# Cocooning Complete at N Reactor Heat Exchanger Facility

## Only dual-purpose reactor's steam facility receives 53,800-square-foot roof

### N Reactor

The last operating reactor at Hanford has completed a major step in the cocooning phase – the final stage of stabilizing and enclosing the highly radioactive reactor core for potentially 75 years. Located along the bank of the Columbia River, N Reactor was the only reactor in the country connected to a heat exchange facility for producing steam-generated electricity.

*President John F. Kennedy spoke at the ground-breaking ceremony for the steam plant at N Reactor in 1963.*

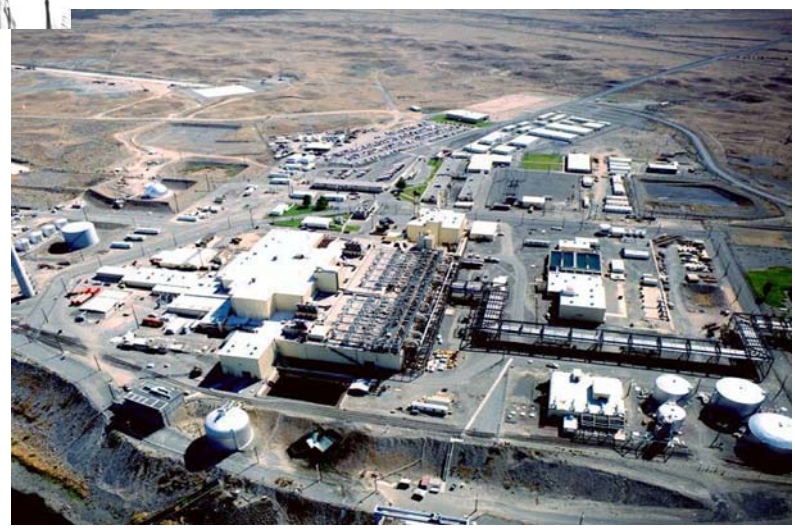
The highly contaminated portions of N Reactor will be cocooned. The massive support structures at the industrial site are being decontaminated and demolished. Extensive demolition occurs after hazardous materials and equipment are isolated, stabilized and removed.

Department of Energy hired Washington Closure Hanford to manage the River Corridor Closure Contract, which encompasses Interim Safe Storage (ISS), or cocooning, of N Reactor. The scope and volume of material is significant and requires extensive planning for protection of the workers and the environment. N Reactor is on schedule to be cocooned by 2012.

### Background

N Reactor is the only dual-purpose nuclear reactor to operate in the United States. While producing plutonium for nuclear weapons during the Cold War, steam was generated and produced 860 megawatts of electricity – enough electricity for approximately 650,000 homes. The steam was transferred to the Hanford Generating Plant located west of the reactor complex, where electricity was produced and distributed to the power grid for public use.

Construction of the reactor began in 1959 and was completed in 1963. The reactor building alone is 85,450 square feet and includes three below-grade floor areas (47 feet deep), and four floors above grade level – the highest point is 80 feet tall. The reactor and heat exchanger building share a common four-foot-thick wall. The heat



*To protect the Columbia River and restore the one-square-mile N Reactor site, 109 buildings will be demolished and approximately 150,000 tons of debris moved away from the river.*

exchanger facility is located south of the main reactor building. Steam was transferred from the exchanger facility to a commercial electrical generation facility.

Cocooning of N Reactor will include isolating the reactor building as well as the heat exchange facility (109-N building), which contains the steam generators.

*Workers prepare the steel support structure for the new roof above N Reactor.*

## Risks and Hazards at N Reactor

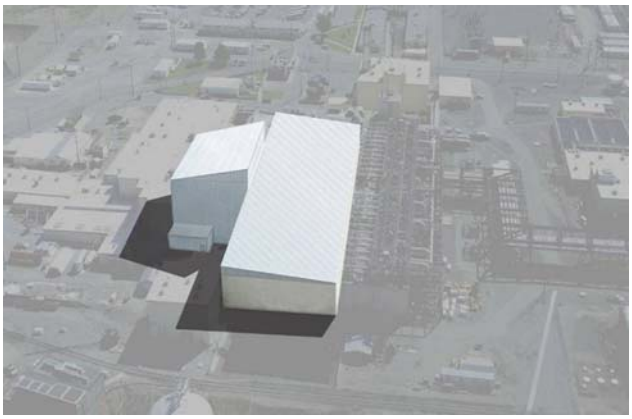
There are many industrial hazards that include asbestos, toxic chemicals and radiological contamination. The U.S. Environmental Protection Agency, Washington State Department of Ecology and the U.S. Department of Energy have agreed the reactor complex needs to be cleaned up to protect the public and environment from harm. Hanford's reactors were used to produce plutonium, a process that involved highly radioactive materials and left behind contaminated facilities that are not appropriate for traditional demolition and disposal. Cocooning a reactor's core allows for safe long-term storage until radiation levels decay, or technology becomes available, so workers are protected from exposure risk during final demolition.


*In early April, 2009, the steam generating facility demolition nears completion up to the four-foot-thick shielding walls surrounding N Reactor's core.*

## Why cocoon the reactors?

Reactors are placed into ISS by:

- Demolishing the building down to the concrete shield walls surrounding the reactor core
- Removing equipment and stabilizing all loose contamination within the facility
- Installing temperature and moisture sensors for remote monitoring
- Constructing a new roof
- Sealing all openings



*Conceptual drawing of cocooned N Reactor – complete by September, 2012.*

Hanford's cocooned reactors are scheduled to remain in interim safe storage for up to 75 years to allow the U.S. Department of Energy, regulators and other stakeholders to determine the final disposal method and to allow the structures' high radiation levels to decay to safer levels.

Temperature and moisture sensors are used to remotely monitor conditions inside the sealed reactor building. Once every five years, workers will enter the structure to conduct inspections and make any needed repairs. During the inspection the buildings are checked for structural integrity, radiological contamination and other conditions of the facility.