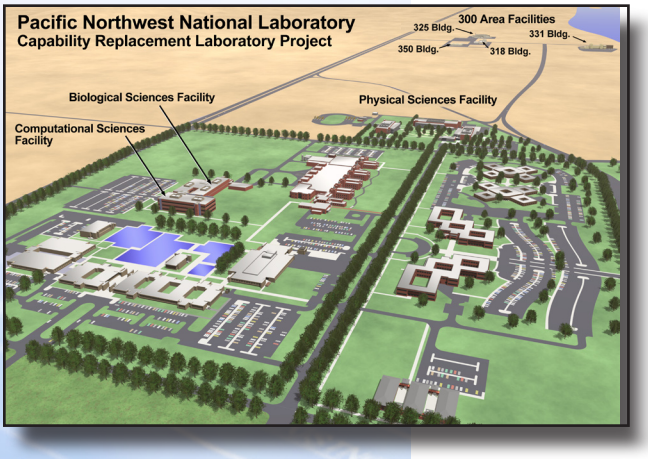
Pacific Northwest National Laboratory
Operated by Battelle for the U.S. Department of Energy

Building Pacific Northwest National Laboratory's Physical Sciences Facility

Office of Science U.S. DEPARTMENT OF ENERGY

National Nuclear Security Administration



The PSF comprises federally funded laboratories for research that will be displaced from accelerated cleanup of the 300 Area of Hanford. The new buildings will be constructed via the Capability Replacement Laboratory project, which also includes extending the operation of four facilities in the 300 Area and building two privately financed facilities.

The U.S. Department of Energy's Pacific Northwest National Laboratory is undergoing a transformation. In the summer of 2007, work began on the 200,000-square-foot Physical Sciences Facility (PSF), a research complex with three laboratories that will house important national and homeland security scientific capabilities, equipment and staff displaced from accelerated cleanup of Hanford's 300 Area. This federally financed replacement facility is jointly sponsored by DOE's Office of Science (SC), the National Nuclear Security Administration (NASA) and the U.S. Department of Homeland Security (DHS).

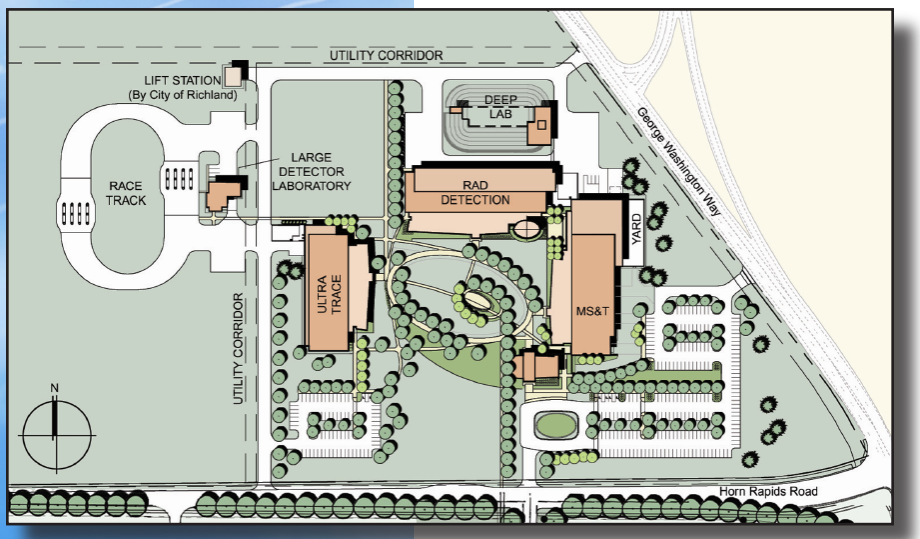
World-Class Radiological Capabilities

Today, more than half of the national laboratory's $765 million business volume supports national and homeland security missions. Several of PNNL's unique capabilities are not replicated anywhere else in the world.

Transitioning from the 300 Area

Many of the capabilities that the federal government and other clients rely on at PNNL are located in the 300 Area of the nearby Hanford Site. Most of the facilities must be vacated by 2011 for environmental cleanup. Nearly half of PNNL's experimental laboratory space and 100 percent of its nuclear and radiological capabilities are located in these buildings.

Some of the staff, equipment and capabilities that will be displaced will be relocated to new buildings—the Biological Sciences, Computational Sciences and Physical Sciences facilities—that will be built through the Capability Replacement Laboratory project. The remaining capabilities will stay in four facilities, the 318, 325, 331 and 350 Buildings, all located in the 300 Area.



The PSF consists of three main laboratories—Radiation Detection, Materials Science & Technology and Ultra-Trace—as well as a large detector laboratory, a low-level underground lab, and a radiation portal monitoring test track.

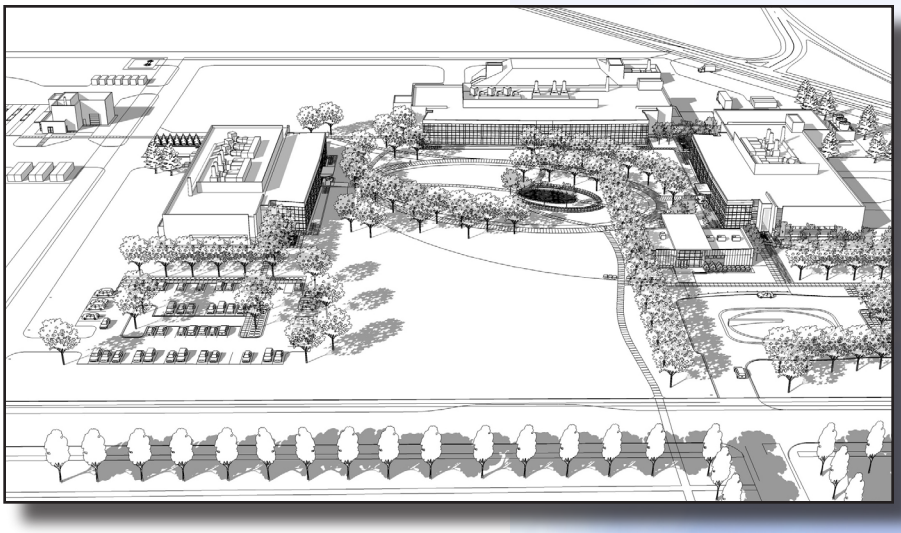
PSF: Unique Research Capabilities

Much of this scientific research and about 450 staff will be transitioned by 2011 to the largest replacement facility to be built, the PSF. This modern complex will contain three laboratories—Materials Science and Technology, Ultra-Trace and Radiation Detection—as well as a low-level underground laboratory, a large detector laboratory, and a radiation portal monitoring test track.

The Materials Science and Technology Laboratory will contain resources that focus on the performance and life of materials for applications involving high-temperature, corrosive and/or radiation environments. Capabilities include:

- Radiation materials science for aging and degradation of materials in nuclear systems and development of radiation-resistant structural materials for advanced fission and fusion reactors.

- High-temperature materials for synthesis, characterization and performance of irradiated and nonirradiated materials at temperatures where properties are affected, as well as environmental effects on high-temperature materials.
- Fundamental mechanisms of materials corrosion/stress-corrosion cracking and radiation-induced materials degradation in nuclear reactor environments.
- Computational materials science for radiation effects modeling to understand and predict materials behavior.



Pacific Northwest National Laboratory will add 200,000 square feet of new laboratories for science, homeland security and nonproliferation missions.

The Ultra-Trace Laboratory, will house PNNL's world-class ultra-trace and radioanalytical capabilities, which range from radiochemical separations and electron microscopy to mass spectrometric detection. PNNL's scientists use unique, state-of-the-art equipment to develop and apply techniques for nuclear forensics in support of critical national needs, such as international treaty verification. Interrelated capabilities include:

- Advanced radiochemistry and radiochemical separations to prepare samples for ultra-low-level radionuclide mass spectrometric analysis in a wide variety of sample matrices.
- Ultra-trace mass spectrometry to provide isotopic analyses and ultra-low-level radionuclide detection.

Ultra-Trace Laboratory

Materials Science and Technology Laboratory

- Microscopy, including polarized light microscopy, scanning electron microscopy, transmission electron microscopy, and microprobe x-ray analyzers, for materials characterization.

Radiation Detection Laboratory

PNNL's Radiation Detection Laboratory will include resources for a variety of low-level and high-level radionuclide measurements.

- Techniques used or under development include state-of-the-art analytical chemistry, radiation physics, light detection, particle detection, chromatography, and scintillating materials, and sorbents ("smart" materials). Capabilities also include field-deployable forensic instrumentation for applications ranging from fundamental science (neutrino mass detection) to the detection and prevention of nuclear proliferation and radiation portal monitoring.
- Ultra-low-level counting as a signature capability of PNNL. This capability illustrates the synergy between science and national security missions, such as SC's Majorana Project (neutrino physics) and NNSA's ultra-low-level counting programs.

State Pays for Utilities

Washington state is providing the city of Richland $5 million to bring utilities—water, electrical power, sewer and other services—to the future site of the PSF.

For More Information, Contact:

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