



The PPPL Highlights for the week ending October 5, 2012, are as follows:

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

In a meeting between PPPL, LLNL and IO x-ray diagnostic experts, the "Von-Hamos" configuration was considered. This geometry permits more effective shielding at the cost of reduced signal levels. A CAD model was created to show how this geometry fits within the port plug, which seemed acceptable. However, the signal reduction resulted in only marginal performance compared to the requirements. It was decided that the next step was to look at solutions between the baseline "Johann" configuration and the "Von-Hamos" design.

Nova Photonics has analyzed the utility of viewing the diagnostic neutral beam from equatorial port plug E3 to obtain core MSE measurements. This idea, which originated with experts at the IO, looks promising to cover the case when the heating beam is aimed off-axis.

NSTX (M. ONO):

NSTX-U is in the Upgrade Project outage in FY 2013

The paper "Confinement and ELM Characteristics of H-mode Plasmas in KSTAR" by J-W. Ahn (ORNL), et al. has been published in Nuclear Fusion 52 (2012) 114001 and can be found at <http://iopscience.iop.org/0029-5515/52/11/114001/>. This paper describes the latest results of confinement and ELM characteristics of KSTAR H-mode plasmas as well as the L-H power threshold study as a function of density. Detailed characteristics of three identified types of ELMy H-mode are reported and the pedestal profile dynamics in the ELM cycle is also described. The analysis result of the ELM suppressed H-mode data by an $n=1$ magnetic perturbation is presented and the role of plasma control in the sustainment of H-mode state is discussed as well.

Michael Bell (PPPL) presented three lectures to the Joint ICTP-IAEA College on Plasma Physics being held October 1 -12, 2012 at the International Centre for Theoretical Physics in Trieste, Italy. The topics of the three lectures were "Magnetic Confinement Fusion Research: History and Fundamentals", "Progress and Outstanding Challenges in Tokamak Research" and "Spherical Tokamaks: Achievements and Prospects".

Rajesh Maingi (ORNL) and Michael Jaworski (PPPL) attended the US/Japan High Power Density Devices workshop meeting in Del Mar, California, October 5-6. R. Maingi presented the talk "Effect of Lithium Coatings on Discharge Characteristics and Profiles in NSTX" and M.

Jaworski presented a talk titled "NSTX Liquid Lithium Divertor Results and On-going Research on Liquid Metal Plasma Facing Components".

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 continued with a peer review to coordinate ongoing Field Coil Power Conversion (FCPC) system activities and resource needs for a timely re-commissioning of the NSTX power supplies. Ex-vessel layouts of the MPTS Laser inputs have been established, and the final design review for the Laser Box, Flight Tube and Calibration Probe will be held later this month.

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

ADVANCED PROJECTS (H. NEILSON):

David Gates and Hutch Neilson visited the DOE Fusion Energy Sciences (FES) office on October 5 as part of a delegation to discuss long-term plans for the U.S. collaboration on Germany's Wendelstein 7-X (W7-X) stellarator. Other members of the delegation were Hans-Stephan Bosch (Max Planck Institute for Plasma Physics), Jeffrey Harris (ORNL), and Glen Wurden (LANL). An overview of the scientific goals and program plan was presented by Dr. Bosch, the W7-X Technical Director. The U.S. participants presented preliminary plans for U.S. participation over the next few years, during which W7-X will make the transition from construction to operation. They explained the benefits of the collaboration to the U.S. FES program. It is expected that formal proposals will be requested later in FY-13. The meeting concluded with a decision to negotiate a formal agreement between the U.S. and IPP concerning U.S. partnership in the W7-X research program.

FUSION SIMULATION PROGRAM (W. TANG):

Bill Tang visited the University of Houston on October 3-5, in response to an invitation from Professor Rathindra Bose, the Vice Chancellor for Research to chair the International External Advisory Board for U.H.'s Texas Learning and Computation Center. The charge involved providing guidance to help determine the most appropriate infrastructure to support the University's new HPC center's focus on interdisciplinary computational science research under the leadership of Professor Barbara Chapman.

THEORY (A. BHATTACHARJEE):

The Theory Department organized a Retreat, September 24-25 and 27 on Princeton University's main campus. The purpose of the Retreat was to develop a strategic plan for the Department spanning four areas: (1) Transport and Confinement, (2) Global MHD, including Energetic Particles, (3) Basic Plasma Science, and (4) High-Performance Computing Support. The Retreat was organized around plenary talks and breakout sessions. The plenary talks were mostly given

by PPPL experimental leaders and Dr. Ronald Waltz from General Atomics, who gave a talk on "Core and Edge Transport and Confinement: Past, Present, and Future". The breakout sessions were moderated by experimentalists, and led by members of the Theory Department. This forum enabled lively and stimulating discussions, and has led to the development of key elements of a strategic plan.

COMPUTATIONAL PLASMA PHYSICS GROUP (S. JARDIN):

S. Jardin and S. Lazerson (Advanced Projects) participated in a teleconference with a ITPA working group that is tasked with making an assessment of the likely edge displacement in ITER due to (a) long-lived core MHD instabilities and (b) application of RMPs. Jardin presented 3D nonlinear results from M3D-C1 on edge displacements from sawteeth and helical deformations in both NSTX and ITER. Lazerson presented results using VMEC to calculate the effect of $n=3$ RMPs. Action items include performing more detailed cross-code comparisons including the comparison of M3D-C1 results with those obtained by Tony Cooper with ANIMEC, and the comparison of NSTX results with data.

ENGINEERING AND INFRASTRUCTURE (M. WILLIAMS):

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

Insulation has been removed from the area of the outer TF flag braze joints so inspections can be done. Ultrasonic testing is expected next week.

TF12 has been removed from NSTX and TF4 will also be removed.

Bakeout tubing that was removed to accommodate the new TF clevis pads is being re-installed.

Three new umbrella legs are bolted in place (two upper and one lower) and they are ready for welding.

Power has been restored to racks 401 and 402 and power for the Glow Discharge system is being installed next.

Soldered cooling tubes into TF conductors nos. 119, 127 and 138. Five TF conductors have been post-solder baked. Five (5) more conductors will ship next week from MTM. Rework completed on TF Bundle Quadrant mold and the unit has been transferred to the coil area. The mold has been cleaned and coated with mold release. Next week the mold will be moved to the production floor, aligned and bolted to the floor.

Aquapour mold has been modified, and will be bundle prepped as soon as lull occurs in the action.

The SOW for sandblasting and priming of OH conductor was completed and is now in the approval cycle.

The fab contract for the CHI Copper leads was awarded to an outside machine shop.

NBI Upgrade: Management conducted the monthly status meeting with all active jobs reporting on progress. Cost and Schedule Indices continue to show jobs tracking well.

NBI Armor: The backing plate as-built machining in the shop continues as a background task but has been on hold due to minimal coverage. Tile machining is out at the vendor. T bar fabrication continues in the shop.

NBI Relocation: Efforts continue in both the NTC and TTC to clear areas and ancillary equipment of minor residual contamination after the beam box and lid move into the NTC last month. Many items have been cleared for free release and removed from the areas for storage or future use. Temporary flexible line has been installed in the NTC to ventilate the beamline to the stack. The lift procedure needed for the alignment process of the beamline has been reviewed and approved. This alignment work is scheduled to begin next week.

NBI Refurbishment: Machining of 90 inch flange feedthroughs continues in the NB shop. As crews become available, efforts will resume on completing the 90 inch flange, ion dump, and calorimeter.

NBI Services: The strategy for routing the water lines through the pump room, MER, and into the NTC has been revisited with additional walkdowns. Several ideas to shift tee locations will potentially improve ease of welding and installation. These ideas are being incorporated into the drawings and procurement package, which is being prepared. Cryo line fabrication continues in the NB shop including parts manufacture, assembly, welding, and leak checking. Design and drafting work for new and modified NB platforms in the NTC is in progress.

NBI Power: Triax cable shipping is imminent pending some final paperwork. Decel coax cable purchase is planned but is a minor cost and is not a long lead item. This purchase will complete all major cabling requirements. The procurement package for cable and tray installation in the TFTR TCB, TTC, and NTC is being prepared.

NBI Controls: Progress continues on modification of 4ABC LCCs in NBPC 138' level.

NBI Duct/TVPS: Many duct flanges have been fabricated in the shop. The circular bellows order is being delivered. The spool sections have been welded. The rectangular bellows flanges have been ordered and are expected by end of calendar year. Several purchases including TMPs have been planned for the start of the fiscal year and these packages are being prepared. The repaired Bay JK weldment went out for heat treatment and is expected back next week. After metrology for final dimensions of the Bay JK weldment, the VV cut can proceed.

Project Management (T. Stevenson):

Progress continues on the revisions planned for the online Work Planning system 6.0. IT has completed many items on the requirements list. Testing will be required prior to rollout. Additional meetings are planned for page changes.

The revised draft for ENG-006 Statements of Work and Specifications went out for departmental

review.

Facilities and Site Services (M. Viola):

Telecommunications: On October 3, Altura, PPPL's phone system vendor, installed the new firmware software on the remainder of the phone system Gateways (3, 4, 5 & 6). It is expected that the new updated revision will resolve the phone system problem associated with intermittent dead analog phone lines.

The PPPL Electricians continue working to reconfigure the ground wiring in the Phone Room under the direction of the AC Power group. There are also plans to add a separate transformer for the phone system circuit.

The annual Skytel Paging Service agreement was submitted and approved. There are currently sixteen Skytel pager users.

Fire Protection: A fire protection review has been completed with a revised scope and SOW for a fire system engineering review.

ACAMS: The drawing mark ups for the print room card reader about 50% complete. Minor problems and administrative details have been resolved.

Carpenter Shop Dust Collection upgrade: The NFPA requirements have been reviewed and the test data has been provided by Henry Carnevale.

Fire System PMs: We followed up on a test discrepancy on the laboratory's second floor pre-action sprinkler by doing a partial retest with the electricians. It has been determined that the problem was with the procedure, not with the system. The procedure has been noted for update.

Operations: The procurement department has awarded a contract to Caufield Construction to renovate the Health Physics Offices (R-202, 302, 303) and Conference Room (R304). A general Basis Ordering Agreement (BOA) will be solicited in the coming weeks to perform similar renovation work throughout PPPL.

We performed a test and start-up of the CS Building High Bay desiccant dehumidifier. The unit is currently in service to support NSTX Coil Shop activities and maintain desired environmental conditions.

The D-Site Mockup Clean Room HVAC System has been repaired and placed back in service. The replacement system is planned to be installed in December and will require a two week Clean Room outage.

The Rad Waster Building Permacon Room HVAC has been repaired and placed back in service.

Steam pipe and condensate insulation work continues in the D-Site Field Coil Power Conversion Building.

Insulators continue to work onsite on condensate lines.

Roof work is continuing on the Commons Deck. It is now completely leak tight. Details about the final deck pavers are being worked out. Progress is weather dependent.

BUSINESS OPERATIONS (E. WINKLER):

Natalya Gnyp completed a course offered by the Princeton University Human Resources Department entitled "Legal Aspects of Supervision". This course is part of the required curriculum for the Princeton University Management Certificate program.

Debbie Parente has accepted a position as a Buyer in the Procurement Division. Debbie will be assisting Arlene White and Dawn Horner in the purchase of commercial items and services. A search for a new Procurement Analyst/Expediter to fill Debbie's former position will begin immediately.

The Procurement Division compiled the Laboratory's cumulative small business subcontracting plan results for fiscal year 2012. The Laboratory's results as they will appear in our report to the US Small Business Administration are: Overall Small Business, 64.2% (Goal 50.2%); Disadvantaged Business, 8.1% (Goal 5.5%); Women Owned, 8.4% (Goal 7.0%); HUBZone, 4.8% (Goal 3.5%); Service Disabled Veteran Owned, 3.0% (Goal 3.0%). In summary, PPPL exceeded four of its five FY 2012 small business-subcontracting goals, and met the fifth goal.

The Business Operations Department successfully closed the books on FY2012 operations.

The Travel Office responded to several DOE requests for information on attendance to various conferences.

The DOE Office of Science approved PPPL's Laboratory Directed Research & Development (LDRD) plan for FY2013 at a maximum funding level of \$2.5 million. In addition, the Princeton Site Office approved continuation of nine FY2012 LDRD projects into FY2013; the total LDRD budget allocated to these projects is \$1.24 million.

A Work for Others Agreement between Corning Incorporated and PPPL, for the project titled, "Radiological Analysis on Glass" was approved by DOE. The Principal Investigator is George Ascione. The budget is \$17,000.

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

ESU Ambulance A-166 responded to four mutual aid assignments in Plainsboro; ESU Engine 66 responded to one mutual aid assignment in Plainsboro and one assignment to D-Site (TFTR Basement) for a suspicious chemical smell.

An ESU Captains' Meeting was held this week; topics of discussion included the recent Baldrige review, Physical Fitness, Foreign Visits & Assignments Procedures, Performance-Based Exercise Drills for the ESU, the STOP Program and ISM, and results from the recent DOE Safeguards and Security survey.

A Security Peer Review Risk Assessment of the Laboratory will take place on October 29-November 2. DOE Office of Science and Office of Health, Safety and Security will conduct the assessment. The Site Protection Division (SPD) will be requesting assistance gathering information from several PPPL Departments to ensure a successful review.

SPD distributed an all-staff message on October 3 regarding a severe traffic alert due to a major motor vehicle accident on the New Jersey Turnpike. The incident caused severe traffic congestion throughout central New Jersey during the day and evening.

PPPL Counterintelligence Officer Paul Moskal visited the Laboratory October 1-3.

SPD would like to remind everyone that next October 7-13 is Fire Prevention Week. The theme for Fire Prevention Week 2012 is "Have Two Ways Out". PPPL's Fire Protection Day will be held on October 9 in the LSB Lobby between 11:00am-1:30pm.

INFORMATION TECHNOLOGY (S. BAUMGARTNER):

A new fiber optic cabling bundle has been run from the PPLCC to the DAS network closet and on to the Receiving 3 building. This was done to reroute network fiber around the area slated for a new lab wing building. That building will disturb the current fiber path from the PPLCC to Mod 6. Receiving 3 will become the new 'hub' for the ESU, Mod6, Facilities, and other buildings on the west and south sides of the PPLCC campus.

CODAC staff attended a meeting to review calculations that will be performed by the NSTX-U Coil Protection System. This meeting should help towards developing a software requirements document.

Drawings are being developed to support a number of CAMAC replacements for NSTX-U.

The design activities for GA integrator boards is wrapping up. Fabrication will commence soon.

OFFICE OF COMMUNICATIONS: (K. MACPHERSON):

Historic photos of PPPL accomplishments were featured prominently in a Flickr photostream prepared by the DOE press office to commemorate DOE's 35th anniversary with 5 of the 39 photos shown tied to PPPL:

<http://www.flickr.com/photos/departmentofenergy/sets/72157631669125692/with/8044517908/>

Chris Cane captured the photostream and posted it on the PPPL website.

The Communications team, including Pamela Hampton and Chris Cane, assisted PPPL scientists with presentation materials for the upcoming IAEA meeting.

John Greenwald received DOE clearance to distribute his news release about the department's \$12.25 million, five-year grant to the Center for Edge Physics Simulation, which is headed by C.S. Chang and based in the Laboratory. John also submitted for DOE approval a news release

about the October 15-18 roadmapping workshop that Hutch Neilson is to chair at UCLA, and revised at DOE's request a proposed news release about the Molybdenum 99 project at PPPL. He also represented the PPPL Communications Department at a monthly meeting of campus science writers held October 4, at Guyot Hall at the Princeton Environmental Institute on the main campus.

Kitta MacPherson and John Greenwald attended a meeting of campus communicators at the Carl Field Center of Princeton University on October 5.

Elle Starkman took numerous photos including: members of the Princeton University Dean for Research's Office; candid images at a farewell for Stephanie Wissel and welcome to Arturo Dominguez; Kelsey Tresemer for an ANS request; and a group of Rutgers students per a request by Rutgers University AlumKnights magazine. She continued to work on a print project for the PSO involving a gallery of photographic images. She also worked to assist Innovation Magazine, Science Education, Graduate Education, and the Dean for Research's Discovery Magazine project with image requests.

Jeanne Jackson Devoe organized the following tour: John DeLooper led a group of science journalism students from Rutgers University on a tour on October 1. The students viewed portions of C- and D-sites.

BEST PRACTICES & EXTERNAL AFFAIRS (J. DELOOPER):

Andrew Zwicker talked with Princeton University freshman and sophomores from Rockefeller College about plasma physics and fusion energy as part of their "Get to Know a Professor" dinner lecture series.

Andrew Zwicker was the featured guest speaker at The Liberty Science Center's Board of Trustees reception. He spoke about the Princeton University Art of Science traveling exhibition that recently opened at the science museum. The exhibition consists of 40 of the best images from the last five Art of Science competitions and will be shown at the museum for the next six months. PPPL is well represented within the exhibit with five photos from PPPL artists. PPPL's Elle Starkman is the only person that has more than one photograph represented in the exhibit. Featured are her photos of a dusty plasma called, "Plasma Table," and a neutron calibration test called, "Neutron Express."

Andrew Zwicker met with officials from The Franklin Institute to discuss transferring administrative duties for the NASA partnership to the museum in FY13.

DIRECTOR'S OFFICE (B. SOBEL):

On October 2, Adam Cohen attended the National Laboratory Chief Operating Officer (NLCOO) meeting held at FERMI Laboratory in Naperville, Illinois.

This report is also available on the following web site:

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