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**Docket:** NRC-2021-0217

Monitoring Criteria and Methods to Calculate Occupational Radiation Doses

**Comment On:** NRC-2021-0217-0001

Monitoring Criteria and Methods to Calculate Occupational Radiation Doses; Extension of Comment Period

**Document:** NRC-2021-0217-DRAFT-0004

Comment on FR Doc # 2021-27302

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## Submitter Information

**Email:** brandi.obrien@wyo.gov

**Government Agency Type:** State

**Government Agency:** Wyoming Department of Environmental Quality

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## General Comment

See attached file(s)

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## Attachments

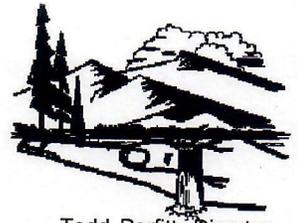
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Mark Gordon, Governor

# Department of Environmental Quality

To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.



Todd Parfitt, Director

Stacy Schumann  
Nuclear Regulatory Commission  
Washington, DC 20555-0001

**SUBJECT: Wyoming Department of Environmental Quality Comments on the NRC Draft Regulatory Guidance 8.34, titled: "Monitoring Criteria and Methods to Calculate Occupational Radiation Doses", Docket ID NRC-2021-0217**

Dear Ms. Schumann,

The Wyoming Department of Environmental Quality (WDEQ, or "Department"), appreciates the opportunity to comment on the draft regulatory guidance 8.34, "Monitoring Criteria and Methods to Calculate Occupational Radiation Doses". The Department also appreciates the Nuclear Regulatory Commission's (NRC's) internal review of its environmental programs, and the conclusions of that review leading to this guidance.

WDEQ's Uranium Recovery Program (URP) has reviewed the draft guidance and is providing the following comments:

1. In Appendix A, the illustrative example uses Equation A.2 for the demonstration of compliance with the 10 CFR 20.1201(e) limit of 10 mg per week of soluble U-nat compounds (Class D and W). The text states that the licensee may use air sampling data, worker exposure, and assigned respiratory protection factors (APF), however the equation itself does not explicitly reflect the use of the exposure duration. In its current form the equation indicates that the fraction of time in hours that the radiological worker is exposed to radiation is 40 hours (2400 minutes), or one full work week. It is recommended that the equation be updated to include a multiplicative term to account for the duration of exposure, so that it is more generalized for use with any exposure period. The following suggested formula includes the exposure time in minutes.

$$m_{i,U} = \frac{C_i \cdot BR \cdot 0.001 \cdot t}{APF \cdot SA_{i,U}}$$

Where

$m_{i,U}$  = the mass intake of uranium isotope  $i$  (mg),

$SA_{i,U}$  = the specific activity of uranium isotope  $i$  (Ci/g),

$BR$  = the breathing rate of "Reference Man" under light work conditions (20,000 ml/minutes),

$t$  = the exposure duration of time (minutes),

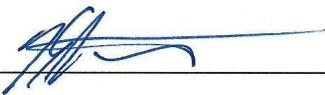
$APF$  = the respiratory assigned protection factor (mg),

0.001 = a conversion constant that yields the mass intake in (mg)

2. It would be helpful to cite RG 8.9 in Page A-2 under “**Soluble Uranium Intakes**” subsection for the other acceptable methods of uranium intake estimate based on bioassay measurements. Alternatively, expanding the example calculation given in Appendix A of the Draft Guidance to add the use of Intake Retention Fraction (IRF) from NUREG/CR-4884 and using Equation 1 from Section 4.3 of RG 8.9 Rev 1, would be helpful.
3. Table A-1 should be updated to include the three uranium isotope air concentrations, the Cs-137 and the Ce-144 concentrations used in the calculation of the intakes. In addition, the duration of the worker’s exposure duration in minutes and the APF used in the calculation of radionuclide intakes in Table A-1 need to be provided for illustration purposes.
4. Under “**Committed Effective Dose Equivalent (CEDE)**” of Appendix A, there is a typo; the data used in calculating CEDE were actually taken from Table A-1 and not from Table A-2 as mentioned in the text.
5. The rounding of the U-234 SA value found in Table A-2 is incorrect, the value should be written as: 6.2E-3 (Ci/g) instead of 6.3E-3 (Ci/g).
6. In Section 4.4.2, a statement is made that would be in an overestimation of the CDE to a specific tissue or organ from the combined contributions from all inhaled or ingested radionuclides. The statement is: “*The CDE for all radionuclides combined is then the sum of the CDE from nonstochastic radionuclides and the CDE from stochastic radionuclides.*”. The combined dose (i.e, combined CDE) should be the sum of the CDEs using the nonstochastic values (whether each value is the limiting conversion factor or not) for each radionuclide as found in Tables 2.1 and 2.2 in FGR No. 11 for inhalation and ingestion pathways, respectively.

The WDEQ appreciates this opportunity for comment of the draft guidance for monitoring criteria and methods to calculate occupational radiation doses. Please feel free to contact Kyle Wendtland at 307-777-7046 or Brandi O’Brien at 307-777-6435 or by email at [Kyle.Wendtland@wyo.gov](mailto:Kyle.Wendtland@wyo.gov) or [Brandi.OBrien@wyo.gov](mailto:Brandi.OBrien@wyo.gov) regarding any questions or concerns you may have regarding these comments.

Regards,



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Kyle Wendtland  
Land Quality Division Administrator  
Wyoming Department of Environmental Quality



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Date

cc: Karin Quigley, LQD/Cheyenne  
Kyle Wendtland, LQD/Cheyenne  
Brandi O’Brien, URP/LQD/Cheyenne