
**Regulatory Analysis for Evaluations of Uranium Recovery
Facility Surveys of Radon and Radon Progeny in Air and
Demonstrations of Compliance with 10 CFR 20.1301
(Proposed Final DUWP-ISG-01)**

U.S. Nuclear Regulatory Commission
Office of Nuclear Material Safety and Safeguards
Division of Decommissioning, Uranium Recovery, and Waste Programs



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ABBREVIATIONS AND ACRONYMS

ADAMS	Agencywide Documents Access and Management System
CFR	<i>Code of Federal Regulations</i>
DUWP	Division of Decommissioning, Uranium Recovery, and Waste Programs
FR	<i>Federal Register</i>
FSME	Office of Federal and State Materials and Environmental Management Programs
ISG	Interim Staff Guidance
NRC	U.S. Nuclear Regulatory Commission

1 Statement of the Problem

On May 21, 1991, the U.S. Nuclear Regulatory Commission (NRC) revised its standards for protection against ionizing radiation in 10 CFR Part 20, "Standards for Protection Against Radiation" (56 FR 23360). In its notice of the final rule, the NRC stated it was "aware that some categories of licensees, such as uranium mills and in situ uranium mining facilities, may experience difficulties in determining compliance with the values in appendix B to §§ 20.1001-20.2401, Table 2, for certain radionuclides, such as radon-222." The NRC also explained several provisions in the rule that might mitigate the difficulties vis-à-vis radon-222 and compliance with public dose standards. For example, the NRC described the provision in 10 CFR 20.1302(c) that allows a licensee, upon approval of the Commission, to adjust effluent concentration values in Appendix B to 10 CFR 20.1001-20.2401, Table 2, for members of the public to take into account the degree of equilibrium between radon and its short-lived progeny; the provision in 10 CFR 20.1302(b)(1) allowing a licensee to calculate dose to an individual likely to receive the highest dose, rather than meet an air concentration value at the boundary of the unrestricted area; and, lastly, if the public dose limit could not be met using the first two provisions, an additional provision in 10 CFR 20.1301(d) for a licensee to apply for prior NRC authorization to operate up to an annual public dose limit of 0.5 rem (5 mSv).

In September 2011, the NRC staff issued draft guidance to address the issues the Commission anticipated in 1991 and additional issues related to surveys of radon-222 and annual demonstrations of compliance with public dose limits (NRC 2011). The NRC staff had, up to that time, observed problems like those anticipated by the Commission in 1991: (1) insufficient accounting for dose contributed by radon progeny; (2) use of incorrect values for radon-222 contained in Table 2 of Appendix B to 10 CFR Part 20; (3) incorrect or inadequate consideration of individuals likely to receive the highest dose; (4) inadequate consideration of dose from other radionuclides; (5) inadequate consideration of the degree of equilibrium between radon and its short-lived progeny; (6) inadequate survey methods; and (7) inadequate consideration of background concentrations of radon-222 in air. The NRC staff considered public comments on the September 2011 draft guidance and issued revised draft FSME-ISG-01 on March 14, 2014 (NRC 2014).

The NRC is now considering issuing final Interim Staff Guidance (ISG) DUWP-ISG-01, "Evaluations of Uranium Recovery Facility Surveys of Radon and Radon Progeny in Air and Demonstrations of Compliance with 10 CFR 20.1301." The final ISG describes methods acceptable to the NRC staff for uranium recovery licensees to perform surveys and estimate public dose from exposure to radon-222 to demonstrate compliance with the public dose standards in 10 CFR 20.1301, "Dose limits for individual members of the public."

2 Objectives

The objective of this regulatory action is to provide final guidance to NRC staff and Agreement State license reviewers on acceptable methods for uranium recovery licensees to demonstrate compliance with 10 CFR 20.1301 public dose limits with respect to exposure to radon-222 and radon-222 progeny in air.

3 Identification and Analysis of Alternative Approaches

The NRC staff considered the following three alternative approaches:

- (1) Do not revise draft FSME-ISG-01;
- (2) Withdraw draft FSME-ISG-01;
- (3) Issue final DUWP-ISG-01.

3.1 Alternative 1: Do Not Revise Draft FSME-ISG-01

Under this alternative, the NRC would retain the current draft FSME-ISG-01 (NRC 2014) and would not issue a final DUWP-ISG-01. If the NRC does not take action, there would be no changes in costs or benefit to the public, licensees, Agreement States, or the NRC. However, the “no-action” alternative would not address the resolution of public comments provided on draft FSME-ISG-01 (NRC 2015) or the results of a NRC staff non-concurrence on the draft final ISG (NRC 2019). For example, the NRC staff has made several clarifying changes in the final DUWP-ISG-01, such as: (1) modification of text in Section 4.5 regarding the use of estimates of uncertainty in compliance determinations; (2) clarifications in Section 4.2.2 and 4.2.3 of the role of dose modeling with appropriate confirmation by measurements; and (3) suggestions for improving the accuracy and precision of measurements of radon-222 in air using track-etch detectors. The NRC and Agreement State licensees would continue to use the guidance in FSME-ISG-01 to revise uranium recovery license applications. This alternative is considered the “no-action” alternative and provides a baseline condition from which other alternatives will be assessed.

3.2 Alternative 2: Withdraw Draft FSME-ISG-01

Under this alternative, the NRC would withdraw FSME-ISG-01. Doing so would eliminate existing guidance that the NRC staff and Agreement States use to review, document, and approve licensee procedures to demonstrate compliance with 10 CFR 20.1301 and equivalent Agreement State regulations. Although this alternative would be less costly than revising FSME-ISG-01, the effect would be to eliminate necessary guidance that provides useful information to the NRC staff and Agreement States, which ensures consistent and complete technical reviews, and helps to ensure that licensee submittals through licensing actions are complete and licensee radiation protection programs are in compliance with regulations. The availability of guidance describing acceptable methods to demonstrate compliance with public dose standards helps licensees and applicants understand the information required in a license application and thereby reduces the likelihood of requests for additional information that could cause licensing delays. Because of these shortcomings, and because this alternative would not fully address the regulatory issues described above, the NRC did not evaluate this alternative further.

3.3 Alternative 3: Issue final DUWP-ISG-01

Under this alternative, the NRC would revise draft FSME-ISG-01 to address public comments received in 2014 and address additional issues identified under the NRC’s non-concurrence program (NRC 2019). By doing so, the NRC would ensure that final DUWP-ISG-01 is current and clear, accurately reflects the NRC staff’s position, and addresses public comments on the draft FSME-ISG-01.

The impact to the NRC would be the costs associated with drafting and issuing the final ISG. The impact to Agreement States would be to make any necessary conforming changes to their procedures. The impact to NRC and Agreement State licensees and applicants would be the marginal incremental costs of preparing license applications and license amendment requests that correctly address potential public exposure to radon-222 and radon-222 progeny in air and compliance with 10 CFR 20.1301 public dose limits. The impact on licensees and applicants of issuing this final guidance is estimated to be minimal because draft guidance on this topic has been available since 2011 (NRC 2011). Although some licensees may need to revise their current radiation protection procedures to adapt to the acceptable methods described in the final DUWP-ISG-01, these licensees will gain in efficiencies because after the adjustment to conform to the final DUWP-ISG-01 guidance, the NRC and Agreement State licensees would gain efficiencies from having clear and accurate guidance.

4 Conclusion and Decision Rationale

Based on this regulatory analysis, the NRC staff concludes that Alternative 3, issuance of the final DUWP-ISG-01, is the best option. This action will enhance the NRC and Agreement State licensees' ability to correctly comply with annual public dose limits in 10 CFR 20.1301 with respect to public exposure to radon-222 in air. The NRC expects that by following the guidance contained in DUWP-ISG-01 may lead to cost savings for applicants and licensees and provides methods acceptable to the NRC staff to demonstrate compliance with 10 CFR 20.1301.

5 References

10 CFR Part 20. *Code of Federal Regulations*, Title 10, *Energy*, Part 20, "Standards for Protection against Radiation.

"Standards for Protection Against Radiation, Final Rule." Published May 21, 1991, in Volume 56 of the *Federal Register*, page 23360 (56 FR 23360).

U.S. Nuclear Regulatory Commission (NRC), "NRC Staff Interim Guidance, Evaluations of Uranium Recovery Facility Surveys of Radon and Radon Progeny in Air and Demonstrations of Compliance with 10 CFR 20.1301." Draft Report for Comment, September 30, 2011. ADAMS Accession No. ML112720481.

NRC, "FSME Interim Staff Guidance, FSME-ISG-01, Evaluations of Uranium Recovery Facility Surveys of Radon and Radon Progeny in Air and Demonstrations of Compliance with 10 CFR 20.1301." Revised Draft Report for Comment, March 20, 2014. ADAMS Accession No. ML13310A198. Pkg. ML13310B306.

NRC, "Summary of Responses to Comments on Revised Draft Interim Staff Guidance DUWP-ISG-01," ADAMS Accession No. ML15051A003. Pkg. ML14058A010.

NRC Form 757, Non-concurrence Process, "Evaluation of UR Facilities Survey of Radon for Compliance with 10 CFR 20.1301 (DUWP ISG-01) Final," ADAMS Accession No. ML19121A171. Pkg. ML14058A010.