NRC Oversight of Nuclear Plant Effluent Discharges

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Presentation to Pilgrim NDCAP
NRC Oversight Highlights

• All effluent releases – whether liquid or gaseous – must meet conservatively set federal limits.
• The NRC conducts inspections to verify that any discharges abide by these requirements.
• Plant owners must document effluent releases in annual reports submitted to the NRC.
Discharge Requirements

Controlled Releases must meet both NRC and EPA regulations
§ 20.1301 Dose limits for individual members of the public.

(a) Each licensee shall conduct operations so that—

(1) The total effective dose equivalent to individual members of the public from the licensed operation does not exceed 0.1 rem (1 mSv) in a year, exclusive of the dose contributions from background radiation, from any administration the individual has received, from exposure to individuals administered radioactive material and released under § 35.75, from voluntary participation in medical research programs, and from the licensee’s disposal of radioactive material into sanitary sewerage in accordance with § 20.203, and

(2) The dose in any unrestricted area from external sources, exclusive of the dose contributions from patients administered radioactive material and released in accordance with § 35.75, does not exceed 0.002 rem (0.02 millisievert) in any one hour.

(b) If the licensee permits members of the public to have access to controlled areas, the limits for members of the public continue to apply to those individuals.

(c) Notwithstanding paragraph (a)(1) of this section, a licensee may permit visitors to an individual who cannot be released, under § 36.75, to receive a radiation dose greater than 0.1 rem (1 mSv) if—

(1) The radiation dose received does not exceed 0.5 rem (5 mSv); and

(2) The authorized user, as defined in 10 CFR Part 35, has determined before the visit that it is appropriate.

(d) A licensee or license applicant shall apply for prior NRC authorization to operate up to an annual dose limit for an individual member of the public of 0.5 rem (5 mSv). The licensee or license applicant shall include the following information in this application:

(1) Demonstration of the need for and the expected duration of operations in excess of the limit in paragraph (a) of this section;

(2) The licensee’s program to assess and control dose within the 0.5 rem (5 mSv) annual limit; and

(3) The procedures to be followed to maintain the dose as low as is reasonably achievable.

(e) In addition to the requirements of this part, a licensee subject to the provisions of EPA’s generally applicable environmental radiation standards in 40 CFR part 190 shall comply with those standards:

(f) The Commission may impose additional restrictions on radiation levels in unrestricted areas and on the total quantity of radionuclides that a licensee may release in effluents in order to restrict the collective dose.
PART 190 - ENVIRONMENTAL RADIATION PROTECTION STANDARDS FOR NUCLEAR POWER OPERATIONS


Source: 42 FR 2860, Jan. 13, 1977, unless otherwise noted.

Subpart A - General Provisions

§ 190.01 Applicability.

The provisions of this part apply to radiation doses received by members of the public in the general environment and to radioactive materials introduced into the general environment as the result of operations which are part of a nuclear fuel cycle.
Documenting Releases
Measuring Release Impacts
NRC Inspection Activities
NRC Inspection Activities (cont’d.)
Comparison of Liquid and Gas Releases to Limits - Pilgrim

Dose from ALL Radionuclides in millirem

Year


NRC annual whole-body dose limit as found in 10 CFR 20.1301

EPA annual whole-body dose limit as found in 40 CFR 190

Note: values in the blue call-outs show the TOTAL whole-body dose for ALL radionuclides and ALL releases in that year

Typical whole-body dose from one transcontinental flight in the summer season (4 millirem)
Radiation Doses

- Limit for occupational exposure of radiation workers set by U.S. NRC and DOE (annual): 5,000 mREM
- Average dose to aviation flight crew member (annual): 310 mREM (Source: NRC/DOE)
- Average occupational dose received by U.S. commercial radiation workers rx (annual): 190 mREM (Source: NRC/DOE)
- Cosmic radiation living in Denver (annual): 80 mREM (Source: EPA)
- Natural radioactivity (annual): 29 mREM (Source: EPA)
- Terrestrial radioactivity (annual): 21 mREM (Source: EPA)
- Average dose to people in the U.S. from all sources of background radiation (annual): 311 mREM (Source: NRC/DOE)
- Radon in average home (annual): 228 mREM (Source: EPA)
- NRC annual dose limit for a member of the public (due to operations from licensed nuclear facilities): 100 mREM (Source: NRC)
- Cosmic radiation living at sea level (annual): 30/33 mREM (Source: EPA/NRC)
- NRC cleanup criteria for site decommissioning/unrestricted release (annual): 25 mREM (Source: NRC)
- Living near a nuclear plant (annual): -1 mREM (Source: EPA/DHHS)
Radiation Doses (cont’d.)
How to Contact Us

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