

# DOE Announces 20-Year Science Facility Plan

In a speech at the National Press Club in Washington, DC, on November 10, U.S. Department of Energy (DOE) Secretary Spencer Abraham outlined a 20-year facility plan for the DOE Office of Science. “The plan will serve as a roadmap for future scientific facilities to support the department’s basic science and research missions,” said Abraham. The plan prioritizes the building of new scientific facilities and upgrades to current sites for a total of 28 facilities that cover the range of science supported by the DOE Office of Science, including fusion energy, materials science, biological and environmental science, high energy physics, nuclear physics, and advanced scientific computing. “This plan will be the cornerstone for the future of critical fields of science in America. These facilities will revolutionize science—and society,” said Abraham. “With this plan our goal is to keep the United States at the scientific forefront.

The Office of Science priority list for new facilities is designed to guide the department as it plans future scientific investments. The list, incorporated into a 48-page booklet titled *Facilities for the Future of Science: A Twenty-Year Outlook*, identifies a number of facilities and research foci of direct interest to nuclear medicine.

Twelve facilities are identified as “near-term” priorities. Rated as priority 1 is ITER (Latin for “the way”), an international collaboration to build the first fusion science experiment capable of producing a self-sustaining fusion reaction (called a “burning plasma”; see [www.iter.org](http://www.iter.org)). Priority 2 is the implementation of an ultrascale scientific computing capability, to be located at multiple sites, that would increase by a factor of 100 the computing capability available to support open scientific research.

Among the 4 facilities tied for priority 3 is a rare isotope accelerator (RIA) that would be the world’s most powerful research facility dedicated to producing and exploring new rare isotopes not found naturally on earth. The strategic plan document notes that “RIA will involve the development of new accelerator technology to create beams of unstable isotopes that are 10 to 100 times more powerful than those available today. It will have the capability to specify, control, and precisely vary the number of protons and neutrons in atomic nuclei, and thus study not only the properties of individual nuclei, but also the evolution of these properties across the nuclear chart.” Nuclear medicine is listed as one of the possible beneficiaries of this technology.

Another of the priority 3 facilities is a protein production and tag facility that would mass produce and characterize thousands of proteins per year. The products of this facility would support the work of a priority 7

facility for the characterization and imaging of molecular machines. This biological user facility “will provide the research community with the world’s largest assembly of sophisticated analytic and imaging instrumentation, combined with state-of-the-art computational tools, to enable users to isolate, identify, characterize, and image the molecular machines present in selected microbes under highly controlled conditions. The facility’s high-throughput capabilities will analyze thousands of molecular machines in the time it now takes to do a few.” It is envisioned that this would make a number of research fields more accessible to researchers for whom such data would otherwise be too expensive or cumbersome to collect.

Other proposed facilities of interest to the nuclear medicine community include upgrades to the Continuous Electron Beam Accelerator, Energy Sciences Network, National Energy Research Scientific Computing Center, and the Spallation Neutron Source facilities as well as the development of a second cold source for the High-Flux Isotope Reactor.

“The complete list of 28 facilities outlines to an important extent the future of science in America—and indeed the world,” Abraham said. “These facilities cover the critical areas where discoveries can transform our energy future, boost economic productivity, transform our understanding of biology, and provide revolutionary new tools to deal with disease.”

Each year, DOE science facilities are used by more than 18,000 researchers from universities, other government agencies, private industry, and other nations. The Spallation Neutron Source, scheduled to be completed in 2006, is the latest large-scale DOE user facility under construction. The DOE Office of Science prepared the priorities list during 2003 with input from the scientific community, DOE laboratories, and advisory committees. Office of Science program managers first identified 46 facilities they believe are required for world scientific leadership over the next 20 years. Six independent advisory committees reviewed the facilities, recommended 53 facilities for construction, and assessed each according to 2 criteria: scientific importance and readiness for construction. Dr. Raymond L. Orbach, director of the Office of Science, prioritized the facilities across the scientific disciplines. A number of the facilities will be located at DOE national laboratories as upgrades to existing activities. The locations of the remaining facilities will be determined through site selections open to laboratories and universities.

View the entire *Future of Science* document at [www.sc.doe.gov](http://www.sc.doe.gov). 