GAO

Low-Dose Radiation

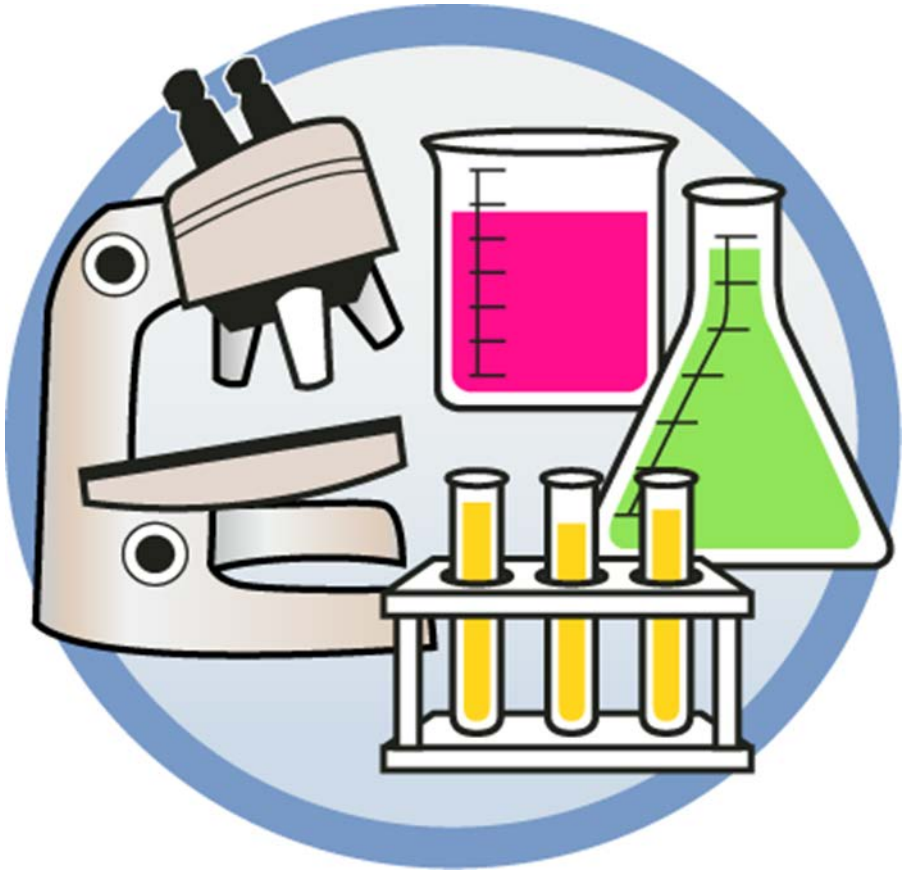
Interagency Collaboration on Planning Research Could Improve Information on Health Effects

Who Are We?

- GAO is an independent, nonpartisan agency serving the Congress to help improve the performance and ensure the accountability of the federal government.
- Our work is done at the request of congressional committees or subcommittees or is mandated by public laws or committee reports.
- To ensure independence, the Comptroller General is appointed to a 15-year term by the President. Other than the CG, there are no political appointees at GAO.

How Are We Organized?

- GAO is organized into 14 mission teams by subject area
- GAO's Science and Technology Issue Area conducts audits of federally funded R&D, IP protection & innovation programs
- GAO's Center for Science, Technology, and Engineering conducts technology assessment and provides expertise to audit teams



Background and Reporting Objectives

- Request from House Committee on Science, Space, and Technology
  - Interest in understanding federal agencies' radiation protection requirements and guidance, and related federal research
- GAO issued report in September 2017 (GAO-17-546) and subsequently testified to Congress on report in November 2017 (GAO-18-184T)
- Reporting Objectives
  - How have selected federal agencies developed and applied radiation protection requirements and guidance for workers and the public?
  - To what extent have federal agencies funded and collaborated on research on the health effects of low-dose radiation?

Scope and methodology

- **Definition of "low-dose" radiation**
  - Below 100 millisieverts (10 rem) according to National Academies 2006 report
- **Focus on ionizing radiation**
- **Research Inclusions/Exclusions**
  - Also Included research on high-dose radiation if agency officials indicated potential implications for low-dose research
  - Excluded research on radiation countermeasures for emergency response and medicines for treating cancer
  - Excluded research on health effects of radiation in space

Scope and methodology

- **Four settings in which radiation exposure can occur:**
  - Operation and decommissioning of nuclear power plants
  - Cleanup of sites with radiological contamination
  - Use of medical equipment that produces radiation, and
  - Accidental of terrorism-related exposure to radiation
- **Four federal agencies involved in setting requirements:**
  - Environmental Protection Agency (EPA)
  - Nuclear Regulatory Commission (NRC)
  - Department of Energy (DOE), and
  - Food and Drug Administration (FDA)
- **Three advisory bodies**
  - International Commission on Radiological Protection (ICRP)
  - National Council on Radiation Protection and Measurements
  - National Academies of Sciences, Engineering, and Medicine

Scope and methodology

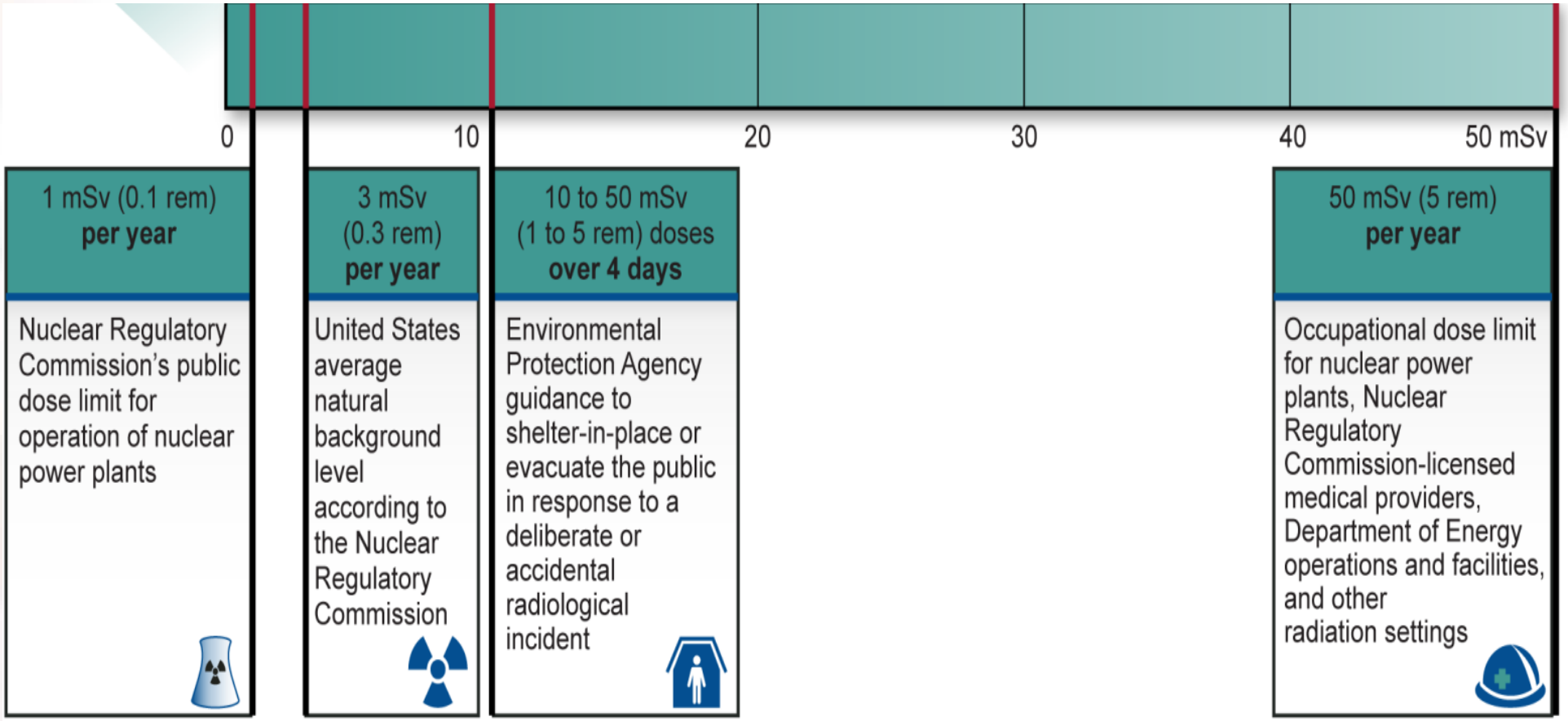
- **Requested information from federal agencies on their funding of research on low-dose radiation in fiscal years 2012-2016:**
  - Environmental Protection Agency (EPA)
  - Nuclear Regulatory Commission (NRC)
  - Department of Energy (DOE)
  - Food and Drug Administration (FDA)
  - Centers for Disease Control and Prevention (CDC)
  - National Institutes of Health (NIH)
  - Occupational Safety and Health Administration (OSHA)
  - National Aeronautics and Space Administration (NASA)
  - National Institute of Standards and Technology (NIST)
  - Department of Defense
  - Department of Homeland Security (DHS)

Objective 1: Agencies Relied on Advisory Bodies to Develop Radiation Protection Requirements

- **Scientific Advisory Bodies: ICRP, NCRP and National Academies**
  - Support linear no-threshold model – assumes risk of cancer increases with every incremental increase in radiation exposure
  - Recognize challenge in accurately estimating cancer risks from very low does of radiation exposure (below 100 millisieverts (10 rem) according to National Academies 2006 report)
  - National Academies report identified research needs in several areas

- **Agency regulations**
  - Under linear no-threshold model, federal agencies set dose limits for radiation exposure well below National Academies low-dose level
  - Agency radiation protection requirements vary depending on setting

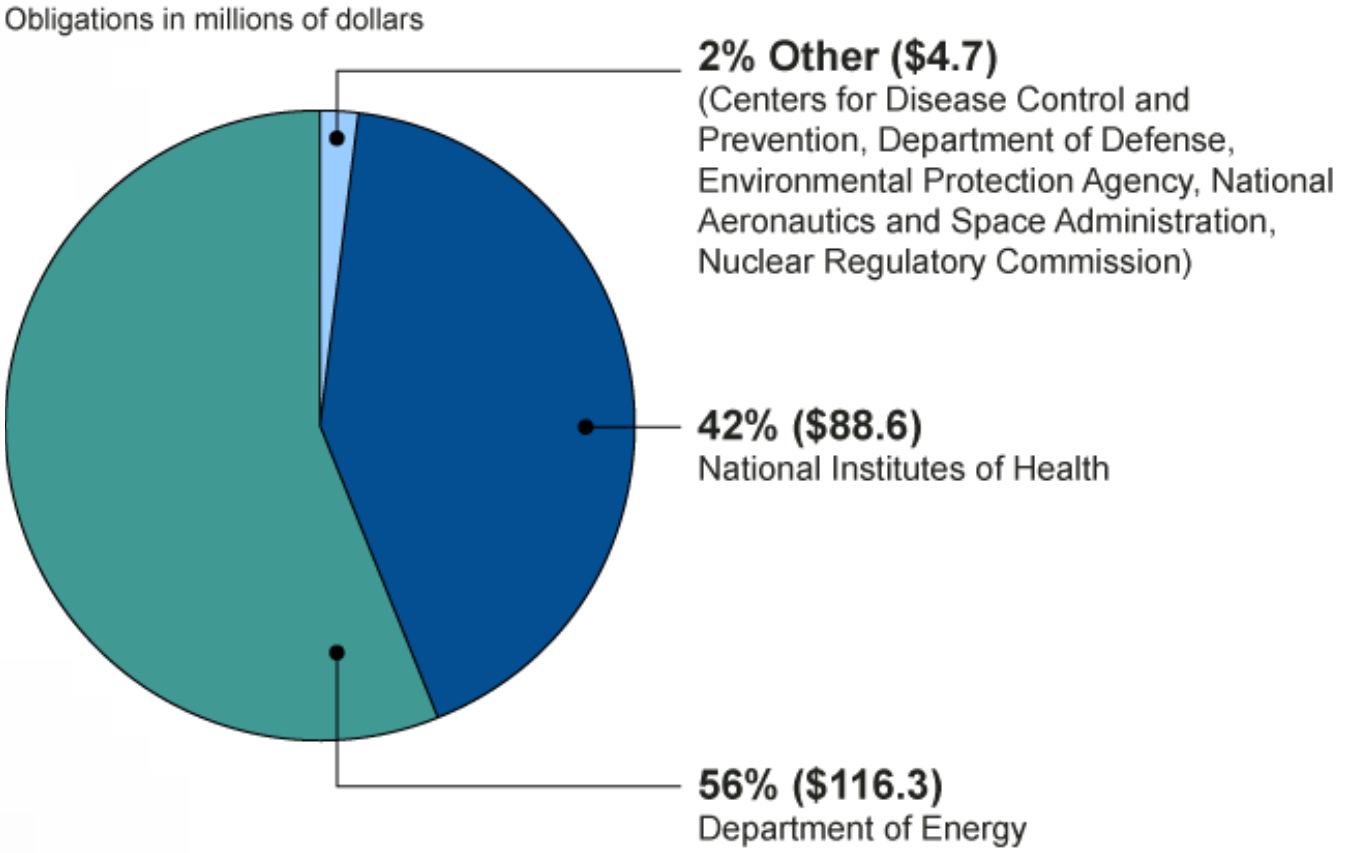
Objective 1: Federal Agency Radiation Protection Requirements



Objective 2: Federally Funded Research on Low-Dose Radiation Health Effects

- **Seven agencies funded research FY2012-2016**
  - DOE, CDC, DOD, EPA, NASA, NIH and NRC obligated about $210 million for research on the health effects of low-dose radiation
    - DOE and NIH accounted for most of this funding
  - DOE's Office of Science funded Low Dose Radiation Research Program for radiobiological research, including the Million Person Study
  - DOE's Office of Environment, Health, Safety, and Security funded several epidemiological studies, including those involving Japanese atomic bomb survivors and assessments of Russian worker and public health risks from radiation exposure in nuclear weapons production in the former Soviet Union
  - NIH has funded both epidemiological and radiobiological studies on low-dose radiation to quantify and understand cancer risks

Objective 2: Obligations for Research on Health Effects of Low-Dose Radiation, by Federal Agency, for Fiscal Years 2012-2016

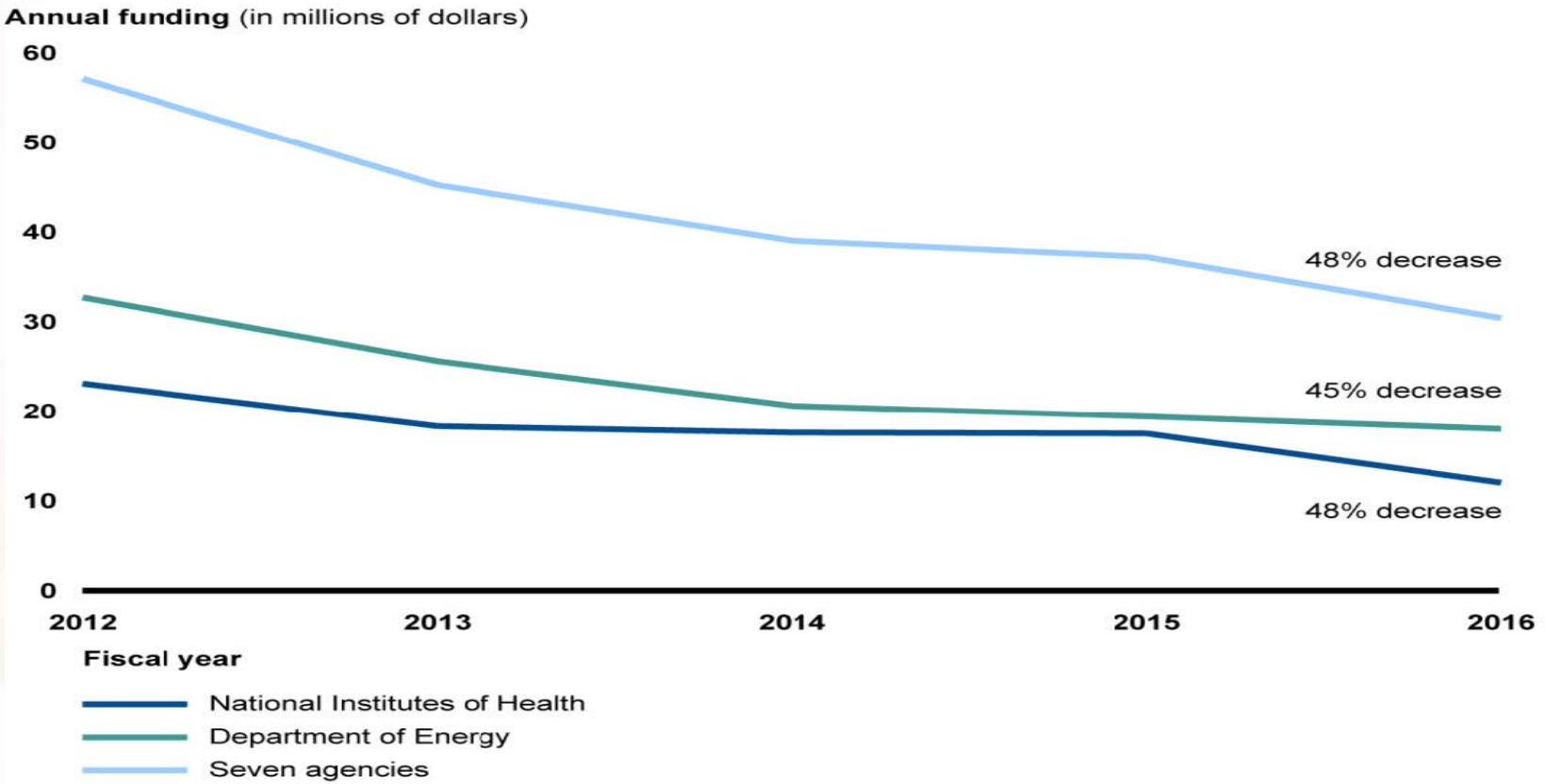


Source: Excerpted from GAO-17-546. | GAO-18-184T

Note: Data on obligations for research on low-dose radiation do not include research on products or medicines used for emergency preparedness or response to a radiation accident or for treating cancer, where radiation exposure is part of the treatment. Dollar figures have not been adjusted for inflation.

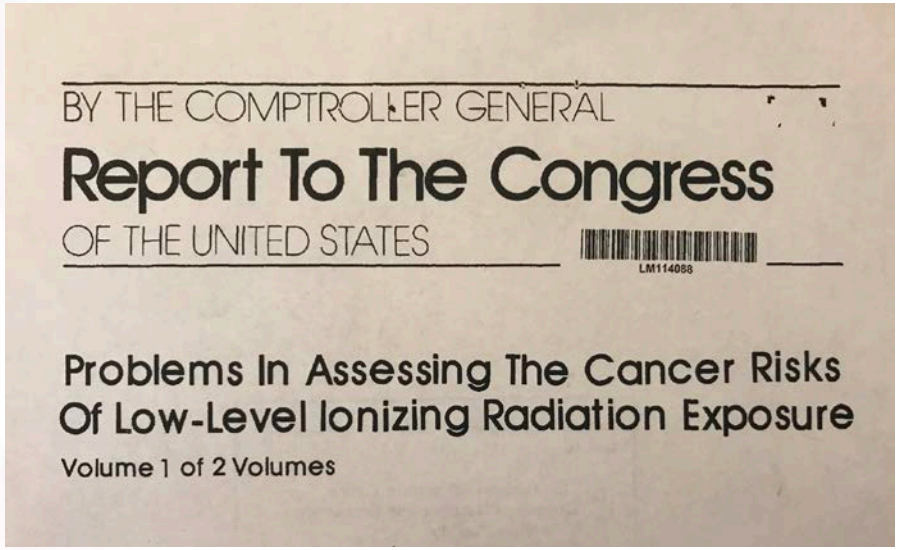
Objective 2: Federally Funded Research on Low-Dose Radiation Health Effects

- **Federal funding for low-dose radiation research decreased by 48% from FY2012-2016**



Source: GAO analysis of agencies' data. | GAO-17-546

Past GAO Reports


BY THE COMPTROLLER GENERAL

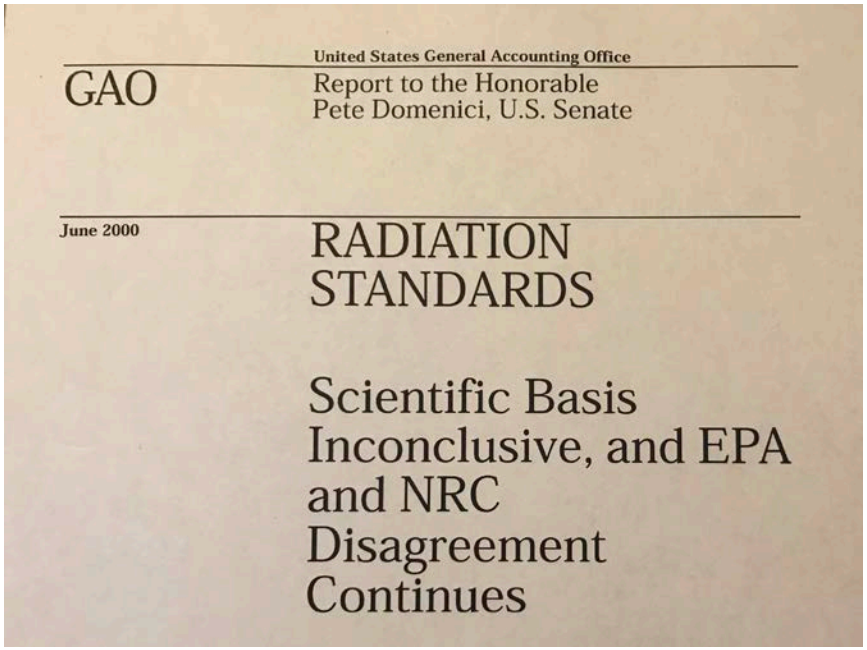
Report To The Congress

OF THE UNITED STATES

LM114088

Problems In Assessing The Cancer Risks Of Low-Level Ionizing Radiation Exposure

Volume 1 of 2 Volumes


United States General Accounting Office

GAO

Report to the Honorable Pete Domenici, U.S. Senate

June 2000

RADIATION STANDARDS

Scientific Basis Inconclusive, and EPA and NRC Disagreement Continues

GAO Recommendation

- **Recommendation:**
  - Secretary of Energy lead development of interagency collaboration mechanism to determine roles and responsibilities for addressing priorities for low-dose radiation research
  - DOE did not concur, but recently informed GAO that National Science and Technology Council (NSTC) within the White House will work with agencies to align low-dose radiation research with a government-wide strategy to be developed by an interagency working group.
- **Next steps:** GAO will conduct at least annual recommendation follow-up with DOE.

Questions?

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