

PIT MANUFACTURING

QUAL-1 STANDS FOR QUALIFICATION

To produce stockpile-worthy pits while meeting strict health, safety, and environmental regulations, the Laboratory modified its plutonium facility, acquired new equipment, developed new fabrication technologies, and significantly improved existing engineering processes. Many manufacturing procedures were upgraded to meet stringent stockpile specifications, and each manufacturing step underwent rigorous quality control.

For each manufacturing procedure, the design agency at Los Alamos set specifications and requirements. To meet them, each team developed a process qualification plan for operations. Before a manufacturing process could be used for production, each process qualification plan and the results of the plan had to be approved by the Los Alamos design agency. Pits for other weapon systems in the stockpile will undergo the same process.

In the spirit of traditional Los Alamos teamwork, Laboratory divisions came together in this complex effort. Participating divisions included Chemistry, Engineering Sciences and Applications, Materials Science and Technology, Nuclear Materials Technology, Decision Applications, Supply Chain Management, Health, Safety and Radiation Protection, Facility and Waste Operations, and the Chief Financial Office.



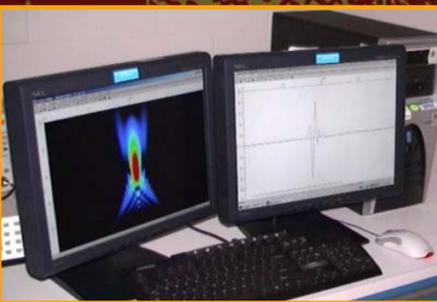
The Plutonium Casting Team develops alloys from raw materials to produce the rough components used to make pits. Purifying plutonium metal to a certain rigid specification is a critical step before casting.



This induction furnace is used in the casting process. Induction heating allows stirring of the molten plutonium. A clean atmosphere ensures consistent material characteristics.



Once the Casting Team has completed its tasks, the Machining Team uses a dry-machining process to refine components into their final form. This precision process minimizes the use of hazardous solvents, and as a result, plutonium shavings (shown coming off the lathe) can be collected for reuse.



This computer setup is part of an automated ultrasonic system used to evaluate pits nondestructively. The system measures reflections caused by differences in acoustic impedance between materials and their interfaces. These variations produce signals like the ones shown on the two computer screens. Scientists use these results to determine if a scanned area meets pit design specifications.



The downdraft room is the place for final pit assembly operations.



Safety procedures require workers to use self-contained breathing apparatus during assembly operations in the downdraft room.



The Welding and Joining Team develops and applies specialized joining and welding processes for both unique and disparate materials.



Laser and conventional welding techniques are used.

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