findings in the Navy's recently released report to Congress on alternative propulsion; the Navy's top acquisition official concluded that nuclear power should be considered for medium surface combatants, such as a cruiser. The FY 2008 Congressional direction requires major combatant vessels to be designed and constructed with integrated nuclear power systems, unless the Secretary of Defense submits a notification to Congress that states the inclusion of an integrated nuclear power system in such a vessel is not in the national interest. The preferred approach for a nuclear powered cruiser would be to modify a single next-generation aircraft carrier propulsion plant (such as that planned for installation in the new GERALD R FORD class of carriers).

Next-Generation Submarine
The Navy is in the process of performing a study to assess the capabilities for a follow-on strategic weapon system to replace the TRIDENT Strategic Weapon System currently deployed on OHIO-class ballistic missile submarines. Per the Navy's 30-year shipbuilding plan, ship construction for an OHIO-class replacement is scheduled to begin in FY 2019. To support this schedule, funding for initial propulsion plant concept design efforts would be needed in FY 2010.

Dry Storage of Naval Spent Nuclear Fuel
Startup of dry storage operations began in late FY 2006 at the Naval Reactors Facility (NRF) in Idaho. This involves the packaging of spent nuclear fuel from wet to dry storage for ultimate shipment to a geological repository. As production tempos will steadily increase over the next several years in line with external agreements, demands for resources and facility improvements will follow. As a result, a commensurate shift in resources from Program laboratories to NRF and the Expended Core Facility (ECF) is expected. Further, as infrastructure related to spent-fuel processing is 50+ years old, NR is currently developing a mission need statement (CD-0) to retain this capability for the long term.

Mission
Naval Reactors is responsible for all naval nuclear propulsion work, beginning with reactor technology development, continuing through reactor operation, and ending with reactor plant disposal. The Program ensures the safe and reliable operation of reactor plants in nuclear-powered submarines and aircraft carriers (constituting 40 percent of the Navy's combatants), and fulfills the Navy's requirements for new nuclear propulsion plants that meet current and future national defense requirements.

Beginning in FY 2009, External Independent Reviews (EIRs) will be funded within the Office of Management to ensure appropriate EIR scope definition as well as to maintain the "external" and "independent" nature of EIR audits on Program project performance baselines. The request includes a FY 2009 target transfer of $500,000 from the Office of National Nuclear Security Administration to the Office of Management (MA) to support EIRs. Examples of EIRs include conducting performance baseline EIRs prior to Critical Decision-2 (CD-2) to support independent validation of the performance baseline, conducting construction/execution readiness EIRs prior to Critical Decision-3 (CD-3) for major system projects, and tailored EIRs.

Funding for a proportional share of NNSA's annual assessment required to pay for Defense Contract Audit Agency activities is included in this appropriation. The amount estimated for Naval Reactors is approximately $700,000 for FY 2008 and $700,000 for FY 2009, to be paid from program funding.

This Campaign provides the modern scientific capabilities and tools that support: (1) Annual legacy stockpile assessments, (2) Certification statements for Life Extension Programs and potential warhead replacement designs, (3) Reduced response times for resolving stockpile issues [e.g., Significant Finding Investigations (SFIs)], and (4) Certified warhead replacement components that meet the goals of responsive infrastructure. The Science Campaign, along with the Advanced Simulation and Computing Campaign (ASC), is principally responsible for the development of improved predictive capability that supports the Quantification of Margins and Uncertainties (QMU). The QMU is a modern methodology that applies to stockpile assessment issues and communicates assessments in a common framework. As the U. S. stockpile continues to evolve due to aging, modifications from lifetime extensions, and the development of enhanced safety features, the assessment of these weapon systems increasingly relies on our ability to assess weapon performance using predictive capabilities that are developed and validated by the Science Campaign. In addition, a responsive infrastructure requires an agile workforce knowledgeable enough to avoid technological surprise, and quickly understand and respond to new threats, an agility only allowed by continued support of weapons science. The transformation of the nuclear weapons complex to a highly responsive infrastructure can only be successful with continual improvements in predictive capability, and support for greater science-based understanding as done in the Science Campaign. Our objective is to have a predictive capability for the entire nuclear explosive package by 2020. The major steps on this path have been planned through 2020 and include the development of: fundamental Plutonium (Pu) equation-of-state and constitutive models by 2011 for primary implosions; models for full primary operation in 2015; and a model of full secondary performance in 2018.

The Science Campaign provides experimental data to validate the models in the simulation codes, and methodologies to apply the codes. These data and methodologies lend confidence to calculations performed to meet Directed Stockpile Work (DSW) commitments to understand the impact of aging on weapon systems, close SFIs, and certify refurbished devices. The pace of work under the Science Campaign is timed to support an ASC milestone in FY 2010 to release substantially improved simulation codes for primaries and secondaries in support of weapon design and certification requirements in the 2012 time frame. This shared code release will require the incorporation of improved physics models, which must be provided by FY 2009, including validated models for plutonium equation of state (EOS) and constitutive properties, improved boost physics models, completion of the Dual Axis Radiographic Hydrodynamic Test (DARHT) Facility 2nd axis as a validation tool, and the use of the High Energy Density Physics (HEDP) facilities.

The scientific advisory group, JASON, in early FY 2007, concluded a review of the progress on the second axis of the DARHT facility at Los Alamos National Laboratory (LANL). The report concluded that there are sound technical bases for the approaches being taken by the project: "The DARHT group is pursuing a well thought out program of fixes and testing. They have 'high confidence' that the current baseline approach will deliver two x-ray pulses, but lower confidence that all four x-ray pulses will meet requirements." The DARHT demonstrated the capability for four pulses at low energy during the third quarter of FY 2007 scaled accelerator tests. On June 20, 2007, the DARHT 2nd Axis Project team successfully transported a 2 kiloampere, 1.6 microsecond electron beam through the 2nd axis accelerator to an energy of 17 MeV and met the technical specifications. The second axis will be completed in FY 2008. In 2009, it will become a tool for conducting science and directed stockpile experiments. We will continue to improve diagnostics and target designs to increase capability to resolve features in hydrodynamic experiments.