NEW YORK STATE | Department of Public Service

Three Empire State Plaza, Albany, NY 12223-1350
www.dps.ny.gov

June 15, 2023

VIA EMAIL

Hon. Michelle L. Phillips
Secretary to the Commission
3 Empire State Plaza
Albany, NY 12223-1350

Re: Matter No. 21-01188 – In the Matter of the Indian Point Closure Task Force and Indian Point Decommissioning Oversight Board.

Dear Secretary Phillips:

Please accept for filing in the above-captioned matter, the U.S. Nuclear Regulatory Commission's June 15, 2023 Indian Point Decommissioning Oversight Board meeting presentation regarding radiation dose standards. Should you have any questions regarding this filing, please contact me. Thank you.

Respectfully submitted,

Tom Kaczmarek
Executive Director
Indian Point Closure Task Force
Indian Point Decommissioning Oversight Board

Basis for the Public Dose Limits in 10 CFR Part 20, Standards for Protection Against Radiation

Bruce A. Watson, CHP
Office of Nuclear Material Safety and Safeguards
Division of Decommissioning, Uranium Recovery and Waste Programs

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Topics of Discussion

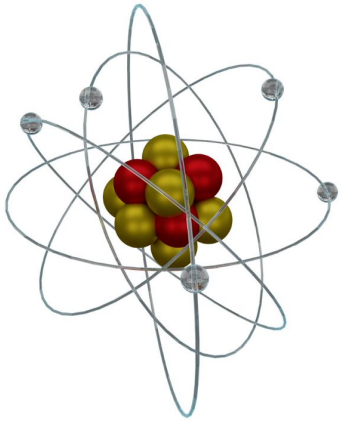
- System of radiological protection
- Scientific organizations that influence the regulations
- What would prompt a change in NRC's regulatory limits
- Liquid effluent discharges

10 CFR Part 20 – last major revision

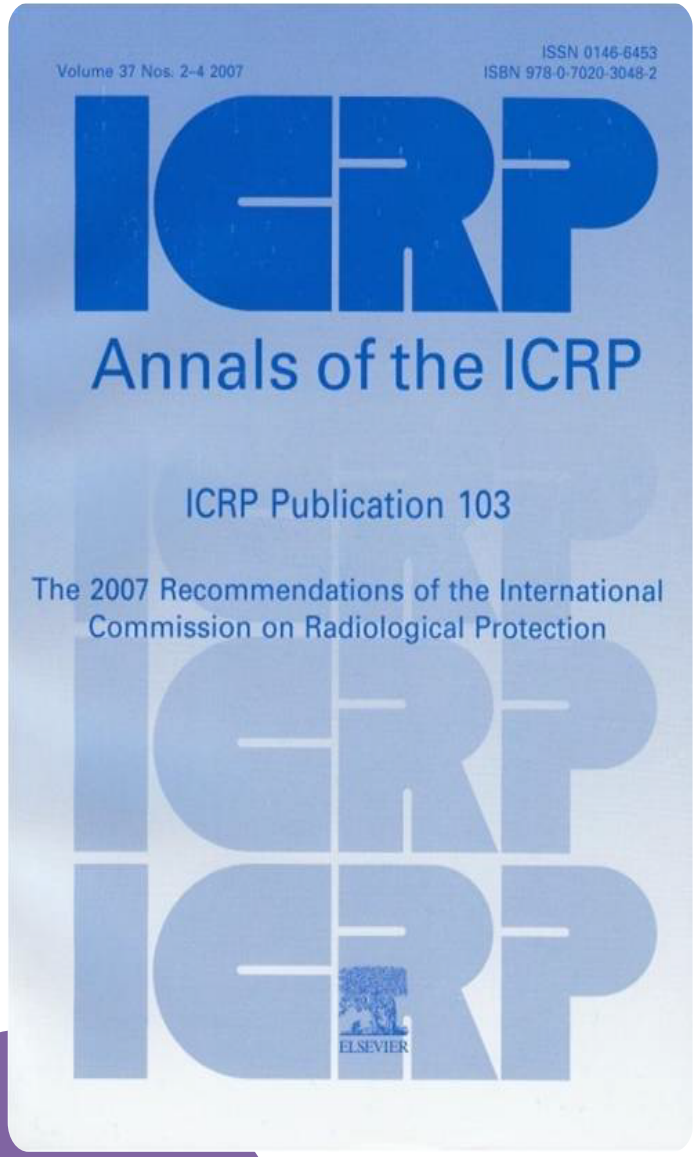
What has happened since then?

NRC has continued evaluating new information from the scientific communities.

Technical Developments



- Developments in basic science (e.g., DOE low dose research program, RERF, IARC)
- UNSCEAR Reports (2000 – 2008)
- BEIR V (1990) and BEIR VII (2005)
- French National Academy report (2005)
- International Council on Radiation Protection (ICRP) Publication 60 (1990) and 103 (2007)



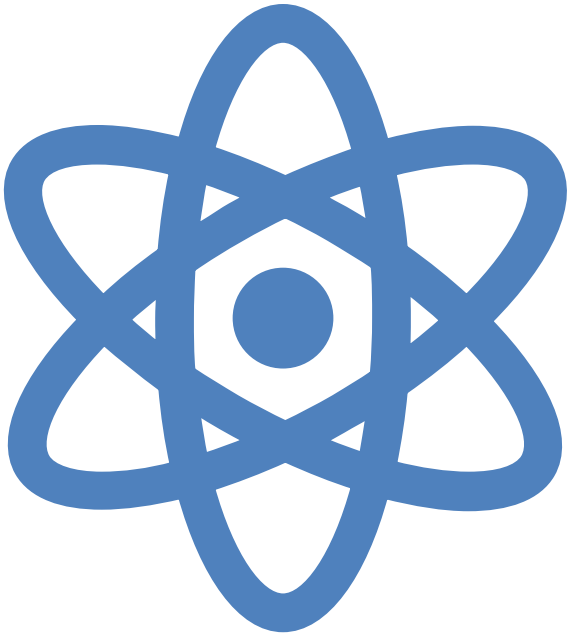
International Council on Radiation Protection (ICRP)

- The ICRP System of Radiological Protection is the basis of all standards, regulations, and practice of radiological protection world-wide, for the protection of patients, workers, the public, and the environment from ionizing radiation.
- The safety standards are applicable to provide adequate protection to all populations, including children, fetuses and women.
- The public dose limit of 100 mrem/y remained the same.

NRC Regulations

- SECY 2012-0064, Staff advised the Commission of the changes to the ICRP recommendations.
- In SRM 2012-0064, the Commission determined that the NRC regulations and standards are adequately protective of public health and safety.
- In 2016, the NRC staff recommended, and the Commission agreed, that current regulatory requirements were adequate to protect public health and safety and no additional requirements or guidance was warranted.

What would prompt a recommendation to revise NRC regulations?



- Substantial increase in public health and safety, and costs are justified
- Updated scientific information / biophysical models
- Interagency alignment (DOE, NRC, EPA, OSHA)

Environmental Regulations:

The EPA regulates the environment.

NRC regulates nuclear power plants.

- **January 1977** – EPA published 40 CFR Part 190,"Environmental Radiation Protection Standards For Nuclear Power Operations." 40 CFR 190.10 established does limits of 25 mrem/y to the whole body and to any organ, except the thyroid which is a 75 mrem/y limit.

- **May 1991 -**The NRC establishes its Radiation Protection Standards, 10 CFR 20 for all types of licensees in conformance to the ***EPA Federal Radiation Protection Guidance,*** based in part on the recommendations of the ICRP, the National Council on Radiation Protection, (NCRP) and the National Academy of Sciences (NAS).

EPA Effluent Regulations

- The EPA establishes regulations in 40 CFR 190 that limits radiation dose to members of the public to less than 25 mrem from all effluents including tritium. NRC enforces the EPA 25 millirem/year effluent limitation to a member of the public.
- EPA has a limit of 20,000 pCi/L the concentrations of tritium for drinking water that to approximately 4mrem/year.
- EPA and EPA Agreement States regulate the non-radioactive pollutant effluents through the Issuance of National Pollution Discharge Elimination System (NPDES) Permits.

.

NRC Effluent Regulations

NRC regulations are part of the plant license and NRC approves the Environmental Technical Specifications and Offsite Dose Calculation Manual. In decommissioning, the NRC conducts an annual inspection of the environmental and effluent program.

- The limits for radiation exposure to members of the public is 100 mrem/year.
- In addition, NRC establishes criteria for nuclear power plants that limit dose to less than 3 mrem per year from liquid effluents, including tritium.
- The NRC publishes each plant's annual radioactive effluent release report and the environmental report on the NRC web page. These reports show that the radiation dose from all effluents, including tritium releases is well below the NRC and EPA limits

Does decommissioning change the water ?
No

During light water nuclear operations, radionuclides are produced as the result of:

- **Fission:** fission products are created, Cs-137, Sr-90, and noble gases such as Krypton and Xenon.
- **Neutrons Activation**: Neutrons activate impurities in the reactor coolant water resulting in atoms becoming radioactive, Co-60, Fe-55, H-3 (Tritium).

The chemical properties of the radionuclides remain the same as non-radioactive compounds:

- Chemically, some are soluble in water and others insoluble
- **Chemically, the compounds behave the same as other non-radioactive compounds in the environment and in biological systems, <u>including humans</u>**
- No new chemical compounds are created from reactor operations or decommissioning

Does decommissioning change the liquid effluents?
No

No, once the reactor is shut down, no new fission products or activation products are created.

Short-lived radionuclides rapidly decay, and the radioactive inventory is slowly being reduced as the radionuclides decay to stable atoms.

The water used to perform decommissioning activities is the same water use to operate and refuel the reactor.

The spent nuclear fuel is encased in Zircaloy Steel, water is not in direct contact with the spent nuclear fuel pellets containing the uranium and other nuclides.

Tritium in Perspective

Tritium is a radioactive isotope of Hydrogen (one proton, two neutrons)

The radioactive hydrogen rapidly incorporates into water molecules and cannot be removed once it becomes tritiated water or more commonly known as “Tritium”

Tritium is produced naturally in the upper atmosphere when cosmic rays interact with Nitrogen atoms (along with C-14 and Be-7)

Tritium is produced by reactors, “however releases are at fractions of the natural background production rate” [EPA fact sheet]. **Tritium is used in medicine, industry, research and by the Defense Complex**.

Tritium be found at very low concentrations in lakes and streams (about 4 pCi/L)

Tritium emits a Beta particles of very low energy (cannot penetrate the skin surface) and has a radioactive half-life of 12.3 years.

<u>Tritium does not bioaccumulate</u>, because water turns over rapidly in the body, tritium in the body is rapidly cleared from tissues [EPA fact sheet, *10-day biological half-life*]

Conclusions

- NRC radiation protection regulations and standards are adequately protective of public health and safety.
- NRC continuously reviews and considers new information from the scientific community, ICRP, NCRP and other expert sources.
- Health Physics Society Tritium Fact Sheet
- NRC Public Website www.nrc.gov/tritium