

Detailed Justification

	(dollars in thousands)		
	FY 2004	FY 2005	FY 2006
Primary Assessment Technologies	44,634	46,450	45,179

The Primary Assessment Technologies subprogram provides the experimental capabilities and analytic tools and methodologies required to certify the nuclear safety and nuclear performance of any aged or rebuilt primary to required levels of accuracy without nuclear testing.

This subprogram supports the development and implementation of the QMU methodology. A principal focus is to understand the sources of uncertainty in models used to predict primary performance and reducing these uncertainties through improved physical data and understanding. Objectives include the development of a better understanding of boost physics and the quantitative role of radiography in primary assessment technologies. This activity also examines the effects of improved materials models on primary certification. This work is closely integrated with Advanced Simulation and Computing code development and validation efforts. An important component of this activity is the analysis of historical nuclear test data and development of an accessible archive of information relevant to the certification of primaries. In FY 2006, this activity will analyze specific underground test events in support of QMU and the results will be placed in a permanent archive (the Nuclear Weapons Information database). Finally, this subprogram is a prerequisite for completing studies to determine whether future primary certification activities will require an advanced radiography capability.

The experimental effort in this subprogram is in hydrotesting, subcritical experiments, materials science, and dynamic system behavior. Experiments at the JASPER facility at the NTS and subcritical experiments will be executed to obtain plutonium dynamic properties that will quantify the uncertainties in material models used in performance codes. In FY 2006, Bechtel Nevada will prepare for subcritical experiments in support of the Lawrence Livermore National Laboratory (LLNL) program. Los Alamos National Laboratory (LANL) and LLNL will conduct weapon physics hydrotests consistent with the priorities of the joint national hydrotest plan. Tests will include integrated weapons experiments that utilize many weapon components and provide data that is the result of a number of physical phenomena relevant to nuclear design and performance modeling. Small-scale and laser-driven experiments also will be executed that will provide data sensitive to a specific physics design phenomenon.

Test Readiness	24,744	26,784	25,000
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Test Readiness maintains underground nuclear test unique capabilities that are not supported in other stockpile stewardship programs. Funds in test readiness support and train critical personnel, acquire and maintain test-specific equipment, and maintain critical infrastructure in a state of readiness adequate to prepare and execute an underground nuclear test on a timescale established by national policy. Funds are requested to continue improving the state of readiness to reach an 18-month test-readiness posture in FY 2006.

FY 2006 objectives include: completion of 90 percent of the documentation required for the safety analysis necessary to prepare for an underground test; mentor key diagnostics personnel in the specification, design and reconstitution of test diagnostics, produce a prototype Pinhole Imaging Neutron Experiment (PINEX) camera using replacement PINEX technology.

(dollars in thousands)		
FY 2004	FY 2005	FY 2006

TA-55 for all pit types and the eventual establishment of a responsive pit manufacturing infrastructure for the long term.

Modern Pit Facility (MPF)	11,546	6,945	7,686
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Based on current pit lifetimes and stockpile requirements, NNSA is planning a responsive pit-manufacturing infrastructure with sufficient capability to provide for the long-term safety and reliability of the Nation's nuclear weapon stockpile. Since 1989, the United States has been without the capability to produce stockpile-certified plutonium pits that are an essential component of modern nuclear weapons. An interim pit manufacturing capability is currently being re-established at LANL, but this capability is not sufficient to support the long-term requirements of the nuclear weapons deterrent. Planning for a MPF with the capability to meet requirements is essential to establish a viable readiness posture. The NNSA will monitor pit lifetime assessments and the age of the stockpile to reaffirm MPF requirements.

Funding in FY 2006 will provide for continuation of design studies and facility requirements documents required to complete a Conceptual Design Report (CDR). MPF activities are organized consistent with the requirements of a major systems acquisition project, including implementation of an earned value management system.

The out year increments within the MPF line are required for future manufacturing capability and do not imply a decision on construction of a Modern Pit Facility.

Pit Campaign Support Activities at NTS....	45,632	51,793	35,182
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The request provides funding for Nevada Test Site (NTS) activities required to ensure that the FY 2007 pit certification subprogram goal is met. The major activities in FY 2006 include the preparation and execution of subcritical experiments to confirm nuclear performance of the W88 warhead with a newly-manufactured pit. The request also supports development of advanced diagnostic and measurement techniques for pit certification.

Total, Pit Manufacturing and Certification Campaign	262,544	263,020	248,760
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Detailed Justification

	(dollars in thousands)		
	FY 2004	FY 2005	FY 2006
Pit Manufacturing.....	105,731	130,411	120,926

The Pit Manufacturing subprogram objective is to produce pits in limited quantities and to sustain an interim pit manufacturing capability at existing Los Alamos National Laboratory (LANL) facilities. In FY 2006, LANL has committed to deliver the number of certifiable W88 pits required to support a FY 2007 W88 pit certification goal. The subprogram supports a multi-year effort by the National Nuclear Security Administration (NNSA) to reorganize activities and process lines at the TA-55 plutonium facility and the purchase and installation of new and/or backup equipment necessary to achieve the capability to manufacture ten W88 pits per year in FY 2007. This subprogram addresses the near-term requirement for newly manufactured pits and maintains an interim pit production capability to support the nuclear weapons stockpile.

Pit Certification.....	88,948	60,478	61,895
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The Pit Certification subprogram objective is to confirm the nuclear performance of a W88 warhead with a Los Alamos National Laboratory (LANL) manufactured pit by the end of FY 2007 and to establish certification processes for future replacement pits. To confirm nuclear performance of the W88 pit without underground nuclear testing, LANL has specified a set of engineering tests and physics experiments, in addition to a comprehensive analytical effort to develop a computational baseline that will provide confidence in future simulation capabilities. The result of these efforts will be the issue of a Major Assembly Release (MAR) for the W88 warhead with a LANL-manufactured pit in FY 2007.

The major focus of FY 2006 activities is completion of the data analysis and post-shot reports for the Unicorn and Krakatau experiments, completion of the revised W88 simulation baseline, completion of preparations for the conduct of the neutron hardness test at the Sandia National Laboratories (SNL) Annular Core Research Reactor facility, and completion of pit destructive tests required to issue a Qualification Engineering Release. In addition, LANL and LLNL will perform planning and development of integral experiments in support of certification of reliable replacement pits in FY 2006. A major item of equipment (MIE), Assembly Chamber and Ancillary Infrastructure, is being initiated in FY 2005 to support this subprogram. Additional details on this MIE are included in the "Major Items of Equipment" table that follows.

Pit Manufacturing Capability.....	10,687	13,393	23,071
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The Pit Manufacturing Capability subprogram objective is to establish the capability to manufacture replacement pits other than the W88 pit. The processes and technologies being developed support NNSA goals that include producing significantly less waste, lowering radiation dose to facility operators, and reducing the unit costs of manufacturing pits.

FY 2006 funding will be used to ensure progress in development of manufacturing processes for future replacement pits. The manufacturing processes for replacement pits will be established by the end of FY 2009, and engineering demonstration units will be manufactured by the end of FY 2012. The technologies being developed can be applied to an interim pit manufacturing capability at LANL

Performance Indicators	FY 2003 Results	FY 2004 Results	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	Endpoint Target
Cumulative percentage of major Nevada Test Site (NTS) milestones, documented in the Pit Manufacturing and Certification Campaign Program Plan, completed toward execution of LANL major subcritical experiment (SCE) activities in support of Major Assembly Release (MAR) for W88 warhead using LANL-manufactured W88 pits (Long-term Output)	R: 20%	R: 40%	T: 70%	T: 85%	T: 100%	N/A	N/A	N/A	By 2007, complete all major NTS SCE milestones necessary to acquire integrating data to enable FY 2007 MAR for W88 warhead using LANL-manufactured W88 pits.
<i>Annual cost per pit capacity to maintain a pit manufacturing capability. (EFFICIENCY MEASURE)</i>	N/A	N/A	N/A	N/A	N/A	T: \$10 M	T: \$10.1 M	T: \$10.2M	By 2021, reduce the cost to maintain a pit manufacturing capability from \$10M per pit capacity in 2008 to \$2.5M.

* Note Critical Decision (CD)-0: Approve Mission Need; CD-1: Approve Alternate Selection and Cost Range; CD-2: Approve Performance Baseline; CD-3: Approve Start of Construction; & CD-4: Approve Start of Operations.

** Target was changed to 20% in program rebaselining caused by FY 2004 reprogramming; program met rebaselined target.