



BACKGROUNDER

Office of Public Affairs

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Environmental Monitoring at Nuclear Power Plants

Nuclear power plants release small amounts of radiation and radioactive materials while they are operating. The NRC's strict rules for these releases keep environmental radiation levels very low and protect public health and safety. NRC reviews of reactor license applications include [analysis](#) of the possible impacts to people, animals, plants and sea life. This analysis, part of the NRC's Environmental Impact Statement for the application, also addresses ways to minimize the impacts. After nuclear plants begin operating, the NRC inspects and verifies the plant is complying with regulations.

The NRC requires nuclear power plants to keep radioactive material releases [as low as is reasonably achievable – otherwise known as ALARA](#).

Plant operators must also:

- Comply with [radiation dose limits for the public](#)
 - Monitor what they release and the environment around the plant
 - Report their results annually to the NRC.
- These reports are posted on the NRC website.



Device for monitoring airborne radiation

Regulations

Radiation is all around us, much of it from natural sources such as cosmic rays, radon gas, and uranium and other elements in the ground. These sources generate an average annual dose of about 310 millirem to U.S. residents. Radiation from a reactor generally cannot be detected further than one mile away. Within one mile, it could be a small fraction of the background dose.

Nuclear power plants must comply with specific public dose limits set by the NRC and the Environmental Protection Agency. EPA's rules can be found in [40 CFR Part 190](#). The NRC rules are in [10 CFR Part 20](#). The NRC's rules define ALARA, and each reactor license also specifies ALARA levels; plant operators must report to the NRC any time those levels are exceeded. Meeting these rules ensures reactors keep doses to the public so small that they are difficult to distinguish from background radiation.

Monitoring Releases and the Environment

Reactor operators must monitor the release of radioactive materials in liquid or the air, as well as direct radiation from the plant. Operating plants have controlled their releases so well that, to this point, all releases have been below the ALARA levels.

Reactor operators also measure radiation levels in the environment. Environmental samples come from the air, surface water (such as ponds, streams and lakes), groundwater, drinking water, milk, fish and shoreline sediment. Independent labs regularly verify the accuracy of licensees' measuring systems. Licensees must report their release data, sampling and system verification results every year to the NRC.



NRC inspector watches sample-testing at Seabrook



Technicians process soil samples

The NRC posts these [annual reports](#) online. Radioactive releases (called effluents) appear in a plant's Effluent Report. Any plant radiation measured in the environment appears in the Environment Report.

The NRC has on-site inspectors that live near the plants and work there full-time. They check regularly to make sure plants are monitoring their releases and keeping them below ALARA levels. Other NRC inspectors who are radiation experts go to the sites for routine radiation inspections. The NRC documents the results of its inspections in [reports](#) available to the public.

Tritium in Groundwater at Nuclear Plants

Tritium is a mildly radioactive form of hydrogen that occurs naturally and also forms during reactor operation. Several nuclear power plants have leaked or spilled water with tritium, sometimes found on-site in wells used to monitor groundwater. In these cases, the NRC expects each licensee to find the source of contamination (often leaks from [buried pipes](#)). The licensee must also have a program to prevent leaks, which the NRC reviews. Measurements of drinking water supplies near [tritium leaks](#) have consistently shown the supplies' tritium levels remain below the EPA's safe drinking water standards. In most cases, the tritium cannot be detected in groundwater samples off-site.

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