AMERICAN REINVESTMENT AND RECOVERY ACT (ARRA)

$12,335,000 of funding was obligated on September 28, 2009 for tasks to be accomplished through November 2011. These funds will be used for additional DIII-D operations, staff retention and facility upgrades to diagnostic and auxiliary heating systems. In the quarter, April to June 2010, Enhanced Operations expenditures totaled $108,637 and supported 0 FTEs; Upgrade expenditures totaled $1,676,155 and supported 11.69 FTEs. Cumulative expenditures through June 2010 are $2,848,836 for Enhanced Operations and $3,968,844 for Upgrades.

Enhanced Operations

This task was completed November 2009. Final payments for procurements of spare parts made during the final three weeks of enhanced operations will be made in July-September 2010.

Upgrades

ECH Socket and Transmission Line

Procurement of components and materials and fabrication are continuing for the gyrotron socket and transmission line. All major parts for the gyrotron stand are on order, as are the majority of the components for the rf transmission line. Parts for the rf transmission line are available for installation and this will be done in conjunction with the rerouting of the existing transmission lines which will occupy a common support structure. Installation of the socket into the ECH vault will begin in the next quarter when the expansion of the vault is completed.

High Voltage Power Supply

Procurement of components and fabrication are continuing for the high voltage power supply, including the mod/reg decks and components for the deck, capacitors, the outdoor enclosure for the capacitor bank and numerous components for the power supply controls. The indoor enclosure for the power supply was also ordered. The long-lead line reactor and one of the two tetrodes were delivered. Statements of work were prepared for the construction of the concrete pads with associated conduit duct banks and for the installation and wiring of the outdoor equipment by external contractors.

Gyrotron

The final design review of the gyrotron was successfully presented by the vendor, CPI. The superconducting magnet system was ordered by CPI. The gyrotron is projected to be delivered on schedule.

ECH Launcher

The ECH launcher specification was completed and agreed to with PPPL during 1st Quarter FY10. PPPL is responsible for fabrication of the launcher.

Edge Diagnostics

The upgrade of the Lithium Beam diagnostic is continuing. The beam was injected into plasma and fluorescence data was obtained at the beginning of this quarter. Work is now focusing on upgrading the detection system and improving the signal to noise ratio.

New DACQ equipment and related electronics (fiber optic receivers/transmitters) were procured for the fixed Langmuir probes (SNL) in the previous quarter. The electronics have been installed and the DACQ configured, installed and tested. Some minor probe upgrades are being planned for the current long machine vent period.

The expansion of the Thomson scattering system began in August 2009 and new lab space was made available for the planned addition of the Edge Thomson system. The mechanical layout of the viewing port was fully modeled in Solid Works and the existing optical design has been migrated to Zemax. Detailed optical design of the expanded system is nearly complete and options have been detailed for mounting the new holder at the existing port. Final physics considerations are being reviewed before the design is completed.

Initial measurements were made in July 2009 for the design of a system for measuring flows in the edge and scrape-off layers, using coherence imaging techniques. Many more measurements were made in the previous quarter (FY10 Q2), this time looking at the lower divertor. A great deal of data has been obtained showing detailed profile of the flows, including in reverse field conditions. Plans are being finalized for an optimized viewing configuration following the success obtained with the prototype views.

The initial physics considerations are now nearly complete for the fielding of a neutral measurement, which is scheduled to be based on a Laser Induced Fluorescence (LiF) scheme. The design has begun, but details will be completed in the next quarter(s).

Core Diagnostics

The visible camera intensifier was ordered in July 2009 with delivery scheduled in early 2010. Following two failures at the vendor's factory, the unit's delivery has been delayed and is now expected for the summer of 2010.

The prototype Fast Ion Loss detector system was installed and took data in FY10 Q1. Following successful operational experience of the prototype, a conceptual design review for the second detector was held and action items from the review are being completed.

Scientific Staff

Scientific staff were funded and retained to support diagnostic and experimental analysis under this task.

Milestone Status (Scheduled/Completed)

Upgrades

- Begin High Voltage Power Supply fabrication (Scheduled Jun 2010/Completed June 2010).

Upcoming Events (July – September 2010)

Upgrades

- Complete Electron Cyclotron Heating Socket & Transmission Line procurement (August 2010)
- Begin Electron Cyclotron Heating Socket & Transmission Line installation (September 2010)
- Complete High Voltage Power Supply procurement (September 2010)
- Complete second phase of gyrotron manufacturing (August 2010)