Detailed Justification

	(dollars in thousands)		
	FY 2003	FY 2004	FY 2005
Stockpile Readiness	**36,630**	**60,628**	**45,812**

Within this activity, the Y-12 National Security Complex (Y-12) is replacing or restoring production capability and revitalizing aging processes. These efforts will result in Y-12's ability to meets its mission requirements in a more efficient and cost effective manner and provide capability for the future needs of the complex. At present, critical manufacturing capabilities are required for weapons refurbishments planned for FY 2006 and beyond within elements of the production site. The Stockpile Readiness activity is the primary vehicle for this revitalization and is tasked with providing virtually all new processing, machining, and inspection equipment required for the Directed Stockpile Work (DSW) effort needed in the intermediate to long range future. As much of Y-12's current capability is based on 20 to 40 year old technology, the Stockpile Readiness activity is charged with improving basic manufacturing capability and appropriately deploying much needed related technology developed by the ADAPT activity and other technology programs.

In FY 2005, this activity will install the scanning electron microscope, high precision mills, forming equipment, electron beam welder, electro polisher, metal working, and coordinate measuring machines. It will also support intelligent manufacturing, digital radiography, science and model based manufacturing, and certification of key materials.

High Explosives and Weapon Operations	**11,742**	**23,510**	**34,220**

The HEWO activity, formerly High Explosives Manufacturing and Weapons Assembly/Disassembly Readiness, conducted at the Pantex Plant and involving other Nuclear Weapons Complex sites as appropriate, ensures that the capability to requalify nuclear assembly components; manufacture and assemble high explosive (HE) components, both main charge and small energetic; and assemble, disassemble, and perform surveillance on nuclear weapons is adequate to meet the current and projected needs of the nation's nuclear weapon stockpile, consistent with national goals and policies. This activity is planned and structured to address the capability, capacity, infrastructure, workforce and facility issues that must be resolved and will serve as the vehicle to implement technologies demonstrated by other programs.

It will provide the equipment, infrastructure, and workforce required, as well as operating support for construction projects needed to accommodate the new capabilities. This campaign is charged with appropriately deploying much needed related technology developed by the ADAPT activity and other technology programs.

The request in FY 2005 supports the implementation of equipment, and the initial startup activities for HE manufacturing and product requalification. In the HE manufacturing area, technical input will be provided to support the High Explosives Pressing Facility Line Item which has design funding included in 04-D-103, Project Engineering and Design, with a planned construction start of FY 2006. Several large pieces of equipment, HE machining centers, machine controllers that support models-based manufacturing, and test equipment will be implemented in the production environment to begin work on the W76-1/Mk4A. In the product requalification activity, three new capabilities will be demonstrated by ADAPT and transitioned to this program for implementation. Equipment to implement in the production environment will be purchased. The initial start up activities for the pit

(dollars in thousands)

FY 2003	FY 2004	FY 2005

implement in the production environment will be purchased. The initial start up activities for the pit requalification and surveillance in the Special Nuclear Material Component Requalification Facility (SNMCRF) will be provided. In addition, Information Technology (IT) infrastructure to support science based manufacturing, computing hardware for model-based design simulation and analysis and connectivity to support the enterprise product planning and interactive electronic procedures for weapon assembly and disassembly activities will be implemented.

Nonnuclear Readiness **20,392** **33,202** **35,457**

The Nonnuclear Readiness activity provides the electrical, electronic, and mechanical production capabilities required to weaponize a nuclear explosive. This activity, primarily involving the Kansas City Plant, the Sandia National Laboratories/New Mexico, and the Los Alamos National Laboratory, deploys the product development and production capabilities required to support nonnuclear product requirements. Nonnuclear functions range from weapon command and control to examining performance during deployment simulations, including weapon structural features, neutron generators, tritium reservoirs, detonators and component testers. The Nonnuclear Readiness activity has three major functions: 1) eliminate gaps in product development and production capabilities required to perform the authorized base workload 2) and authorized life extension programs, and 3) achieve operational readiness of all product development and production capabilities as required by the known and anticipated requirements of the Stockpile Stewardship Program. In addition to the major weapon program planning documents, the Applied Technology Roadmap and Responsive Infrastructure information are used as guidance.

In FY 2005, this activity supports the replacement of product testers and the deployment of production equipment required to manufacture and accept new products supporting the Life Extension Programs. Equipment includes electronic component packaging for flight testing, mechanical component fabrication, engineered material production, and material evaluation and qualification. The request also reflects implementation of as-built/design model archiving and transfer capabilities, and automated feature-based manufacturing development, manufacturing, and inspection for production of W76 components.

Tritium Readiness..... **46,674** **59,557** **58,850**

The Tritium Readiness activity establishes and operates the Commercial Light-Water Reactor (CLWR) Tritium Production System to produce tritium, maintaining the national inventory of tritium to support the nuclear weapons stockpile. Production of tritium in the Tennessee Valley Authority's (TVA) Watts Bar reactor began in October 2003. Irradiated rods will be removed in FY 2005 and transported to a temporary storage location awaiting completion of the Tritium Extraction Facility (TEF). This action will complete the production-development-and-demonstration portion of the campaign. Tritium will also be produced in subsequent operating cycles of the reactor as required by the stockpile size. Although the TVA's Sequoyah reactors will be capable of tritium production, it will remain in a "stand-by" tritium production mode for the foreseeable future.

Major activities in FY 2005 include: $33.6 million for completion of the first irradiation cycle; initiation of the second irradiation cycle including incremental reactor fuel costs; handling and transportation of irradiated tritium-producing rods; fabrication of rods for the third irradiation cycle; and $25.3 million for other project costs (OPC) associated with equipment and systems testing, crew

(dollars in thousands)

FY 2003	FY 2004	FY 2005

and $25.3 million for other project costs (OPC) associated with equipment and systems testing, crew training, and other activities in preparation of the completion and startup of the Tritium Extraction Facility.

Tritium Readiness Construction **83,128** **74,558** **21,000**

Project 98-D-125, TEF, Savannah River Site will provide the capability to receive and extract gases containing tritium from the CLWR Tritium Producing Burnable Absorber Rods (TPBARs) or other targets of similar design. The TEF will provide shielded remote TPBAR handling for the extraction process, clean-up systems, and delivery of extracted gasses containing tritium to the Tritium Recycle Facility for further processing. The TEF facility construction will be completed in FY 2005 to support start up of facility operations planned to begin in FY 2007. The TEF will provide steady-state production capability of as much as several Kg of tritium per year and will have an operational life span of at least 40 years. This will provide an initial capability. Capacity can be sized as the stockpile requirements change.

Advanced Design & Production Technologies **71,581** **77,461** **84,788**

The Advanced Design and Production Technologies (ADAPT) activity (previously included under Engineering Campaigns) integrates and systematically develops new technologies and enhanced capabilities to improve the effectiveness of the production complex and to deliver qualified refurbishment products upon demand. Developing fast turn-around-engineering options through virtual prototypes and implementing modern product data management and collaboration tools are a means to achieve this goal. ADAPT's guiding vision for the future is to become an essential resource for identification, development and integration of applied technology capabilities to achieve rapid product realization meeting nuclear weapons complex requirements and related national security needs. ADAPT develops qualified manufacturing processes and capabilities for deployment by other programs for sustained manufacturing. These qualified manufacturing processes support directed production schedules or Life Extension Programs (LEPs).

In FY 2005, ADAPT will balance near term LEP requirements and Advanced Technology Roadmap strategies. Major focus areas for near-term requirements include: developing capabilities and improvements to tritium processing, "Quarter Cost" Arming, Fusing, and Firing W76 subassembly production, hazardous materials production processes, improving secure connectivity of electronic data within the nuclear weapons complex, and developing minimum capability to produce War Reserve mechanical hardware with qualified Model Based processes. Advanced technology focus areas address standardization of nuclear weapons complex business methods and expanding Model Based and Non-contact gauging capabilities.

Total, Readiness Campaign **270,147** **328,916** **280,127**

Explanation of Funding Changes

	FY 2005 vs. FY 2004 ($000)

- **Stockpile Readiness**

  In FY 2005, this activity will continue to fund the highest priority projects slated to restore the machining, radiography, inspection, and testing capabilities and equipment required to support LEP baselines. ..... - 14,816

- **HE and Weapon Operations**

  This increase supports the science based manufacturing necessary to meet requirements for the W76-1 and other LEPs. Some of the products include models-based design, engineering, and manufacturing for the B61-7/11; deployment of pit qualification workstations; and models-based product definition for the W76-1 ..... + 10,710

- **Nonnuclear Readiness**

  This increase reflects expanded funding of on-going projects and initial funding of new projects, including neuton generator production testers and process improvements to support replacement or development of production capability at Kansas City Plant, Sandia National Laboratories/New Mexico, and Los Alamos National Laboratory. ..... + 2,255

- **Tritium Readiness**

  This decrease reflects the Tritium Readiness activity baseline schedule, which completes the transition from the Commercial Light Water Reactor (CLWR) Program, not including the Tritium Extraction Facility (TEF), to full production-scale operation of the tritium production system using a single reactor. ..... - 707

- **Tritium Readiness Construction**

  This decrease is consistent with the baseline goals. It is consistent with the 2nd Quarter FY 2003 baseline for the project and will enable the project to meet its end-point milestones as scheduled ..... - 53,558

- **Advanced Design & Production Technologies**

  This request for additional funding reflects increased work in process development to support tritium consolidation (TCON) plans and the necessary improved capabilities for the Tritium Extraction Facility (TEF), increased work in science-based manufacturing to meet directed stockpile workload needs such as development of new manufacturing techniques for engineering development of stronglink design modifications, new cable testing processes and equipment, and some additional emphasis on raising the minimum level of connectivity and

capability of the secure, electronic nuclear weapons "enterprise" to improve speed