

PRINCETON PLASMA PHYSICS LABORATORY

WEEKLY highlights



The PPPL Highlights for the week ending August 31, 2012, are as follows:

U.S. ITER FABRICATION (D. JOHNSON):

In a meeting with the IO Diagnostics Division Head Mike Walsh and other IO experts and US experts, it was decided to delay the MSE CDR. This review had been scheduled for mid-October has now been delayed at least until mid-December, in order to investigate the possibility of using emission from the Diagnostic Neutral Beam, rather than from the Heating Beam to measure pitch angles in the central part of the plasma. It was proposed that the IO and US cost share through a Task Agreement to fund this investigation, to be undertaken by experts at Nova Photonics, a small US company. Nova will perform an initial assessment of the feasibility of use of the DNB in the next two weeks under an existing contract.

Comments on a Manufacturing and Cost Study of the ITER Upper Camera Diagnostic were sent to TNO, prior to a video-conference planned for September 7.

At the TOFE Conference in Nashville, TN, D. Loesser (PPPL) presented a paper entitled "ITER Diagnostic First Wall", and M. Youssef (UCLA) presented "3-D Nuclear Analysis of ITER Diagnostics Generic Equatorial Port Plug Performed with the ATTILA Design Code".

The LFS Reflectometer Procurement Description was submitted for comment to PPPL QA and Procurement Departments.

NSTX (M. ONO):

NSTX-U is in the Upgrade Project outage in FY 2012

J. Menard attended the ANS Topical Meeting on the Technology of Fusion Energy (TOFE-2012) in Nashville, TN held August 27-31, and gave a plenary presentation entitled "National Spherical Torus Experiment Upgrade – Status and Plans". He also participated in a tour of two ORNL facilities: the High Flux Isotope Reactor (HFIR) and the Spallation Neutron Source (SNS). The presentation can be viewed at http://nstx.pppl.gov/DragNDrop/Scientific_Conferences/TOFE/2012/Menard_NSTX-U_TOFE2012_v2.pdf.

M. Ono attended the Joint Conference of the International Conference on Open Magnetic Systems for Plasma Confinement (OS) and the International Workshop on Plasma Material Interaction Facilities for Fusion (PMIF) held August 27-31, in Tsukuba, Japan. He gave an

invited plenary presentation entitled "Overview of innovative PMI research on NSTX-U and related PMI facilities at PPPL". The presentation can be viewed at http://nstx.pppl.gov/DragNDrop/Scientific_Conferences/PMIF/2012/.

PPPL graduate student Tyler Abrams recently returned from a summer practicum at the University of Illinois at Urbana-Champaign. He worked in the Department of Nuclear, Plasma, and Radiological Engineering in the laboratory of NSTX-U collaborator Professor David Ruzic. Abrams used a deuterium beam for surface sputtering measurements of a molybdenum alloy (TZM) with and without lithium coatings. They are important to NSTX-U since TZM is under consideration as a future plasma-facing component.

NSTX Upgrade construction activities continued this week and are highlighted in the Engineering section below.

Preparations of non-upgrade equipment for plasma operations in the NSTX-U configuration also continued. A peer review of the proposed configuration of the NSTX Gas System was held, and progress was made on establishing locations for required penetrations. Engineering actions for analysis, penetrations, plumbing, valves and gauges will now be scoped-out, costed, and prioritized. This includes a new gas delivery system for boronization. The IT group is developing Plasma Control System Algorithms for the proposed power, gas, and magnetic diagnostic system configurations. We are in the process of testing interfaces for the prototype fault detector and firing generator. The fault detector system test procedure will be ready to go out for review by early next week. Painting and general maintenance of outdoor equipment continued.

Access to the NSTX test cell will be available only through previous arrangement with the Upgrade Work Control Center.

ADVANCED PROJECTS (H. NEILSON):

Advanced Projects activities were represented in several papers at the ANS Technology of Fusion Energy (TOFE) Conference, held August 27-30 in Nashville, Tennessee. The Laboratory's LDRD study of Fusion Pilot Plants was summarized in "Comparison of Options for a Pilot Plant Fusion Nuclear Mission," by T. Brown; "TF Inner Leg Space Allocation for Pilot Plant Design Studies," by P. Titus; "Structural Analysis of the Toroidal Field Magnets for a Conceptual Advanced Tokamak Fusion Pilot Plan," by A. Zolfaghari; and an invited paper, "Mission and Readiness Assessment for Fusion Nuclear Facilities," by H. Neilson. PPPL's contributions to ARIES were highlighted in "The Evaluation of the Heat Loading from Steady, Transient, and Off-Normal Conditions in ARIES Power Plants," by C. Kessel. A stellarator collaboration with Auburn University was highlighted in "Calculation of Eddy Currents in the CTH Vacuum Vessel and Coil Frame," by A. Zolfaghari. Hutch Neilson organized and moderated a Town Hall Meeting, "From ITER to DEMO – Technology Towards Fusion Power," in an evening session at the conference.

Everson Tesla continues to make good progress in the fabrication of the Wendelstein 7-X Trim Coils. The third Type "A" coil satisfactorily completed hydrostatic and flow testing after the installation of the flow manifolds and hosing. The flow testing was completed at a higher differential pressure than the first two coil using Everson's recently upgraded equipment. The

fourth coil has been fully wound and began vacuum pressure impregnation this week. The mandrel and mold for the fifth and final coil, which is of a different design, have been ordered. The last coil is expected to be fabricated and shipped by the end of the calendar year.

FUSION SIMULATION PROGRAM (W. TANG):

Bill Tang (PPPL) and Martin Greenwald (MIT) presented the key features of the Fusion Simulation Program (FSP) to DoE-SC managers Jim Van Dam (Deputy Director of FES), John Mandrekas, Steve Eckstrand, and others from FES and Randall Laviolette of ASCR on August 29 in Germantown, Maryland. Mike Zarnstorff (PPPL) also attended and participated in the associated discussions of future prospects for the FSP. Copies of the briefing slides were provided to ASCR AD Dan Hitchcock and Deputy Head William Harrod, who had planned to attend but were called away to other obligations. After the initial session including ASCR presence, productive discussions with FES led by J. Van Dam were held on possible FSP connections to international collaboration opportunities in the near future. On August 30, Bill Tang met with Dr. Harrod for positive discussions of FSP as well as ASCR's strong interests in international collaboration activities including China's Exascale Software CoDesign plans and the G8-sponsored international path to exascale software projects.

ENGINEERING AND INFRASTRUCTURE (M. WILLIAMS):

NSTX Upgrade (R. Strykowski, E. Perry, L. Dudek, T. Stevenson):

All upper TF clevis pads have been welded to the vacuum vessel. Six lower clevis pads are yet to be welded - these are special configurations.

New hardware for the PF3 supports is being installed. The new hardware for the lower PF2 supports has been completed.

TF flag additional hole drilling continues, all but three flags have been completed.

The repair of the welds on the JK cap and duct extension continue with the replacement of the Bay J nozzle tube.

TF quadrant mold repairs continue with the fit-up of the new pieces prior to final machining.

The large hook on the NTC overhead crane has been tagged out until the crane repair contractor can inspect scale found on the upper sheave and determine whether it needs to be replaced.

Centerstack Fabrication: Eleven conductors are now insulated. Three are in the CS winding area awaiting cleaning prior to winding next week. Five conductors are in the soldering area being prepped and soldered. Five more conductors are at MTM and are on track for delivery at PPPL the week of September 10. Work continues on the quadrant mold in the Tech Shop. The new shell flanges were completed and are being welded onto the shell segments. The mold is on track to finish Sept 13.

PFC Tiles: It has been determined that ATJ graphite can withstand the thermal shock, however it is no longer manufactured. Investigations are underway to locate surplus material with certs that may be used. If the search fails to turn up enough ATJ an alternate material will need to be selected.

Coil Support Structures: The OTF weldment being reworked by an outside vendor was discovered to have defects (voids) in the material. The whole lot of parts was rejected and is now in the process of being returned to the supplier. An order for 24 replacement parts has been placed with the second lowest bid vendor.

A test was performed to determine the effectiveness of a moly disulfide lubricating coating on stainless steel. The test results are now being evaluated.

Fabricators delivered assembled OTF support rod ends , Umbrella vertical stiffeners, and PF 4/5 columns this week.

Diagnostics: All of the centerstack diagnostic sensors have been wound and assembled.

NBI Upgrade: Activities continue in the NB Shop and Tech Shop, the NTC, and the TTC. Full HP support continues to keep pace with project requirements including multiple surveys to characterize box and lid prior to relocation to the NTC. Repair of the cap and port extension continues in the Tech Shop. The relocation procedure is in final review and now includes relocation of BL and components as well as installation and alignment of box, 90 inch flange, the source platform, and its rails. An ECP was developed for duct flanges.

NBI Armor: Backing plate machining on the second plate continues as a background task in the shop.

NBI Relocation: Progress continues on preparations for the BL and lid moves. Detailed logistics for transport in the TTC, South High Bay, and NTC have been finalized. Decon of the box and lid are in progress with recent surveys indicating good results. The IP for the beam box, lid, and supports has been reviewed and approved.

NBI Services: Fabrication of cryo lines continues in the NB shop. Installation of LN supply line on the NTC East, North, and West walls resumed and nears completion.

NBI Controls: LCC controls and wiring modifications continue on the NBPC 138 level.

NBI Duct and TVPS: The Bay JK weldment and port extension welding repairs continue. Additional work has been included to replace the Bay J flange also. Port extension repairs are underway. Preparations for leakchecking the weldment are underway. Machining of a duct flange is in progress in the Tech Shop. The spool sections have been received from the rolling vendor.

Office of Project Management (T. Stevenson):

Development of the revision to the Work Planning online system 6.0 is in progress by IT including productive discussions regarding implementation of requirements.

Development of the Systems Engineer training per procedure ENG-016 on Preventive Maintenance continues.

A Peer Review on the revision to procedure ENG-006 SOW for JONs and process improvements was held and deemed acceptable. After resolution of chits the procedure will be ready for department review.

Facilities and Site Services (M. Viola):

Roof Projects: The LSB Roof and the PPLCC roof upgrade have been completed and are ready for the final inspection by Carlisle. Work on the MG Low Roof is progressing nicely. The project is scheduled to be complete by Sept 10. Work on completing the Auditorium roof and the drainage problem at the Commons Deck will be started during the week of Sept 4, weather permitting.

Material Services: Material Services requested upgrades to the existing business system to comply with new personal property requirements and are presently testing the upgrades that will be administered in the near future.

Cafeteria: The completion of the refurbishing of the pass through refrigerator in the cafeteria has been confirmed for 9/10. Cafeteria AC Unit casing and drain pan was refurbished along with a new cooling coil and is back in service.

Maintenance: Annual state boiler and chiller (and miscellaneous unfired pressure vessel) inspections were conducted with no observed deficiencies. Boilers will be closed and test fired in the next two weeks. Tentative steam start-up is scheduled for October 15. Proposals for renovations of the HP Offices and Conference Room renovations will be solicited next week to local general contractors by Procurement. A General Facility Renovation Basic Ordering Agreement (BOA) is being prepared for future work.

Piping insulation work was completed in the LSB basement and first floor mechanical rooms.

BUSINESS OPERATIONS (E. WINKLER):

A report on the feasibility of an onsite service contractor assessment system was submitted to Adam Cohen. The report was prepared by a team of representatives from Procurement, Quality Assurance, ESH&S, Engineering and Business Computing, in response to a Skidsteer Incident corrective action item.

ENVIRONMENT, SAFETY, HEALTH & SECURITY (J. LEVINE):

ESU Engine 66 responded to Princeton for four mutual aid assignments and to B-Site for 1 assignment due to an unexpected power outage. ESU Ambulance A166 responded to Plainsboro for 2 mutual aid assignments and to C-Site for one assignment.

The biennial DOE Safeguards and Security Survey of PPPL was held on August 20-22. Four DOE staff from the Chicago Office reviewed Program Management Operations, Protective Force Operations, Physical Security, Key Control and Accountability Procedures, Cyber Security, Nuclear Materials Control and Accountability, and Unclassified Visits and Assignments by Foreign Nationals. The Survey team was very complimentary of the Safeguards and Security Program, and provided only one finding and several suggestions.

SPD distributed two all-staff messages: the first regarding tips to prepare for Hurricane Seasons 2012; the second regarding a local rabies alert from Middlesex County.

Acting New Jersey Governor Kim Guadagno ordered the flag of the United States of America and the flag of the State of New Jersey flown at half-staff on August 30, in honor of United States Army Sergeant First Class Gunther H. Wald. Army Sergeant 1st Class Wald was a Green Beret soldier whose remains were recently found in Vietnam. He was killed during a Special Forces reconnaissance patrol in November 1969. He was a Palisades Park, New Jersey native.

President Obama ordered all flags throughout the United States of America and its Territories and possessions lowered to half-staff on August 31, as a mark of respect for the memory of Neil Armstrong. Please visit <http://www.whitehouse.gov/the-press-office/2012/08/27/presidential-proclamation-death-neil-armstrong> to view the Presidential Proclamation. Please visit <http://www.whitehouse.gov/the-press-office/2012/08/25/statement-president-passing-neil-armstrong> to view the Presidential statement on Neil Armstrong.

A final design review to discuss installation details for the Outdoor Ruckus Wireless Project was held on August 30.

Emergency Services Officer Jon Bain attended the Emergency Vehicle Trainer class in Trenton, New Jersey, and is now certified as an emergency services vehicle operator trainer.

INFORMATION TECHNOLOGY (S. BAUMGARTNER):

Requisitions have been approved for hardware, software, and training for the development of a CAMAC-replacement Timing & Synchronization system.

Schematics and parts lists have been updated for the GA integrator boards. After GA approves these modifications, design of the printed circuit board will begin.

On the NSTX-U Plasma Control System, Greg Tchilinguirian has committed driver software for the new I/O boards into the systems' software repository.

John Dong and Carl Scimeca are exploring an upgrade to the auditorium's audio-visual systems, to enhance the user-experience for Science on Saturdays and other MBG Auditorium spill-over situations.

Adam Kelley, Tony Bleach and Steve Baumgartner met with representatives of Princeton University's Treasury Department to discuss PrU's PeopleSoft upgrade project, possible impacts

on PPPL and begin the process to investigate suitability of PPPL's business systems being hosted by Princeton University.

OFFICE OF COMMUNICATIONS: (K. MACPHERSON):

The Princeton University home page posted John Greenwald's article on PPPL's delivery of the first trim coils to the W7-X stellarator project in Germany. Two of John's PPPL articles are currently on the Princeton home page; the university previously posted his piece about Rob Goldston's model for estimating the width of the scrape-off layer in tokamaks.

Kitta MacPherson distributed John's profile of Amitave Bhattacharjee to local news media.

Elle Starkman edited and added sound to a video about the NSTX-U. She also photographed Jeanne Jackson Devoe and the PPPL Volleyball team.

DIRECTOR'S OFFICE (B. SOBEL):

On August 29, Mike Zarnstorff and Bill Tang traveled to DOE in Washington for FSP Futures discussions.

Adam Cohen attended the Extraordinary MAC meeting, August 27-28. The meeting was held in Aix-en-Provence, France.

This report is also available on the following web site:

<http://www-local.pppl.gov/director/highlights/2012-highlights.htm>