



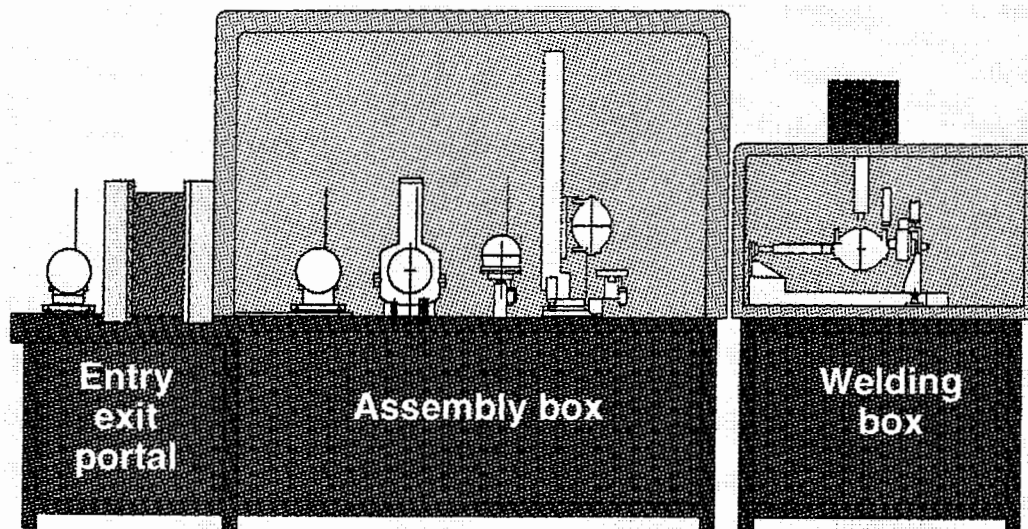
Innovative Warhead Design "Pit Reuse" **James V. Tyler**

- **The pit is the metal component in the primary that contains the fissile material.**
- **Pit reuse avoids the need for plutonium fabrication.**
- **The LLNL W89 (SRAM) program established pit reuse.**
 - **We began investigation of the pit reuse option in early 1990.**
 - **We addressed a wide range of issues.**
 - **DOE adopted pit reuse as baseline for the W89 in August 1991, after an inter-lab review of our work.**
- **By proactively developing the pit reuse option, we were able to keep the W89 project on schedule, in spite of the shutdown of plutonium fabrication at the Rocky Flats Plant.**
- **LLNL has conducted successful nuclear testing of pit reuse. This testing provides a database for possible future development of the concept.**



Innovative Warhead Design "Pit Reuse" Continued

- Pit reuse greatly simplifies the production of pits for replacement warheads.
 - Reduces cost.
 - Reduces radioactive waste generation.
 - Reduces radiation exposure to workers.
 - Avoids the need for a plutonium fabrication facility.
- DOE directed LLNL to develop the pit reuse work station to be installed at the Pantex Plant.



- This workstation performs both assembly and welding operations.
 - The glove boxes are not contaminated in normal operation.
 - Shielding and robotics are used to reduce radiation exposure to workers.
 - Can support both LLNL and LANL reuse designs.
- At present, pit reuse provides the nation's only option to manufacture replacement warheads in large numbers.



Innovative Warhead Design "Pit Reuse" Continued

- **DOE has directed LLNL to explore pit reuse options for replacement warheads with improved safety and use control.**
 - **When the W89 project was terminated (July 1992), DOE directed LLNL to continue to develop pit reuse technology.**
 - **We supplied pit reuse options for the Navy's SLBM Phase 2 study.**
 - **We are conducting a tech demo project for an enhanced surety cruise missile warhead.**
 - **This is the only DOE tech demo program. It helps maintain production capability in the production plants.**
- **The LLNL pit reuse effort is training a new generation of warhead technologists.**
 - **Physicists**
 - **Engineers**
 - **Materials scientists**
- **Some of these have replaced experienced workers who recently retired or were promoted. They are maintaining our warhead expertise.**

LLNL successfully used innovation to address a practical issue in warhead development/production. We addressed a wide range of issues in a coordinated way by using the multi-disciplinary capabilities of the Laboratory. An ongoing effort is maintaining and exercising many of these capabilities.

**Technical Leadership for
Weapons Systems Development**

Lawrence Livermore National Laboratory

1991

W89-Alternate Team

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The W89-ALT team has demonstrated a significant new approach to the design of producible nuclear weapons. This advance can significantly lower the cost of new weapons production while reducing worker radiation exposure and decreasing the amount of nuclear weapons entering waste reprocessing streams. In addition to improved producibility, this development incorporates the best nuclear weapons safety features currently available.

**1991 and 1992
Weapons
Recognition of Excellence
Awards Ceremony**



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