DAF Upgrades Facilitate JASPER Mission

The Device Assembly Facility (DAF) at the Nevada Test Site (NTS) recently has undergone an upgrade that will enhance the site's stockpile stewardship role.

The DAF has been fitted with the capability to assemble targets for the Joint Actinide Shock Physics Experimental Research (JASPER) facility. Previously targets were assembled at Lawrence Livermore National Laboratory (LLNL) and shipped to NTS for testing.

Richard Higgs, program leader of the Joint Nevada Program Office (JNPO), says the assembly of plutonium targets using a "glovebox" is the first time that such a technique has been employed for target assembly at NTS. Assembling the targets on-site has benefits for both the JASPER and DAF facilities.

"Previously plutonium (actinide) targets were assembled into a mechanical structure and shipped in Type B containers from LLNL to JASPER," Higgs says. "By shipping small plutonium components directly to the DAF for assembly, materials can be moved by commercial carriers – reducing shipping costs dramatically."

Higgs continues, "Subsequently moving the assembled targets from DAF to the JASPER facility also improves timeliness in the relationship between assembly and the actual experiment. It is significant because it is a more effective way to conduct experiments and it increases the data quality by reducing the chances of the target being damaged by lengthy transport and handling. Some target designs even have a shelf life after completion that can now be met earlier."

JASPER plays an integral role in the certification of the nation's nuclear weapons stockpile. It provides a method to generate and measure data pertaining to the properties of radioactive materials at high shock pressures, temperatures and strain rates. These extreme laboratory conditions approximate those experienced in nuclear weapons.

Since the 1992 moratorium on nuclear testing, the National Nuclear Security Administration Nevada Site Office (NNSA/NSO) relies on the many capabilities, including the gas-gun technology of JASPER to obtain material properties data. Data from experiments is used to validate computer models. Results are used for code refinement, permitting better predictive capability and ensuring confidence in the U.S. nuclear stockpile.

"JASPER has been used to conduct 80 experiments, or shots, since 2001. Nine shots have been completed in 2008, four of them involving plutonium. The first assembly using the glovebox technique was completed in late June and was successfully tested in mid-July," Higgs says.

Incorporating use of the glovebox at DAF is a significant achievement. This addition required the design and construction of a secondary confinement room within one of the DAF buildings. Within the secondary confinement room gloveboxes were installed, Higgs says. Simply, a glovebox is a confinement system that allows workers to insert their hands through gloves into a box to handle hazardous materials.

Bob Golden, acting assistant manager for National Security programs at NSO, says that "as our capability to handle nuclear material in support of our stockpile missions continues to increase, so does the potential role of DAF in the Nuclear Weapons Complex." The DAF is under constant evaluation for missions work that will provide greater benefit to the Nuclear Weapons Complex. "The configuration of the DAF to support glovebox assembly is an example of how NNSA/NSO, the National Laboratories and National Security Technologies are working together to support important Stockpile Stewardship missions at the NTS," says Golden.

Higgs adds, "The DAF was built for the assembly of underground nuclear test devices. Anything else is considered an adaptation of that mission. The NTS community has demonstrated that we have the ability, intellect and resources to envision something different and enhance the role we have in securing the nation's nuclear future."