

A Short History of Radiation Protection at US EPA

Presented by Mike Boyd
US EPA/ Radiation Protection Division
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Disclaimer and Scope

- More details about EPA's program history are available in the document, "Radiation Protection at EPA – The First 30 Years" (J.Dziuban, 2000) available at www.epa.gov/radiation.
- Any factual mistakes or expressed opinions are attributable to me and not my employer.
- I am focusing on radiation protection at EPA, and, in the interest of time, have chosen not to include radioactive waste management in this presentation.

The Formation of EPA

- Reorganization Plan No. 3 (Dec. 2, 1970)
 - Reorganization of Executive Branch agencies proposed by President Nixon and approved by Congress
 - Established the Environmental Protection Agency
 - Reflected growing environmental concerns in the U.S. such as Love Canal
- Certain functions transferred to EPA from Dept. of Health, Education and Welfare; Dept. of Agriculture; Dept. of Interior; and, the Atomic Energy Commission

Functions Transferred from HEW's Bureau of Radiological Health

- Development of Protective Action Guides
- Responsibility for the collection, analysis, and interpretation of data on environmental radiation levels
 - Included 2 laboratories in AL & NV
- Environmental impact analysis and evaluation
- Certain other monitoring, research, and development authorities

Functions Transferred from the Atomic Energy Commission

- Establish generally applicable environmental standards for the protection of the general environment from radioactive material
 - Defined in the Atomic Energy Act as “limits on radiation exposures or levels, or concentrations or quantities of radioactive material, in the general environment outside the boundaries of locations under the control of persons possessing or using radioactive material” – applies to nuclear fuel cycle facilities “outside the fence”

Functions Transferred from the Federal Radiation Council (FRC)

- FRC abolished by Reorganization Plan No. 3 and all functions transferred to EPA
- Principal FRC function is Federal Guidance; i.e., to “advise the President with respect to radiation matters directly or indirectly affecting health, including guidance for all Federal agencies in the formulation of radiation standards and in the establishment and execution of programs of cooperation with States”

Early Federal Guidance Reports



Other Radiation Protection Authorities

- Clean Air Act (CAA) – Dec. 31, 1970
 - Radionuclides defined as hazardous air pollutants under the CAA
 - Regulated through National Emission Standards for Hazardous Air Pollutants (NESHAPs)
- Safe Drinking Water Act (SDWA) – 1974
 - SDWA requires EPA to set maximum contaminant levels (MCLs) for U.S. drinking water supplies
 - MCLs issued for gross alpha, Ra, U, and all manmade beta/photon emitters

Other Radiation Protection Authorities

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) – 1980
 - Known as Superfund; Regulations at 40 CFR 300 (1994)
 - Provides for risk-based cleanup of abandoned or legacy sites
 - Radionuclides are included along with other carcinogens and hazardous chemicals for setting risk-based cleanup goals

Major RP Regulations from EPA

- Uranium Fuel Cycle – 40 CFR 190 (1977)
 - ICRP Pub. 2-based dose standards
- Drinking Water – 40 CFR Part 141 (1976)
- Uranium and thorium mill tailings – 40 CFR Part 192 (1983)
- National Emissions Standards for Hazardous Air Pollutants, Standards for Radionuclides – 40 CFR Part 61 (1983)

A Few of EPA's Contributions to RP

- Control of Radioactivity in the Environment
 - Radioactivity in the air and drinking water are regulated better than before
 - Radon awareness efforts (stressing testing and mitigation)
 - Cleanup of FUSRAP and other legacy sites, old radium sites, and CERCLA radiation sites

Contributions to Radiation Emergency Response

- Issue Protective Action Guides for emergencies
- Operate RadNet system of radiation monitors (see Fukushima data at epa.gov/radiation)
- Lead federal agency for domestic response to foreign nuclear incidents such as Chernobyl (note that White House retained lead for Fukushima)
- Assume control of Federal Radiological Monitoring and Assessment Center (FRMAC) from DOE after the emergency phase of a domestic incident is ended

Contributions to Radiation Science

- Issued June 2011 updated “Blue Book” -- *EPA Radiogenic Cancer Risk Models and Projections for the U.S. Population* (download from epa.gov/radiation)
- Sponsor NAS reports on the Biological Effects of Ionizing Radiation (most recent is BEIR VII)
- Support radiation epidemiology studies
 - Serve on Joint Coordinating Committee on Radiation Effects Research -- Mayak and Techa River studies
 - Collaborate with scientists at Radiation Effects Research Foundation in Hiroshima, Japan

Federal Guidance Contributions

- EPA has used Federal Guidance to
 - Set New Limits for Uranium Workers
 - Set Revised General Standards for Workers
 - Issue Guidance on the Use of Diagnostic X-rays
- Federal Guidance Technical Reports have standardized methods for dose and risk assessment (Reports 11, 12, and 13)

Planned New Federal Guidance

- FGR 12 is being revised to give age- and gender-specific external dose coefficients for ~ 1200 radionuclides
 - Work performed at ORNL
 - Will incorporate ICRP Pub. 107 decay data
- FGR 13 is being revised to update age- and gender-specific cancer risk coefficients
 - Will reflect new Blue Book and BEIR VII
 - Will update U.S. baseline health data to 2000

Planned New Federal Guidance

- EPA is replacing FGR 9 with FGR 14 this year
 - *Federal Radiation Protection Guidance for Diagnostic and Interventional X-ray Procedures*
 - Updates guidance to include higher dose digital procedures (CT) and interventional fluoroscopy
- EPA may revise FGR 11 – radionuclide-specific adult dose conversion factors
 - Would be required if NRC updates dosimetry in 10 CFR Part 20 (RP regs.) or EPA updates 40 CFR 190 (fuel cycle regs.)

Current Activities

- Regulations under review:
 - 40 CFR Part 61, Subpart W – radon from operating U mill tailings
 - 40 CFR Part 192 – U and Th mill tailings
- EPA is in the early stages of considering a possible update to 40 CFR 190, similar to considerations at US NRC for possible update to 10 CFR Part 20
 - Could be opportunity for updating science; particularly for dosimetry system

In Short, That's How EPA Got Here

- Instead of “Where should we have gone?”, a few things we might still do to improve radiation protection (just my opinion!):
 - Adopt SI in our daily lives – old dogs can learn new tricks and it will help us communicate better with the rest of the world (see Fukushima)
 - Adopt ICRP 103 dosimetry (when it's available)
 - Better integrate radon and TENORM into RP (If you're worried about manmade sources, test for Rn first!)
 - Continue to use effective dose for annual standards, but adopt risk for long term performance standards