

NRC's Radiation Protection Policy - What Does it Take for Change?

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Overview

- Key Milestones for Radiation Protection Policy
- Below Regulatory Concern (BRC) Policy Statements
- Is LNT the Issue? Options for Licensees
- Exploring Case Studies
- LNT & ALARA: Why go beyond ALARA?
- External influencing factors
- Impacts
- Thoughts for the Future



Key Milestones*

NRC Radiation Protection Policy

- 1957: Atomic Energy Commission issues 10 CFR Part 20
- 1977: ICRP 26 published
- 1980: BEIR III issued
- 1980: NRC issues an Advanced Notice of Proposed Rulemaking
- 1986: NRC issues proposed Part 20 changes
- 1987: NCRP issues Report 91
- 1990: NRC Below Regulatory Concern Policy Statement issued
- 1990-1: ICRP Report 60 issued
- 1991: NRC issues its revised Part 20 updating it to ICRP 26 & 30
- 2007: ICRP issues Report 103
- 2009: NRC: stakeholder outreach to update Part 20 & Part 50, App. I
- 2016: NRC discontinues Part 20 & Part 50, App. I rulemakings

The Below Regulatory Concern (BRC) Policy Statements

- NRC issued *two* BRC policy statements :
 - 1986: Radioactive Waste BRC
 - 1990: BRC Policy Statement for a consistent risk framework
- Low-Level Radioactive Waste Policy Amendments Act of 1985
- 1991: NRC issues indefinite moratorium on use of the statements
- 1992: Energy Policy Act of 1992 revoked the 1986 and 1990 BRC policy statements
- 1993: Formal withdrawals of BRC Policy Statements and related rulemaking which would have implemented the 1986 BRC Waste Statement
- NRC continues to issue exemptions on a case-by-case basis

Evolving NRC Policy

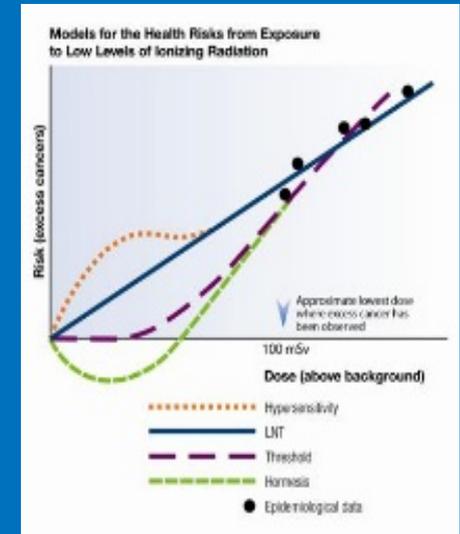
- 2009-12: NRC engaged in extensive stakeholder outreach to update Part 20 & Part 50, App. I to reach alignment with ICRP 103
- 2012: NRC Commission direction (SECY-12-0064):
 - Update methodology and terminology to align with ICRP 103
 - Develop improvements for effective implementation of ALARA
 - Continue discussions for dose limits to the lens of the eye & embryo/fetus
 - Disapproved reduction of dose limits from 50 mSv/y to 20 mSv/y
 - Disapproved SI units
 - Improve reporting of occupational exposure
- 2014: Advanced Notice of Proposed Rulemaking for Part 20
- 2015: Advanced Notice of Proposed Rulemaking for Part 50, App I
- SECY-16-0009: Recommendation to discontinue rulemaking
- Dec 2016: NRC discontinues Part 20 & Part 50, App. I rulemakings

Is LNT the issue?

What are the Options for Licensees?

Case studies:

1. Petition for rulemaking
2. Request an exemption
3. ALARA & Decommissioning



Ex 1: Petition for Rulemaking

- 2015: NRC received 3 similar petitioner requests* to amend Part 20 with regard to the LNT hypothesis (80 FR 35870)
- Petitioners assert that valid scientific studies and evidence exist that contradicts LNT hypothesis
- Petitioners recommend
 - Worker's effective doses up to 100 mSv (10 rem) per year if chronic
 - Removal of ALARA from the regulations, as it makes no sense to decrease radiation doses that are not only harmless, but may be hormetic
 - Raise public dose limits to same level as worker dose limits, as these low doses may be hormetic
 - End differing doses limits for pregnant women, embryos and fetuses, and children under 18 years of age

Current Status of LNT Petitions

- >3,200 public comment letters received
- NCRP Commentary 27* issued in April 2018:
 - Review of recent epidemiologic studies support the continued use of the LNT model for radiation protection
 - Concluded that no alternate dose-response relationship appears better than LNT
- Currently developing a Commission paper for a decision on petitioners requests

* NCRP Commentary 27, *“Implications of Recent Epidemiologic Studies for the Linear-Nonthreshold Model and Radiation Protection*

Ex 2: Exemptions

NRC receives and has approved many exemptions to Part 20 based on justification. Examples include:

- SECY-99-077: Approval for a Th licensee to use alternate ICRP internal dosimetry models (ICRP 68); and to approve future exemptions, case-by-case (e.g., fuel cycle facilities)
- SECY-99-136: Exemptions granted to transfer baghouse slag containing <0.05 wt% source material to exempt persons if doses were less than 1 mSv/y (NRC notification if >0.25 mSv)
- SECY-01-0148 : Continuance to consider and grant licensee requests to use the ICRP revised internal dosimetry models on a case-by-case basis

Ex 3: ALARA & Decommissioning

Current 1997 decommissioning regulations are performance-based and risk-informed:

- NRC terminates ~100 materials licenses/y
- NUREG-1757, V2, R1: Decommissioning Guidance
 - Reasonable land use
 - Flexibility: screening vs site-specific dose assessment
 - No calculations needed for ALARA (App N)
- No need to go below the regulatory limits
- Requests for exemptions (e.g., ICRP 26 → 72)
- 2002 NRC-EPA MOU: facilitates decision-making

LNT & ALARA

- 10 CFR 20.1101(b) – implementation of ALARA
- NRC Regulatory Guide 8.29 (1996)
 - Because of the “..absence of scientific certainty regarding the relationship between low doses and health effects,” LNT is used as a “conservative assumption for radiation protection purposes”
- ALARA is intended to be an operating principle rather than an absolute minimization of exposures
- What pushes licensees to go beyond ALARA?

Why go beyond ALARA?

ALARA: making a *reasonable* effort to maintain exposures as far below the limit as is *practical*...

- But licensees have many external factors:
 - NRC as the regulator
 - Stakeholder questions/concerns
 - Other Federal or State regulations
 - Accreditation requirements
 - Insurance requirements
 - Peer pressure to lower doses

Where do we go from here?

UNSCEAR 2015 Report

Attributing Health Effects to Ionizing Radiation Exposure and Inferring Risks

- UNSCEAR highlights the concepts of attributability, inference of risk, and use of collective dose which could impact
 - Justification
 - Optimization
 - Graded approach
 - Low doses and associated uncertainties
 - The LNT hypothesis & its use in the safety standards
 - Challenges in communicating radiation benefits and risks



Impacts

- Regulatory agencies make changes based upon science, national and international recommendations, and in the U.S., the participatory rulemaking process
- Stakeholder engagement & communication support are needed for paradigm shift
- Educate external influences for a moderate approach
- Focus on the facts that NRC regulations do allow for flexibility to:
 - Use risk-informed, performance based approaches for implementation
 - Request exemptions to use new models/methodology

Thoughts for the Years Ahead

- Completion of the health risk assessment from low-dose/dose rates (Million Worker Study)
- Improving realism in dose assessment
- Use the UNSCEAR concepts of attribution in practice
- Use of ALARA as designed
- Strong scientific support for a different dose-response relationship
- For change to occur there must be international and national consensus

Thank you!

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