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

BACKGROUNDER

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Analysis of Cancer Risks in Populations Near Nuclear Facilities—Phase 2 Pilot Study

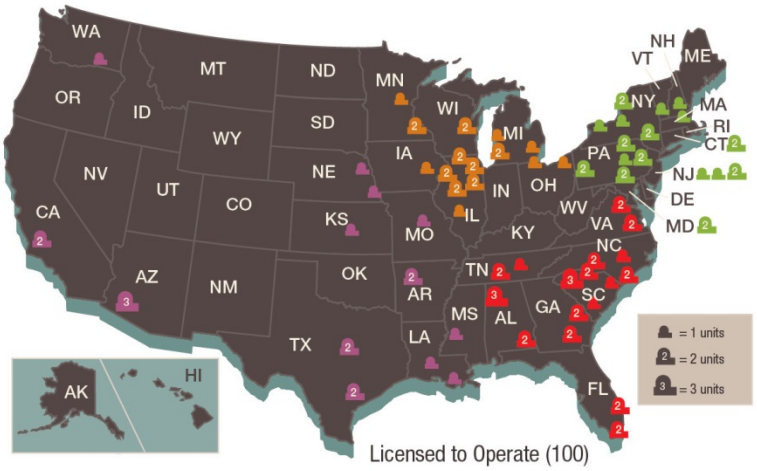
Background

U.S. Nuclear Regulatory Commission-licensed facilities sometimes release very small radiation doses during normal operations. Facility operators must follow NRC regulations by closely monitoring and controlling these releases to meet very strict radiation dose limits. The plants also must publicly report them to the agency. Some people are concerned these releases could affect the health of communities around nuclear facilities.

To help address these concerns, the NRC asked the National Academy of Sciences (NAS) to perform a state-of-the-art study on cancer risk for populations surrounding NRC-licensed facilities (see map). The NAS will study nuclear power plants and certain plants that create the nuclear fuel used in the power plants. The NAS effort will create an up-to-date, more thorough examination of cancer incidence than the 1990 U.S. National Institutes of Health-National Cancer Institute (NCI) report, *"Cancer in Populations Living Near Nuclear Facilities."* The 1990 NCI report concluded that cancer mortality rates were the same whether a reactor was nearby or not. The NRC staff uses the NCI report as a primary resource during public discussions of the risk of dying from cancer in communities near nuclear facilities.

The NRC is also exploring how the study could look at smaller geographical areas than the counties used in the NCI report.

U.S. Operating Commercial Nuclear Power Reactors



NRC Request and Results of Phase 1

The NRC and NAS agreed on a two-phase approach. The NAS Phase 1 committee completed their report in May 2012 and recommended two approaches for assessing cancer risks. The committee also recommended a pilot study of seven nuclear facilities to assess whether the approaches could work on a larger scale–this is the Phase 2 pilot study. The Phase 1 committee identified many technical challenges for the pilot study, including:

- The need for large groups of people to detect very small changes in risk.
- Uneven availability and quality of cancer data for areas smaller than a county.
- Difficulty in reliably capturing information on population movement, risk factors and other variables that could make interpreting the results difficult.

The pilot study will determine if these technical challenges can be overcome. The study will also develop procedures and data collection methods while estimating the necessary time and resources.

The Phase 1 committee specifically recommended the pilot study have two parts: a population study of cancer diagnosis and mortality rates for multiple cancer types and all age groups, down to the census-tract level, and a "case control" study of childhood cancers in children born within a fixed distance of a nuclear facility.

NRC-regulated facilities record information on their releases and report it once a year to the NRC. The committee recommended using this data and examining populations within about 30 miles (50 kilometers) of nuclear facilities to cover a range of potential radiation exposures. The committee also recommended adapting existing computer models (or developing a new model) to estimate radiation doses to individual organs from airborne and liquid radioactive releases.

The NAS committee recommended these facilities for the pilot study:

- Dresden Nuclear Power Station, Illinois.
- Millstone Power Station, Connecticut.
- Oyster Creek Nuclear Generating Station, New Jersey.
- Haddam Neck, Connecticut (decommissioned).
- Big Rock Point Nuclear Power Plant, Michigan (decommissioned).
- San Onofre Nuclear Generating Station, California (permanently shut down).
- Nuclear Fuel Services, Tennessee.

These facilities were selected because they started operation at different times and represent both currently operating and decommissioned nuclear facilities. Moreover, these facilities have some variation in surrounding population sizes, the quality and maturation of the state's cancer registry, and level of complexity for the registry's research approval processes and research support.

Project Status

The NRC accepted the NAS recommendations and asked the NAS to carry out the pilot study. NAS started the pilot planning phase in September 2013. The pilot study will have two steps: Pilot Planning and Pilot Execution. Planning activities include:

- Appointing the study committee;
- Identifying the processes for selecting qualified individuals and/or organizations to perform the technical tasks;

- Assessing the availability and quality of release and weather data;
- Investigating the use of existing dose-estimation models or the need to create a new model;
- Identifying state requirements for data sharing and transfer of health information;
- Obtaining Institutional Review Board approvals for the study, as appropriate; and
- Identifying key stakeholders and assessing their concerns, perceptions, and knowledge.

Pilot Execution phase activities include:

- Obtaining data on weather and nuclear facility airborne and waterborne releases turning the information into computer files that can be used for dose estimation;
- Using the computer model identified or developed in the planning phase to estimate absorbed doses to individual organs from monitored releases;
- Obtaining cancer incidence and mortality data at the census tract level to determine whether the population study can be carried out;
- Linking birth registration and cancer incidence data to identify eligible cases of childhood cancers and matched controls to determine whether the case control study can be carried out;
- Developing processes for public participation and for communicating with key stakeholders identified in the planning phase.

At the conclusion of the Pilot Execution step, the NAS will report its findings regarding the scientific feasibility and merit of carrying out a wider assessment of cancer risks near additional NRC-licensed facilities. The report will also include, if feasible, an analysis of cancer risks in the populations near the seven pilot facilities. NAS estimates the pilot study will take 2-3 years to complete.

At the conclusion of the pilot study, the NRC will review and consider the report recommendations and stakeholder comments to determine whether to analyze additional facilities.

The NAS website has the most current information on the study, including study design, modeling of estimated doses and any public meetings associated with the effort.

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