



40 CFR part 190

Advance Notice of Proposed Rulemaking and Summary of Public Comments

Prepared for:

Science Advisory Board – Radiation Advisory Committee

By:

Office of Radiation and Indoor Air

November 10, 2015

Presentation Outline

What is 40 CFR 190?

- Background

Why is EPA Considering Revisions?

Advance Notice of Proposed Rulemaking (ANPR)

- Issue and questions

Public Comments Summary (by issue)

Next Steps

Key Technical Areas



What is 40 CFR part 190?

40 CFR Part 190 establishes environmental radiation protection standards for nuclear power operations

- Applies to U milling, U conversion & enrichment, U fuel fabrication, nuclear power plants, & reprocessing facilities involved in electricity production
- Final Rule published Jan 13, 1977 - 40 CFR Part 190

EPA's "generally applicable" standards are implemented by the Nuclear Regulatory Commission



Background

40 CFR 190 contains two main radiation protection provisions:

- Public Dose limits (190.10(a))
 - Dose to any individual shall not exceed 25 mrem/yr whole body, 75 mrem/yr to thyroid, and 25 mrem/yr to any other organ
- Radionuclide Release limits (190.10(b))
 - Annual limits on total quantities of radioactivity entering the environment for certain radionuclides per Gigawatt electricity produced; primarily for reprocessing
 - 50,000 curies Kr-85
 - 5 millicuries I-129
 - 0.5 millicuries combined of Pu 239 & other alpha emitters



Rationale for Existing (1977) Standard

Standards for the nuclear power industry should include:

- Dose limit to individuals
- Total radiation dose limit to populations (collective dose)
- Limits that reduce the risk of health effects attributable to these doses including future risk from the release of long-lived radionuclides to the environment
- Limits that account for the effectiveness and costs of technology available to mitigate these risks through effluent control



Why is EPA Considering Revisions?

Standards are 38 years old, and don't reflect the most recent science

- Assumptions used as basis for current rule not borne out
- Nuclear industry has evolved considerably

At the time this effort was initiated, timing was appropriate for a review

- Renewed interest in nuclear power (2010)
 - Prior to incident at Fukushima, Japan
- NRC efforts to update requirements (e.g. dosimetry)

Several technical issues identified during initial Agency review

- Dosimetry is outdated – relies upon ICRP 2 methods
- No groundwater protection provisions
 - Not consistent with more recent Agency policies
- Enforcement issues associated with 40 CFR 190.10 (b)
 - Release limits scaled to total electricity production



Advance Notice of Proposed Rulemaking (ANPR)

ANPR issued and open for comment through August 3, 2014

General Question - Should the Agency revise its existing standards for Environmental Radiation Protection from Nuclear Power Operations (40 CFR part 190)?

Six major issues presented for public comment:

- *Should the Agency express its limits for the purpose of this regulation in terms of radiation risk or radiation dose?*
- *How should the Agency update the radiation dosimetry methodology incorporated in the standard?*
- *Should the Agency retain the radionuclide release limits in an updated rule and, if so, what should the Agency use as the basis for any release limits?*
- *How should a revised rule protect water resources?*
- *How, if at all, should a revised rule explicitly address storage of spent nuclear fuel and high-level radioactive waste?*
- *What new technologies and practices have developed since 40 CFR part 190 was issued, and how should any revised rule address these advances and changes?*



PUBLIC COMMENTS

*What We Heard From the
Public*



Overall Impressions

ANPR was broadly distributed

- Over 24,000 comments received (488 discrete)
- Commenters included individuals, environmental activists, federal gov't, state gov't, nuclear industry, academia

98% were duplicates or form submittals

- General opposition to relaxing the protection limits
- Appear to be prompted by erroneous media reports claiming 'EPA is raising radiation limits'



Issue 1: Consideration of a Risk Limit to Protect Individuals

Should the Agency express its limits for the purpose of this regulation in terms of radiation risk or radiation dose?

- Question that drew the most interest
- Dose was supported heavily by industry, but also by some of the public
- Risk was supported heavily by the public and environmentalists, but also by some in industry
- Concept of harmonizing the standards for radiation protection with NRC's 10 CFR part 20 revision was introduced



Issue 1: Consideration of a Risk Limit to Protect Individuals - cont'd.

Should the Agency base any risk standard on cancer morbidity or cancer mortality?

- Commenters supported both metrics
- Morbidity supporters cited importance of 'quality of life' issues
- Mortality supporters cited better scientific data, consistency with how other pollutants are regulated, and lower uncertainties.

How might implementation of a risk limit be carried out?

- Industry commenters stated difficult to implement citing industry-wide procedures, licenses, policies, training, software, etc. needing development
- Too costly to implement – No data submitted



Issue 2: Updated Dose Methodology

How should the Agency update the radiation dosimetry methodology incorporated in the standard?

If a dose standard is desired, how should the Agency take account of updated scientific information and methods related to radiation dose?

- Few specific responses but most wanted the most up-to-date science to be used
- Some cited effective dose was more technically sound
- Most activists wanted organ specific doses, citing that limiting effective dose and committed effective dose to “25 mrem/yr” would allow more radiation
 - Iodine may be the prime example (thyroid dose)
- Some stated committed effective dose (vs effective dose) was more closely linked to real incidences of cancer



Issue 2: Updated Dose Methodology – cont'd

In updating the dose standard, should the methodology in ICRP 60 or ICRP 103 be adopted?

- Some stated that updates to implementing ICRP 103, and FGR 13 should be available in adequate time for incorporation
- Some stated that if the Agency proceeds with using ICRP 60 methodology as the basis of a revised standard, it would be incorporating 'outdated science'
- A few respondents stated the Agency should allow flexibility when determining which methodology to be used



Issue 3: Radionuclide Release Limits

Should the Agency retain the radionuclide release limits in an updated rule and, if so, what should the Agency use as the basis for any release limits?

- Most commenters believed this provision needed revision of some type, but no consensus on how to change it
- Many activists erroneously believed that this provision prevented reprocessing and as such wanted the provision to be kept



Issue 3: Radionuclide Release Limits – cont'd

Is it justifiable to apply limits on an industry-wide basis and, if so, can this be reasonably implemented?

- No commenters supported industry-wide standards in their-current form
- Some commenters believed dose standards were adequately protective, so release limits could be eliminated
- Some commenters supported site- or facility-specific release limits as being more practical

If release limits are used, are the radionuclides for which limits have been established in the existing standard still appropriate?

- Industry commenters believed that limits on Kr were not technically justified because of the minimal health risk posed by the low energy beta emissions
- Many activists believed that limits should be placed on tritium and C-14 as well.
 - Note that these were considered in the original rulemaking



Issue 4: Water Resource Protection

How should a revised rule protect water resources?

- Second most commented issue
- Many (activists, state gov't) believed that a ground water protection provision is needed
- Most industry commenters believed that adequate steps were being taken to prevent ground water from being contaminated
 - Industry voluntary programs
 - NRC taking steps to identify and control the problem



Issue 4: Water Resource Protection – cont'd

If a ground water protection standard is established, what should the basis be and how should it be implemented?

- Many activists believed that the Safe Drinking Water Act Maximum Contaminant Levels (MCLs) were appropriate
 - Consistent with current Agency policies
- Some stated that **all water**, not just drinking water, were potential sources needing protection
- A smaller set (mostly industry and gov't) believed that the MCLs should not be used citing that new risk levels have not been adopted
 - Agency should update MCLs consistent with 4 mrem/yr for beta-emitters

Are additional standards aimed at limiting surface water contamination needed?

- Some supported the Agency looking at more data



Issue 5: Spent Nuclear Fuel and High-Level Radioactive Waste Storage

How, if at all, should a revised rule explicitly address storage of spent nuclear fuel and high-level radioactive waste?

- Very few commenters addressed this issue
- Slight majority believed that no changes needed to the current language as it refers to spent nuclear fuel and high-level waste storage
- Some activists wanted changes to language specifying the length of time for storage in spent fuel pools, or dry cask storage pads
- A couple of commenters believed that clarifications were needed between 40 CFR parts 190 and 191
 - Wanted assurance that dose standard for 190 would not be additive to dose standard for 191 for reactor sites that store spent fuel



Issue 6: New Nuclear Technologies

What new technologies and practices have developed since 40 CFR part 190 was issued, and how should any revised rule address these advances and changes?

- Least commented issue
- No commenter stated that any new technologies warranted revised standards
- Some commenters stated that US is not pursuing other fuel cycles, so the issue is not ripe
- Some activists believed that if reprocessing were pursued, EPA should develop revised standards addressing this
- No commenters expressed concerns that small modular reactors warranted new standards



Other issues

Technical

- Linear No-Threshold model as a basis for health effects
 - Although specifically not identified as an issue for comment, it is relevant to the risk vs. dose question
 - Received several comments either for or against

Process/Policy

- Some commenters stated that the Agency should have a clearer statement on the goal of this potential revision
- On comment on logistics of working with Office of Water & NRC to assure that nuclear power plant licenses have incorporated best technology available (BTA; similar in concept to “Best Available Technology”)
 - Does AEA pre-empt states BTA authorities under CWA section 316[b] (cooling water intake structures)?
- When will we make statement to public regarding our next steps with this potential revision?

Beyond Scope

- Lack of regulation of the coal-fired power plant industry



Next Steps

Identify issues for follow-up

- Technical/economic studies will likely be needed
- Policy analysis of issues given the comments

Continue dialogue

- NRC, ISCORS (Interagency Steering Committee on Radiation Standards)
- Other public discussions
 - SAB consultation (Spring 2016)
 - Tribal consultation - TBD

After analyses and dialogue, provide recommendations to management on changes to 40 CFR 190

Determine if a proposal is warranted

