, 2012 which is included in Appendix 6 of this document.
- Presentation entitled *Radon Emissions from Tailings* dated July 2, 2009 by Dr. Douglas Chambers included in Appendix 7 of this document.
- Presentation entitled *Radon Flux from Evaporation Ponds* – A presentation by Kenneth R. Baker PhD and Alan D. Cox included in Appendix 8 of this document
- Presentation entitled *Experimental Determination of Radon Fluxes over Water* by Oscar Paulson on behalf of the National Mining Association (NMA) included in Appendix 9 of this document.
- Review of Standards for Uranium and Thorium Milling facilities @ 40 CFR Part 61 and 192 – Steve Brown, SENES Consultants Ltd – November 7, 2010 included in Appendix 11 of this document.

Elimination of the Requirements to Measure Radon Fluxes from Pre-December 1989 Conventional Mill Tailings Impoundments

The preamble states:

We concluded that the original work practice standards (now proposed as GACT) continue to be an effective practice for the limiting of radon emissions from conventional impoundments and from heap leach piles. We also concluded that by maintaining an effective water cover on non-conventional impoundments the radon emissions from those impoundments are so low as to be difficult to differentiate from background radon levels at uranium recovery facilities. Therefore, we are proposing today that it is not necessary to require radon monitoring for any affected sources regulated under Subpart W.
Source: Federal Register / Volume 79, Number 85 / Friday, May 2, 2014 / Proposed Rules page 25399.

Kennecott Uranium Company concurs with this conclusion and agrees that Method 115 Tests should no longer be required. There is only a single operating (Subpart W) tailings impoundment in Wyoming (Kennecott Uranium Company's impoundment) and it has never exceeded the 20 pCi/m2-sec radon flux limit. Radon emission from this impoundment is minimal and at or below background for the area in which it was constructed. Long term fluxes from the Sweetwater Uranium Project's impoundment are below average background for the Great Divide Basin in which the impoundment is situated. The historic radon flux rates are presented in the table below:

	Average Impoundment Flux	Area Used		
Test Date	pCi/m2-sec	Tailings	Pool	Total
		Square Meters		
August 7, 1990	9.00	74,000.0	90,400.0	164,400.0
August 13, 1991	5.10	78,543.0	85,857.0	164,400.0
August 5, 1992	5.60	86,330.0	78,070.0	164,400.0
August 24, 1993	5.00	83,413.8	80,986.2	164,400.0
August 23, 1994	5.00	91,688.8	72,711.2	164,400.0
August 15, 1995	3.59	98,339.9	66,060,1	164,400.0
August 13, 1996	5.47	101,689.4	62,710.6	164,400.0
August 26, 1997	4.23	94,729.0	66,366.6	161,095.6
August 11, 1998	2.66	98,858.9	62,236.7	161,095.6
August 10, 1999	1.27	87,776.9	72,706.3	160,483.2
August 8, 2000	4.05	85,122.4	75,360.8	160,483.2
August 14, 2001	6.98	92,172.2	68,311.0	160,483.2
August 13, 2002	4.10	100,144.6	60,338.6	160,483.2
August 12, 2003	7.11	100,119.2	60,364.0	160,483.2
August 17, 2004	6.38	98,525.8	61,957.4	160,483.2
August 16, 2005	7.63	114,566.5	46,053.2	160,619.7
August 15, 2006	3.37	111,976.5	47,469.6	159,446.1
August 13, 2007	6.01	114,687.9	47,550.6	162,238.5
August 5, 2008	4.59	108,010.6	62,888.1	170,898.7
July 30, 2009	1.60	44,312.7	112,097.1	156,409.8
August 10, 2010	1.44	32,244.4	124,577.1	156,821.5
August 9, 2011	2.17	32,253.5	125,209.7	157,463.2
July 31, 2012	4.31	57,141.6	100,321.6	157,463.2
July 30, 2013	8.48	61,228.9	96,234.3	157,463.2
August 7, 2014	8.97	64,640.5	92,808.2	157,448.7

Discussion in the Preamble Specific to the Sweetwater Uranium Project's Tailings Impoundment

The Preamble to the rulemaking specifically discusses Kennecott Uranium Company's Sweetwater Uranium Project's tailings impoundment stating:

> *The Sweetwater conventional mill is located 42 miles northwest of Rawlins, Wyoming. The mill operated for a short time in the 1980s and is currently in standby status. Annual radon values collected by the facility indicate that there is little measurable radon flux from the mill tailings that are currently in the lined impoundment. This monitoring program remains active at the facility. According*

> *to company records, of the 37 acres of tailings, approximately 28.3 acres of tailings are covered with soil; the remainder of the tailings are continuously covered with water. The dry tailings have an earthen cover that is maintained as needed. During each monitoring event one hundred radon flux measurements are taken on the tailings continuously covered by soil, as required by Method 115 for compliance with Subpart W. The mean radon flux for the exposed tailings over the past 21 years was 3.5 pCi/m 2/sec. The radon flux for the entire tailings impoundment was calculated to be 6.01 pCi/m 2/sec. The calculated radon flux from the entire tailings impoundment surface is thus approximately 30% of the 20.0 pCi/m 2/sec standard.*

Kennecott Uranium Company would like to clarify one statement in this text and address an error in the text as well.

When the text states, "…*approximately 28.3 acres of tailings are covered with soil…"* and "*The dry tailings have an earthen cover that is maintained as needed."* It should be understood that the soil or earthen cover that does cover some of the actual mill tailings is not just soil but is in fact 11(e).2 byproduct material that was excavated in the course of a soil remediation project conducted on site from December 2005 to October 2007 that involved the excavation of 233,268 cubic yards of 11(e).2 byproduct material in the form of contaminated soils and placement of that material over the existing tailings in the impoundment.

The error in the text involves the radon flux rate. The preamble states:

> *The mean radon flux for the exposed tailings over the past 21 years was 3.5 pCi/m 2/sec. The radon flux for the entire tailings impoundment was calculated to be 6.01 pCi/m 2/sec. The calculated radon flux from the entire tailings impoundment surface is thus approximately 30% of the 20.0 pCi/m 2/sec standard.*

These values are incorrect. The flux values for the entire impoundment (dry and water covered areas) from 1990 to 2013 are as follows:

Sweetwater Uranium Project Method 115 Test Results Fluxes for Entire Impoundment	
Date	**Flux Rate (pCi/m2-sec)**
August 7, 1990	9.00
August 13, 1991	5.10
August 5, 1992	5.60
August 24, 1993	5.00
August 23, 1994	5.00
August 15, 1995	3.59
August 13, 1996	5.47
August 26, 1997	4.23
August 11, 1998	2.66
August 10, 1999	1.27
August 8, 2000	4.05
August 14, 2001	6.98
August 13, 2002	4.10
August 12, 2003	7.11
August 17, 2004	6.38
August 16, 2005	7.63
August 15, 2006	3.37
August 13, 2007	6.01
August 5, 2008	4.59
July 30, 2009	1.60
August 10, 2010	1.44
August 9, 2011	2.17
July 31, 2012	4.31
July 30, 2013	8.48
Average:	4.80

The preamble mentions "…*the past 21 years"* and for that period the flux is incorrect as well. The flux from the entire impoundment (dry plus water covered areas) was 4.77 pCi/M2-sec for the twenty-one (21) year period from August 1990 to August 2010.

The preamble continues discussing the tailings impoundment at the Sweetwater Uranium Project stating:

> *We believe that the existing conventional impoundments at both the Shootaring Canyon and Sweetwater facilities can meet the work practice standards in the current Subpart W regulation. The conventional impoundments at both these facilities are less than 40 acres in area and are synthetically lined as per the requirements in 40 CFR 192.32(a).*

The impoundment at the Sweetwater Uranium Project is not less than forty (40) acres in area. The 2013 surveyed area covered by 11(e).2 byproduct material in the impoundment is 157,448.7 square meters (38.91 acres). This is not however the total area of the impoundment. The impoundment was never filled to capacity having only been filled with 2.5 million tons of tailings when the mill ceased operating on April 15, 1983. Thus the 11(e).2 byproduct material subject to radon flux measurements resides on 38.91 acres on the impoundment bottom. This configuration is clearly visible on the map and Google Earth image included in Appendix 2. The actual area at the top of the embankment (the level to which the impoundment would have been filled had the facility continued to operate) is 61.49 acres. Kennecott Uranium Company wishes to remind the agency that this impoundment at its total size is grandfathered

as per the letter dated March 21, 1996 from the Environmental Protection Agency (EPA) included in Appendix 4.

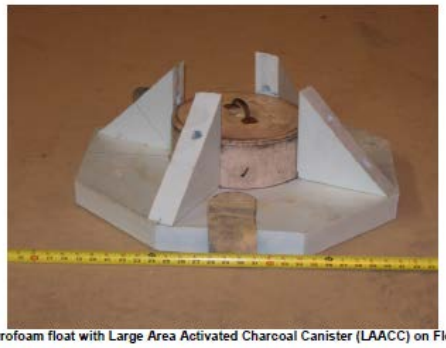
Methodologies for Measuring Radon Fluxes over Water

The preamble states:

> *We are also proposing that no monitoring be required for this type of impoundment. We have received information and collected data that show there is no acceptable radon flux test method for a pond holding a large amount of liquid. (Method 115 does not work because a solid surface is needed to place the large area activated carbon canisters used in the Method). Further, even if there was an acceptable method, we recognize that radon emissions from the pond would be expected to be very low because the liquid acts as an effective barrier to radon emissions;*
> Source: Federal Register / Volume 79, Number 85 / Friday, May 2, 2014 / Proposed Rules page 25398

Kennecott Uranium Company agrees with the statement that *no monitoring be required for this type of impoundment* and that *radon emissions from the pond would be expected to be very low because the liquid acts as an effective barrier to radon emissions*; The preamble continues by stating that *there is no acceptable radon flux test method for a pond holding a large amount of liquid. (Method 115 does not work because a solid surface is needed to place the large area activated carbon canisters used in the Method).",* Homestake Mining Company of California, Kennecott Uranium Company, and Energy Laboratories, Inc. successfully conducted tests to gather data on radon emissions from fluid surfaces using Large Area Activated Charcoal Canisters (LAACCs) using a modified version of Method 115. These tests successfully gathered valuable radon emission data. The images below clearly show the application of Method 115 to fluid surfaces:

Method 115 Large Area Activated Charcoal Canister (LAACC) adapted to float on fluid surfaces (Homestake Mining of California)



Styrofoam float with Large Area Activated Charcoal Canister (LAACC) on Floor

Styrofoam float with Large Area Activated Charcoal Canister (LAACC) Floating in Lagoon Tied to Anchors

Method 115 Large Area Activated Charcoal Canister (LAACC) adapted to float on fluid surfaces (Kennecott Uranium Company)

Large Area Activated Charcoal Canister (LAACC) Equipped with Float

Large Area Activated Charcoal Canister (LAACC) Floating in Water Filled Barrel

Large Area Activated Charcoal Canister Adapted to Float on Water (Energy Laboratories, Inc.)

Requirement for a Minimum of One (1) Meter of Fluid in a Fluid Retention Pond

The proposed rule in 40 CFR 61.225(b) states:

> *(b) The owner or operator of any uranium recovery facility with nonconventional impoundments must maintain records that include measurements confirming that one meter of liquid has been maintained in the nonconventional impoundments at the facility.*

The preamble states:

> *We are proposing that these nonconventional impoundments (the evaporation or holding ponds) must maintain a liquid level in the impoundment of no less than one meter at all times during the operation of the impoundment. Maintaining this liquid level will ensure that radon-222 emissions from the uranium byproduct material in the pond are minimized. We are also proposing that there is no maximum area requirement for the size of these ponds since the chance of radon emissions is small. Our basis for this determination is that radon emissions from the pond will be expected to be very low since the liquid in the ponds acts as an effective barrier to radon emissions; given that radon-222 has a very short half-life (3.8 days), there simply is not enough time for approximately 98% of the radon produced by the solids or from the solution to migrate to the water surface and cross the water/air interface before decaying.*
> *By requiring a minimum of one meter of water in all nonconventional impoundments that contain uranium byproduct material, the release of radon from these impoundments would be greatly reduced. Nielson and Rogers (1986) present the following equation for calculating the radon attenuation:*
>
> *Where:*
> *A = Radon attenuation factor (unit less)*
> *l = Radon-222 decay constant (sec¥1)*
> *= 2.1×10¥6 sec¥1*
> *D = Radon diffusion coefficient (cm2/sec)*
> *= 0.003 cm2/sec in water*
> d = Depth of water (cm)
> *= 100 cm*

$$A = e^{\left(-\left[\frac{\lambda}{D}\right]^{0.5} d\right)}$$

> *The above equation indicates that the attenuation of radon emanation by water (i.e., the amount by which a water cover will decrease the amount of radon emitted from the impoundment) depends on how quickly radon-222 decays, how quickly radon-222 can move through water (the diffusion coefficient), and the thickness of the layer of water. Solving the above equation shows that one meter of water has a radon attenuation factor of about 0.07. That is, emissions can be expected to be reduced by about 93% compared to no water cover.*
>
> *The benefit incurred by this requirement is that significantly less radon will be released to the atmosphere. The amount varies from facility to facility based on the size of the nonconventional impoundment, but across existing facilities radon can be expected to be reduced by approximately 24,600 curies, a decline of approximately 93%.*

Large depths (over one (1) meter) of water are not required to reduce radon fluxes. The image below shows a floating Large Area Activated Charcoal Canister (LAAC) unit floating in relatively shallow (approximately two (2) feet deep) water (note that the device's anchors are clearly visible).

Styrofoam float with Large Area Activated Charcoal Canister (LAACC) Floating in Lagoon Tied to Anchors

The measured fluxes for these detectors are provided in Appendix 6 and are uniformly low. One (1) meter of water is not required and this is shown by actual testing as opposed to calculation.

The requirement to maintain a minimum of one (1) meter of water is poor practice since it reduces operational flexibility, may interfere with minimum freeboard requirements and actually reduce evaporation rates in that evaporation rates are higher in shallower ponds since the sun is capable of heating shallower water in ponds lined with black liner to higher temperatures than deep water ponds. Kennecott Uranium Company recommends that fluid depths in fluid retention impoundments be at the discretion of the operator in order to maximize evaporation rates while complying with any existing minimum freeboard requirements.

Requirements for Heap Leach Piles

The proposed rule states:

> *(c) Heap Leach Piles. Heap leach piles shall comply with the phased disposal management practice in 40 CFR 61.252(a)(1)(i). Heap leach piles shall be constructed in lined impoundments that are no more than 40 acres in area and shall comply with the requirements of 40 CFR 192.32(a)(1). The owner or operator shall have no more than two heap leach piles, including existing heap leach piles, in operation at any one time. The moisture content of heap leach piles shall be maintained at 30% or greater. The moisture content shall be determined on a daily basis, and performed using generally accepted geotechnical methods. The moisture content requirement shall apply during the heap leach pile operational life.*

The proposed rule defines heap leach piles as follows:

> *(j) Heap Leach Pile. A heap leach pile is a pile of uranium ore placed on an engineered structure and stacked so as to allow uranium to be dissolved and removed by leaching liquids.*

The preamble states:

> *The final affected source type for which we are proposing GACT standards is heap leach piles. While there are currently no operating uranium heap leach facilities in the United States, we are proposing to regulate the HAP emission at any future facilities using this type of uranium extraction under Subpart W since the moment that uranium extraction takes place in the heap, uranium byproduct materials are left behind. During the process of uranium extraction on a heap, as the acid drips through the ore, uranium is solubilized and carried away to the collection system where it is further processed. At the point of uranium movement out of the heap, what remains is uranium byproduct materials as defined by 40 CFR 61.251(g). In other words, what remains in the heap is the waste produced by the extraction or concentration of uranium from ore processed primarily for its source*

material content. Thus, Subpart W applies because uranium byproduct materials are being generated during and following the processing of the uranium ore in the heap.

As a result, we are proposing GACT standards for heap leach piles. We are proposing that these piles conform to the phased disposal work practice standard specified for conventional impoundments in 40 CFR 61.252(a)(1)(i)(which limits the number of active heap leach piles to two, and limits the size of each one to no more than 40 acres) and that the moisture content of the uranium byproduct material in the heap leach pile be greater than or equal to 30% moisture content. We believe that the phased disposal approach can be usefully applied here because it limits the amount of tailings that can be exposed at any one time, which limits the amount of radon that can be emitted. The phased disposal work practice standard is applicable for heap leach piles because heap leach piles are expected to be managed in a manner that is similar in many respects to conventional impoundments. Based on what we understand about the operation of potential future heap leach facilities, after the uranium has been removed from the heap leach pile, the uranium byproduct material that remains would be contained in the heap leach structure which would be lined according to the requirements of 40 CFR 192.32(a)(1). The heap leach pile would also be covered with soil at the end of its operational life to minimize radon emissions.

This is what is required to occur at conventional impoundments using the phased disposal standard. Limiting the size of the operating heap leach pile to 40 acres or less (and the number of operating heap leach piles at any one time to two) has the same effect as it does on conventional impoundments; that is, it limits the area of exposed uranium byproduct material and therefore limits the radon emissions from the heap leach pile. While we believe that the 40 acre limitation is appropriate for heap leach piles, we are requesting comment on what should be the maximum size (area) of a heap leach pile.

We are also proposing as GACT that the heap leach pile constantly maintain a moisture content of at least 30% by weight. By requiring a moisture content of at least 30%, the byproduct material in the heap leach pile will not become dewatered, and we think that the heap leach pile will be sufficiently saturated with liquid to reduce the amount of radon that can escape from the heap leach pile. However, we request further information on all the chemical mechanisms in place during the leaching operation, and whether the 30% moisture content is sufficient for minimizing radon emissions from the heap leach pile. We also request comment on the amount of time the 30% moisture requirement should be maintained by a facility. We are proposing the term ''operational life'' of the facility. We are aware of several operations that take place during the uranium extraction process at a heap leach pile. After an initial period of several months of allowing lixiviant to leach uranium from the pile, the heap leach pile is allowed to ''rest,'' which enables the geochemistry in the pile to equilibrate. At that point the heap leach pile may be subjected to another round of extraction by lixiviant, or it may be rinsed to flush out any remaining uranium that is in solution in the heap leach pile. After the rinsing, the pile is allowed to drain and a radon barrier required by 40 CFR 192.32 can be emplaced. We are proposing that the operational life of the heap leach pile be from the time that lixiviant is first placed on the heap leach pile until the time of the final rinse. We believe this incorporates a majority of the time when the heap leach pile is uncovered (no radon barrier has been constructed over the top of the heap) and when the ability for radon to be emitted is the greatest.

Kennecott Uranium Company has the following comments regarding heap leach piles:

- **Thirty (30) Percent Moisture Requirement**

  The proposed rule states:

  The moisture content of heap leach piles shall be maintained at 30% or greater.

  Sands that host uranium in the United States generally have porosities at or below thirty (30) percent. Proposing a thirty (30) percent moisture content is in essence proposing that the material being leached be fully saturated. This is in essence forcing operators to perform a form of vat leaching as

opposed to heap leaching. It may well be impossible to maintain thirty (30) percent moisture content in a heap leach pile absent submerging it.

Operators should be allowed to operate heap leach piles in accordance with best engineering practice.

- **Assumption of Acid Leaching**

The proposed rule assumes acid leaching when the preamble states:

> *During the process of uranium extraction on a heap, as the acid drips through the ore, uranium is solubilized and carried away to the collection system where it is further processed.*

Alkaline leach mills have operated in the past in the United States. An example would be the now decommissioned Homestake United Nuclear Partners Mill (also known as the Partners Mill) along Highway 53, north of Milan, New Mexico. The following pertains to that mill:

> *Hence, all of the limestone ore mined in the Grants area after March 1963 was processed at the Homestake-Sapin Partners' plant. In April of 1968, the partnership became United Nuclear-Homestake Partners, and in 1981 Homestake Mining Company acquired complete control of the operation. [***Source:** *Historical Review of Uranium Production from the Todilto Limestone, Cibola and McKinley Counties, New Mexico* (William Chenoweth New Mexico Geology - November 1985)]

This mill processed uranium ore mined from the Jurassic Todilto limestone. The ore consisted of uranium that was contained within fractures within the Jurassic Todilto Limestone. *Origin of Intraformational Folds in the Jurassic Todilto Limestone, Ambrosia Lake Uranium Mining District, McKinley and Valencia Counties, New Mexico* states:

> *Uranium deposits occur in association with the joints, fractures, small scale thrust faults, and shear zones of intraformational folds whose origin is here attributed to differential sediment loading.*

If additional ore of this type were found and mined it could not be acid leached given the fact that it would consume uneconomic quantities of acid since it is limestone hosted. The following pertains to the material's lime content:

> *The high lime ores of the Todilto were not amenable to acid leaching... [***Source:** *Historical Review of Uranium Production from the Todilto Limestone, Cibola and McKinley Counties, New Mexico* (William Chenoweth New Mexico Geology - November 1985)]

This material if mined would require alkaline leaching. In addition, since the uranium occurs in filled fractures, the leaching solutions would not have to penetrate the limestone to be effective. They would only have to leach the uranium out of fractures between discrete limestone pieces; hence 30% saturation would not be required for effective leaching.

- **Assumption that the Leached Material would Remain on the Pad**

The document makes an assumption that once leached the material now depleted of uranium would remain on the heap leach. A licensee may find it expedient to construct a heap leach pad with an asphalt bottom upon which equipment could be operated. The licensee may wish to load the pad with ore, leach the material and then remove the material from the pad and place it in a separate permitted 11(e).2 byproduct material impoundment.

- **Jurisdiction over Heap Leach Impoundments**

The preamble states:

40 CFR 61.250. Subpart W defines ''uranium byproduct material or tailings'' as ''the waste produced by the extraction or concentration of uranium from any ore processed primarily for its source material content.''

It continues by stating:

Subpart W requirements specifically apply to the affected sources at the uranium recovery facilities that are used to manage or contain the uranium byproduct material or tailings.

Thus the requirements of 40 CFR Part 61 Subpart W applies to waste. Ore on a heap leach pad when first placed is not waste but ore. During the leaching process it is not waste either, since it is being leached and is a valuable material, uranium is being recovered from it.

Only after all of the economically recoverable uranium has been removed from the material on the heap leach does that material become a waste. Thus under the definition of byproduct material used in this rulemaking, operating heap leach piles should not be subject to regulation under 40 CFR Part 61 Subpart W since it regulates waste.

Once leaching is complete, the material on the pad then becomes a waste and is then subject to 40 CFR part 40 Appendix A Criterion 6 which states in part:

Criterion 6—*(1) In disposing of waste byproduct material, licensees shall place an earthen cover (or approved alternative) over tailings or wastes at the end of milling operations and shall close the waste disposal area in accordance with a design [1] which provides reasonable assurance of control of radiological hazards to (i) be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years, and (ii) limit releases of radon-222 from uranium byproduct materials, and radon-220 from thorium byproduct materials, to the atmosphere so as not to exceed an average[2] release rate of 20 picocuries per square meter per second (pCi/m^2s) to the extent practicable throughout the effective design life determined pursuant to (1)(i) of this Criterion. In computing required tailings cover thicknesses, moisture in soils in excess of amounts found normally in similar soils in similar circumstances may not be considered. Direct gamma exposure from the tailings or wastes should be reduced to background levels. The effects of any thin synthetic layer may not be taken into account in determining the calculated radon exhalation level. If non-soil materials are proposed as cover materials, it must be demonstrated that these materials will not crack or degrade by differential settlement, weathering, or other mechanism, over long-term intervals.*

In addition, Criterion 6(A) specifically defines milestones for closure stating:

Criterion 6A—*(1) For impoundments containing uranium byproduct materials, the final radon barrier must be completed* as expeditiously as practicable considering technological feasibility *after the pile or impoundment ceases operation in accordance with a written, Commission-approved reclamation plan. (The term* as expeditiously as practicable considering technological feasibility *as specifically defined in the Introduction of this appendix includes factors beyond the control of the licensee.) Deadlines for completion of the final radon barrier and, if applicable, the following interim milestones must be established as a condition of the individual license: windblown tailings retrieval and placement on the pile and interim stabilization (including dewatering or the removal of freestanding liquids and recontouring). The placement of erosion protection barriers or other features necessary for long-term control of the tailings must also be completed in a timely manner in accordance with a written, Commission-approved reclamation plan.*

The above criterion while crafted to address uranium mill tailings impoundments addresses "*…impoundments containing uranium byproduct materials …*" which could be a heap leach pad following completion of the leaching process. Heap leach pads at which leaching is complete would be fall under Criterion 6A above and should not be subject to regulation under 40 CFR Part 61 Subpart W since:

- When operating they do not contain 11(e).2 byproduct material wastes as defined in the subpart and:
- When operations cease they are no longer operating impoundments and as such to not fall under 40 CFR Part 61 Subpart W, but rather immediately fall under 10 CFR Part 40 Appendix A and are subject to Nuclear Regulatory Commission (NRC) milestones for reclamation.

Nature of Fluids from Licensed Uranium Recovery Operations

The preamble in referring to impoundments at licensed in-situ uranium recovery operations states:

> *These impoundments, since they contain uranium byproduct material, are subject to the requirements of Subpart W.*

The preamble in referring to impoundments at licensed heap leach recovery operations states:

> *The byproduct material is contained in the liquids used to leach uranium from the ore in the heap leach pile as well as draining the heap leach pile in preparation for closure.*

The following definition is in the proposed rule:

> *(i) Non-Conventional Impoundment. A non-conventional impoundment can be located at any uranium recovery facility and contains uranium byproduct material suspended in and/or covered by liquids. These structures are commonly known as holding ponds or evaporation ponds. They are removed at facility closure*.

In the first case the Preamble appears to state that the liquids themselves contained in the impoundments in the case of in-situ uranium recovery operations are byproduct material while in the case of heap leaching operations the liquids contain the byproduct material. The definition in the proposed rule clearly states that the byproduct material is contained in the liquids themselves when it states "... *uranium byproduct material suspended in and/or covered by liquids*." Kennecott Uranium Company requests that this language be clarified. Does this language mean that if the liquids from a heap leach pad or in the case of the definition for in-situ uranium recovery operations as well are sufficiently filtered or otherwise treated to remove any suspended byproduct material, the treated water would not be byproduct material and not subject to regulation either under the proposed rule or under the Atomic Energy Act (AEA) of 1954 as Amended?

Definition of Operation

The proposed rule adds the following new definitions:

> *(e) Operation. Operation means that an impoundment is being used for the continued placement of uranium byproduct materials or tailings or is in standby status for such placement. An impoundment is in operation from the day that uranium byproduct materials or tailings are first placed in the impoundment until the day that final closure begins.*
>
> *(k) Standby. Standby means the period of time that an impoundment may not be accepting uranium byproduct materials but has not yet entered the closure period.*

Kennecott Uranium Company requests that the definition of *Standby* specifically reference 10 CFR Part 40 Appendix A when mentioning a *closure period*. The closure period begins *at the end of milling operations* as described in 10 CFR Part 40 Appendix A. Closure in 210 CFR Part 40 Appendix A is defined as follows:

> Closure *means the activities following operations to decontaminate and decommission the buildings and site used to produce byproduct materials and reclaim the tailings and/or waste disposal area.*

The definition of *Operation* conflicts with existing regulations, specifically those in 10 CFR Part 40 Appendix A added following the rescission of 40 CFR Part 61 Subpart T. 10 CFR Part 40 Appendix A Criterion 6A(3) states:

> *(3) The Commission may authorize by license amendment, upon licensee request, a portion of the impoundment to accept uranium byproduct material or such materials that are similar in physical, chemical, and radiological characteristics to the uranium mill tailings and associated wastes already in the pile or impoundment, from other sources, during the closure process. No such authorization will be made if it results in a delay or impediment to emplacement of the final radon barrier over the remainder of the impoundment in a manner that will achieve levels of radon-222 releases not exceeding 20 pCi/m^2s averaged over the entire impoundment.*

This language authorizes a licensee upon Commission approval to accept 11(e).2 byproduct material during the defined closure period. The new definition of *Operation* in the proposed rule conflicts with this language in that if a licensee accepted 11(e).2 byproduct material during closure as approved by a Commission granted license amendment, in the eyes of the Environmental Protection Agency (EPA) under this proposed revision to 40 CFR Part 61 Subpart W, the licensee would be in operation. To quote the law firm of Thompson and Pugsley:

> *EPA's definition of "operation" essentially renders the prior rescission of Subpart T moot. The rescission of Subpart T was part of a joint settlement agreement between NMA (then AMC), NRC, and EPA. The Proposed Rule cannot retroactively rescind that settlement without appropriate agreement amongst the parties.*

It should be noted that National Emissions Standards for Hazardous Air Pollutants (Rescission of Subpart T - Federal Register / Volume 59, Number 135 / Friday July 15, 1994 **/** Rules and Regulations), when discussing the Nuclear Regulatory Commission's conforming rule (changes to 10 CFR Part 40 Appendix A), states:

> *Criterion 6A also specifies the conditions for Commission approval of extensions for performance of milestones and continued acceptance of uranium byproduct and other materials in the pile or impoundment. 10 CFR part 40, appendix A Criterion 6A (2) and (3) (59 FR 28220, June 1, 1994). These provisions vary somewhat from NRC's proposal, to reflect changes made in EPA's final amendments to subpart D at §§ 192.32(a)(3) (iv) and (v). The changes are "(1) that only byproduct material, not 'similar' material, will be approved for continued disposal after the final radon barrier is essentially complete and the verification of radon flux levels has been made, and (2) that public participation is specifically to be provided for only in the case of continued disposal after radon flux verification, in addition to general clarification of the paragraph." (59 FR 28224, June 1, 1994):*

Placement of Evaporation Ponds (Lined or Unlined) on Top of Tailings in an Existing 40 CFR Part 61 Subpart W Impoundment

The proposed rule should include specific language stating that any evaporation or fluid retention impoundments constructed on top of existing tailings/11(e).2 byproduct material in an existing 40 CFR part 61 Subpart W impoundment are not subject to any regulation under the subpart since the impoundment as a whole is regulated under the subpart.

Kennecott Uranium Company requests that the following language be inserted into the rule:

> *Fluid retention impoundments either lined or unlined constructed on top of 11(e).2 byproduct material within existing 40 CFR Part 61 Subpart W impoundments shall not be subject to any additional regulation under this rule.*

Risk Posed by Kennecott Uranium Company's Tailings Impoundment

The preamble states:

"... while the maximum lifetime cancer risks from radon associated with the impoundments at the Sweetwater mill were 2.4 × 10-5. As we indicated in our original 1989 risk assessment, in protecting public health, EPA strives to provide the maximum feasible protection by limiting lifetime cancer risk from radon exposure to approximately 1 in 10,000 (i.e., 10-4)."

Kennecott Uranium Company has not verified this estimate of risk; however, it is almost an order of magnitude below 1 x 10-4, the Environmental Protection Agency's (EPA's) standard. Given the low risk posed by these impoundments and Kennecott Uranium Company's impoundment in particular (as stated by the Environmental Protection Agency), Kennecott Uranium Company questions the necessity for this entire 40 CFR Part 61 Subpart W rule making given the very low risk value determined by the Environmental Protection Agency..

Conclusions

Kennecott Uranium Company believes that this rulemaking especially the extension of 40 CFR Part 61 Subpart W to fluid retention impoundments and heap leach piles is unnecessary for the following reasons:

- Specifically for the reasons put forward in the document entitled *Application of United States Environmental Protection Agency 40 CFR Part 61, Subpart W Regulations to Uranium Recovery Facilities* prepared by the law firm of Thompson and Pugsley, PLLC.

Should the agency choose to proceed with the rulemaking Kennecott Uranium Company has the following concerns regarding it:

- The definition of 11 (e).2 byproduct material used in it is inconsistent with other definitions of 11 (e).2 byproduct material in other regulations.
- The regulation is designed to regulate Hazardous Air Pollutant (HAP) emissions yet it incorporates groundwater protection standards (references to 40 CFR Part 192.32
- It conflicts with existing Nuclear Regulatory Commission (NRC) regulations regarding liner requirements in 10 CFR part 40 Appendix A.
- It proposes to regulate heap leach piles when such authority may not exist and makes certain potentially invalid assumptions regarding their operation.
- It proposes a definition of Operation that appears to conflict with existing regulations in 10 CFR part 40 Appendix A and with the agreement that led to the rescission of 40 CFR Part 61 Subpart T.
- The preamble contains erroneous information regarding Kennecott Uranium Company’s tailings impoundment.
- The preamble is unclear regarding the nature of the fluids involved and their relationship to 11(e).2 byproduct material.
- In the case of Kennecott Uranium Company’s tailings impoundment it is regulating an insignificant risk.

Kennecott Uranium Company appreciates the opportunity to comment on this proposed rule. If you have any questions please do not hesitate to contact me.

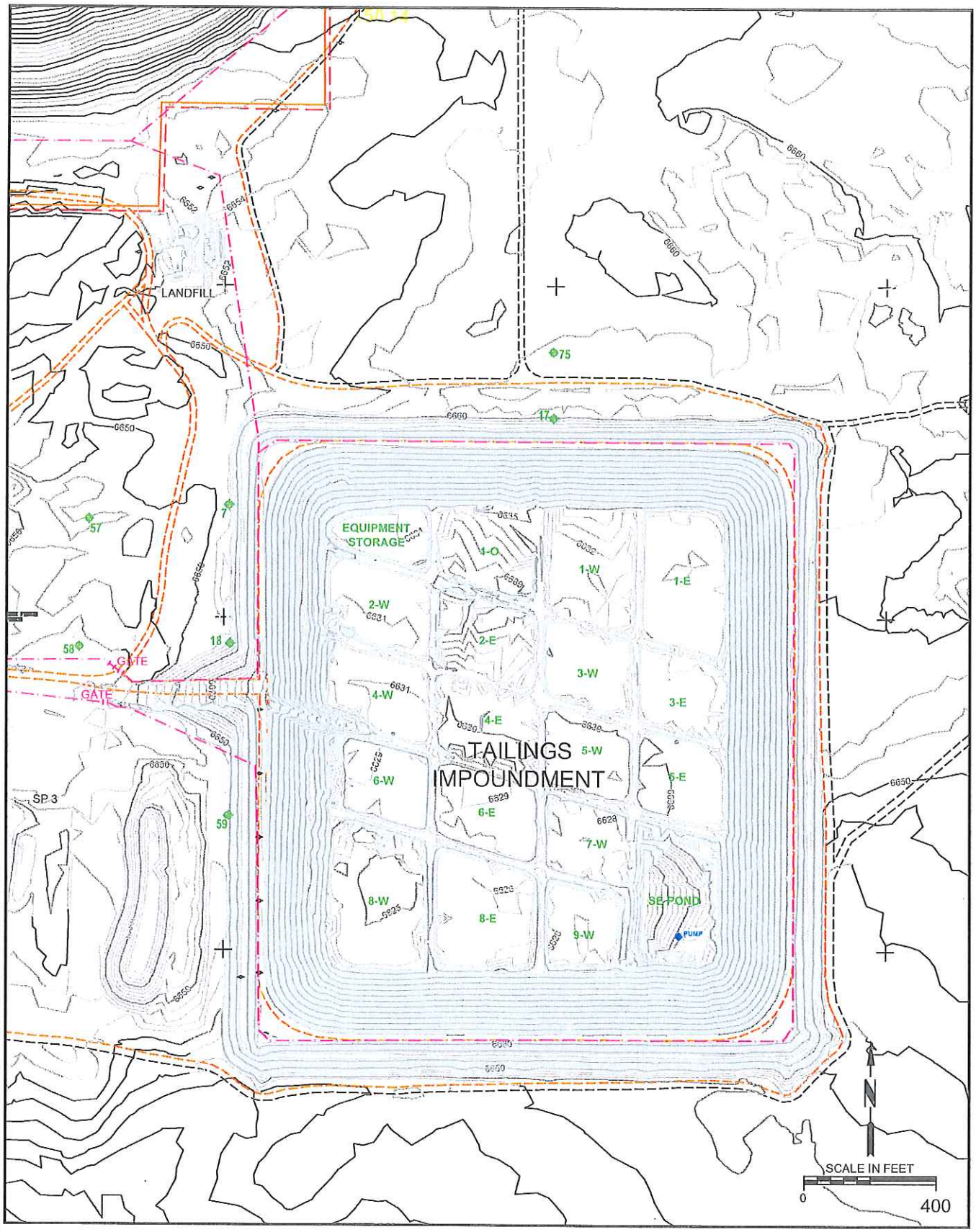
Sincerely yours,

Oscar Paulson
Facility Supervisor

cc: Rich Atkinson - Cedar Mountain Ventures, LLC.
Katie Sweeney - National Mining Association (NMA).

Appendix 1

Appendix 2



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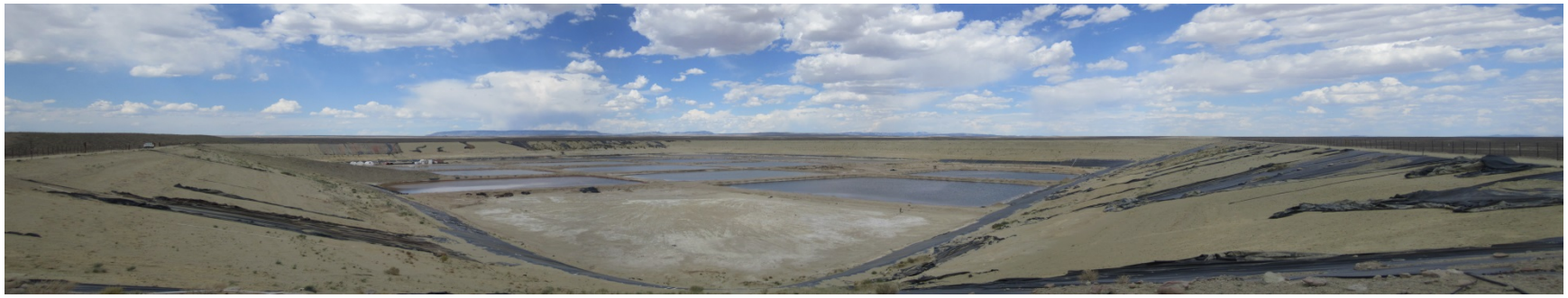
PROJECT:	TASK:
451101	-

PREPARED BY: TELESTO

JULY 2009 TAILINGS AREA SURVEY

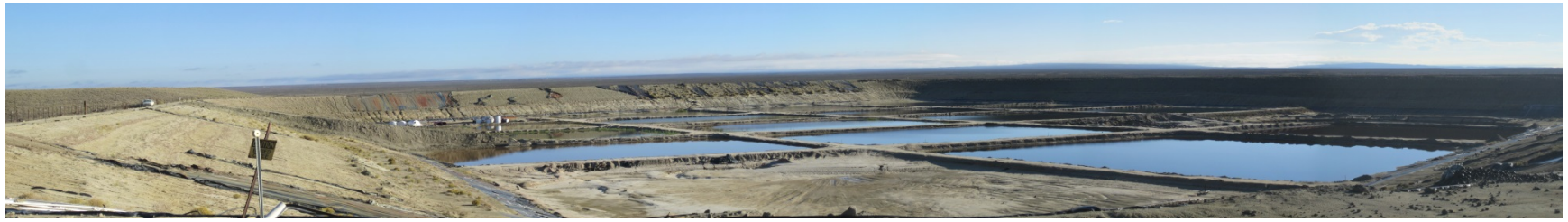
PREPARED FOR: SWEETWATER URANIUM FACILITY

Tailings Panoramas - 2013



June 17, 2013

July 15, 2013



September 16, 2103

Appendix 3

NRC FORM 374

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and the applicable parts of Title 10, Code of Federal Regulations, Chapter I, Parts 19, 20, 30, 31, 32, 33, 34, 35, 36, 39, 40, 51, 70, and 71, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	
1. Kennecott Uranium Company Sweetwater Project	3. License Number SUA-1350, Amendment 32
2. P.O. Box 1500 Rawlins, Wyoming 82301-1500	4. Expiration Date November 10, 2014
	5. Docket No. 40-8584 Reference No.

6. Byproduct Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum amount that Licensee May Possess at Any One Time Under This License
Natural Uranium and/or Natural Uranium Byproducts	Any	Unlimited

Section 9: Administrative Conditions

9.1 The authorized place of use shall be the licensee's Sweetwater uranium milling facility, located in Township 24 North, Range 93W, Sweetwater County, Wyoming.

9.2 All written notices and reports to the Nuclear Regulatory Commission (NRC) required under this license, with the exception of incident and event notifications, shall be sent to the following address: ATTN: Document Control Desk, c/o Deputy Director, Decommissioning and Uranium Recovery Licensing Directorate, Division of Waste Management and Environmental Protection, Office of Federal and State Materials and Environmental Management Programs, Washington, DC 20555, Mail Stop T-8 F5, or by express delivery to 11545 Rockville Pike, Rockville, Maryland 20852-2738.

Incident and event notifications, which require telephone notification under 10 CFR 20.2202 and 10 CFR 40.60, shall be made to the NRC Operations Center at (301) 816-5100.

[Applicable Amendments: 16, 18, 25, 26]

9.3 Changes, Tests and Experiments

(a) The licensee may, without obtaining a license amendment pursuant to §40.44, and subject to conditions specified in (b) of this condition:

i. make changes in the facility as described in the license application (as updated),

Posted
cc: P Atkinson

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
SUA-1350

Docket or Reference Number
40-8584

Amendment No. 32

ii make changes in the procedures as described in the license application (as updated), and

iii conduct test or experiments not described in the license application (as updated).

(b) The licensee shall obtain a license amendment pursuant to §40.44 prior to implementing a proposed change, test or experiment if the change, test, or experiment would:

i Result in any appreciable increase in the frequency of occurrence of an accident previously evaluated in the license application (as updated);

ii Result in any appreciable increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety previously evaluated in the license application (as updated);

iii Result in any appreciable increase in the consequences of an accident previously evaluated in the license application (as updated);

iv Result in any appreciable increase in the consequences of a malfunction of an SSC previously evaluated in the license application (as updated);

v Create a possibility for an accident of a different type than any previously evaluated in the license application (as updated);

vi Create a possibility for a malfunction of an SSC with a different result than previously evaluated in the license application (as updated);

vii Result in a departure from the method of evaluation described in the license application (as updated) used in establishing the Final Safety Evaluation Report (FSER) or the Environmental Assessment (EA) or Technical Evaluation Reports (TERs) or other analysis and evaluations for license amendments;

viii For purposes of this paragraph as applied to this license, SSC means any SSC which has been referenced in a staff SER, TER, EA, or Environmental Impact Statement (EIS) and supplements and amendments thereof.

(c) Additionally, the licensee must obtain a license amendment unless the change, test, or experiment is consistent with the NRC conclusions, or the basis of, or analysis leading to, the conclusions of actions, designs, or design configurations analyzed and selected in the site or facility SER, TER, and EIS or EA. This would include all supplements and amendments, and TERs, EAs, EISs issued with amendments to this license.

d) The licensee's determinations concerning (b) and (c) of this condition shall be made by a Safety and Environmental Review Panel (SERP). The SERP shall consist of a minimum of three individuals. One member of the SERP shall have expertise in management (e.g., Plant Manager) and shall be responsible for financial approval for changes; one member shall have expertise in operations and/or construction and shall have responsibility for implementing any operational changes; and, one member shall be the radiation safety officer (RSO) or equivalent, with the responsibility of assuring changes

conform to radiation safety and environmental requirements. Additional members may be included in the SERP as appropriate, to address technical aspects such as groundwater, hydrology, surface-water hydrology, specific earth sciences, and other technical disciplines. Temporary members or permanent members, other than the three above-specified individuals, may be consultants.

e) The licensee shall maintain records of any changes made pursuant to this condition until license termination. These records shall include written safety and environmental evaluations made by the SERP that provide the basis for determining changes are in compliance with (b) of this condition. The licensee shall furnish, in an annual report to the NRC, a description of such changes, test, or experiments, including a summary of the safety and environmental evaluation of each. In addition, the licensee shall annually submit to the NRC changed pages, which shall include both a change indicator for the area changed, e.g., a bold line vertically drawn in the margin adjacent to the portion actually changed, and a page change identification (date of change or change number or both), to the operations plan and reclamation plan of the approved license application (as updated) to reflect changes made under this condition.

[Applicable Amendment: 18]

.4 The licensee is hereby authorized to possess byproduct material in the form of uranium waste tailings and other uranium byproduct waste generated by the licensee's milling operations authorized by this license.

The licensee is authorized to operate an ion exchange (IX) uranium recovery facility in accordance with submittals dated September 27, 1989, and October 18, 1991. Contaminated liquid and solid wastes from the IX plant shall be placed in the tailings impoundment.

The licensee is not authorized to produce any other uranium concentrates until a pre-operational inspection has been completed and any safety issues resolved. The inspection should confirm, in part, that operating procedures and approved radiation safety and environmental monitoring programs are in place, and that pre-operational testing is complete.

For monitoring purposes, the standby mode of operation is applicable for any continuous 90-day or longer period when no yellowcake is produced by the mill. The NRC shall be notified at least ninety (90) days prior to any planned resumption of uranium milling operations.

9.5 The licensee shall conduct operations in accordance with statements, representations, and conditions contained in Sections 5.2, 5.3, 5.4, and 6.0 of the original license application as revised, dated August, 1978; in Sections 2.0, 3.0, and 4.0 of the renewal application dated March 1984, as supplemented by submittals dated April 3, 1983, and January 17, 1985; and the Final Design Volume VII of the license renewal application submitted September 18, 1997, with page changes submitted April 13, June 10, July 1, and July 20,1998, and March 25, 1999; and the renewal application dated May 25, 2004, except where superseded by license conditions below.

Whenever the word "will" is used in the above referenced submittals, it shall denote a requirement.

MATERIALS LICENSE
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9.6 Standard operating procedures (SOPs) shall be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. These SOPs for operational activities shall enumerate pertinent radiation safety practices to be followed and will be available for the pre-operational inspection.

Additionally, written procedures shall be established for non-operational activities to include in-plant and environmental monitoring, bioassay analyses, and instrument calibrations. An up-to-date copy of each written procedure shall be kept in the mill area to which it applies.

All SOPs (for both operational and non-operational activities) shall be reviewed and approved in writing by the RSO before implementation and whenever a change in procedure is proposed to ensure that proper radiation protection principles are being applied. In addition, the RSO shall perform a documented review of all existing operating procedures at least annually.

9.7 The licensee shall maintain an NRC-approved financial surety arrangement, consistent with 10 CFR 40, Appendix A, Criteria 9 and 10, adequate to cover the estimated costs, if accomplished by a third party, for decommissioning and decontamination of the mill and mill site, reclamation of any existing or approved tailings or waste disposal areas, reclamation of approved evaporation ponds, groundwater restoration, and the long-term surveillance fee. With submittal of a revised reclamation/decommissioning plan, the licensee shall submit, for NRC review and approval, a proposed revision to the financial surety arrangement, if estimated costs in the proposed plan exceed the amount covered in the existing financial surety. The NRC-approved revision to the cost estimate shall be incorporated into the next annual surety amount.

For the approved reclamation plan referenced in License Condition 10.5, the licensee shall provide the NRC-approved surety amount (adjusted for inflation) for reclamation of the proposed structures associated with resumption of mill operation (e.g., tailings impoundment, evaporation ponds, and diversion channels) before commencement of construction of any of these structures.

Annual updates to the surety amount required by 10 CFR 40, Appendix A, Criteria 9 and 10, shall be submitted to the NRC at least three (3) months prior to the anniversary date (October 30) of the approved surety arrangement. If the NRC has not approved a proposed revision to the surety coverage thirty (30) days prior to the expiration date of the existing surety arrangement, the licensee shall extend the existing surety arrangement. The revised surety amount will be in effect within three (3) months of written NRC approval.

The licensee's currently NRC-approved surety (performance bond) shall be continuously maintained in an amount no less than $11,018,000 for the purpose of complying with 10 CFR 40, Appendix A, Criteria 9 and 10, for decommissioning costs related to the existing facility, until a replacement amount is authorized by the NRC.

[Applicable Amendments: 16, 17, 18, 19, 20, 23, 24, 26, 27, 28, 29, 30, 31, 32]

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9.8 The licensee shall have an archeological survey performed prior to disturbing any previously unsurveyed areas. Such surveys shall be submitted to the NRC and the State Historic Preservation Office (SHPO) for review and approval. No such disturbance shall occur until authorization to proceed has been granted by the NRC and SHPO. In addition, all work in the immediate vicinity of any buried cultural deposits unearthed during the disturbance of land shall cease until approval to proceed has been granted by the NRC and SHPO.

9.9 The licensee is hereby exempted from the requirements of Section 20.1902(e) of 10 CFR Part 20 for areas within the mill buildings, provided that all entrances to the mill buildings are conspicuously posted in accordance with Section 20.1902(e) and with the words, "Any Area Within this Mill May Contain Radioactive Material."

9.10 Decommissioning of the facility shall be performed as presented in the Final Design, Volume VI, Part 2 - Mill Decommissioning Addendum to the Existing Impoundment Reclamation Plan, submitted May 28, 1998, as supplemented by the response to comments submitted February 3, 1999, and the catchment basin remediation plan dated May 12, 2004, as revised July 22, 2004, December 15, 2004, January 18, 2005, and October 3, 2006. The verification results of this remediation are to be submitted to NRC for approval, as soon as reasonably possible. The catchment basin verification report and NRC's approval letter shall be referenced in the Final Status Survey Report. Residual contamination remaining under structural foundations after the catchment basin remediation shall be removed at the time the structures are decommissioned. The NRC shall be notified and detailed SOPs for decommissioning (land and buildings) shall be available for review at least three (3) months before decommissioning begins.

[Applicable Amendments: 21, 25]

Section 10: Operational Controls, Limits, and Restrictions

10.1 The mill production per calendar year shall not exceed 4,100,000 pounds of yellowcake, as referenced in the Revised Environmental Report, dated August 1994.

10.2 All liquid effluents from mill process buildings, with the exception of sanitary wastes, shall be returned to the mill circuit or discharged to the tailings impoundment.

10.3 The licensee shall construct and operate the proposed tailings impoundment, liner system, evaporation ponds, and tailings disposal system in compliance with Volumes III, IV, and VII of the Final Design application submitted by cover dated June 11, July 23, and September 18, 1997, including page changes submitted April 13, June 10, July 1, and July 20, 1998, and March 25, and June 21, 1999.

The licensee is currently authorized to construct up to eight evaporation ponds and one new impoundment. An additional two evaporation ponds and an additional five impoundments, as described in the above documents, may be constructed after: 1) notification of NRC; 2) submittal of data confirming the proposed design; and 3) an increase in the surety amount, based on the NRC-approved cost estimate for reclaiming the additional structures.

[Applicable Amendment: 17]

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10.4 A detailed embankment monitoring program shall be submitted for NRC approval at least three (3) months prior to placing tailings effluent.

10.5 The existing tailings impoundment, the proposed tailings impoundments, and the proposed evaporation ponds shall be reclaimed in accordance with the Final Design Volumes V, VI, and VI Part 2 of the license renewal application submitted August 1, 1997, August 20, 1997, and May 28, 1998, with page changes submitted June 10, 1998, and supplements submitted February 3, February 25, and June 21, 1999.

10.6 During any period of mill standby, the licensee shall not add tailings or other solid wastes to the tailings impoundment, except byproduct material in the form of debris generated by routine site maintenance. The licensee may add a maximum of 2,800 cubic yards of 11e.(2) byproduct material generated by Crow Butte Resources, Inc. in the course of operating its Crow Butte In Situ Leach (ISL) facility that is licensed by SUA-1534 and solid and liquid wastes from the site's IX plant. Disposal of the Crow Butte ISL materials shall be in accordance with the licensee's submittal of July 9, 1996.

During any period of mill standby at least a weekly inspection of the tailings area shall be performed and documented.

[Applicable Amendment: 22]

Section 11: Monitoring and Recordkeeping Requirements

11.1 The results of sampling, analyses, surveys and monitoring, and of calibration of equipment, as well as reports on audits and inspections, and any subsequent reviews, investigations, and corrective actions, shall be documented. Unless otherwise specified in NRC regulations or this license, all such documentation shall be maintained for a period of at least five (5) years.

11.2 The licensee shall conduct an annual survey of land use (private residence, grazing areas, private and public potable water and agricultural wells, and nonresidential structures and uses) in the area within five (5) miles of any portion of the restricted area boundary.

11.3 The licensee shall conduct a corrective action program (CAP) with the objective of returning the ground-water concentrations of chromium, natural uranium, and combined radium-226/228 to the levels referenced in Addendum to the Revised Environmental Report, Background Ground Water Quality and Detection Standards, January 1996, as revised by page changes January 8, 1998 (approved by the NRC letter of May 28, 1998), and the catchment basin ground-water corrective action plan dated May 12, 2004, as revised July 22, 2004, December 15, 2004, and January 18, 2005.

The ground-water protection standards at point of compliance (POC) wells TMW-15, 16, 17, and 18, with background being defined in the above Addendum are: arsenic = 0.05 mg/L, beryllium = 0.01 mg/L, cadmium = 0.01 mg/L, chromium = 0.05 mg/L, lead-210 = 8.9 pCi/L, nickel = 0.01 mg/L, combined radium-226/228 = 5.8 pCi/L, selenium = 0.01 mg/L, thorium-230 = 7.0 pCi/L, natural uranium = 36.0 pCi/L, and gross alpha = 15.0 pCi/L, manganese = 0.2 mg/L, and iron = 0.6 mg/L.

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Pump-back wells may be added or removed from service with the goal of improving the performance of the CAP. POC, monitoring, and pump-back wells shall be sampled at the locations, at the frequency, and for the parameters provided in Table 5-1 (for existing impoundment) of the Final Design Volume VII, submitted (page change) June 21, 1999. Reporting limits for sampled constituents shall be as provided in Table 5-11 of the Final Design Volume VII, submitted April 13, 1998.

The catchment basin pump-back wells and monitoring wells TMW-92, 93, 94, 95, 97, 98, 99, 100, 101, 104, 111, 112, 113, and 115 will be sampled quarterly for diesel range and gasoline range organics and volatile organic compounds, in addition to the above constituents. The ground-water protection standards to be used to assess data from these wells are as follows: 1,1-dichloroethane = 3.0 mg/L, 1,1-dichloroethene = 0.007 mg/L, DRO = 10 mg/L, GRO = 10 mg/L, naphthalene = 1.5 mg/L, toluene = 1 mg/L, 1,1,1-trichloroethane = 0.20 mg/L, 1,2,4-trimethylbenzene = 0.012 mg/L, 1,3,5-trimethylbenzene = 0.012 mg/L, m+p xylenes = 10 mg/L, manganese = 0.2 mg/L, aluminum =1.8 mg/L, and iron = 0.6 mg/L.

[Applicable Amendments: 17, 21, 22]

11.4 Upon resumption of milling operations, the licensee shall implement a ground-water detection monitoring program for the tailings impoundment and evaporation ponds to ensure compliance with 10 CFR 40, Appendix A, in accordance with the Addendum to the Revised Environmental Report, Background Ground Water Quality and Detection Standards, January 1996, as revised by the submittals of January 8, 1998, and March 25, 1999; and conduct an environmental monitoring program in accordance with on-file SOPs for environmental monitoring, and in accordance with Table 5-2 of the Final Design Volume VII, submitted (page change) June 21, 1999.

[Applicable Amendment: 17]

11.5 During any period of mill standby, the licensee shall conduct an environmental monitoring program in accordance with on-file SOPs for environmental monitoring, and in accordance with Table 5-1 of the Final Design Volume VII, submitted (page change) June 21, 1999, as revised January 18, 2005.

[Applicable Amendments: 17, 21]

Section 12: Reporting Requirements

12.1 An annual report of the review of all existing operating procedures, required to be performed by the RSO, shall be prepared and retained on site.

12.2 Spills, Pond Leaks, Excursions, and Incident/Event Reporting

Until license termination, the licensee shall maintain documentation on unplanned release of source or 11e.(2) byproduct materials and process chemicals. Documented information shall include, but not be limited to: date, volume, total activity of each radionuclide released, radiological survey results, soil sample results (if taken), corrective actions, results of post remediation surveys (if taken), and a map showing the spill location and the impacted area.

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The licensee shall have procedures which will evaluate the consequences of the spill or incident/event against 10 CFR 20, Subpart M, and 10 CFR 40.60 reporting criteria. If the criteria are met, then report to the NRC Operations Center as required.

If the licensee is required to report any spills, pond leaks, excursions of source, 11e.(2) byproduct material, and process chemicals that may have an impact on the environment, or any other incidents/events to State or Federal Agencies, a notification shall be made to the NRC Headquarters Project Manager (PM) by telephone or electronic mail (e-mail) within 48 hours of the event. This notification shall be followed, within thirty (30) days of the notification, by submittal of a written report to NRC Headquarters PM as per License Condition 9.2, detailing the conditions leading to the spill, pond leak, excursion, or incident/event, corrective actions taken, and results achieved.

[Applicable Amendment: 18]

12.3 An annual report will be submitted to the NRC that includes: (1) description of changes, tests, or experiments approved by the SERP; (2) page changes to the approved license application made by the SERP; (3) a report of the annual land use survey indicating any differences in land use from that described in the previous report; (4) a ground-water CAP review, describing the progress toward attaining the ground-water protection standards including the areal extent and concentration of hazardous constituents and estimates of the time needed to obtain compliance; (5) the ground-water monitoring report for the year; and (6) the ALARA audit report.

12.4 A completion report(s), including as-built drawings, verifying that reclamation and decommissioning of the site has been performed according to the NRC-approved plans shall be provided within six (6) months of completion of the work. The report(s) shall also include summaries of results of the quality assurance and control testing to demonstrate that the approved specifications were met.

FOR THE NUCLEAR REGULATORY COMMISSION

Date: Aug 8, 2013

Andrew Persinko, Deputy Director
Decommissioning and Uranium Recovery
Licensing Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Appendix 4

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2466

MAR 21 1996

Ref: 8P2-TX

Oscar A. Paulson, P.G., Supervisor
Sweetwater Uranium Facility
Kennecott Uranium Company
P.O. Box 1500
Rawlins, WY 82301

Dear Mr. Paulson:

This follows our conversation of March 12, 1996, and responds to your correspondence of September 13, 1995, as addressed to Bryon Bunger of EPA's Office of Radiation and Indoor Air.

Your September 15, 1995, correspondence proposes to level tailings within the existing impoundment, instal a new liner system with leak detection capability, and then place the impoundment back into use upon the commencement of milling operations. Your interpretation of 40 CFR Part 61 Subpart W would retain this unit under the definition of "Existing impoundment" as referenced by 61.250(d). This interpretation would allow for the construction and use of one additional impoundment per 61.252(b)(1).

This office concurs with your interpretation of the referenced regulations. Please be reminded that the modified existing impoundment as well as any other subsequent impoundments constructed under 61.252(b)(1) will need with the Radon-222 Emission Standard per 61.252(a).

This office is also in receipt of your February 13, 1996, 40 CFR Part 61 Supart I submittal. Relating to a broad reorganization of the Region VIII EPA offices, please direct all appropriate submittals (Subpart I,W, et.) to myself.

Should you have any questions or comments concerning this letter, please direct them to Mr. Lon Q. Hesla at (303) 312-6036 of my immediate staff or also feel free to contact me directly.

Sincerely,

Milton W. Lammering, Director
Toxics Program

cc: Bryon Bunger - ORIA/HQ
Charlotte Abrams NRC c/o
Uranium Recovery Branch
Division of Waste Management
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Appendix 5

Application of United States Environmental Protection Agency 40 CFR Part 61, Subpart W Regulations to Uranium Recovery Facilities

I. INTRODUCTION

The United States Environmental Protection Agency (EPA) appears to be taking the position that the ***work practice standard***s in its 40 CFR Part 61, Subpart W *National Emissions Standards for Radon Emissions from Operating Mill Tailings* apply to evaporation ponds at conventional and in situ uranium recovery (ISR) sites licensed by the Nuclear Regulatory Commission (NRC) or its Agreement States. This memorandum evaluates the legal and regulatory bases for any potential applicability of the EPA's 40 CFR Part 61, Subpart W regulations to evaporation ponds at currently operating and future operating uranium recovery facilities, including specifically ISR facilities.

A. Atomic Energy Act of 1954 and the Uranium Mill Tailings Radiation Control Act of 1978

1. Statutory and Regulatory Program

Currently, uranium recovery facilities and the 11e.(2) byproduct material (mill process tailings and other related wastes)[1] that they produce are actively regulated by NRC under the Atomic Energy Act of 1954, as amended by the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA). As a general proposition, the AEA was intended to promote the expeditious and efficient recovery of source material for the purposes of national defense and, later, a domestic nuclear power industry. To oversee its implementation, the AEA granted broad regulatory authority to the Atomic Energy Commission (AEC) (now NRC) to regulate source material (uranium) recovery processes after the removal of the source material from its place in nature by surface or underground uranium *mining*.

As concerns about the potential hazards from uranium recovery wastes developed, the AEC/NRC determined that it had no authority to regulate the wastes generated by uranium recovery (i.e., uranium milling) upon the cessation of active recovery operations as such wastes no longer qualified as *licensable* source material under the AEA (i.e., they contained less than 0.05%, by weight, uranium and/or thorium). As a result of this and the potential radiological and *non*-radiological hazards associated with such wastes, in 1978, Congress enacted UMTRCA with two specific intentions: (1) to facilitate the remediation of abandoned "inactive" mill tailings sites that were no longer operated under an active AEA license (Title I) and (2) to provide AEA statutory authority to regulate the management and disposal of wastes from the uranium recovery processing at active (licensed) uranium recovery facilities (Title II).

[1] *See also* 42 U.S.C. § 7911 (UMTRCA definition of "residual radioactive material").

In order to address the management and control of wastes located at such facilities, UMTRCA created a new category of AEA material known as 11e.(2) byproduct material, which it defined as, "the tailings or wastes produced by the extraction or concentration of uranium or thorium from any *ore* processed *primarily* for its source material content." 42 U.S.C. § 2014(e)(2) (2007).

UMTRCA outlined a comprehensive, multi-agency regulatory oversight process by which appropriate regulations governing the safe management and containment of 11e.(2) byproduct material were to be promulgated and implemented. UMTRCA assigned EPA the authority to promulgate standards of general applicability (for both Title I and Title II programs) addressing both the radiological and *non*-radiological hazards of uranium mill tailings and related wastes. For the *non*-radiological hazards, these generally applicable standards were to provide protection equivalent to that provided by Subtitle C of the Solid Waste Disposal Act (SWDA), which is better known as the Resource Conservation and Recovery Act (RCRA). EPA purposely was not given any enforcement or implementation authority over 11e.(2) byproduct material under RCRA or UMTRCA.

In 1983, pursuant to Congress' mandate in UMTRCA, EPA promulgated its final regulations for active uranium mill tailings facilities at 40 CFR Part 192. UMTRCA directed the Commission (NRC) to implement and enforce the generally applicable standards developed by EPA through its regulations and licenses.[2] Although required to conform its general regulatory requirements to EPA's 40 CFR Part 192 regulations, UMTRCA also granted NRC expanded authority to develop its own requirements for the management of 11e.(2) byproduct material to protect public health, safety, and the environment. Specifically, Section 84(a) of the AEA (Section 205 of UMTRCA) directs NRC to ensure that any 11e.(2) *byproduct material* is managed in a manner:

> that the Commission deems appropriate to protect health, safety, and the environment from the potential *radiological* and *non-radiological* hazards associated with such materials….

42 U.S.C. § (2007).

Thus, UMTRCA amended the AEA to provide EPA/NRC with express authority to regulate both the radiological and the *non*-radiological hazards associated with 11e.(2) byproduct material, whether in the soil, in the air or in the groundwater. The primary concern, however, was the uncontrolled tailings solids (i.e., sands and slimes).[3]

It should also be noted that uranium mills are subject to additional EPA AEA regulation for radiation dosage to members of the public and the general environment, *excluding radon*, as a result of *operations*. Pursuant to its

[2] 42 U.S.C. § 2022(d).
[3] Tailings solids (sands) had been used in construction activities which generated radiation exposure concerns.

Reorganization Plan No. 3 of 1970 authority, EPA developed a dose limit applicable to *all* AEA fuel cycle facilities, including uranium mills, of 25 mrem/year to the nearest receptor from all potential pathways, excluding the dose from radon. The annual dose to the entire body of a human being must not exceed 25 millirems, 75 millirems to the thyroid, and 25 millirems to any other organ of a member of the public. These standards apply to doses associated with the milling of uranium *ore* as of December 1, 1980. Since 40 CFR Part 190 excludes radon, as a practical matter, its provisions primarily address radioactive particulate emissions from mill facilities, including (1) yellowcake dust and (2) windblown tailings. Thus, there are both EPA and NRC regulations that address the radiological and *non*-radiological effluents from active uranium mills and an EPA fuel cycle standard that addresses what effectively is airborne radiological particulate contamination from such mills.[4]

These requirements have been in place since the early 1980s and have evolved over time to create a robust regulatory program for the safe and effective management of uranium mill tailings facilities. As a necessary part of this regulatory evolution, NRC and its licensees sought to further define the extent of NRC's authority to regulate 11e.(2) byproduct material, particularly with respect to the extent of EPA and State authority over *non*-radiological aspects of 11e.(2) byproduct material. Given that 11e.(2) byproduct material contains both radiological and *non*-radiological constituents and that there were potentially significant conflicts between NRC and EPA/States relating to regulatory authority over the latter, it was inevitable that jurisdictional authority over 11e.(2) byproduct material needed to be defined more precisely.

As a general proposition, NRC has preemptive regulatory authority to address the potential *radiological* hazards associated with AEA licensed facilities, including uranium recovery facilities, their tailings impoundments, evaporation ponds, and other site facilities. In 1980, NRC's Office of Executive Legal Director "(OELD)" issued an advisory legal opinion concluding that the AEA, as amended by UMTRCA, did not preempt the exercise of *non*-Agreement State authority over the *non-radiological* components of 11e.(2) *byproduct material*. In reaching this conclusion, OELD conceded that:

> the question is *so close* that the Commission *could reasonably choose either interpretation*, but that *the better legal view* is that non-Agreement States and the NRC have concurrent jurisdiction to regulate the *non-radiological* hazards of mill tailings, both before and after the November 8, 1981 date upon which the Mill Tailings Act becomes fully effective.[5]

[4] It is important to note that, prior to the enactment of UMTRCA, *non*-radiological (hazardous) contaminants at AEA-licensed facilities typically were regulated by the States.

[5] Memorandum from Howard K. Shapar, Executive Legal Director, NRC, to Chairman Ahearne, NRC re: OELD Legal Opinion on Two Questions Relating to the Operation of the Uranium Mill Tailings Radiation Control Act of 1978, Attachment B, 2-3 (April 28, 1980) (emphasis added).

After careful consideration of the uranium recovery industry's analysis of this "concurrent jurisdiction" issue in NMA's White Paper entitled *Recommendations for a Coordinated Approach to Regulating the Uranium Recovery Industry* disputing the OELD opinion and the position of NRC Staff in SECY-99-277[6] supporting the OELD opinion, in 2000, the Commission determined that the OELD opinion should be overturned and that the Commission, indeed, exercises exclusive jurisdiction over both the radiological *and non*-radiological aspects of 11e.(2) byproduct material.[7] As a result, implementation and enforcement of relevant AEA regulatory programs for licensed uranium recovery operations is under the exclusive authority of NRC and its Agreement States, including mill facility construction and operations, tailings impoundment construction, operations, and final closure, and associated uranium recovery facilities such as evaporation ponds.

B. Clean Air Act of 1977 and Implementing Regulations (40 CFR Part 61)

In addition to the authority vested in EPA under UMTRCA, Congress granted EPA additional authority to regulate certain aspects of uranium recovery facilities. In 1977, Congress enacted the Clean Air Act (CAA) under which EPA was directed to address potentially hazardous *radiological* air emissions at a variety of facilities, including uranium mills. In response to this statutory mandate and pursuant to Section 112 of the CAA, EPA promulgated 40 CFR Part 61 to address radiological air emissions from such facilities.

40 CFR Part 61, Subpart T *National Emission Standards for Radon Emissions from the Disposal of* ***Uranium Mill Tailings*** were promulgated by EPA to address potential hazardous air pollutants (e.g., radon as particulate emissions were addressed effectively under the above-noted 40 CFR Part 190 fuel cycle regulations) at mill tailings facilities regulated under Title II of UMTRCA, which were *no longer operational*. Subpart T stated, in pertinent part:

> Radon-222 emissions to the ambient air from uranium mill tailings pile that are no longer operational shall not exceed 20 pCi/(m^2 -sec) (1.9 pCi/(ft^2 -sec)) of radon-222.

Subsequently, after challenges to Subpart T were filed in the United States Court of Appeals for the District of Columbia Circuit (D.C. Circuit), Subpart T was the subject of settlement discussions between the American Mining Congress (now NMA), EPA, NRC, and environmental groups, with NRC and Agreement States monitoring as interested, but not formally litigating, parties. These negotiations ultimately led to NRC revising its mill tailings regulations to require licensees to achieve enforceable "milestones" leading to accelerated placement of radon barriers at *non-operational*

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[6] United States Nuclear Regulatory Commission, *Concurrent Jurisdiction of Non-Radiological of Uranium Mill Tailings*, SECY-99-277 (December 2, 1999).

[7] United States Nuclear Regulatory Commission, Staff Requirements Memorandum, *Concurrent Jurisdiction of Non-Radiological of Uranium Mill Tailings*, SECY-99-277 (August 11, 2000).

(i.e., no longer actively milling or on standby) Title II mill tailings disposal sites[8] to satisfy EPA's and the environmental groups' concerns that the potential threat from radon emissions be addressed by the prompt placement of radon barriers over disposal areas.[9] After NRC finalized its revisions to 10 CFR Part 40, Appendix A in accordance with this settlement, EPA rescinded Subpart T of its 40 CFR Part 61 regulations and, as such, its requirements no longer apply to operating uranium mills.[10]

40 CFR Part 61, Subpart W entitled *National Emission Standards for Radon Emissions from* ***Operating Mill Tailings*** was promulgated to address radon emissions at *active* (including standby) uranium mill tailings facilities. Thus, Subpart W applies to operators of uranium mill tailings facilities while they are processing uranium/thorium ores and creating 11e.(2) byproduct material:

> The provisions of this subpart apply to owners or operators of facilities licensed to manage uranium byproduct materials during and following the processing of uranium ores, commonly referred to as uranium mills and their *associated tailings*. This subpart does not apply to the disposal of *tailings*.

New tailings impoundments constructed after December 15, 1989 must comply with one of two *work practice* standards:[11] (1) *phased disposal* in lined impoundments of forty (40) acres and meet the requirements of 40 CFR § 192.32(a) with no more than two impoundments in operation at one time; or (2) *continuous disposal* of tailings that are dewatered and immediately disposed of with no more than ten acres uncovered at one time. EPA's radon measurement Method 115 requires measurement of the different "regions" of tailings disposal facilities except those covered by water.[12]

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[8] 59 Fed. Reg. 28,220 (1994).

[9] EPA was clearly concerned with prompt placement of radon barriers over tailings piles and EPA, thus, indicated that the primary purpose of the settlement was:

> "to ensure that owners of uranium mill tailings disposal sites ... bring those piles into compliance with the 20 pCi/m^2s flux standard as expeditiously as practicable considering technological feasibility . . . with the goal that all current disposal sites be closed and in compliance with the radon emission standard by the end of 1997, or within seven years of the date on which existing operations and standby sites enter disposal status.

59 Fed. Reg. 36,280, 36,282 (1994).

[10] *See* 61 Fed. Reg. 68972 (December 30, 1996) (emphasis added).

[11] 40 CFR § 61.252(a) (2007).

[12] The Response to Comments to EPA's Final Rule on radon-222 emissions from licensed mill tailings demonstrates that EPA considered an emission standard and determined that "boundaries could be changed to comply with an emission standard which is not an acceptable practice under the Clean Air Act. Also, methods to determine emissions from tailings piles also have not been sufficiently developed to provide accurate and consistent measurements of radon emissions." United States Environmental Protection Agency, Office of Radiation Programs, *Final Rule for Radon-222 Emissions from Licensed Uranium Mill Tailings*, Response to Comments (August, 1986).

C. Application of Subpart W Work Practice Standards to Conventional and ISR Facilities

Whether Subpart W's work practice standards apply to other than *active* mill tailings impoundments at uranium recovery facilities is informed by review and analysis of the regulatory records associated with both Subparts T and W, since both were promulgated at the same time and, as these Subparts' titles suggest, were intended to address only uranium mill tailings disposal facilities.

1. Promulgation of Subpart T Regulations and Subpart W Work Practice Standards (Proposed Rule): March 7, 1989

On March 7, 1989, EPA issued a Proposed Rule for the regulation of hazardous air pollutants at uranium milling facilities, both active and inactive. First, 40 CFR Part 61, Subpart T entitled *National Emission Standards for Radon Emissions From the Disposal of* ***Uranium Mill Tailings*** were promulgated by EPA to address potential hazardous air pollutants (e.g., radon) at mill tailings facilities regulated under Title II of UMTRCA, which were no longer operational. Subpart T stated, in pertinent part:

> Radon-222 emissions to the ambient air from uranium mill tailings pile *that are no longer operational* shall not exceed 20 pCi/(m^2 -sec) (1.9 pCi/(ft^2 -sec)) of radon-222.

Second, 40 CFR Part 61, Subpart W entitled *National Emission Standards for Radon Emissions from* ***Operating Mill Tailings*** addresses radon emissions at *active* (including standby) uranium mill tailings facilities. Subpart W covers the owners and operators of uranium mill tailings facilities while they are processing uranium/thorium ores and creating 11e.(2) byproduct material:

> The provisions of this subpart apply to owners or operators of facilities licensed to manage uranium byproduct materials during and following the processing of uranium ores, commonly referred to as uranium mills and their associated tailings. This subpart does not apply to the disposal of tailings.

Neither the titles of these two Subparts nor the language of the Proposed Rules provide any indication that they were intended to apply to anything other than uranium mill tailings impoundments, as opposed to impoundments used solely as evaporation ponds.

2. Promulgation of Subpart T Regulations and Subpart W Work Practice Standards (Final Rule, Response to Comments, and Analysis): December 15, 1989

As noted above, on March 7, 1989, EPA proposed a new set of CAA regulations to reduce potential radon-222 emissions from inoperative uranium mill tailings

impoundments and new work practice standards for active tailings impoundments constructed after the Rule's effective date.

On December 15, 1989, EPA published a Federal Register notice promulgating its final Section 112 NESHAP standards governing radon emission standards for *non*-operational and operational uranium mill tailings impoundments, as well as future impoundments, analyzing the risks associated with radon emissions from such impoundments, and discussing the potential effects of the newly proposed 20 pCi/m2-s standard on such impoundments. The final rule makes no reference whatsoever to evaporation ponds at uranium mill sites, but did explicitly reference the types of radon source terms to which Subparts T and W were intended to apply. For example, when describing the process of uranium milling, EPA states:

> The process of separating uranium from its ore creates waste material called uranium mill tailings….These tailings are collected in impoundments that vary in size from 20 to 400 acres….For the current radionuclides NESHAP rulemaking, EPA is promulgating rules for three different subcategories that deal with mill tailings: operating mill tailings—existing *piles*, operating mill tailings—new technology, and disposal of uranium mill tailings (as a separate source category….Existing mill tailings *piles are large piles of wastes that emit radon*.

As discussed below, the use of the term mill tailings *piles* in this notice is consistent with the language used by Congress when defining "tailings" in UMTRCA:

> the remaining portion of a metal-bearing ore after some or all of such metal, such as uranium, has been extracted."[13]

This notice also reinforced a commonly accepted premise that would suggest that an evaporation pond would not be a significant radon source term because, as EPA states, "[r]adon emissions from these piles are retarded by the presence of water. However, if operations cease, and the pit is allowed to dry out, emissions can increase significantly."[14] Thus, EPA expressly recognized that the presence of water *in tailings* will significantly retard radon emission from given source terms. Accordingly, evaporation ponds which are constructed and used to contain significant amounts of process or waste water presumably would not represent a significant potential source of radon emissions.

3. Rescission of 40 CFR Part 61, Subpart T (Proposed Rule): December 31, 1991

On December 31, 1991, EPA proposed to rescind 40 CFR Part 61, Subpart T "as

[13] It is also common sense that a uranium mill tailings *pile* would not be an evaporation pond, because water generally does not collect and remain in a *pile*.
[14] 54 Fed. Reg. 51654 (December 15, 1989).

it applies to owners and operators of uranium mill tailings disposal sites that are licensed by the Nuclear Regulatory Commission (NRC) or an affected NRC Agreement State…."[15] EPA's proposed rescission notice included a section specifically devoted to the question of "whether the requirement extends to the evaporation pond thereby jeopardizing the other remedial aspects of the UMTRCA program."[16] This discussion recognized that evaporation ponds play an important role in the UMTRCA remedial action programs at uranium mill tailings sites:

> The regulations contemplated by this notice seek to control the emission of radon-222 by requiring the installation of an earthen cover over the disposal piles as expeditiously as practicable considering technological feasibility. However, there are other aspects to the UMTRCA regulatory scheme, including the long-term maintenance of the piles (once controlled) against erosion, and the reclamation and maintenance of groundwater….*These actions entail the use of evaporation ponds that in some instances….have been placed directly upon the disposal site*.[17]

After discussing whether evaporation ponds were to be subject to its 40 CFR Part 61, Subpart T standard, EPA concluded:

> EPA does not intend that the expeditious radon cover requirement extend to the areas where evaporation ponds are located, even if on the pile itself, to the extent that such evaporation pond is deemed by the implementing agency (NRC or an affected Agreement State) to be an appropriate aspect to the overall remedial program for the particular site involved.[18]

Indeed, EPA's Proposed Rule prescribed an approach to evaporation pond remediation as follows: "the evaporation pond area may be covered to control radon *after it is no longer in use and ready for covering*."[19] EPA supported this conclusion by reasoning that:

> the ponds themselves serve as an effective radon barrier, thus this decision is bolstered by the absence of any evidence that there is a significant public health risk presented by the radon emissions from

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[15] 56 Fed. Reg. 67561. This language demonstrates that EPA acknowledges that evaporation ponds are not to be considered as part of the class of facilities known as "uranium mill tailings piles."
[16] *Id.*
[17] *Id.* (emphasis added). The fact that evaporation ponds could be (and had been) located on top of an inoperative tailings piles to de-water piles and assist in groundwater corrective action was made known to EPA by American Mining Congress (AMC) negotiators during the settlement negotiations that ultimately led to the rescission of Subpart T.
[18] *Id.*
[19] 56 Fed. Reg. 67561 (emphasis added).

> these evaporation ponds during the period they are employed as part of the overall remediation of the site.[20]

Based on this determination, EPA concluded:

> EPA believes the overall public health interest in comprehensively resolving the problems associated with each site is best served by requiring that the radon cover be expeditiously installed in a manner that does not require interruption of this other aspect of remediation….Rather, EPA believes that provided all other parts of the pile are covered with the earthen cover, compliance with the 20 pCi/m2 standard will result….[21]

EPA's conclusions about the potential radon source term from evaporation ponds being actively used in uranium mill tailings site reclamation efforts are no less valid for such ponds being actively used during uranium recovery operations at an operational facility subject to Subpart W work practice standards.

4. Rescission of Subpart T (Final Rule): December 30, 1996

Five years after the issuance of its Proposed Rule for the rescission of Subpart T, EPA released its Final Rule declaring that Subpart T was indeed rescinded and noted that Subpart W work practice standards continued to apply to uranium mill tailings facilities constructed after December 15, 1989.[22] EPA's Final Rule contained no statements indicating any change in its interpretation of the scope of these standards, as offered in the Proposed Rule.

5. Amendments to EPA Mill Tailings Regulations (Final Rule): November 15, 1993

On November 15, 1993, EPA promulgated a Final Rule containing amendments to its regulations applicable to operational NRC/Agreement State licensed uranium mill tailings facilities. In this Federal Register notice/Final Rule, EPA responded to a number of public comments, including comments related to the application of Subpart W requirements to evaporation ponds. As stated by EPA:

> *EPA reiterates that the Agency does not intend the expeditious radon cover requirement to extend to areas where evaporation ponds are located*, even if on the pile itself, to the extent that such evaporation pond is deemed by the implementing agency…to be an appropriate aspect of the overall remedial program for the particular site.[23]

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[20] *Id.*
[21] *Id.*
[22] *Id.*
[23] 56 Fed. Reg. 67561 (emphasis added).

Essentially, in this Final Rule, EPA restated its conclusion in the Subpart T rescission regulatory record that active evaporation ponds do not represent a significant potential radon source term.[24]

6. Current Statutory and Regulatory Language

On the face of it, while fluids can be 11e.(2) byproduct material if they are no longer to be used in process operations, such fluids deposited in evaporation ponds do not qualify as "tailings" as the term is generally understood under any relevant regulatory definitions. As demonstrated by a variety of statutory and regulatory materials, despite the fact that evaporation pond fluids contain some fines from mill processing that are either suspended in the fluids or that have settled on the liner of the pond as such fluids have evaporated (which can be considered "tailings-like" 11e.(2) byproduct material), neither the fluids with entrained solid fines nor the fines themselves typically would be considered "tailings" in a pond used solely for evaporation purposes during *active* or closure operations. An *active* tailings pile/impoundment is one into which tailings (a mixture of sands, slimes, and fluids) are placed during uranium recovery. The sands and slimes constitute the bulk of the material (typically 70% plus).

First, UMTRCA's definition of "tailings," as incorporated by EPA in 40 CFR Part 61 from UMTRCA, indicates: "[t]he term 'tailings' means *the remaining portion of a metal-bearing ore after some or all of such metal, such as uranium, has been extracted*."[25] Water stored in an evaporation pond from either active recovery operations or groundwater corrective action is not consistent with the UMTRCA definition of "tailings" as the water is added to the processing circuit for the ore (or removed from the groundwater), and is not part of "the remaining portion of the metal-bearing ore from which uranium was extracted." Given that EPA's regulations in 40 CFR Part 61, Subpart T incorporate the UMTRCA definition of "tailings,"[26] EPA arguably has accepted the distinction between tailings in a tailings pile or impoundment and water related to uranium milling in an evaporation pond that may have resulted either from processing or from a groundwater corrective action program.

Second, as discussed above, EPA's 40 CFR Part 61, Subpart W regulations consistently utilize the terms "tailings pile" and "tailings impoundment" when discussing the site facilities that are covered by Subpart W work practice standards, which, on its face, does not apply to a liquid storage facility. For example, 40 CFR § 61.221 states in pertinent part:

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[24] *Id.*

[25] 42 U.S.C. § 7911(8)

[26] It should be noted that Subpart W's definition of "uranium byproduct material or tailings" adopts essentially the same definition of "11e.(2) byproduct material in Section 11(e) of the AEA, as amended by UMTRCA.

> As used in this subpart, all terms not defined here have the meanings given them in the Clean Air Act or subpart A of part 61. The following terms shall have the following specific meanings:
>
> (a) *Long term stabilization* means the addition of material on a uranium mill *tailings pile* for the purpose of ensuring compliance with the requirements of 40 CFR 192.02(a). These actions shall be considered complete when the Nuclear Regulatory Commission determines that the requirements of 40 CFR 192.02(a) have been met.[27]

In addition, when prescribing the 20 pCi/m2-s standard in Subpart T, EPA states:

> (a) Radon-222 emissions to the ambient air from uranium mill *tailings pile* that are no longer operational shall not exceed 20 pCi/(m^2 -sec) (1.9 pCi/(ft^2 -sec)) of radon-222.
>
> (b) Once a uranium mill *tailings pile or impoundment* ceases to be operational it must be disposed of and brought into compliance with this standard within two years of the effective date of the standard. If it is not physically possible for an owner or operator to complete disposal within that time, EPA shall, after consultation with the owner or operator, establish a compliance agreement which will assure that disposal will be completed as quickly as possible.[28]

EPA's Subpart W regulations use both the term "tailings impoundment" and "tailings pile" when discussing the facilities to which Subpart W's 20 pCi/m2-s radon emission standard applies and the work practice standards for operational and potential future tailings facilities.[29] The use of the term "pile" is consistent with prior practices at uranium mill tailings sites where mill tailings were routinely placed in a "pile" rather than the current practice of placing mill tailings in an "impoundment." However, the random use of the terms "pile" and "impoundment" suggests that as technology was transforming, the terms were being interchangeably applied to mill "tailings" disposal facilities. As a result, Subpart W appears to apply to "tailings" as described in EPA's rulemaking materials, whether the term "piles" or "impoundments" is used.

Additional evidence for the positions espoused above can be found in EPA's background and guidance documents on NESHAPs, its Final Rule on Subpart W work practice standards, and their application to uranium mill tailings piles/impoundments and the appendix setting out Method 115 entitled *Monitoring*

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[27] 40 CFR § 61.221(a-b).
[28] 40 CFR § 61.222(a-b).
[29] *Compare* 40 CFR § 61.252(a); 40 CFR § 61.252(b-c). This is entirely consistent with the history of the development of uranium mill tailings disposal facilities in that the older uranium mills constructed "piles" for disposal of tailings; but by the time that EPA's CAA regulations were being developed and promulgated, the technology had advanced to use "impoundments" which were, and are, more stable and controllable in both the short and long-term context than the old "piles."

for Radon Emissions. Initially, EPA's NESHAP documents expressly recognize that the scope of the Subpart W work practice standards was intended to reach *tailings* stored in on-site tailings piles/impoundments *and not* to other site facilities such as evaporation ponds:

> As with any ore-processing operation, uranium milling produces large quantities of waste rock. Uranium mill wastes, *or tailings*, are usually stored in an impoundment located on the mill site.[30]

Further, EPA's guidance on work practices includes a discussion of potential work practice procedures for controlling radon emissions from milling operations that result in tailings. These practices include the use of "earthen covers" to be applied to tailings to reduce potential fugitive emissions such as radon:

> Earth covers which consist of layered soil approximately 3 meters deep are frequently used on waste piles, reclaimed lands, or inactive surface mining areas to reduce both particulate and radon emissions.[31]

However, the use of an earthen cover to retard radon emissions from an evaporation ponds rather than a mill tailings pile/impoundment is unnecessary because the water in the pond retards such emissions, and EPA's recognition that, when the pond is no longer actively used, it will be dried and covered.

EPA's background document for its Subpart W work practice standards contains additional evidence to support the conclusion that such standards do not apply to evaporation ponds. When describing what is encompassed by the term "tailings," EPA states:

> Tailings include the barren crushed ore material plus process solutions. These tailings consist of mixtures of sands and slimes (coarse and fine tailings). *Evaporation ponds used to contain excess liquid from tailings impoundments also contain suspended…tailings….*[32]

This statement appears to support the fact that the term "tailings" is intended to apply to the materials in a site's active mill tailings impoundments and not to fluids in impoundments used solely as evaporation ponds, as evaporation ponds are considered a separate point of analysis from mill tailings impoundments. EPA's

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[30] United States Environmental Protection Agency, *Radionuclides: Background Information Document for Final Rules*, Volume I at 4-29 (October, 1984).

[31] United States Environmental Protection Agency, *Final Rule for Radon-222 Emissions from Licensed Uranium Mill Tailings: Background Information Document* at 7-2 to 7-3 (August, 1986).

[32] *Id.* at 3-19. In addition, the statement following this quote further demonstrates that EPA considered fluids in evaporation ponds to not be a radon source term: "*If exposed,* these solids are assumed to emit radon-222 at the same specific flux as tailings impoundments." The low nature of tailings covered by water is also noted by EPA in Volume I of its Background Information Document on *Radionuclides*: "When tailings impoundment areas are almost completely covered by water, radionuclide emissions will be low."

Response to Comments also includes evidence that the work practice standards were not intended to apply to evaporation ponds due to their minimal radon emissions:

> Recent technical assessments of radon emission rates from tailings indicate that radon emissions from tailings covered with less than one meter of water, or merely saturated with water, are about 2% of emissions from dry tailings. *Tailings covered with more than one meter of water are estimated to have a zero emissions rate. The Agency believes this calculated difference between 0% and 2% is negligible. The Agency used an emission rate of zero for all tailings covered with water or saturated with water in estimating radon emissions.*[33]

Additionally, as Method 115, paragraph 2.1.3 states, "radon flux measurements shall be made within each region on the pile, *except for those areas covered with water*." Paragraph 2.1.3(a) also states, "*Water covered area*--no measurements required as radon flux assumed to be *zero*."[34]

Finally, significantly, EPA also discusses the relatively small amount of radon potentially emitted from on-site impoundments at *in situ* uranium recovery (ISR) sites: "A small amount of radon is released from the waste impoundments use to store contaminated liquids from the operation." Further, EPA's Background Information Document on *Radionuclides* states regarding ISR projects: "The radioactive emissions from this source are small compared to the other sources."[35] These statements are bolstered by EPA's response to comments on its final NESHAP for underground uranium mines rule:

> The Agency has not ignored the risks from surface and <u>in situ</u> uranium mining…Standards were not proposed for either of these technologies as the maximum ground level air concentrations of radon emitted from these activities are significantly lower than those which result from underground mining.[36]

Thus, the records in the Subpart T, Subpart W, and Subpart B proceedings and EPA's Method 115 rationale and proceedings suggest strongly that evaporation

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[33] United States Environmental Protection Agency, *Final Rule for Radon-222 Emissions from Licensed Uranium Mill Tailings: Response to Comments* at 11 (October, 1984).

[34] Emphasis added. *See also* Method 115, Paragraph 2.1.6 *Radon Flux Measurement*…The radon collector is placed *on the surface* of the pile area to be measured and allowed to collect radon for a time period of 24 hours. The detailed measurement procedure provided in Appendix A of EPA 520/5-85-0029(1) shall be used to measure the radon flux on the uranium mill tailings except the *surface of tailings* shall not be penetrated by the lip of the radon detector as directed in the procedure, rather the collector shall be carefully positioned *on a flat surface* with soil or tailings used to seal the edge.

[35] *See* United States Environmental Protection Agency, *Radionuclides, Background Information Document for Final Rules*, Volume II, p. 5-2 (October, 1984).

[36] United States Environmental Protection Agency, *Radionuclides: Response to Comments for Final Rules*, Volume I at 87 (October, 1984).

ponds at conventional uranium milling facilities, much less those at ISR facilities do not warrant the application of work practice standards to control radon emissions.

D. Conclusions

Therefore, based on the foregoing discussion, it appears that EPA's 40 CFR Part 61, Subpart W work practice standards do not apply to evaporation ponds at uranium recovery facilities.

Appendix 6

Kennecott Uranium Company
Sweetwater Uranium Project
Radon Flux from Tailings Impoundment Pools

Pool	Radium-226 Activity		Radon Emanation Coefficient	Radon-222 Activity in	LAACC Number	Water	Pool	Placed		Retrieved		Charcoal	Measured Flux	Barometric Pressure During Test		Temperature During Test (Two (2) Meters above Ground Surface)		Ratio of Radon-222 Activity in picoCuries per liter to Flux in picoCuries per meter2-second
Name	Fluid	Sediment	Sediment	Fluid		Temperature	Depth	Date	Time	Date	Time	Moisture		Minimum	Maximum	Minimum	Maximum	
	(pCi/L)	(pCi/gr)	(Percent)	(pCi/L)		(Degrees Centigrade)	(Inches)					(Percent)	(pCi/M2-sec)	Millimeters of Mercury	Millimeters of Mercury	Degrees Centrigrade	Degrees Centrigrade	
1-E	26	10.2	23.1	570	116	19.5	16	8/10/2010	11:24	8/11/2010	12:53	3.1	0.83	765.075	766.677	9.902	27.555	0.0015
1-E	26	10.2	23.1	570	117	19.5	18	8/10/2010	11:27	8/11/2010	12:54	2.0	0.82	765.075	766.677	9.902	27.555	0.0014
1-E	26	10.2	23.1	570	1	15.5	16	8/11/2010	12:53	8/12/2010	13:18	3.1	<0.05	761.976	765.363	12.064	28.311	
1-E	26	10.2	23.1	570	2	15.5	18	8/11/2010	12:54	8/12/2010	13:18	3.1	0.50	761.976	765.363	12.064	28.311	0.0009
5-E	39	8.8	14.3	1750	118	19.5	13	8/10/2010	11:33	8/11/2010	12:57	2.9	0.78	765.075	766.677	9.902	27.555	0.0004
5-E	39	8.8	14.3	1750	119	19.5	10	8/10/2010	11:37	8/11/2010	12:58	2.4	0.78	765.075	766.677	9.902	27.555	0.0004
5-E	39	8.8	14.3	1750	3	15.5	13	8/11/2010	12:57	8/12/2010	13:20	3.0	<0.05	761.976	765.363	12.064	28.311	
5-E	39	8.8	14.3	1750	4	15.5	10	8/11/2010	12:58	8/12/2010	13:22	2.9	0.57	761.976	765.363	12.064	28.311	0.0003
9-W	22	7.3	27.6	772	120	20.3	24	8/10/2010	11:43	8/11/2010	13:01	2.8	0.76	765.075	766.677	9.902	27.555	0.0010
9-W	22	7.3	27.6	772	121	20.3	28	8/10/2010	11:49	8/11/2010	13:03	2.6	0.67	765.075	766.677	9.902	27.555	0.0009
9-W	22	7.3	27.6	772	122	20.3	29	8/10/2010	11:53	8/11/2010	13:04	1.7	0.63	765.075	766.677	9.902	27.555	0.0008
9-W	22	7.3	27.6	772	5	16.7	24	8/11/2010	13:01	8/12/2010	13:25	3.5	0.51	761.976	765.363	12.064	28.311	0.0007
9-W	22	7.3	27.6	772	6	16.7	28	8/11/2010	13:03	8/12/2010	13:27	3.5	0.51	761.976	765.363	12.064	28.311	0.0007
9-W	22	7.3	27.6	772	7	16.7	29	8/11/2010	13:04	8/12/2010	13:27	2.5	0.56	761.976	765.363	12.064	28.311	0.0007
SE Pool	15	18.2	18.7	446	123	19.1	16	8/10/2010	12:00	8/11/2010	13:09	3.6	0.64	765.075	766.677	9.902	27.555	0.0014
SE Pool	15	18.2	18.7	446	124	19.1	15	8/10/2010	12:03	8/11/2010	13:11	2.5	0.61	765.075	766.677	9.902	27.555	0.0014
SE Pool	15	18.2	18.7	446	125	19.1	10	8/10/2010	12:07	8/11/2010	13:12	2.0	0.64	765.075	766.677	9.902	27.555	0.0014
SE Pool	15	18.2	18.7	446	8	17.8	16	8/11/2010	13:09	8/12/2010	13:32	3.3	<0.05	761.976	765.363	12.064	28.311	
SE Pool	15	18.2	18.7	446	9	17.8	15	8/11/2010	13:11	8/12/2010	13:34	3.0	0.51	761.976	765.363	12.064	28.311	0.0011
SE Pool	15	18.2	18.7	446	10	17.8	10	8/11/2010	13:12	8/12/2010	13:33	2.3	0.53	761.976	765.363	12.064	28.311	0.0012

Notes: None of the activated charcoal exceed a moisture content of 3.60% following the test.
None exceeded the 11% limit on moisture described by Dr. Baker.
The test's Lower Limit of Detection (LLD) was 0.5 picoCuries per meter2-sec

Charcoal for this test counted for ten (10) minutes as opposed to five (5) minutes to improve Lower limit of Detection (LLD).
Barometric pressure data is corrected for elevation (corrected to sea level)

Appendix 7

Radon Emissions From Tailings Ponds

Presented To:

National Mining Association (NMA)

/Nuclear Regulatory Commission (NRC)
Uranium Recovery Workshop

Denver – July 2, 2009

Presented By:

Dr. Douglas B. Chambers

Today's Discussion

- Subpart W
- Radon
- Radon diffusion
- Radon flux from tailings
- Radon from water cover
- EPA's proposed method of monitoring
- Summary observations

Subpart W
NESHAP for Radon Emissions from Operating Mill Tailings

- ***Uranium byproduct material or tailings*** **means waste produced by the extraction or concentration of uranium from any ore processed primarily for its source material content.**
- **Rn-222 flux from existing uranium mill tailings pile of less than 20 pCi/m^2 · s**

Subpart W …(cont'd)
NESHAP for Radon Emissions from Operating Mill Tailings

- **New tailings impoundments must meet one of two work practices**
  - **For phased disposal, no more than two 40 acre cells (including existing impoundments can be in operation at any single time**
  - **For continuous disposal, tailings are dewatered and immediately disposed with no more than 10 acres in operation at any one time**
- **Annual radon flux testing required**

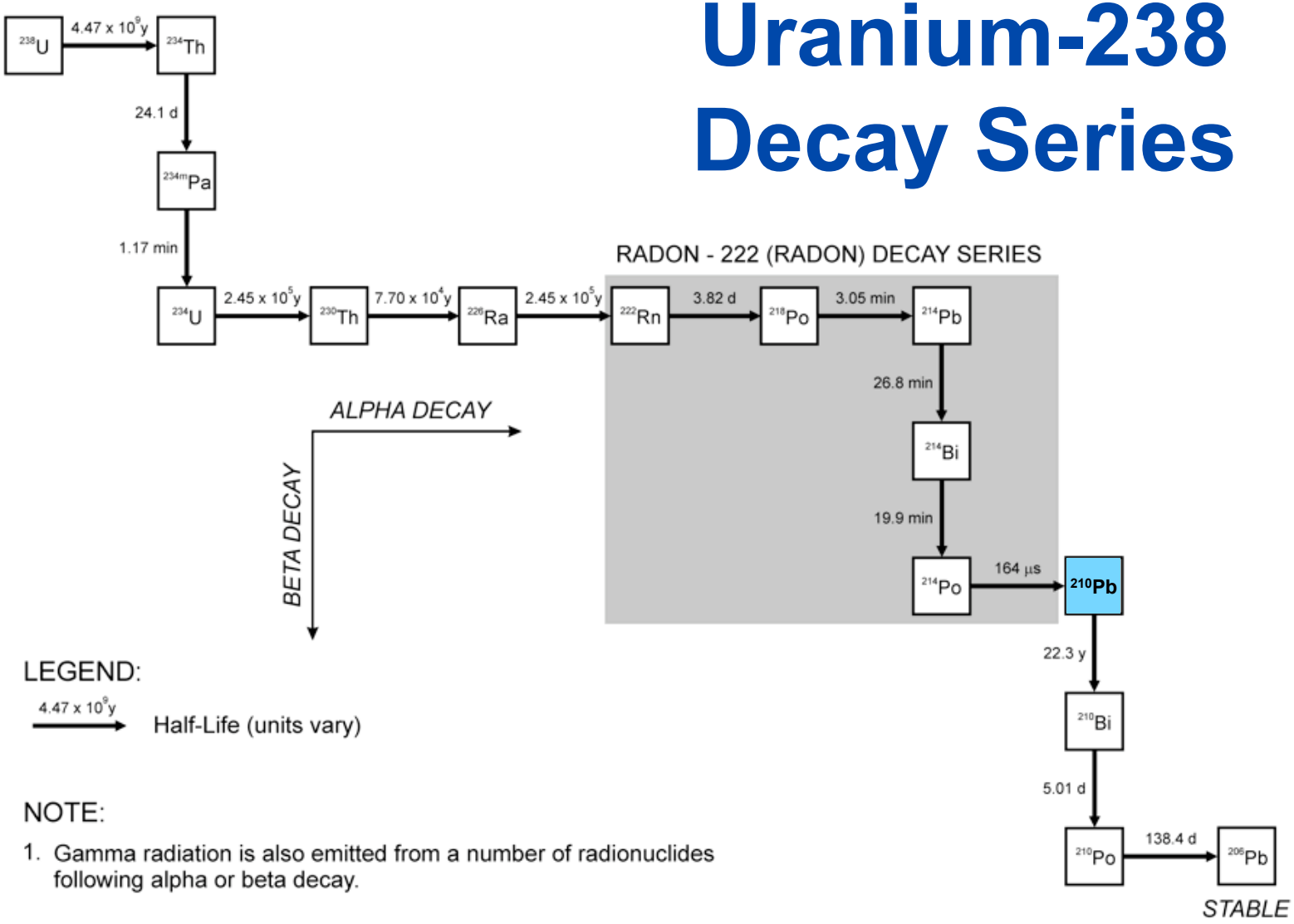
Nominal Radon Flux
(BID – Final Rule for Radon, EPA 1986)

- **Dry Tailings (soil)** **1 pCi Rn-222/m^2s per pCi Ra-226/g**
- **Saturated** **0.3 pCi Rn-222/m^2s per pCi Ra-226/g**
- **Water Cover** **0 pCi Rn-222/m^2s per pCi Ra-226/g**

Radon

- Radon is everywhere
- Produced through radioactive decay of Ra-226
- Half-life of 3.82 days
- EPA has raised issue with ISR evaporation ponds
- EPA has raised issue with Pb-210

Uranium-238 Decay Series



NOTE:

1. Gamma radiation is also emitted from a number of radionuclides following alpha or beta decay.

Radon Production Rate

The radon production rate (q) in a porous radium-bearing material can be expressed as:

$$q = [Ra] \times \rho \times \frac{E}{P} \times \lambda$$

$$= \frac{\beta \times E}{P} = \frac{\beta}{P}$$

Where:

[Ra] = radium-226 concentration

ρ = bulk density (g/cm^3)

E = emanation coefficient

P = porosity (void fraction)

λ = radon decay constant

β = emanating power ($pCi/s\text{-}cm^3$)

Diffusion Length

$$L = \sqrt{\frac{D}{\lambda_P}}$$

Where:

L = diffusion length
= distance to which concentration decreases by factor of e (= 2.718)

D = bulk diffusion coefficient (cm^2/s)

λ = radon decay constant
= $2.1 \times 10^{-6}/s$

P = porosity (void volume/total volume)

Diffusion of Radon Across a Medium

In general, when radon is covered by inert material, diffusive flux (J) can be expressed (approximately) as:

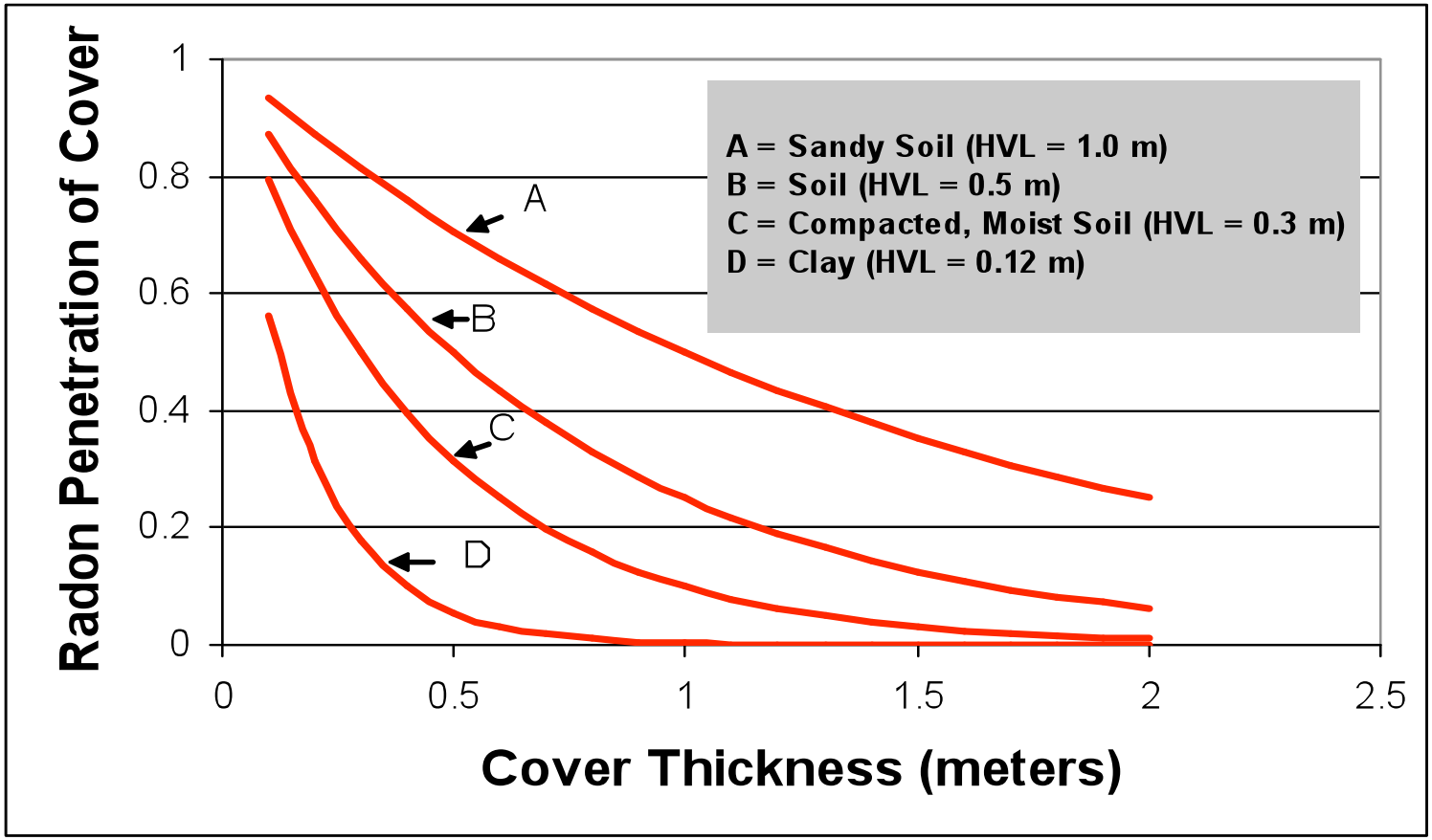
$$J = e^{\frac{-Z}{L}}$$

Where:

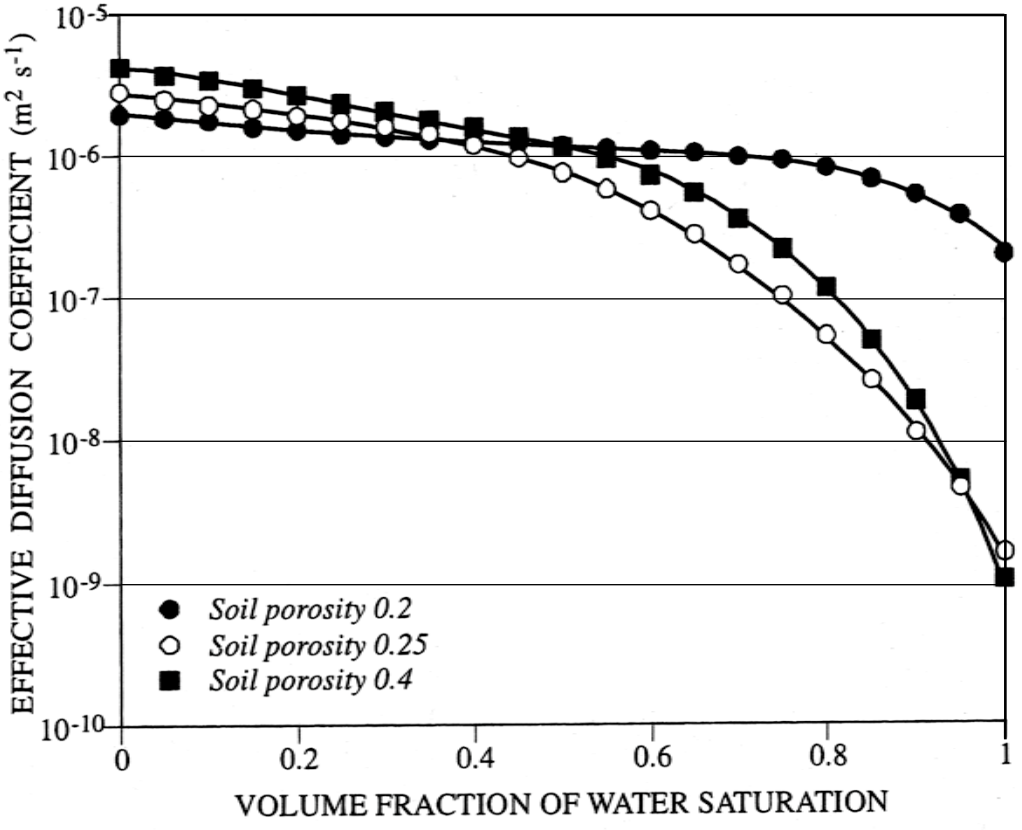
Z = "Cover" thickness

L = diffusion length

Diffusion of Radon Across a Medium

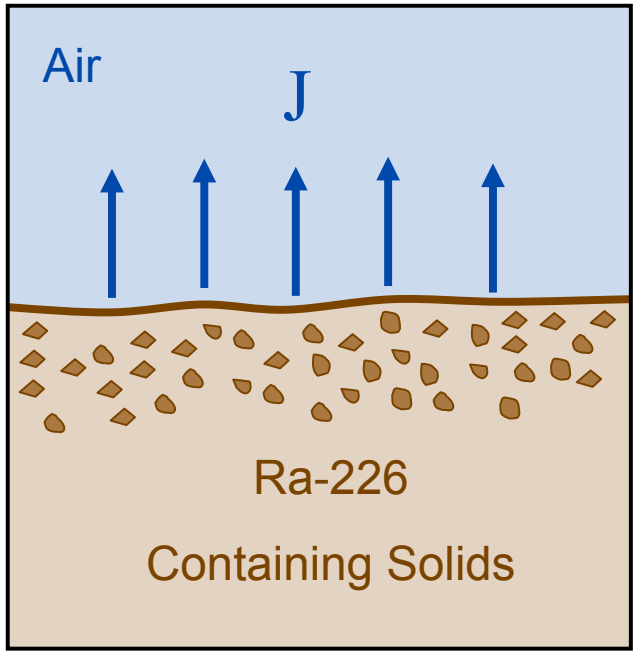


Experimental Diffusion Coefficients (UNSCEAR 2000)



SOURCE: After UNSCEAR 2000

Radon Flux



Based on Fick's Laws:

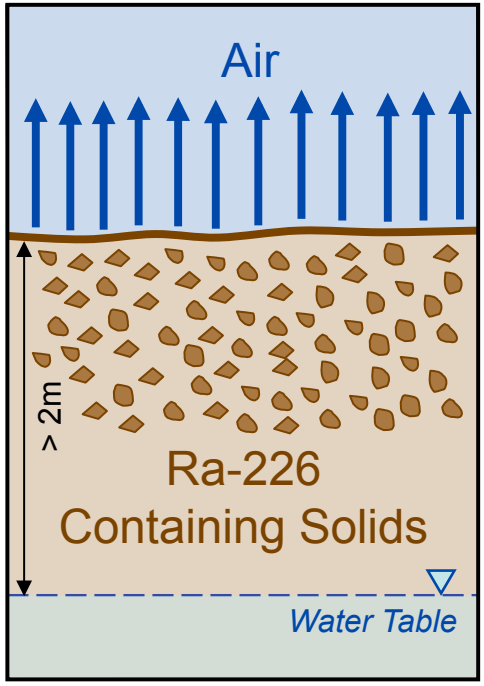
$$J = \beta \times L \quad (pCi/m^2 \cdot s)$$

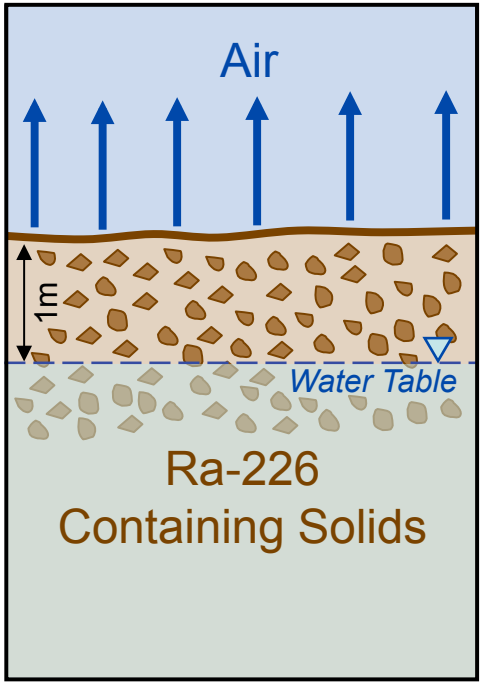
Where:

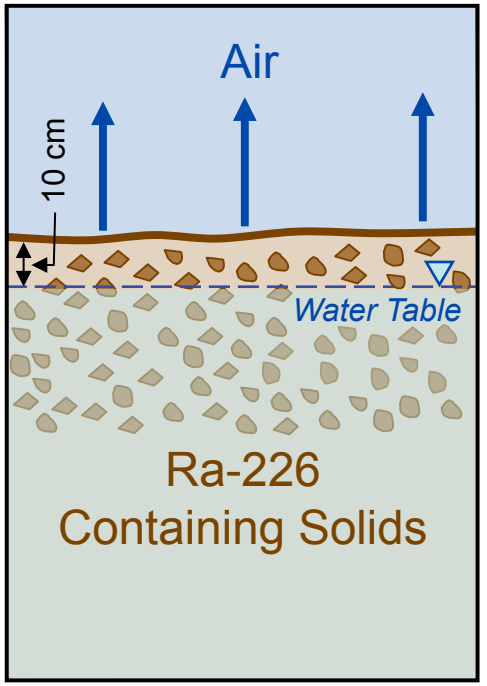
β = emanating power ($pCi/m^3 \cdot s$)

L = diffusion length

Effects of Depth to Water Table







Radon From Water Cover (1)

- **Two Mechanisms**
  - **Diffusion**
  - **Turbulent transfer**

Radon From Water Cover (2)

- **Diffusion**
  - **Diffusion coefficient in water << diffusion coefficient in air (1/100th)**
  - **Rn-222 gas exchange via diffusion from surface of small lake has been measured (Experimental lakes, Ontario)**

$$F\ (pCi/m^2 \cdot d) \cong k_{Rn}\ (m/d)\ x\ [C\text{-}Co]\ (pCi/m^3)$$
$$\cong k_{Rn}\ x\ C$$

  - For k_{Rn} ~ 0.5m/d

C (pCi/L)	F (pCi/m^2 • s)
10	5.8 x 10^{-5}
100	5.8 x 10^{-4}
1000	5.8 x 10^{-3}

Radon From Water Cover (3)

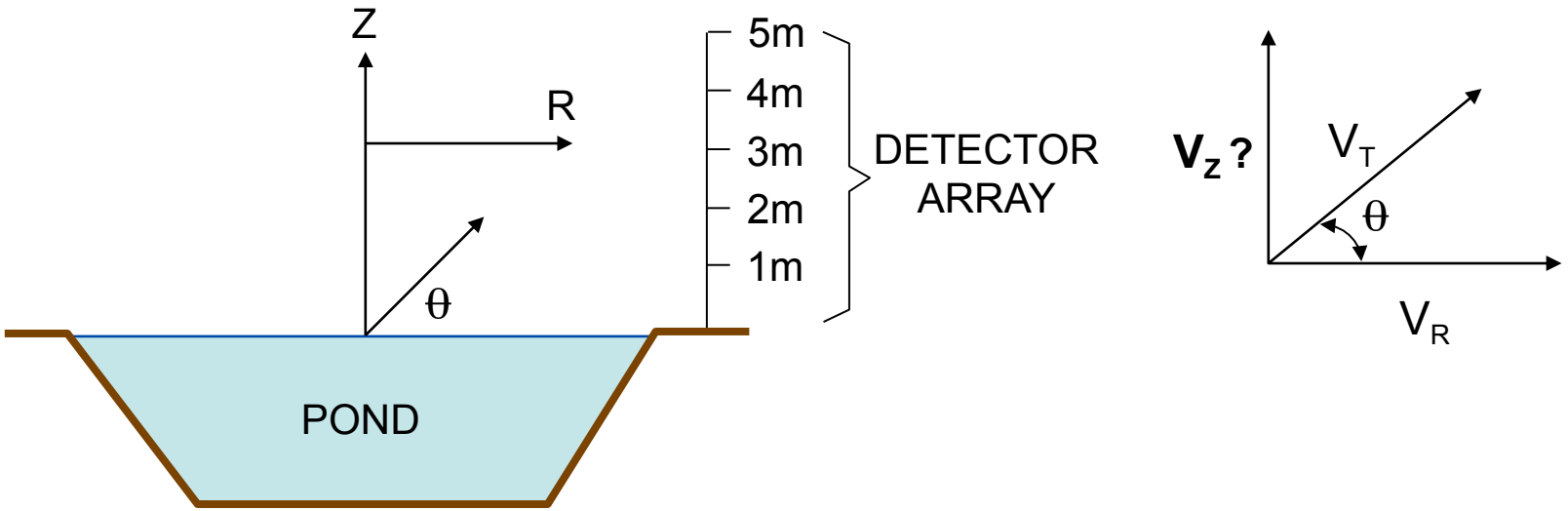
- **Turbulence (wave action)**
  - **Rn-222 is produced at the rate of 2.1 x 10^{-6}/s from Ra-226**
  - **Assumes radon released at surface as it is produced from Ra-226 within "turbulent" layer**

Ra-226 (pCi/L)	Depth of Turbulent Mixing (cm)	Rn-222 (pCi/m^2•s)
10	10	0.002
	50	0.01
100	10	0.02
	50	0.1
1000	10	0.2
	50	1

Can We Measure Radon Flux From Water Covered Tailings ?

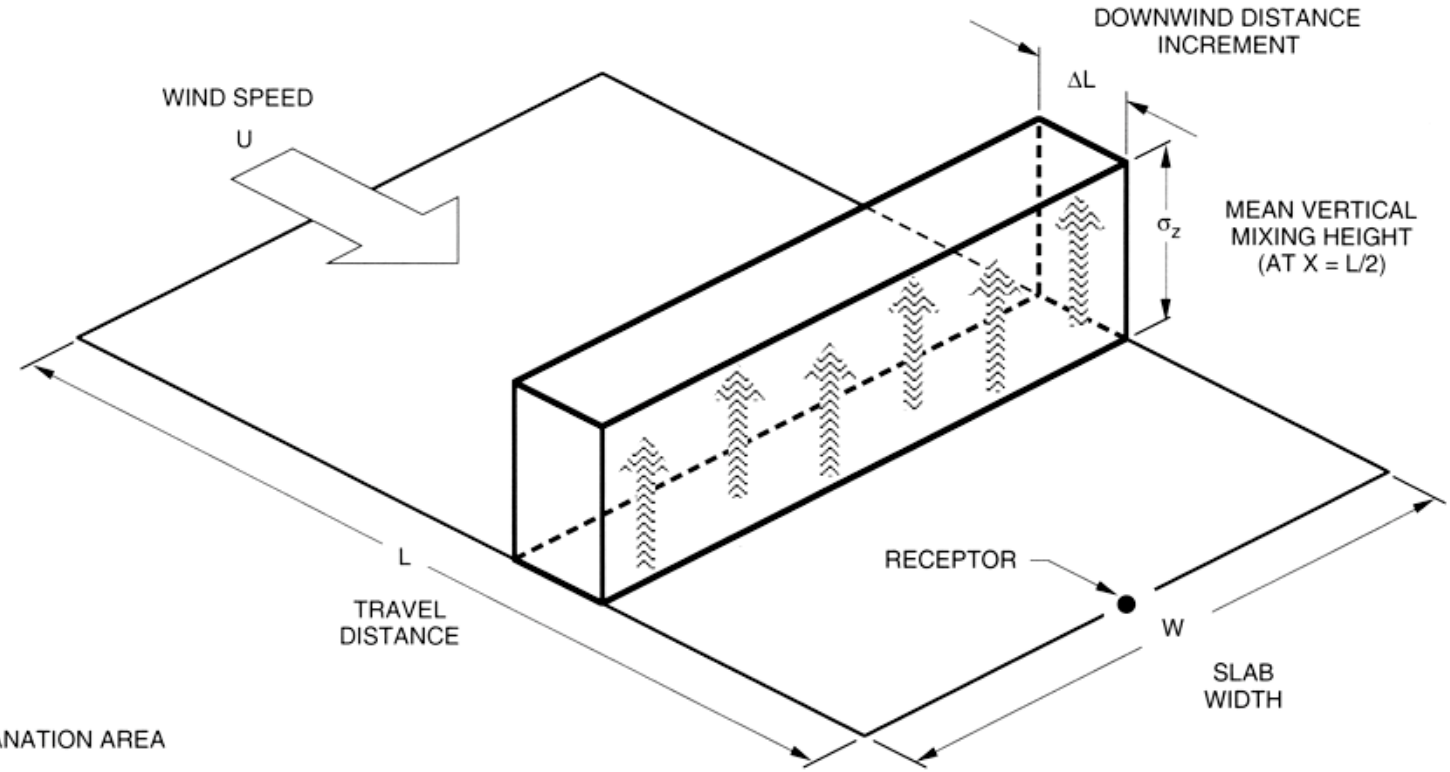
- EPA's proposal
- Schiager's method
- Diurnal variation
- Rn-222 with distance
- Pb-210 with distance

Pond Showing Z & R Directions and Detector Array



SOURCE: After EPA, 2009

Schiager's Box Model



NOTE:

$W\Delta L$ = EMANATION AREA

$\sigma_z W\Delta L$ = DILUTION VOLUME

$$C_X\ (pCi / m^3) = \frac{[\text{FLUX}, \Phi]\ [\text{AREA}, W\Delta L]\ [\text{TIME}, L/U]}{[\text{VOLUME}, \sigma_z W\Delta L]} = \frac{\Phi L}{U\sigma_z}$$

σ_z defined by stability class

SOURCE: After Schiager, 1974

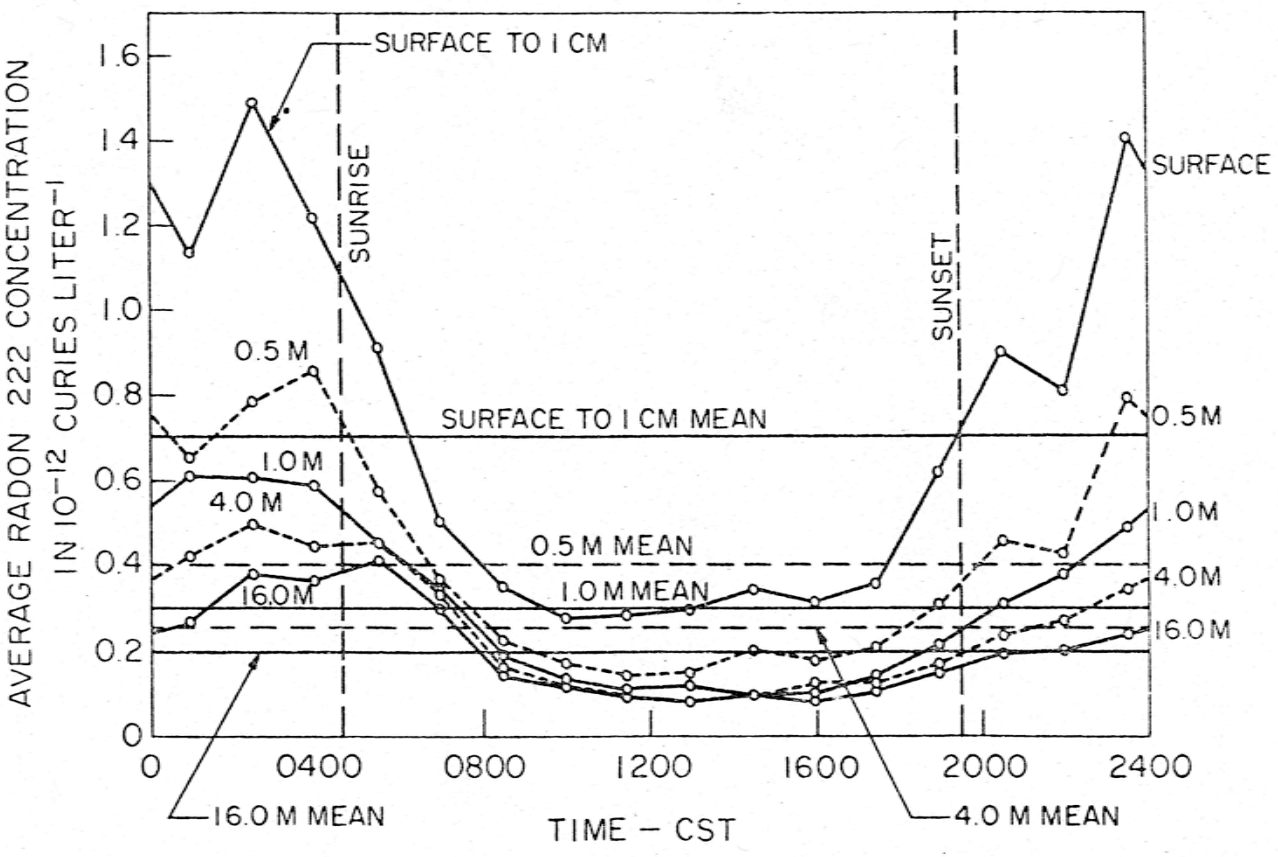
Incremental Radon

- **Using Schiager model**
  - 80 acres of pond
  - Radon flux of 1 $pCi/m^2 \cdot S$
  - L= 600 m
  - Sigma z from Turner workbook of (about) 24m
  - Assume u = 3 m/s
- **Radon concentration at edge of cell**

  C = (1 x 600)/(3 x 24) pCi/m^3 x 1 m^3/1000L

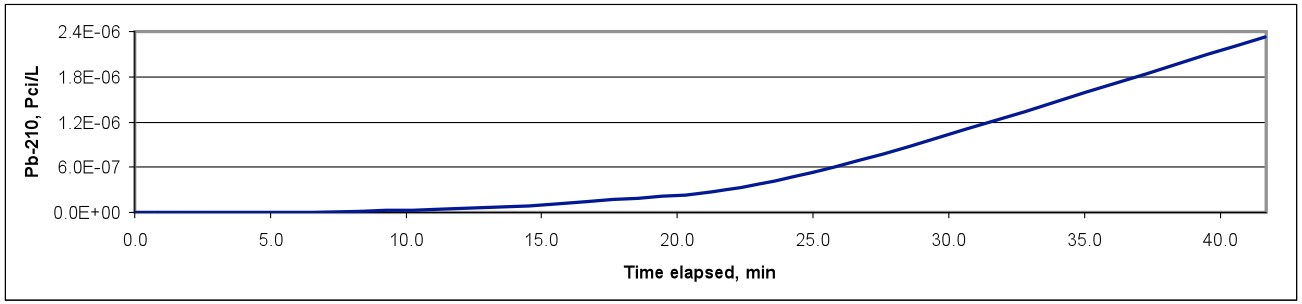
  = 0.08 pCi/L

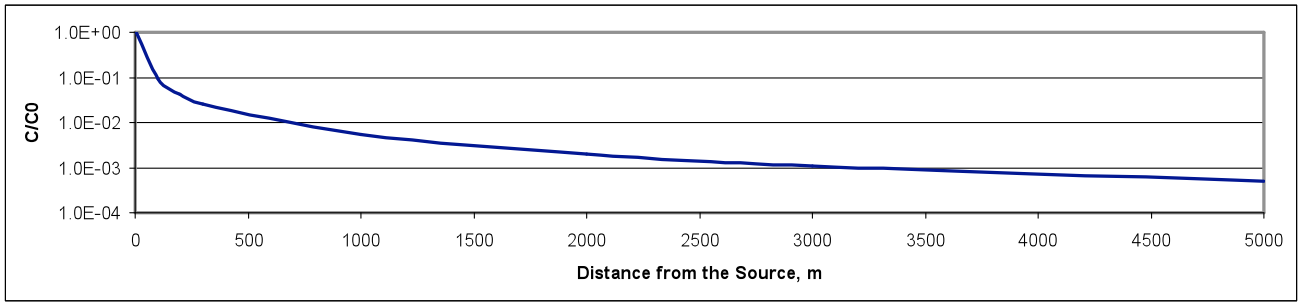
Rn-222 Concentration Diurnal Variation

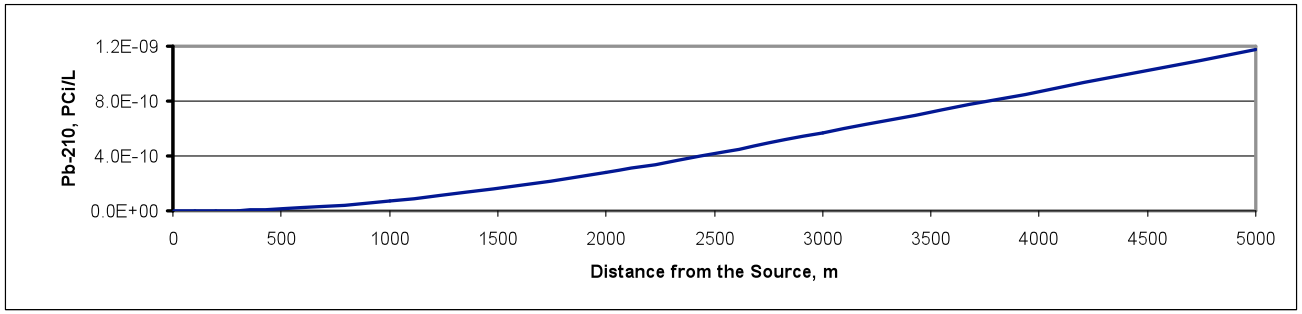


SOURCE: After Pearson, U.S. Department of Health & Welfare, 1967

Pb-210 with Distance*







* Denver Windrose, 80 acre source at 1pCi/m^{2}s, direction of maximum concentration

** Background Pb-210 ranges from 3x10^{-6} pCi/L to 30x10^{-6} pCi/L (UNSCEAR 2000)

Key Observations

- Rn-222 is everywhere
- Concentrations of Rn-222 vary with location, time of day, meteorological conditions .....
- Rn-222 flux from ponded areas << dry areas
- Practical limits on ability to measure Rn-222 (or Pb-210) from pond areas
- Suggest feasibility assessment (DQO process) prior to implementation of proposed monitoring practices

Appendix 8

Radon Flux from Evaporation Ponds

Kenneth R. Baker, Ph.D.
Environmental Restoration Group, Inc
Albuquerque, NM

and

Alan D. Cox
Homestake Mining Company of California
Grants, NM

Current Issue: Regulatory Agencies Expressing Interest in Radon Emissions from Ponds

- Approach to evaluate issue included
  - Modeled radon emissions from pond
  - Studied water vapor adsorption on activated charcoal flux canisters
  - Studied effect of water vapor adsorption on flux measurements
  - Performed Radon Flux Measurements on a pond

Model

- Stagnant-Film model for the transport of a gas across an air-water interface[1]
  - Results of:

Radon Flux = 0.01 pCi m^{-2} s^{-1} per pCi L^{-1} of dissolved radon

[1]**Summarized in** Schwarzenbach, Rene P., Philip M. Gschwend, and Dieter M. Imboden. *Environmental Organic Chemistry*. 2nd Edition. 2002

Predicted Flux at Homestake Evaporation Pond (EP-1)

- Measured Ra-226 concentration = 165 pCi L^{-1}
- Measured Temperature = 20.6 ^{o}C
- Assume Rn-222 in secular equilibrium with Ra-226

Model Predicted Flux at EP-1 = 1.65 pCi $m^{-2}s^{-1}$

ERG Radon Flux Canister Design

Figure 1. ERG Radon Flux Canister

- Charcoal weight is approximately 385 grams
- EPA design calls for 170 grams of charcoal

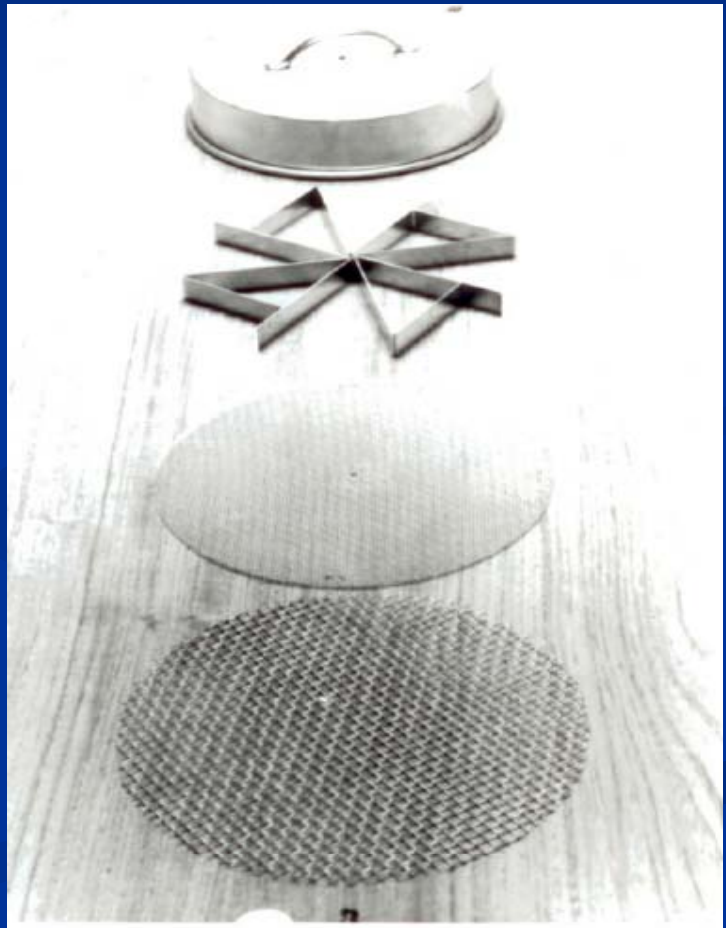


Figure 2. ERG Canister Internal Components

Flux Canister Floatation Platform

- 10-in. ID plastic pipe
- 4-in. low density foam
- Tape band

Previous Water Vapor Adsorption Studies

- Affects observed in previous studies
  - **radon adsorption efficiency is reduced as temperatures and humidity increases**
  - **water vapor competes with radon adsorption**
  - **water vapor reduces radon adsorption when water mass gain of charcoal exceeds 11 %**

Radon Flux Baseline Studies

Configuration: Analyzed 9 Unexposed Canisters

Result: Mean Flux = 0.12 ± 0.11 pCi $m^{-2}s^{-1}$

Radon Flux Baseline Studies

- Configuration: Analyzed 10 canisters exposed for 24 hours to only water

Result: Mean Flux = 0.13 ± 0.10 pCi $m^{-2}s^{-1}$

Radon Flux Baseline Studies

- Deployed 23 flux canisters on newly constructed radon barrier in NM (August 2009) following EPA Method 115 procedures :
  - Increase in mass of 5.9 ± 1.0 percent, based on dry weight of charcoal
  - Three canisters placed at background location with results of 1.08, 1.15, and 1.42 pCi $m^{-2}s^{-1}$

Water Vapor Adsorption Studies with Desiccant

- Inserted 2-cm thick desiccant between canister
- Desiccant became saturated within 6 hours
- Abandoned possible desiccant use

Water Vapor Adsorption Studies

- Configuration: Floating Platform on pool of aged-city water
  - Five canisters deployed for 24 hours
  - Uniform temperature of 20-23 ºC

Result: Increase in mass ranging from 4.5 to 5.2 percent, based on dry weight of charcoal, with an average of 4.8 percent

Assessment of Radon Adsorption During Study (24-hour exposure)

Canisters	Number	Moisture Content (%)	Mean Flux (pCi $m^{-2}s^{-1}$)	Standard Deviation (pCi/$m^{-2}s^{-1}$)
After Baking Out	5	0	0.10	0.10
After Placement On Water	5	0 - 5.2 4.8 avg	0.11	0.08
After Placement On Flux Pad	5	4.8 avg	1.76	0.06

Shows that canisters do not adsorb radon from air while on floating platform

Influence of Canister Moisture on Flux Measurements

Canisters	Number	Moisture Content (%)	Mean Flux (pCi $m^{-2}s^{-1}$)	Standard Deviation (pCi $m^{-2}s^{-1}$)
Exposed to Flux Pad Only	7	≈ 0	1.84	0.34
Exposed to Water before Flux Pad	8	7.1 -8.8 Avg 7.9	2.10	0.16

Flux Measurements on EP-1 Homestake Uranium Mill Site

Canister Number	Flux ($pCi\ m^{-2}s^{-1}$)	Flux Standard Deviation ($pCi\ m^{-2}s^{-1}$)	Percent Moisture Increase
43	1.77	0.06	11.06
12	1.12	0.05	10.57
82	.99	0.05	13.38
44	1.02	0.05	10.68
13	0.77	0.05	9.38
Mean	1.13		11.0

Summary

- Canisters adsorb little radon from air while on water
- Measured radon flux was not affected by charcoal moisture content under measurement conditions
- Model predicted 1.65 pCi/m^2s which compares well with the mean measured flux of 1.13 pCi/m^2s

Questions?

Appendix 9

National Mining Association

Experimental Determination of Radon Fluxes over Water

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Introduction

- This presentation will:
  - Discuss prior information regarding radon fluxes from water surfaces
  - Discuss laboratory research funded by the National Mining Association (NMA) regarding radon fluxes from water surfaces.
  - Compare the results of the research with previously reported data.
  - Show that radon fluxes from most water surfaces at uranium recovery operations are insignificant and approximate background soil fluxes for most areas.

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Prior Work

- Information regarding radon fluxes from water surfaces has been presented on the following two (2) occasions:
  - *Radon Emissions From Tailings Ponds* - Dr. Douglas B. Chambers - July 2, 2009
  - *Radon Flux from Evaporation Ponds* – Dr. Kenneth R. Baker, Ph.D. Environmental Restoration Group, Inc and Alan D. Cox - Homestake Mining Company of California

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Prior Work - *continued*

- *Radon Emissions From Tailings Ponds* - Dr. Douglas B. Chambers - July 2, 2009
  - Discussed Rn-222 gas exchange via diffusion from the surface of a small lake (Experimental lakes, Ontario)
  - Concluded that Radon-222 releases were low as shown in the table below:

Ra-226 (pCi/L)	Depth of Turbulent Mixing (cm)	Rn-222 (pCi/m^2·s)
10	10	0.002
	50	0.01
100	10	0.02
	50	0.1
1000	10	0.2
	50	1

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Prior Work - *continued*

- *Radon Flux from Evaporation Ponds* – Dr. Kenneth R. Baker, Ph.D. Environmental Restoration Group, Inc and Alan D. Cox - Homestake Mining Company of California
  - Measured radon flux from an evaporation pond using modified floating Large Area Activated Charcoal Canisters (LAACCs)
  - Concluded that radon fluxes obeyed the Stagnant Film Model (SFM) and that flux rates in picoCuries per meter2-second were approximately 0.01 times the Radium-226 activity of the water. The Radon-222 activity of the water was not measured in this experiment and was assumed to be in equilibrium with the dissolved Radium-226.
  - A picture of the floating Large Area Activated Charcoal Canister (LAACC) used is shown below:

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Discussion of Prior Work

- Both prior experiments were performed in outdoor environments specifically in experimental lakes or evaporation ponds under non-laboratory conditions.
- No specific data regarding actual Radon-222 activity of the water was provided for either experiment.

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Purpose of this Research

- This current research was performed to determine Radon-222 flux at the surface of water containing Radium-226 and Radon-222 under controlled laboratory conditions using an accepted method of determining Radon – 222 flux, specifically using Large Area Activated Charcoal Canisters (LAACCs) as described in *Radon Flux Measurements on Gardiner and Royster Phosphogypsum Piles Near Tampa and Mulberry, Florida* since this is the currently accepted method of determining radon flux in Method 115 referenced in 40 CFR Part 61.253 *Determining compliance*.
- In this way, data gathered in the course of this study can be effectively compared with other data collected in prior compliance monitoring work using Large Area Activated Charcoal Canisters (LAACCs) since the measurement method is the same.

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Testing Protocol

- Five (5) barrels containing deionized water with the following Radium-226 activities were created using a traceable Radium-226 standard:
  - 0 picoCuries per liter (water with no added Radium-226)
  - 5,000 picoCuries per liter
  - 10,000 picoCuries per liter
  - 15,000 picoCuries per liter
  - 20,000 picoCuries per liter

The solutions were placed in barrels as shown below:

The Radium – 226 in the solutions in the barrels was allowed to attain radiometric equilibrium with the Radon-222 by being allowed to sit covered for forty (40) days (slightly over ten (10) half lives for Radon-222).

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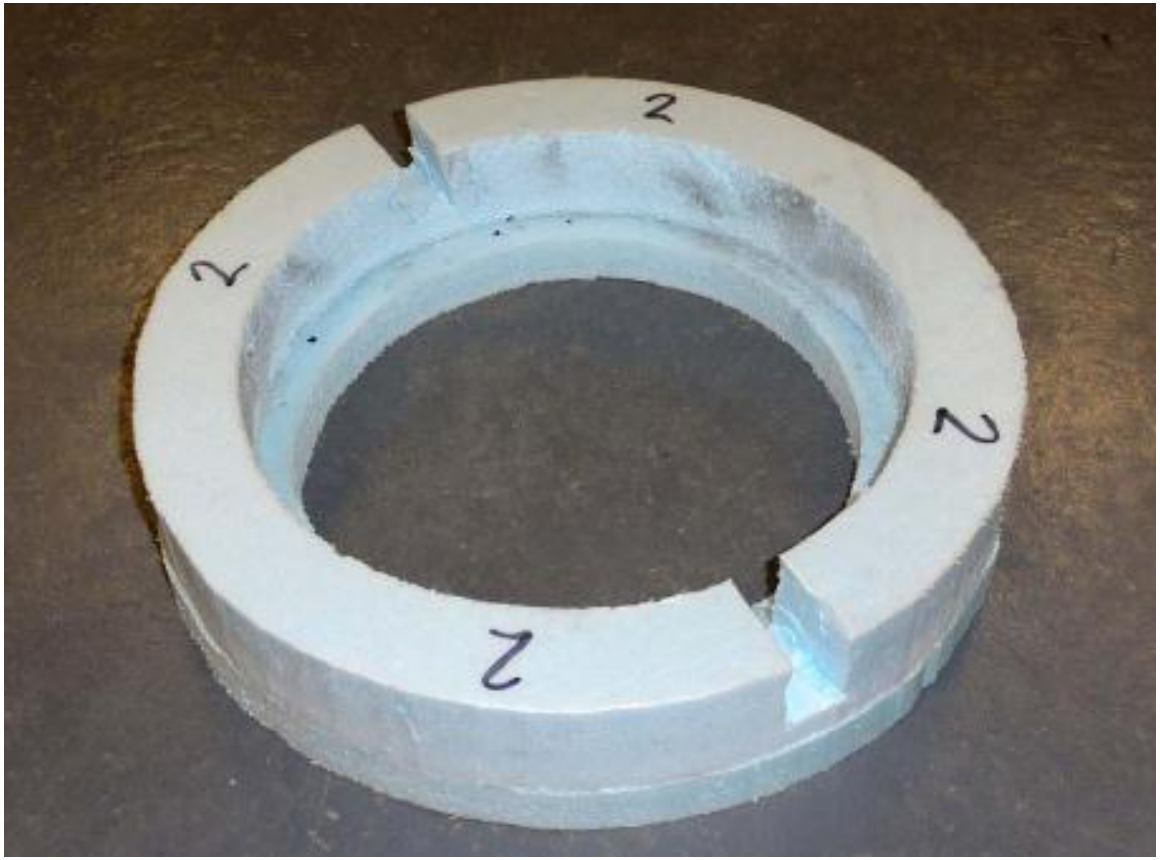
Testing Protocol *continued*

- Styrofoam floats were created to float the Large Area Activated Charcoal Canisters (LAACCs) over the water in the barrels as shown below:



Testing Protocol *continued*

- The Large Area Activated Charcoal Canisters (LAACCs) were installed in the floats as shown below:

The Large Area Activated Charcoal Canisters (LAACCs) fit snugly in the float to create a seal.
They are similar in appearance to the ones used by Dr. Kenneth R. Baker.

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Testing Protocol continued

- The Large Area Activated Charcoal Canisters (LAACCs) were floated on top of the Radium-226/Radon-222 bearing water in the barrels as shown below:

The weight of the Large Area Activated Charcoal Canister (LAACC) unit presses the float into the water creating a seal between the water and the float.

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Testing Protocol *continued*

- Barrels of Radium-226 solution were prepared.
- The analysis results for the barrels were as follows:

Barrel Number	Prepared Radium-226 Activity	Measured Radium-226 Activity	Measured Radon-222 Activity
	pCi/L	pCi/L	pCi/L
1	0.0	-0.5	32. 4
2	5,000.	4,580.	5500.
3	10,000.	9,450.	11000.
4	15,000.	13,900.	16600.
5	20,000.	19,200.	21500.

•The barrels were allowed to attain radiometric equilibrium for forty (40) days (slightly over ten (10) half lives for Radon-222).
•A very high Radium-226 activity (higher than would be encountered in operations) was used to test relationships under extreme conditions.
•Data reported to the number of significant figures provided in final report.

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Testing Results

	Test Summary						
	Date Canister Set	Date Canister Removed	Radium-226 Activity Reported	Radium-226 Activity Used	Radon-222 Activity	Reported Flux Rate	Flux rate Used
			pCi/L	pCi/L	pCi/L	pCi/M2-sec	pCi/M2-sec
Day 1	7/31/11	8/1/11	-0.5	0.0	32. 4	<0.5	0.0
Day 1	7/31/11	8/1/11	4,580.	4,580.	5500.	2.8	2.8
Day 1	7/31/11	8/1/11	9,450.	9,450.	11000.	5.6	5.6
Day 1	7/31/11	8/1/11	13,900.	13,900.	16600.	8.8	8.8
Day 1	7/31/11	8/1/11	19,200.	19,200.	21500.	12.	12.
Day 2	8/1/11	8/2/11	-0.5	0.0	32. 4	<0.5	0.0
Day 2	8/1/11	8/2/11	4,580.	4,580.	5500.	2.4	2.4
Day 2	8/1/11	8/2/11	9,450.	9,450.	11000.	4.3	4.3
Day 2	8/1/11	8/2/11	13,900.	13,900.	16600.	6.8	6.8
Day 2	8/1/11	8/2/11	19,200.	19,200.	21500.	8.3	8.3
Day 3	8/2/11	8/3/11	-0.5	0.0	32. 4	<0.5	0.0
Day 3	8/2/11	8/3/11	4,580.	4,580.	5500.	2.2	2.2
Day 3	8/2/11	8/3/11	9,450.	9,450.	11000.	4.6	4.6
Day 3	8/2/11	8/3/11	13,900.	13,900.	16600.	6.8	6.8
Day 3	8/2/11	8/3/11	19,200.	19,200.	21500.	8.9	8.9
Day 4	8/3/11	8/4/11	-0.5	0.0	32. 4	<0.5	0.0
Day 4	8/3/11	8/4/11	4,580.	4,580.	5500.	1.9	1.9
Day 4	8/3/11	8/4/11	9,450.	9,450.	11000.	3.7	3.7
Day 4	8/3/11	8/4/11	13,900.	13,900.	16600.	5.5	5.5
Day 4	8/3/11	8/4/11	19,200.	19,200.	21500.	7.3	7.3
Day 5	8/4/11	8/5/11	-0.5	0.0	32. 4	<0.5	0.0
Day 5	8/4/11	8/5/11	4,580.	4,580.	5500.	2.0	2.0
Day 5	8/4/11	8/5/11	9,450.	9,450.	11000.	3.5	3.5
Day 5	8/4/11	8/5/11	13,900.	13,900.	16600.	4.8	4.8
Day 5	8/4/11	8/5/11	19,200.	19,200.	21500.	7.9	7.9
Day 6	8/5/11	8/6/11	-0.5	0.0	32. 4	<0.5	0.0
Day 6	8/5/11	8/6/11	4,580.	4,580.	5500.	2.0	2.0
Day 6	8/5/11	8/6/11	9,450.	9,450.	11000.	3.5	3.5
Day 6	8/5/11	8/6/11	13,900.	13,900.	16600.	5.0	5.0
Day 6	8/5/11	8/6/11	19,200.	19,200.	21500.	6.6	6.6

Notes:

- Reported Radium-226 activity of -0.51 set to zero for calculation purposes.
- Reported Radon-222 flux of <0.5 set to zero for calculation purposes
- Data reported to the number of significant figures provided in final report.

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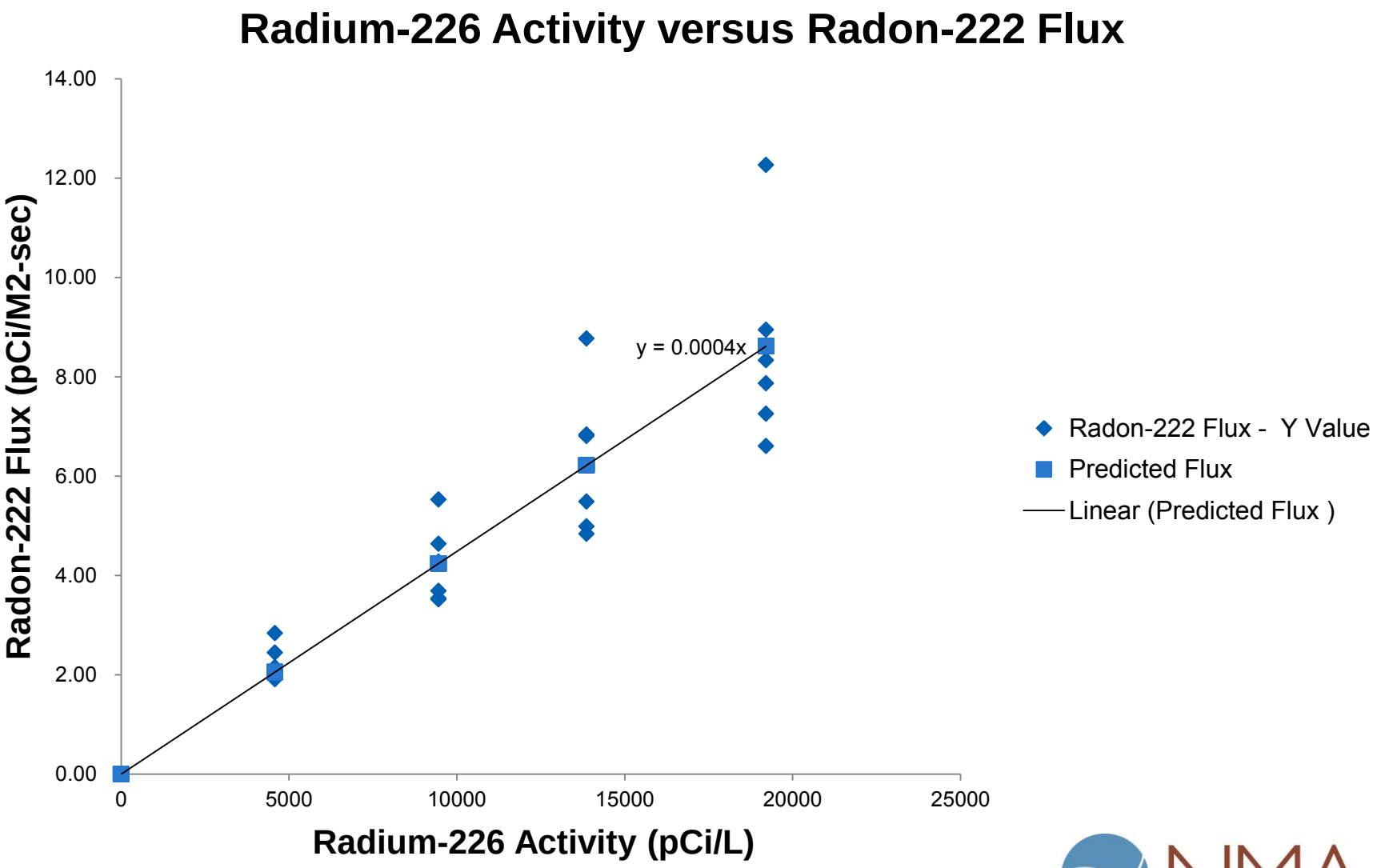
Radium-226 Activity versus Radon-222 Flux Rate



Note: The R^2 (correlation coefficient squared) value is 0.96, showing good linear correlation.

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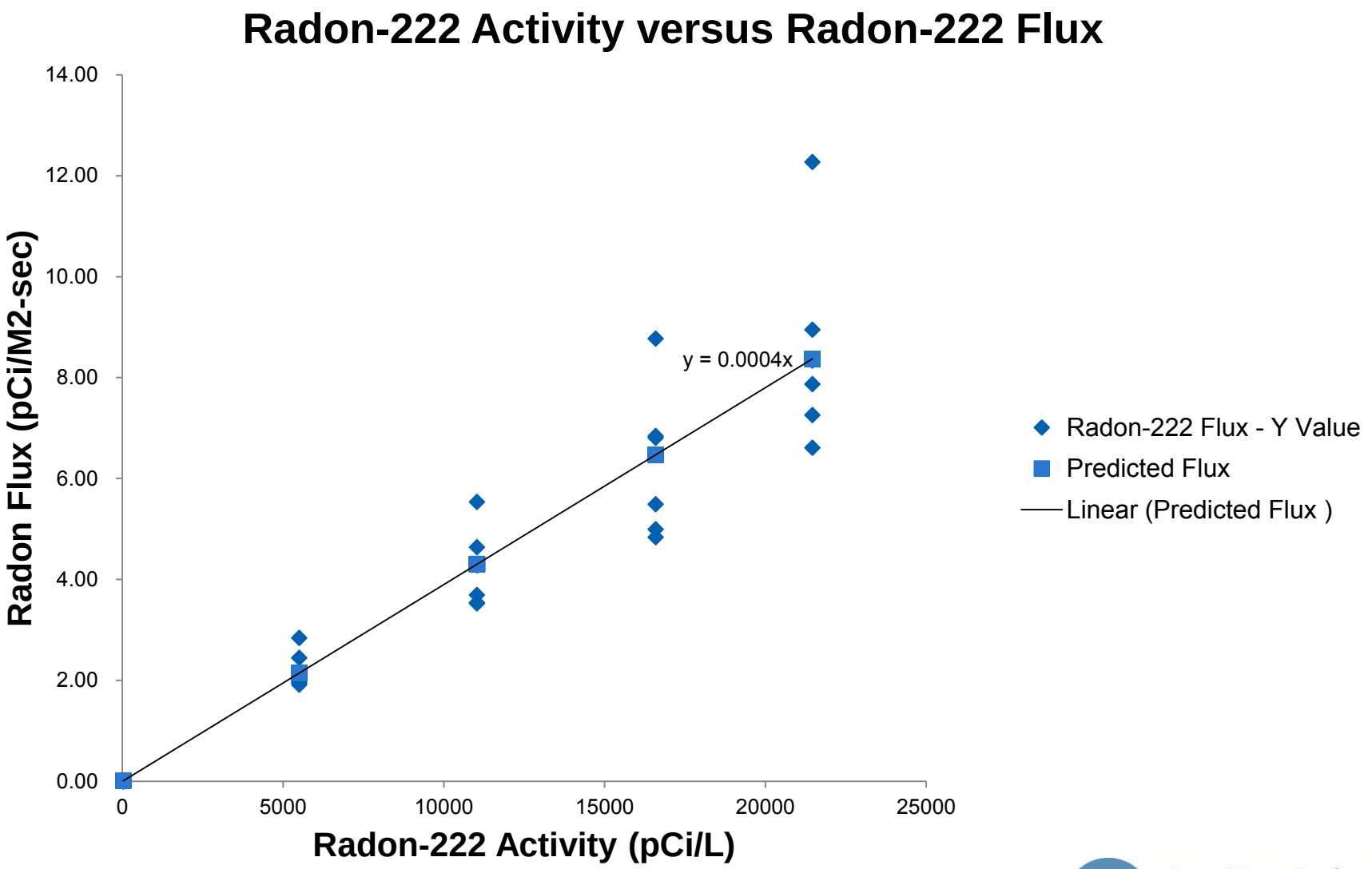
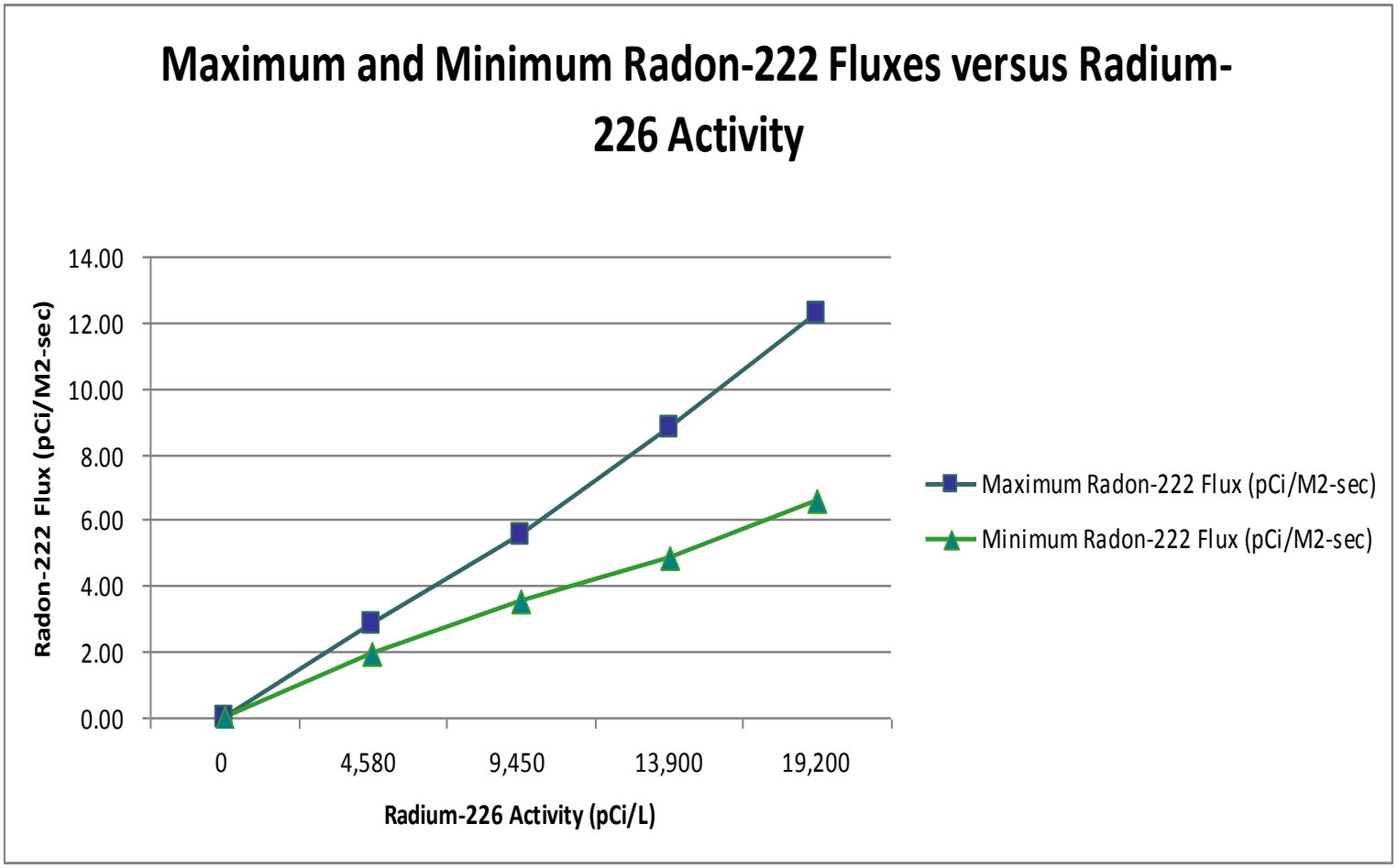
Radon-222 Activity versus Radon-222 Flux Rate



Note: The R^2 (correlation coefficient squared) value is 0.96, showing good linear correlation.

Maximum and Minimum Radon-222 Fluxes versus Radium-226 Activity of the Water



Maximum Slope = 0.00064
Minimum Slope = 0.00034
Average Slope = 0.0004 (previous slide)

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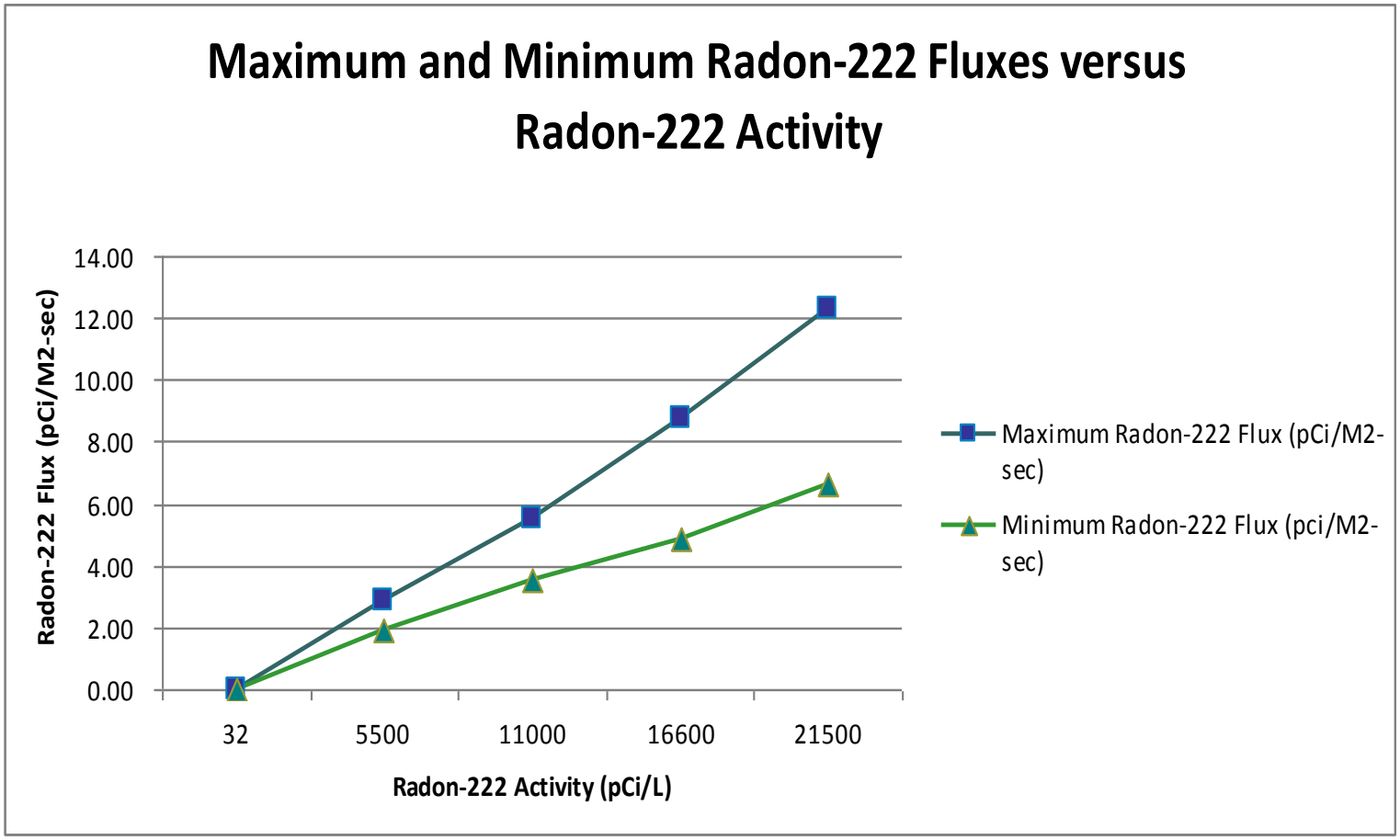
Maximum and Minimum Radon-222 Fluxes versus Radon-222 Activity of the Water



Maximum Slope = 0. 00057
Minimum Slope = 0.00031
Average Slope = 0.0004 (previous slide)

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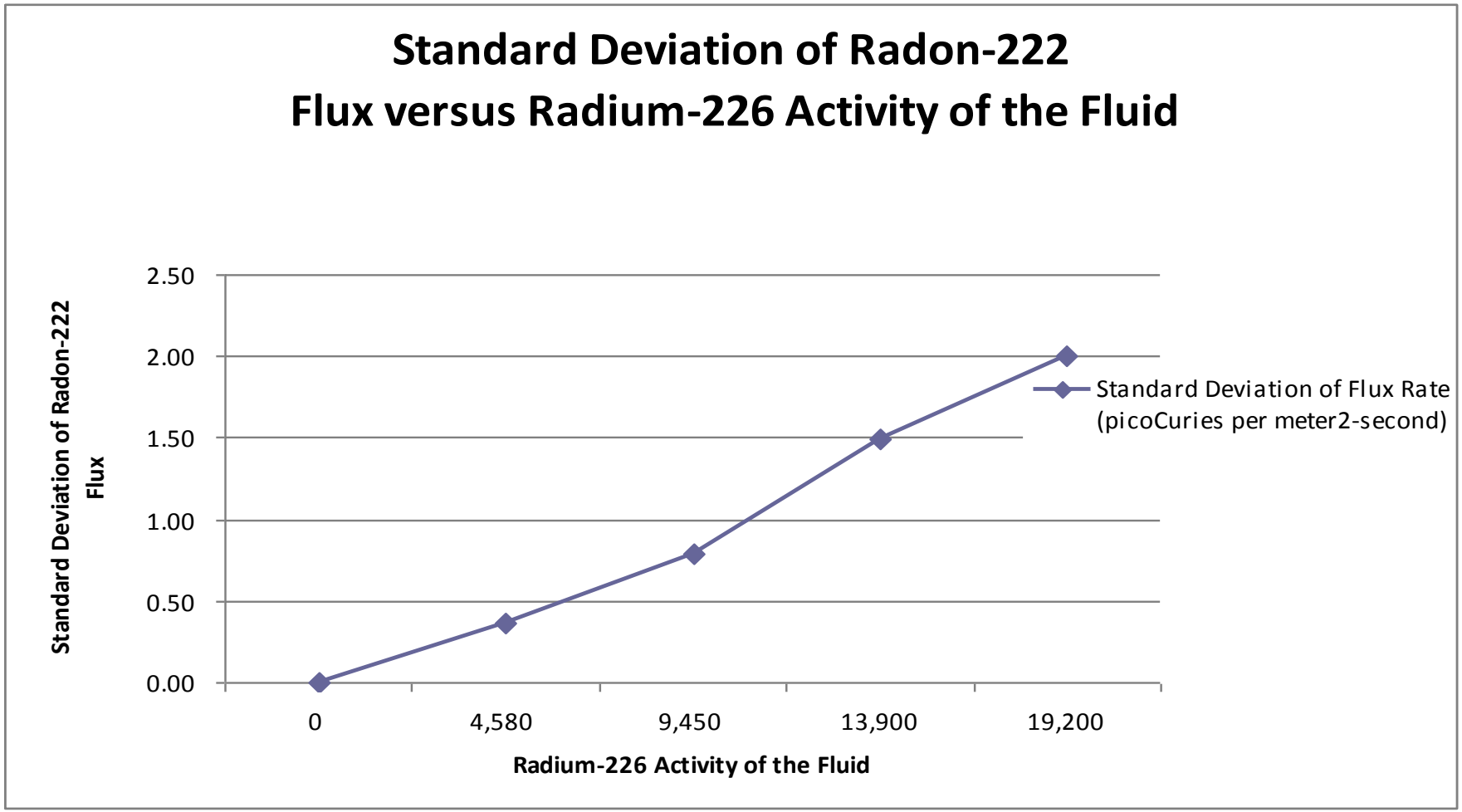
Standard Deviation of Radon-222 Flux versus Radium-226 Activity of the Water



Standard deviation of the Radon-222 flux equals approximately 0.0001 times the Radium-226 activity of the fluid.

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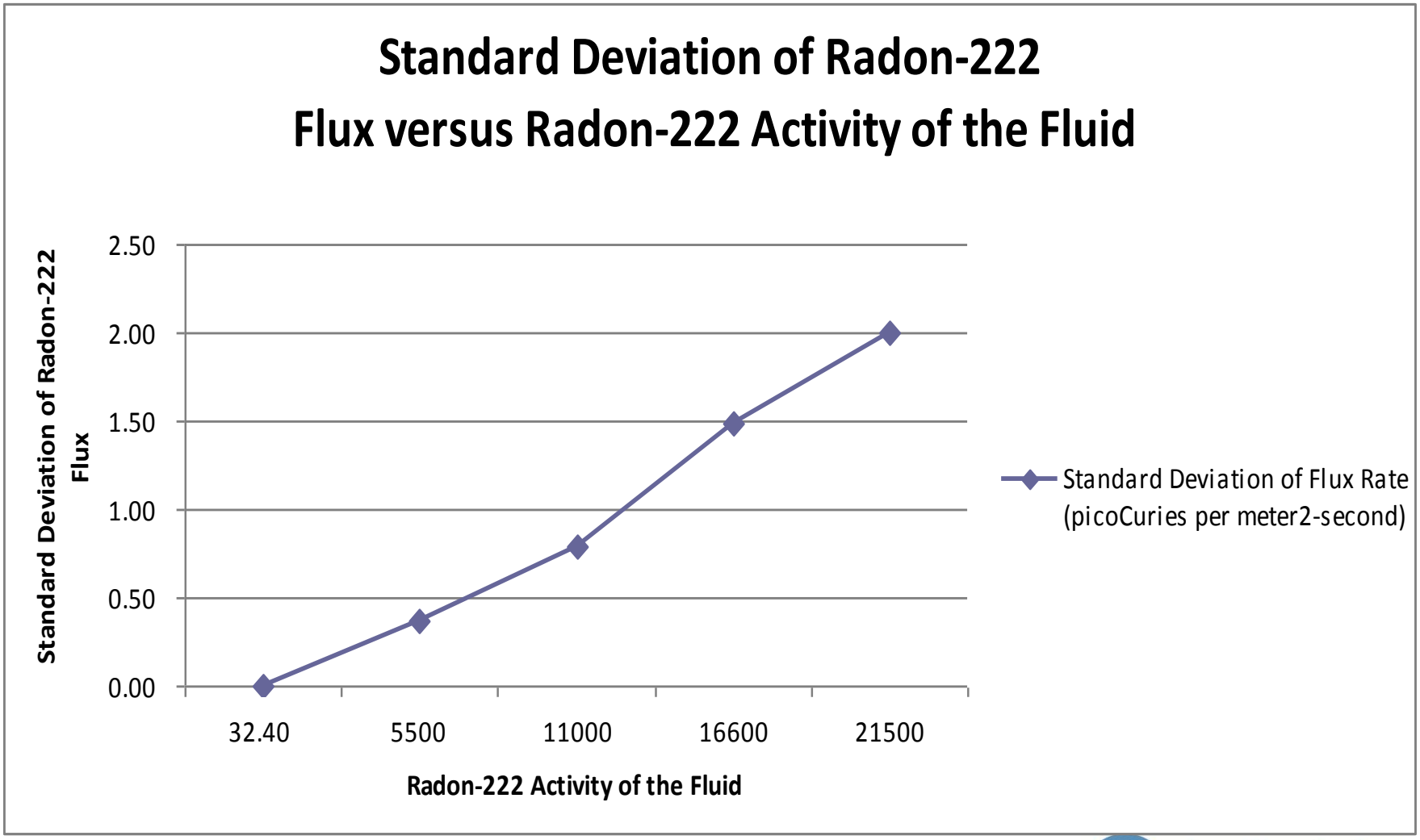
Standard Deviation of Radon-222 Flux versus Radon-222 Activity of the Water



Standard deviation of the Radon-222 flux equals approximately 0.0001 times the Radon-222 activity of the fluid.

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Conclusions

- Radon-222 flux is linearly dependent upon Radon-222 activity of the fluid even at high fluid Radon-222 activities.
- Standard deviation of the flux rate is also linearly dependent upon the Radon-222 activity of the fluid approximating 0.0001 times the Radon-222 activity.
- In a normal distribution, 95.4% of the measurements will lie within two (2) standard deviations from the mean.
- The mean of the flux rate is related linearly to the Radon-222 activity of the fluid approximating 0.0004 times the Radon-222 activity.
- For the measured Radon-222 activities of the fluid in the barrels, 95.4% of the measured flux rates at the fluid surface can be calculated by the following equation:
    - Radon-222 Flux = 0.0004*(Radon-222 Activity) +/- 2*(0.0001)*(Radon-222 Activity) which simplifies to:
    - Radon-222 Flux = 0.0004*(Radon-222 Activity) +/-0.0002(Radon-222 Activity)
- This equates well with the relationship between the maximum flux rates and Radon-222 activity of 0.00057*(Radon-222 Activity)

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Conclusions *continued*

•This experimental data does not correlate well with fluxes derived from application of the Stagnant Film Model (SFM). The Stagnant Film Model (SFM) appears to be too conservative, over estimating fluxes by at least an order of magnitude.

•This data however correlates fairly well with data presented by Dr. Douglas Chambers regarding the experimental lake, shown again below:

Ra-226 (pCi/L)	Depth of Turbulent Mixing (cm)	Rn-222 (pCi/m^2•s)
10	10	0.002
	50	0.01
100	10	0.02
	50	0.1
1000	10	0.2
	50	1

The experimental data lies between the Radon-222 fluxes from turbulent mixing depths of 10 and 50 centimeters.

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Conclusions *continued*

- The above discussed experimental data fits well with the Radon-222 flux data obtained by another uranium recovery licensee in tests conducted in its tailings impoundment in August 2010 that was recently submitted to the Environmental Protection Agency (EPA).
- Radon-222 fluxes from water surfaces even in the case of high Radium-226 and Radon-222 activities are minimal and in the case of fluid Radium-226 activities up to 5,000 pCi/L are within the range and variability of natural background assuming a *typical planet wide background flux of 1 - 2 pCi/m2 - sec* (Steven H Brown, CHP, SENES Consultants Limited – November 7, 2010).
- Construction of a fluid retention impoundment and filling it with water containing up to 5,000 pCi/L Radium-226 would just displace normal background surface flux in most areas.

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Appendix 10

August 11, 2000

MEMORANDUM TO:	William D. Travers Executive Director for Operations
FROM:	Annette L. Vietti-Cook, Secretary /RA/
SUBJECT:	STAFF REQUIREMENTS - SECY-99-0277 - CONCURRENT JURISDICTION OF NON-RADIOLOGICAL HAZARDS OF URANIUM MILL TAILINGS

The Commission has disapproved the staff's recommendation to formally adopt the current staff practice of acknowledging the concurrent jurisdiction of non-Agreement States over the non-radiological hazards of 11e.(2) byproduct material. The Commission has determined that NRC has exclusive jurisdiction over both the radiological and non-radiological hazards of such material. The staff should ensure that all affected states are aware of this decision. The Commission, while aware that at least one court has reached a different conclusion on this matter, will address any potential issues arising from prior judicial precedent on a case specific basis.

cc: Chairman Meserve
Commissioner Dicus
Commissioner Diaz
Commissioner McGaffigan
Commissioner Merrifield
OGC
CIO
CFO
OCA
OIG
OPA
Office Directors, Regions, ACRS, ACNW, ASLBP (via E-Mail)
PDR

Appendix 11

SENES Consultants Limited

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EPA Review of Standards for Uranium and Thorium Milling Facilities @ 40 CFR Parts 61 and 192.

Comments by Steven H Brown, CHP
Revised November 7, 2010

I am Steven Brown from Centennial Colorado. I appreciate the opportunity to provide these comments for EPA's consideration regards to review of EPA standards for Uranium and Thorium Milling Facilities @ 40 CFR Parts 61 and 192.

I have been a practicing health physicist for over 40 years. I am certified by the American Board of Health Physics and a Diplomat of the American Academy of Health Physics. I am a past president of Central Rocky Mountain Chapter of the Health Physics Society.

The Health Physics Society, formed in 1956, is a scientific organization of professionals who specialize in radiation safety. Its mission is to support its members in the practice of their profession and to promote excellence in the science and practice of radiation safety. Today its nearly 6,000 members represent all scientific and technical areas related to radiation safety including academia, government, medicine, research and development, analytical services, consulting, and industry in all 50 states and the District of Columbia.

I would like to provide EPA with some broad scientific perspectives related to the adequacy of existing public exposure standards for uranium mills and in situ recovery facilities that are promulgated in 40 CFR Parts 61, 190 and 192. Specifically, these are the 20 picocuries per meter squared per second (pCi / m2-sec) radon flux criteria for uranium mill tailings impoundments specified in Part 61 Subpart W and Part 192, Subpart D as well as the 25 mrem /year public exposure standard in Part 190 as referenced in Part 192.

My remarks will address the following seven questions:

1. Are the existing radiation dose limits in the regulations (Federal and Agreement States) for uranium milling facilities (including in situ recovery plants) adequate to protect the public from additional radiation exposure above our natural background exposure?
2. Is the existing 20 picocuries per meter squared per second (pCi/meter^2 – sec) radon flux (emission) standard in 40 CFR Parts 61, Subpart W and 192, Subpart D adequate to protect the public from additional radiation exposure above our natural background exposure?
3. What do we know about radon releases from water impoundments?
4. What do we know about radon emissions from ISRs?
5. What are current practices and results in estimating doses to the public from uranium recovery facilities?
6. What is known about the potential health effects to populations living in the vicinity of uranium mines and mills?
7. What is known about the health impacts (e.g., lung cancer) to many uranium miners who worked underground in the 1950s and 1960s?

1. Are the existing regulations (Federal or USNRC Agreement States) for uranium milling facilities (including in situ recovery plants) adequate to protect the public from additional radiation exposure above our natural background exposure?

Our lifestyles, where we choose to live, what we eat and drink, has a much larger impact on our radiation exposure than exposure at current regulatory limits. The basic regulatory limits that operating uranium mills and ISRs must comply with are 100 millirem* per year from all sources including radon and 25 millirem / year excluding radon** (US Nuclear Regulatory Commission: 10 CFR 20 and 10 CFR 40 Appendix A; US Environmental Protection Agency: 40 CFR 190; Texas Department of State Health Services, Title 30 of the Texas Administrative Code, Chapter 336; Colorado Department Health of Public and Environment, 6 CCR 1007 - 1, Part 4)

*NOTE: a millirem is a unit of effective radiation dose. It is related to the amount of energy absorbed by human tissue and other factors. 1,000 millirem = one rem.

** Radon is a naturally occurring radioactive gas, which is released into the atmosphere at the Earth's surface from the decay of radium. Both radium and radon are daughter products of uranium.

Now lets compare these numbers to the annual radiation doses we receive as citizens of planet Earth. Figure 1 below depicts the typical components of human exposure in the US to ionizing radiation.

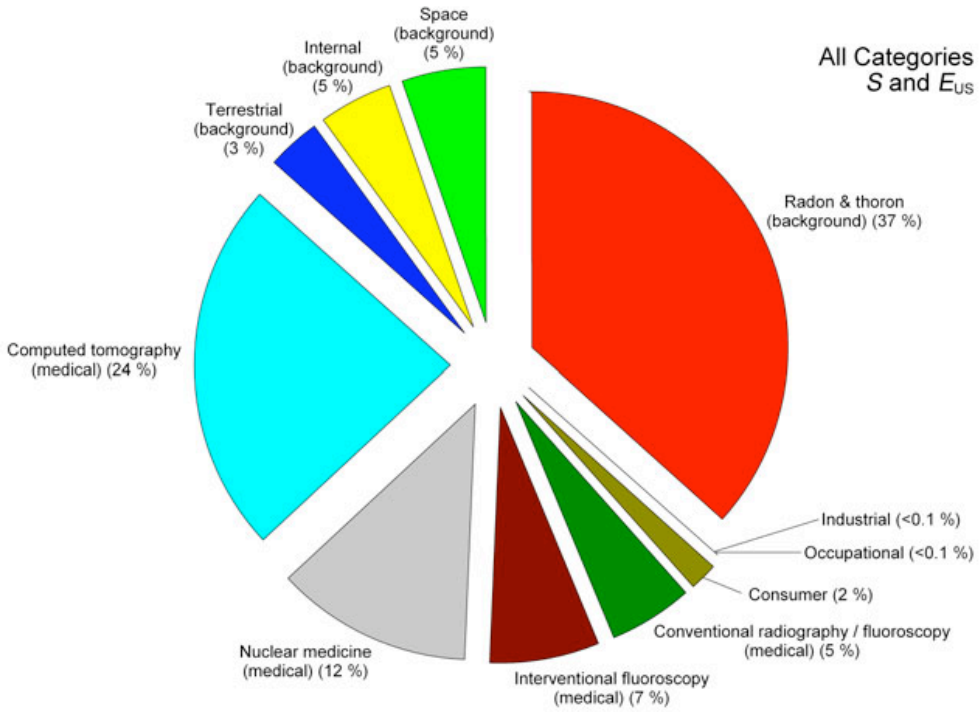

Figure 1: Percent contribution of various sources of exposure to the total radiation dose of a typical resident in the US. Reproduced from National Council on Radiation Protection and Measurements. Report No. 160*, Ionizing Radiation Exposure of the Population in the United States.* 2009.

As can be seen from figure 1, background radiation exposure is about 50% of the total exposure; the other 50% is primarily from medical exposures. Consumer products we use everyday that contain radioactive materials (e.g., smoke detectors, luminous watches, etc) contribute about 2 % of our dose. Other man made sources of radiation, including the nuclear industry, contribute < 0.1% of our annual dose.

Natural background can vary considerable from place to place across the United States or over relatively small areas within a region. This is due to effects of elevation (higher cosmic radiation exposure at higher elevations), greater levels of naturally occurring radioactive elements in soil and water in mineralized areas (e.g., igneous formations in Rocky Mountains) and other factors like local geology and chemistry. This is depicted in Table 1, which compares average annual background radiation exposure for the US, all of Colorado and Leadville, CO. (high elevation and in mineralized area) as contrasted to coastal areas like Virginia and Oregon. This table shows the major components of natural background radiation including terrestrial radiation (uranium, radium, thorium and a naturally radioactive form of potassium in soil, rocks and water), cosmic radiation (high energy particles and rays from space) and internal radiation (from food, water and radon gas from

natural uranium decaying in the ground).

The data in Table 1 demonstrates that the differences in annual background exposure based on where one chooses to live, what one chooses to eat and drink have a much greater impact on public exposure than the regulatory dose limits we discussed above.

Source	US Avg.[1]	Colorado [2]	Leadville, CO. [2]	Virginia [3]	Oregon [3]
Cosmic Radiation	31	50	85	28	28
Terrestrial Radiation	19	49	97	20	27
Radon and Other Internal	260	301	344	182	102
Totals	310	400	526	230	157

TABLE 1: Comparison of average radiation backgrounds in US (units of millirem / yr)

[1] National Council on Radiation Protection and Measurements. Report No. 160, *Ionizing Radiation Exposure of the Population in the United States.* 2009.
[2] Moeller D, Sun LSC. *Comparison of Natural Background Dose Rates for Residents of the Amargosa Valley, NV, to those in Leadville, CO, and the States of Colorado and Nevada.* Health Physics 91:338-353; 2006
[3] USEPA. Assessment of Variations in Radiation Exposure in the United States. Contract Number EP-D-05-002 (Revision 1). Washington, DC. 2006

Because background radiation varies significantly across the U.S., it follows that population exposure varies accordingly. As indicated in Table 1, if for example, one chooses to live in Colorado vs. Oregon, the difference in his or her annual radiation dose is more than 240 mrem /yr which is more than twice the Federal public exposure limit for uranium mills of 100 mrem /yr. In other words, if you are a resident of Colorado and leave to visit your sister for a month in Oregon, you could "save" 20 – 30 mrem of exposure, which is about equal to the EPA 40 CFR 190 limit of 25 mrem /year excluding radon.

2. Is the existing 20 picocurie/meter^2 – second (pCi/m2-sec) radon flux /emission standard in 40 CFR Parts 61, Subpart W and 192, Subpart D adequate to protect the public from additional radiation exposure above our natural background exposure ?

Specifically regarding natural background exposure to radon, note that Figure 1 and Table 1 demonstrate that radon can contribute much more than 50 % of our total background exposure and almost 300 mrem / yr in the Rocky Mountain States (due to higher levels of natural uranium and radium in the soil and rocks than, e.g., the coastal plains of the US).

It is recognized that EPA's public exposure criteria for radon in 40 CFR 61, Subpart W and Part 192, Subpart D is expressed as a "flux" (emission rate from a surface) of 20 pCi/m2-

sec. This limit however includes natural background, which is typically 1-2 pCi/m^2-sec almost anywhere on the earth's surface and can be several times higher than this in mineralized areas. So in some places, the EPA radon flux limit could be just a few times the existing background rate.

It is also recognized that 40 CFR Subpart W also imposes work practice requirements @ 61.252(b)(1) limiting the operator to two tailings impoundments of no more than 40 acres each. Accordingly, if it is assumed that the entire 80- acres are emitting radon at the limit of 20pCi/m2 -sec, the annual "source term" can be directly calculated to be about 200 Curies. This is approximately equal to the "source term" from 2-3 square miles of the earth, almost anywhere, at a typical planet wide background flux of 1 - 2 pCi/m2- sec.

However, the quantity or emission rate of a radionuclide from a source within the restricted area of a licensed facility is not the primary criteria for public radiation protection. This is routinely achieved by demonstrating compliance with the fundamental public dose limit of 100 mrem /year including radon (e.g., @ 10 CFR 20.1301 and commensurate sections of Agreement State regulations) and in demonstrating compliance to concentrations of radionuclides permitted to be released to unrestricted areas (e.g., at the site boundary) specified in 10 CFR 20, Appendix B, Table 2 (for radon = 1 X 10^{-8} uCi/ml w/o progeny; 1 X 10^{-10} with progeny).

It is at the site boundary and/or locations where people actually live, not at a somewhat arbitrary* location within the restricted area inaccessible to the public, that public radiation protection criteria should be applied. Although the historical need is understood for establishment of the radon flux criteria to limit radiological impact to a future public who may have access to formerly decommissioned uranium tailings sites, for licensed operating facilities, other mature regulatory controls as referenced here provide much greater assurances that exposure of the public is maintained ALARA in support of optimizing the risk vs. benefit relationship.

* "Arbitrary" relative to the most likely pathways of exposure to a member of the pubic including considerations of local meteorology and demography

3. What Do We Know About Radon Releases from Water Impoundments?

In response to concerns regards to radon releases from the decay of its radium parent contained in water impoundments (e.g., evaporation ponds) associated with uranium recovery facilities, two recent reports provide some valuable insight:

(1) SENES Consultants Ltd, *Evaporation Pond Radon Flux Analysis, Piñon Ridge Mill Project, Montrose County, Colorado*. August 2010 for Energy Fuels Resources Corporation; included as Appendix D of Energy Fuels' *Application for Approval for Construction, Pinon Ridge Mill, Montrose County,* Colorado as *s*ubmitted to US EPA Region VIII, Denver, Colorado August 31 2010. This report is posted along with the complete application on the EPA Subpart W web

site under "Applications", *Pinon Ridge Mill: Application for Approval of Construction of Tailings Facility.*

This study provided estimates of radon flux from and concentrations above proposed water impoundments (evaporation ponds containing raffinate solution) with a specified radium concentration and compared results to other existing models. Conservative estimates of radon flux indicates that the emissions are low and less than or similar to the pre-operational average background radon flux of 1.7 pCi m^{-2} s^{-1} observed at various locations within the proposed tailings areas on the site. The estimated radon flux levels from the evaporation ponds is also a small fraction (less than 10%) of the 20 pCi m^{-2} s^{-1} limit for pre-1989 uranium tailings that has been assumed here for context. This conservative estimate was based on the Nielson and Rogers model *.

* Nielson, K.K. and V.C. Rogers 1986. *Surface Water Hydrology Considerations in Predicting Radon Releases from Water-Covered Areas of Uranium Tailings Ponds.* Proc. Eighth Annual Symposium on Geotechnical & Hydrological Aspects of Waste Management, Geotechnical Engineering Program, Colorado State University & A.A. Balkema, Fort Collins, CO, USA, February 507, PP:215-222.

The model assumes that the emission rates are enhanced by the turbulence at the top layer of the water column where all the radon in the top one-meter of water is assumed to be released to air instantaneously. For comparison purposes, the same parameters were used to estimate the radon emissions using an on-line program that is available on the World Information Services on Energy (WISE) website. The on-line model, which is attributed to the Rogers and Nielson model, produced identical results.

The results of this assessment also indicated that the radon emissions associated with the evaporation of the raffinate solution and the emissions due to the operation of sprinkler systems are extremely low and insignificant compared to the radon flux from the ponds due to diffusional and turbulence processes.

Finally, the calculations indicated that the incremental air concentration due to the emission of radon from the evaporation ponds is very small (on the order of 3%) relative to the assumed background radon concentration.

(2) K.R. Baker and A.D. Cox 2010. *Radon Flux from Evaporation Ponds*. Presented at National Mining Association (NMA) / Nuclear Regulatory Commission (NRC) Uranium Recovery Workshop 2010, Denver, CO, May 26-27.

A presentation by Baker and Cox at the most recent NMA/NRC workshop in Denver (May 2010) and subsequently at the National Health Physics Society Annual Meeting in Salt Lake City (June 2010) considers the situation where appreciable concentrations of radon are present in the ponded water, as may arise for example from elevated levels of Ra-226 dissolved in the pond water. Baker and Cox, reporting on a stagnant film model and some

measurement data*, suggest a radon flux of the order of 1 pCi m^{-2} s^{-1} per 100 pCi/L of dissolved radon in the ponded water.

* A modified version of EPA Method 115 was used to measure radon flux from the pond surface

4. What do we know About Radon Emissions from ISRs?

Regarding radon evolution from in situ uranium recovery facilities, the majority of radon, which is released at the surface is not (as at a conventional mill) a result of on-surface decay of radium over time in tailings impoundments since ISRs do not generated conventional tailings as a radon source. At ISRs, the radon is brought to the surface dynamically, dissolved in the lixiviant returning from underground. Just as dynamically, that portion of the total dissolved radon that is above the solution's saturation value is released when encountering atmospheric pressures and temperatures.

Modern ISR uranium recovery processes are operated under "closed loop' conditions. The circulating lixiviant goes directly from well field header houses thru the ion exchange process and is then reconstituted and returned directly to the well field as an essentially closed system. Atmospheric conditions are initially encountered during resin transfer at the shaker screens. Accordingly, the vast majority of the "radon source term" for these facilities is associated with small releases from the well heads and header houses in the well fields and from the IX - resin – elution system interface where the process is first opened to atmospheric pressure. For facilities that have water retention ponds at the back end of the process (barren lixiviant bleeds, restoration wastes, etc), only a small percentage of the radon originally dissolved in the pregnant lixiviant initially returning from the well fields would be expected to remain. ISRs in Texas are currently operating without these "surge ponds" and send liquid wastes directly to a permitted deep disposal well.*

* For general discussions of the radiological characteristics of ISRs, including mechanisms of radon evolution, see: National Mining Association. *Generic Environmental Report in Support of the Nuclear Regulatory Commission's Generic Environmental Impact Statement for In Situ Uranium Recovery Facilities,* K Sweeney, NMA to L Camper, USNRC November 30, 2007; Brown, S. *The New Generation of Uranium In Situ Recovery Facilities: Design Improvements Should Reduce Radiological Impacts Relative to First Generation Uranium Solution Mining Plants*. Proceedings of the 2008 Waste Management Symposium, Phoenix. ASME Press, New York, NY, ISBN # 978160560422. 2008.

For more on mechanisms of ISR radon source terms see: Brown**,** S. and Smith, R., 1982. *A Model for Determining the Radon Loss (Source) Term for a Commercial In Situ Leach Uranium Facility.* In: M. Gomez (Editor), Radiation Hazards in Mining-Control, Measurement, and Medical Aspects. Soc. Min. Eng., pp. 794—800; Marple, M.L and Dziuk, T, Texas Department of Health, Bureau of Radiation Control. *Radon Source Terms at In Situ Uranium Extraction Facilities in Texas.* Proceedings of the Sixth Annual Uranium Seminar, South Texas Minerals Section of AIME. Corpus Christi. September 11-14, 1982

5. What are Current Practices and Results in Estimating Doses to the Public from Uranium Recovery Facilities?

Calculations performed in accordance with existing NRC guidance are used to estimate source terms and calculate off-site dose to the public. For example, USNRC Regulatory Guide 3.59, Section 2.6 provides methods acceptable to NRC for estimating the radon source term during ISR operations. Additionally, USNRC NUREG 1569, Appendix D, provides the MILDOS – AREA computer code methodology acceptable to the NRC, which includes expressions for calculating the annual Rn-222 source terms from various aspects of ISR operations which is then used by MILDOS to calculate off-site public dose and demonstrate compliance with dose limits of 10 CFR 20.1301.

See e.g.: U.S. Nuclear Regulatory Commission, NUREG-1569, *Standard Review Plan for In Situ Leach Uranium Extraction License Applications*, June 2003. Yuan, Y.C., J.H.C. Wang and A. Zielen. 1989. *MILDOS-AREA: An Enhanced Version of MILDOS for Large-area Sources.* Argonne National Laboratory (ANL) report ANL/ES-161. June 1989; U.S. Nuclear Regulatory Commission (NRC), 1987. *Methods for Estimating Radioactive and Toxic Airborne Source Terms for Uranium Milling Operations*. Regulatory Guide 3.59.

Regards to historical estimates of offsite radon concentrations and public dose from ISRs as reported by its licensees, the U.S. Nuclear Regulatory Commission, in NUREG-1910, *Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities (*2009), Chapter 4.2 indicates:

- Quarterly and biannual measurements of downwind concentrations of radon at an operational ISR facility boundary from 1991 to early 2007 were below 74 Bq/m3 [2.0 pCi/liter] with a majority of measurements below 37 Bq/m3 [1 pCi/liter]. For comparison, these measured values are well below the NRC effluent limit for radon at 10 CFR Part 20, Appendix B of 370 Bq/m3 [10 pCi/liter] and in fact, are probably just background values.

- Argonne National Laboratory's MILDOS-AREA computer code (Argonne National Laboratory, 1989 – see above) is typically used to calculate radiation doses to individuals and populations from releases occurring at operating uranium recovery facilities. The code is capable of modeling airborne radiological effluent releases applicable to both conventional mills and ISR facilities (including radon gas from well fields and processing facilities and yellowcake particulates from thermal drying operations)

- All reported doses have been well within the 10 CFR Part 20 annual radiation dose limit for the public of 1 mSv [100 mrem/yr] including dose from radon and its progeny and within the EPA fuel cycle annual limit (40 CFR 190) of 0.25 mSv [25 mrem], which does not include dose due to radon and its progeny.

6. What is known about the potential health effects to populations living in the vicinity of uranium mines and mills?

Uranium is a heavy metal and acts similarly to other heavy metals in the body (like molybdenum, lead, mercury). Accordingly, for natural uranium, national and international human exposure standards are based on the possible *chemical toxicity* of uranium (e.g., effect on kidney—nephrotoxicity), not on radiation and possible "cancer effects" (radiotoxicity). However, there has never been a death or permanent injury to a human from uranium poisoning*.

* See e.g.: (1) U.S. Nuclear Regulatory Commission. *Standards for Protection Against Radiation*; 10 CFR 20, Appendix B., Table 1. 1992. (2) International Commission on Radiological Protection. *Limits for Intakes of Radionuclides by Workers*. ICRP Publication 30, 1979. (3) US Dept. of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. *Toxicological Profile for Uranium.* 1999. *(4) Acute Chemical Toxicity of Uranium.* Kathryn, RL and Burkin, RK. Health Physics, 94(2), pp 170-179, February 2008)

Regarding ionizing radiation in general, the health effects are well understood. No health effects have been observed in human populations at the exposure levels within the range and variability of natural background exposures in the US. An official position of the National Health Physics Society is that below 5,000 – 10,000 millirem (which includes the range of both occupational and environmental exposures), risks of health effects are either to small to be observed or non- existent (see *Radiation Risks in Perspective* @hps.org/hpspublications/positionstatements). International and national authorities that establish exposure standards for workers and the public rely on the work of scientific committees of the highest professional standing for their evaluations of the scientific information on the health effects of ionizing radiation. These scientific committees include the United Nations Scientific Committee on the Effects of Ionizing Radiation (UNSCEAR); the International Commission on Radiological Protection (ICRP); the National Academy of Science's Biological Effects of Ionizing Radiation (BEIR) Committee, the National Council on Radiation Protection and Measurements (NCRP) and others.

But what about the specific concerns regarding health effects to populations living close to uranium recovery facilities? Despite much confusion and misunderstanding, possible health effects in populations living near uranium mines and mills have been well studied. No additional effects have been observed when compared to the health status of other similar populations not living nearby. A few sources providing the scientific evidence that supports this conclusion include:

- US Department of Health and Human Services, Public Health Services, Agency for Toxic Substance and Disease Registry, *Toxicological Profile for Uranium*, 1999. Chapter 1: Public Health Statement for Uranium, Section 1.5: How Can Uranium Effect My Health? – " No human cancer of any type has ever been seen as a result of exposure to natural or depleted uranium" (Available at:

http://www.atsdr.cdc.gov/toxprofiles/tp150.html)

- *Cancer and Noncancer Mortality in Populations Living Near Uranium and Vanadium Mining and Milling Operations in Montrose County, Colorado, 1950 -2000*. Boice, JD, Mumma, MT et al. International Epidemiology Institute, Rockville, MD and Vanderbilt University, Vanderbilt-Ingram Cancer Center, Nashville, TN. Journal of Radiation Research, 167:711-726; 2007: " The absence of elevated mortality rates of cancer in Montrose County over a period of 51 years suggests that the historical milling and mining operations did not adversely affect the health of Montrose County residents"

- *Cancer Mortality in a Texas County with Prior Uranium Mining and Milling Activities, 1950 – 2001.* Boice, JD, Mumma, M et al. International Epidemiology Institute, Rockville, MD and Vanderbilt University, Vanderbilt-Ingram Cancer Center, Nashville, TN Journal of Radiological Protection, 23:247 – 262; 2003 – "No unusual patterns of cancer mortality could be seen in Karnes County over a period of 50 years suggesting that the uranium mining and milling operations had not increased cancer rates among residents".

- *Cancer Incidence and Mortality in Populations Living Near Uranium Milling and Mining Operations in Grants, New Mexico, 1950–2004.* Boice, JD, Mumma, M et al. International Epidemiology Institute, Rockville, MD and Vanderbilt University, Vanderbilt-Ingram Cancer Center, Nashville, TN. Journal of Radiation Research, 174, 624–636. 2010 – "With the exception of male lung cancer (*in former underground miners*), this study provides no clear or consistent evidence that the operation of uranium mills and mines adversely affected cancer incidence or mortality of county residents".

7. But what about the known health impacts (e.g., lung cancer) to many uranium miners who worked underground in the 1950s and 1960s?

These miners worked in conditions that by today's standards we would consider unacceptable. They were exposed to very high levels of radon progeny (which are decay products of uranium) in poorly ventilated underground mines. Many of these miners also had severe smoking habits, which enhanced the ability of the radon daughters to deliver radiation dose to the lung. Follow up of 68,000 former miners over many years indicated the occurrence of about 2700 lung cancers in this population; much higher than the expected incidence. This is an incidence rate of about 4%. As a point of comparison, the baseline incident rate of lung cancer in non-smoker, Caucasian males today is about 0.4 % (Dr. John Boice, International Epidemiology Institute, Vanderbilt University – personal communication)

These conditions existed before we had Federal Agencies (Occupational Safety and Health

Administration - OSHA, Mine Safety and Health Administration - MSHA, US Nuclear Regulatory Commission - NRC) and laws to better protect workers throughout American industry (construction, manufacturing, farming, mining, etc). Based on the best scientific information available, we consider as safe the occupational exposure standards we have today as enforced by these agencies. The level of exposure of some of these early uranium miners was 100 – 1000 times higher than our current Federal standards.

As just one of many possible historical comparisons regards to working conditions in American industry decades ago, it is of note that almost 100 men died from construction and related accidents in the building of the Hoover Dam in the 1920s, long before Federal regulations were in place to protect workers. These circumstances would of course also be unacceptable today

Conclusions:

(1) The existing public radiation exposure criteria for uranium mills and in situ recovery facilities in 40 CFR Parts 61, 190 and 192 are adequately protective since they represent small fractions of the natural radiation background variation across the US. Our lifestyles, where we choose to live, what we eat and drink, has a much larger impact on our radiation exposure than exposure at these very low regulatory limits.

(2) Regarding ionizing radiation in general, the health effects are well understood. No health effects have been observed in human populations at the exposure levels within the range and variability of natural background exposures in the US.

(3) Radon emission rates (flux) from water impoundments (evaporation ponds) at licensed conventional mills and ISRs are not expected to be significantly different than that from typical background radon emission associated with land surfaces almost anywhere due to the very poor diffusion of radon through water.

(4) Historical environmental measurements made in the vicinity of uranium recovery facilities and public dose assessment performed and reported to the USNRC indicate radon concentrations at site boundary locations and doses to the public are consistently well below Federal limits.

(5) The possibility of health effects in populations living near uranium mines and mills over 50 years have been well studied by national scientific bodies of the highest professional standing. No additional effects have been observed when compared to the health status of other similar populations not living nearby.

(6) However, given that 40 CFR 192 was released in 1983, changes and updates have been made in the basic dosimetry models and science we use today to estimate radiological doses and risks. Accordingly, EPA should consider reassessing exposure terminology and criteria (e.g., as used in 40 CFR 190) to be consistent with current national and international methods and models, e.g., (1) International Commission on Radiological

Protection, 2008. “Publication 103 Recommendations of the ICRP, Annals of the ICRP.” 2008 and (2) National Research Council, 2006. “Health Risks for Exposure to Low Levels of Ionizing Radiation; BEIR VII, Phase II.”

Thornton, Marisa

From: Thornton, Marisa on behalf of Collections.SubW
Sent: Wednesday, March 25, 2015 10:37 AM
To: Thornton, Marisa
Subject: Fw: UMUT Response

From: Stahle, Susan
Sent: Monday, March 9, 2015 9:09 AM
To: Collections.SubW
Subject: FW: UMUT Response

Susan Stahle
Attorney-Advisor
Air and Radiation Law Office
Office of General Counsel
U.S. Environmental Protection Agency
202-564-1272 (ph)
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stahle.susan@epa.gov

From: Rosnick, Reid
Sent: Wednesday, February 04, 2015 1:42 PM
To: Stahle, Susan
Cc: Peake, Tom; Schultheisz, Daniel
Subject: RE: UMUT Response

Thanks, Sue! Do you think Anthony Moffa or Pat Childers needs to see this too?

From: Stahle, Susan
Sent: Wednesday, February 04, 2015 1:36 PM
To: Rosnick, Reid
Cc: Peake, Tom; Schultheisz, Daniel
Subject: RE: UMUT Response

Hi –

Here are my edits on the letter.

Thanks,

Susan Stahle
Attorney-Advisor

Air and Radiation Law Office
Office of General Counsel
U.S. Environmental Protection Agency
202-564-1272 (ph)
202-564-5603 (fax)
stahle.susan@epa.gov

From: Rosnick, Reid
Sent: Wednesday, February 04, 2015 12:34 PM
To: Stahle, Susan
Cc: Peake, Tom; Schultheisz, Daniel
Subject: UMUT Response
Importance: High

Sue,

Attached is a draft response to the UMUT request for a second consultation (being sent separately). The due date is today, but if you could please review it by COB it would be appreciated. Please give me a call at home 301-461-3848 if you have any questions. Thanks

_____

Reid J. Rosnick
US Environmental Protection Agency
Radiation Protection Division
202.343.9563
rosnick.reid@epa.gov

Thornton, Marisa

From: Thornton, Marisa on behalf of Collections.SubW
Sent: Wednesday, March 25, 2015 10:37 AM
To: Thornton, Marisa
Subject: Fw: Supplemental Information to Comments by Ute Mountain Ute Tribe on NESHAPS Subpart W - calculations of radon flux from uranium tailings impoundments

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From: Stahle, Susan
Sent: Monday, March 9, 2015 9:08 AM
To: Collections.SubW
Subject: FW: Supplemental Information to Comments by Ute Mountain Ute Tribe on NESHAPS Subpart W - calculations of radon flux from uranium tailings impoundments

Susan Stahle
Attorney-Advisor
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From: Rosnick, Reid
Sent: Wednesday, February 11, 2015 1:06 PM
To: sclow@utemountain.org
Cc: Celene Hawkins; tnatori@utemountain.org; Michael King; H. Michael Keller; clarrick@utemountain.org; Leland Begay; Malcolm Lehi; Manuel Heart; Deanne Wall; Regina Lopez-Whiteskunk; Priscilla Blackhawk; Gary Hayes; Juanita PlentyHoles
Subject: RE: Supplemental Information to Comments by Ute Mountain Ute Tribe on NESHAPS Subpart W - calculations of radon flux from uranium tailings impoundments

Hello Scott,

I'm sending acknowledgement of your email. Thanks.

Reid

From: Scott Clow [mailto:sclow@utemountain.org]
Sent: Wednesday, February 11, 2015 11:50 AM
To: Rosnick, Reid
Cc: Celene Hawkins; tnatori@utemountain.org; Michael King; H. Michael Keller; clarrick@utemountain.org; Leland Begay; Malcolm Lehi; Manuel Heart; Deanne Wall; Regina Lopez-Whiteskunk; Priscilla Blackhawk; Gary Hayes; Juanita

PlentyHoles
Subject: Supplemental Information to Comments by Ute Mountain Ute Tribe on NESHAPS Subpart W - calculations of radon flux from uranium tailings impoundments

Dear Reid,
I have attached a supplemental brief regarding the Tribe's calculations and interpretations of the proposed NESHAP Subpart W Rule. Please consider this as we continue to work on effective Tribal Consultation on this matter.
Sincerely,
Scott Clow
Ute Mountain Ute Tribe

Thornton, Marisa

From: Thornton, Marisa on behalf of Collections.SubW
Sent: Wednesday, March 25, 2015 10:37 AM
To: Thornton, Marisa
Subject: Fw: Revision to Ute Mtn Ute consultation request

From: Stahle, Susan
Sent: Monday, March 9, 2015 9:06 AM
To: Collections.SubW
Subject: FW: Revision to Ute Mtn Ute consultation request

Susan Stahle
Attorney-Advisor
Air and Radiation Law Office
Office of General Counsel
U.S. Environmental Protection Agency
202-564-1272 (ph)
202-564-5603 (fax)
stahle.susan@epa.gov

From: Stahle, Susan
Sent: Friday, February 13, 2015 11:40 AM
To: Peake, Tom
Cc: Rosnick, Reid; Schultheisz, Daniel
Subject: RE: Revision to Ute Mtn Ute consultation request

Hi Tom –

The letter looks good, no comments from me.

Thanks,

Susan Stahle
Attorney-Advisor
Air and Radiation Law Office
Office of General Counsel
U.S. Environmental Protection Agency
202-564-1272 (ph)
202-564-5603 (fax)
stahle.susan@epa.gov

From: Peake, Tom
Sent: Friday, February 13, 2015 8:47 AM
To: Stahle, Susan
Cc: Rosnick, Reid; Schultheisz, Daniel
Subject: Revision to Ute Mtn Ute consultation request

Sue,
We have revised our response to the Ute Mountain Ute request for another consultation. Would you look at to see if we represent things accurately?

Thanks.
Tom Peake
US EPA Radiation Protection Division
Director, Center for Waste Management and Regulations

phone: 202-343-9765 

PS to Reid and Dan: I changed the first sentence of the last paragraph from "…meetings with the Tribe on other issues prior to publication…" to "…meetings with the Tribe prior to and after publication…"

Thornton, Marisa

From: Thornton, Marisa on behalf of Collections.SubW
Sent: Wednesday, March 25, 2015 10:36 AM
To: Thornton, Marisa
Subject: Fw: Revision to Ute Mtn Ute consultation request

From: Stahle, Susan
Sent: Monday, March 9, 2015 9:06 AM
To: Collections.SubW
Subject: FW: Revision to Ute Mtn Ute consultation request

Susan Stahle
Attorney-Advisor
Air and Radiation Law Office
Office of General Counsel
U.S. Environmental Protection Agency
202-564-1272 (ph)
202-564-5603 (fax)
stahle.susan@epa.gov

From: Peake, Tom
Sent: Friday, February 13, 2015 11:42 AM
To: Stahle, Susan
Cc: Rosnick, Reid; Schultheisz, Daniel
Subject: RE: Revision to Ute Mtn Ute consultation request

Thanks!

From: Stahle, Susan
Sent: Friday, February 13, 2015 11:40 AM
To: Peake, Tom
Cc: Rosnick, Reid; Schultheisz, Daniel
Subject: RE: Revision to Ute Mtn Ute consultation request

Hi Tom –

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Thanks,

Susan Stahle
Attorney-Advisor

Air and Radiation Law Office
Office of General Counsel
U.S. Environmental Protection Agency
202-564-1272 (ph)
202-564-5603 (fax)
stahle.susan@epa.gov

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Sent: Friday, February 13, 2015 8:47 AM
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Tom Peake
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phone: 202-343-9765

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Thornton, Marisa

From: Thornton, Marisa on behalf of Collections.SubW
Sent: Wednesday, March 25, 2015 10:36 AM
To: Thornton, Marisa
Subject: Fw: Ute Mountain Ute Response

From: Stahle, Susan
Sent: Monday, March 9, 2015 9:04 AM
To: Collections.SubW
Subject: FW: Ute Mountain Ute Response

Susan Stahle
Attorney-Advisor
Air and Radiation Law Office
Office of General Counsel
U.S. Environmental Protection Agency
202-564-1272 (ph)
202-564-5603 (fax)
stahle.susan@epa.gov

From: Stahle, Susan
Sent: Wednesday, February 25, 2015 10:00 AM
To: Rosnick, Reid
Cc: Edwards, Jonathan; Perrin, Alan; Peake, Tom; Harrison, Jed
Subject: RE: Ute Mountain Ute Response

Hi Reid –

The letter looks good, no comments from me.

Thanks,

Susan Stahle
Attorney-Advisor
Air and Radiation Law Office
Office of General Counsel
U.S. Environmental Protection Agency
202-564-1272 (ph)
202-564-5603 (fax)
stahle.susan@epa.gov

From: Rosnick, Reid
Sent: Wednesday, February 25, 2015 9:34 AM
To: Stahle, Susan
Cc: Edwards, Jonathan; Perrin, Alan; Peake, Tom; Harrison, Jed
Subject: Ute Mountain Ute Response
Importance: High

Hi Sue,

Mike has made some changes to our response to the Tribe regarding a second consultation. Mike would like your comments on the revised letter. I have made the changes (attached), along with the proposed letter, also attached. Please let me know if you have any questions or comments. Thanks

Reid

_____
Reid J. Rosnick
US Environmental Protection Agency
Radiation Protection Division
202.343.9563
rosnick.reid@epa.gov

Thornton, Marisa

From: Thornton, Marisa on behalf of Collections.SubW
Sent: Wednesday, March 25, 2015 10:35 AM
To: Thornton, Marisa
Subject: Fw: Ute Mountain Ute Response

From: Stahle, Susan
Sent: Monday, March 9, 2015 9:04 AM
To: Collections.SubW
Subject: FW: Ute Mountain Ute Response

Susan Stahle
Attorney-Advisor
Air and Radiation Law Office
Office of General Counsel
U.S. Environmental Protection Agency
202-564-1272 (ph)
202-564-5603 (fax)
stahle.susan@epa.gov

From: Rosnick, Reid
Sent: Wednesday, February 25, 2015 10:01 AM
To: Stahle, Susan
Subject: RE: Ute Mountain Ute Response

Thanks!

From: Stahle, Susan
Sent: Wednesday, February 25, 2015 10:00 AM
To: Rosnick, Reid
Cc: Edwards, Jonathan; Perrin, Alan; Peake, Tom; Harrison, Jed
Subject: RE: Ute Mountain Ute Response

Hi Reid –

The letter looks good, no comments from me.

Thanks,

Susan Stahle
Attorney-Advisor
Air and Radiation Law Office

Office of General Counsel
U.S. Environmental Protection Agency
202-564-1272 (ph)
202-564-5603 (fax)
stahle.susan@epa.gov

From: Rosnick, Reid
Sent: Wednesday, February 25, 2015 9:34 AM
To: Stahle, Susan
Cc: Edwards, Jonathan; Perrin, Alan; Peake, Tom; Harrison, Jed
Subject: Ute Mountain Ute Response
Importance: High

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Mike has made some changes to our response to the Tribe regarding a second consultation. Mike would like your comments on the revised letter. I have made the changes (attached), along with the proposed letter, also attached. Please let me know if you have any questions or comments. Thanks

Reid

_____

Reid J. Rosnick
US Environmental Protection Agency
Radiation Protection Division
202.343.9563
rosnick.reid@epa.gov

Thornton, Marisa

From: Thornton, Marisa on behalf of Collections.SubW
Sent: Wednesday, March 25, 2015 10:38 AM
To: Thornton, Marisa
Subject: Fw: FW: AX-15-000-4505 - Response Due Date is Feb. 4, 2015 - Direct Reply please prepare response for OD/DOD signature. Thanks!
Attachments: [Untitled].pdf; ATT00001.htm

From: Stahle, Susan
Sent: Monday, March 9, 2015 9:09 AM
To: Collections.SubW
Subject: FW: FW: AX-15-000-4505 - Response Due Date is Feb. 4, 2015 - Direct Reply please prepare response for OD/DOD signature. Thanks!

Susan Stahle
Attorney-Advisor
Air and Radiation Law Office
Office of General Counsel
U.S. Environmental Protection Agency
202-564-1272 (ph)
202-564-5603 (fax)
stahle.susan@epa.gov

From: Rosnick, Reid
Sent: Wednesday, February 04, 2015 12:35 PM
To: Stahle, Susan
Subject: FW: FW: AX-15-000-4505 - Response Due Date is Feb. 4, 2015 - Direct Reply please prepare response for OD/DOD signature. Thanks!

As promised.

From: Edwards, Jonathan
Sent: Monday, January 26, 2015 10:42 AM
To: Rosnick, Reid; Peake, Tom; Schultheisz, Daniel; Perrin, Alan
Subject: FW: FW: AX-15-000-4505 - Response Due Date is Feb. 4, 2015 - Direct Reply please prepare response for OD/DOD signature. Thanks!

FYI. Here is the incoming letter from the Ute Mountain Utes. --Jon

---

From: Harrison, Jed
Sent: Monday, January 26, 2015 10:39 AM
To: Flynn, Mike

Cc: Edwards, Jonathan; Peake, Tom; Rosencrantz, Ingrid
Subject: FYI: FW: AX-15-000-4505 - Response Due Date is Feb. 4, 2015 - Direct Reply please prepare response for OD/DOD signature. Thanks!

Mike-

I agree with Pat, this should come to ORIA.

RPD – If you haven't seen this yet . . . .

Let me know if you need some assistance on this.

Jed

Jed Harrison SENIOR ADVISOR FOR TRIBAL AFFAIRS
U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF RADIATION & INDOOR AIR
(702) 784 8218 MOBILE: (702) 494 7050

4220 S. MARYLAND PARKWAY
BLDG. D, SUITE 800
LAS VEGAS, NEVADA 89119

From: Childers, Pat
Sent: Monday, January 26, 2015 5:50 AM
To: Harrison, Jed; Flynn, Mike; Edwards, Chebryll
Cc: Hamilton, Sabrina
Subject: FW: AX-15-000-4505 - Response Due Date is Feb. 4, 2015 - Direct Reply please prepare response for OD/DOD signature. Thanks!

All

incoming letter on Southern Utes on consultation for Subpart W. It was assigned to OITA originally.

Mike should I ask Sabrina to assign to ORIA?

Pat

From: Koslow, Karin
Sent: Monday, January 26, 2015 8:38 AM
To: Childers, Pat
Subject: Fwd: AX-15-000-4505 - Response Due Date is Feb. 4, 2015 - Direct Reply please prepare response for OD/DOD signature. Thanks!

Karin Koslow
Deputy Director
American Indian Environmental Office

202-564-0171

Begin forwarded message:

From: "Stewart, Lakita" <Stewart.Lakita@epa.gov>
Date: January 23, 2015 at 5:24:03 PM EST
To: "Chase, JoAnn" <Chase.JoAnn@epa.gov>, "Koslow, Karin" <Koslow.Karin@epa.gov>, "Silver, Edna" <Silver.Edna@epa.gov>, "McInnis, Marissa" <McInnis.Marissa@epa.gov>, "Baca, Andrew" <Baca.Andrew@epa.gov>
Subject: AX-15-000-4505 - Response Due Date is Feb. 4, 2015 - Direct Reply please prepare response for OD/DOD signature. Thanks!

Detail

AX-15-000-4505

Citizen Information

Generate Control Slip

Citizen/Originator: 1). Heart, Manuel - P.O. Box 248, Towaoc, CO 81334-0248
Constituent:
Committee: **Sub-Committee:**

Control Information

View Correspondence

Control Number:	AX-15-000-4505	**Alternate Number:**	
Status:	Pending	**Closed Date:**	N/A
Due Date:	Feb 04 2015	**# of Extensions:**	0
Letter Date:	Jan 13 2015	**Received Date:**	Jan 21 2015
Addressee:	AD-Administrator	**Addressee Org:**	EPA
Contact Type:	LTR (Letter)	**Priority Code:**	Normal
File Code:	404-141-02-01_141_b Controlled and Major Corr. Record copy of the offices of Division Directors and other personnel.		
Signature:	DX-Direct Reply (+)		
CC:	AO-IO-SO - Scheduling Office Amy Hambrick - AO-IO R8 - Region 8 -- Immediate Office Search CC		
Signature Date:	Date		
Primary Subject:	DRF - Daily Reading File - Second Governnient-to-Government Consultation between EPA and the Ute Mountain tlte Tribe, Rulemaking Activity 40 C.F.R. Part 61, Subpart W	**Secondary Subject:**	
Instructions:	DX-Respond directly to this citizen's questions, statements, or concerns	**Instruction Notes:**	
General Notes:			

Lead Information

Lead Author: N/A

Lead Assignments:

Assigner	Assignee	Office	Assigned	Due Date	Completed	Instructions
Ken Labbe	OITA	OITA	01/21/2015	02/04/2015	N/A	DX-Respond directly to this citizen's questions, statements, or concerns

Supporting Information

Supporting Author: N/A

Supporting Assignments:

Assigner	Assignee	Office	Assigned Date
No records found.			

History

Action By	Office	Date	Action
Ken Labbe	OEX	01/21/2015	Assign OITA as lead office
Lakita Stewart	OITA	01/22/2015	Accepted the group assignment

Comments

Commentator	Date	Comments
No records found.		

*: Required field

(+): Lookup field, press space bar for complete list

OK Cancel

UTE MOUNTAIN UTE TRIBE

P.O. Box 248
Towaoc, Colorado 81334-0248
(970) 565-3751

January 13, 2015

Ms. Gina McCarthy
Administrator
Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

RE: Second Government-to-Government Consultation between EPA and the Ute Mountain Ute Tribe, Rulemaking Activity 40 C.F.R. Part 61, Subpart W

Dear Administrator McCarthy:

Thank you for the letter dated September 26, 2014 from Acting Assistant Administrator Janet McCabe regarding government-to-government consultation between the EPA and the Ute Mountain Ute Tribe ("Tribe") regarding the 40 C.F.R. Part 61, Subpart W (NESHAPS Subpart W) rulemaking. As you may know, because we were unable to schedule a meeting that included substantive discussion of the Tribe's outstanding questions and concerns about the rulemaking before the public comment period ended on October 29, 2014, we chose to defer the next consultation meeting until the EPA had an opportunity to review the Tribe's public comments and conduct the necessary work to answer the outstanding questions from the July 10, 2014 meeting. I am sending this letter to formally request that the EPA schedule the second consultation meeting with the Tribe on the NESHAPS Subpart W rulemaking before the EPA issues a final Subpart W rule (and far enough in advance of the final Subpart W rule for the Tribe to have meaningful involvement in the EPA's final rule). We look forward to addressing the outstanding questions from the July 10, 2014 meeting and the issues raised in our October 29, 2014 public comments.

Please contact Scott Clow, Environmental Programs Department Director, at (970) 564-5432 or sclow@utemountain.org or Celene Hawkins, Associate General Counsel, at (970) 564-5642 or chawkins@utemountain.org to set the second consultation meeting regarding the NESHAPS Subpart W rulemaking.

Sincerely,

Manuel Heart

Manuel Heart
Chairman
Ute Mountain Ute Tribe

Cc: Tribal Council
Peter Ortego, General Counsel, Ute Mountain Ute Tribe
Celene Hawkins, Associate General Counsel, Ute Mountain Ute Tribe
H. Michael Keller, Special Counsel, Ute Mountain Ute Tribe
Scott Clow, Environmental Programs Director, Ute Mountain Ute Tribe
JoAnne Chase, Director, American Indian Environmental Office, U.S. EPA
Shaun McGrath, Regional Administrator, U.S. EPA, Region 8
Dr. Yvette Roubideaux, Director, Indian Health Services
Kevin Washburn, Assistant Secretary, Indian Affairs

FedEx Express NEW Package US Airbill

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From ID No. 0200

Recipient's Copy

1 From

Date 1-16-15

Sender's Name Scott Clow Phone 970 564-5432

Company Ute Mountain Ute Tribe EPD

Address 520 Sunset Blvd PO BOX 420

Dept./Floor/Suite/Room

City Towaoc State CO ZIP 81334

2 Your Internal Billing Reference 127-8260-8715

3 To

Recipient's Name MS. Gina McCarthy Phone 202 564-4700

Company Environmental Protection Agency

Address 1200 Pennsylvania Ave N.W.

We cannot deliver to P.O. boxes or P.O. ZIP codes.

Dept./Floor/Suite/Room

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Use this line for the HOLD location address or for continuation of your shipping address.

City Washington State DC ZIP 20460

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HOLD Saturday
FedEx location address REQUIRED. Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

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- ☐ FedEx 2Day — Second business afternoon.* Thursday shipments will be delivered on Monday unless SATURDAY Delivery is selected.
- ☐ FedEx Express Saver — Third business day.* Saturday Delivery NOT available.

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☐ Indirect Signature — If no one is available at recipient's address, someone at a neighboring address may sign for delivery. For residential deliveries only. Fee applies.

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