



The PPPL Highlights for the week ending February 1, 2013, are as follows:

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

PPPL proposed a new set of delivery dates to the ITER Organization which would provide eight weeks float on all steady-state electric power network component deliveries.

A subcontract proposal evaluation board was convened for the procurement of ITER HV Circuit Breakers.

In a meeting with the IO Diagnostics Group, PPPL port plug design team expressed concerns concerning delays in IO design of the generic port plug structures and the diagnostic shield modules due to the associated impacts on US efforts to design the diagnostic first wall and the US port plugs. Due to these delays, the US proposed an amendment to the Diagnostic First Wall Task Agreement - which delayed the dates of the analysis progress reports, the PDR, and the FDR. The IO Diagnostics Division Head is considering this proposal.

A mature draft was developed for the physics design and provision of microwave instrumentation for the Low-Field-Side Reflectometer Diagnostic with the goal to circulate to the IO and ORNL for comment after one more iteration.

Progress on document deliverables for the Residual Gas Analyzer Preliminary Design Review was reviewed. A detailed report was given by Bill DeVan of the USIPO about the progress on CODAC-related documents. This PDR is scheduled for the week of April 8. Possible dates for a US-DA Readiness Review were discussed without a firm conclusion.

Steady State Electric Network and Diagnostics Risk Registry entries were further refined.

NSTX (M. ONO):

On January 28, Roger Raman (University of Washington) gave the talk "Overview of Physics Results from NSTX and the NSTX-U Program Plans" to the Quest ST group at Kyushu University. On January 28 and 30, additional discussion with Professor Hanada of Quest and a representative of a local engineering company has led to a CHI design for Quest that is now ready for an assessment of hardware installation cost. On January 31 - February 1, R. Raman visited the University of Hyogo group to discuss the hardware requirements to support transient CHI studies on HIST. He also gave a condensed version of the NSTX overview talk to the HIST plasma group.

Professor Yoshihiko Hirooka of NIFS (National Institute for Fusion Science), Japan visited NSTX/PPPL under the US-Japan bi-lateral collaboration during the week of January 28. He discussed the lithium-effects on core confinement both in NSTX and TFTR and dust related collaboration activities with M. Ono, C. H. Skinner, R. Kaita, M. A. Jaworski, D. Mansfield, J. Strachan and R. Goldston. He also visited the NSTX lithium and dust test facilities and Lithium Tokamak Experiment.

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

Preparations for plasma operations in the NSTX-U configuration also continued with an ongoing engineering study to provide a new vacuum vessel boronization system. The fabrication of the new field coil power conversion (FCPC) system firing generators continues to make good progress, and the first production firing generator is expected to be ready to install in an FCPC rectifier next week.

ITER & TOKAMAKS (R. WILSON):

DIII-D (R. Nazikian):

C. Kessel and F. Poli visited D3D to discuss integrated modeling activities for interpreting D3D discharges, validating transport models and projecting to future devices. The main focus of the work will include ITER-like baseline inductive discharges and steady state discharges. Comparison of transport models will be a primary focus. Initial activities will be to setup the TSC coil and structure model and TRANSP input files for a specific DIII-D discharge.

B. Tobias and G. Kramer attended the Winter Workshop on Energetic Particles at University of California - Irvine. D. Mikkelsen is currently visiting General Atomics to assess ways of simulating gyrokinetic turbulence in a rippled magnetic field in order to understand the physics of resonant magnetic perturbation induced transport in DIII-D. W. Solomon presented a summary of the five year plan on scenario development to the DIII-D Program Advisory Committee.

Alcator C-Mod (R. Ellis):

A. Diallo is visiting CMOD to work, in collaboration with J. Hughes, B. LaBombard, J. Walk, L. Delgado, and CMOD researchers, on the analysis of the data of pedestal evolution experiment (MP709). Progress has been made in the kinetic profiles, radiated power, and fluctuations analysis of the turbulence prior to the onset of ELMs.

ADVANCED PROJECTS (H. NEILSON):

C. Kessel and F. Poli participated in the ARIES project meeting. They reported the final progress on the advanced physics and advanced technology configuration (known as ACT-1) including: time-dependent transport evolutions to steady state, ideal MHD stability, PF coils, heating and

current drive assessments for LH, IC, and EC, and a number of other physics issues, and provided the outline for the physics basis paper that will be compiled. Early systems analysis for the next case, the conservative physics and conservative technology configuration (ACT-2) were reported. The ACT-2 study will be the subject of the remainder of the FY13 activity.

The Wendelstein 7-X (W7-X) trim coil supplier, Everson Tesla, Inc., successfully completed the resin impregnation of the fifth and last W7X Trim Coil this week. The coil will be removed from the mold in the next several days.

The K-DEMO project team met this week to review progress toward the next milestone, namely to update the design point by February 28, as a basis for the next several months' analysis. Team members from the Laboratory and Korea's National Fusion Research Institute (NFRI) reviewed radial build space allocations for the K-DEMO pre-conceptual design. Based on the discussion, an update was subsequently issued by K-DEMO project leader Keeman Kim of NFRI. Plans for system code analysis and conductor analysis during the next month were finalized. The team has submitted abstracts for papers to be presented at conferences later this year: "Performance evaluation of K-DEMO cable-in-conduit conductors using the Florida electro-mechanical cable model, by Y. Zhai et al., to be presented at the International Conference on Magnet Technology, to be held July 14-19 in Boston; "Progress in Developing the K-DEMO Device Configuration," by T. Brown, et al., and "Systems Analysis Exploration of Operating Points for the Korean DEMO Program," by C. Kessel, et al., to be presented at the Symposium on Fusion Engineering, to be held June 10-14 in San Francisco.

FUSION SIMULATION PROGRAM (W. TANG):

In response to the invitation from Dr. Doug Ray, Associate Laboratory Director for the Fundamental and Computational Science Directorate at the Pacific Northwest National Laboratory (PNNL), B. Tang visited Richland, Washington on January 31 for discussions exploring possible collaborative alliances that could also involve the new Northwest Institute of Advanced Computing [<https://niac.labworks.org/>]. The Institute was recently established jointly by the University of Washington and PNNL. Tang was hosted on this visit by Dr. Moe Khaleel, the Director of PNNL's Computational & Mathematics (CSM) Division, with focus on discussing prospects for joint proposals responding to future ASCR-supported initiatives in the key area of verification, validation, and uncertainty quantification.

COMPUTATIONAL PLASMA PHYSICS GROUP (S. JARDIN):

TRANSP off-site collaborators presently authenticate with PKI FusionGrid credentials issued by the ESnet Certificate Authority (CA), a parallel service to the more widely used DOEGrids CA, to submit jobs to the PPPL computer system. Both DOEGrids CA and ESnet CA will cease providing PKI services on March 23, and are transitioning services to a new CA managed by the Open Science Grid (OSG). However, OSG will not support storing credentials on a "MyProxy" server since this does not comply with IGTF policies. Now Certificates will be stored on the user's computer. All TRANSP collaborators have been notified of the changes and instructions and tools have been provided on the TRANSP Website. The TRANSP Production service is now managing and accepting both types of FusionGrid credentials (user-managed and

MyProxy-managed) until such time as the old ones gradually expire. Several groups of users have already made the change and have not reported any undue difficulties. Any questions regarding the transition should be referred to Tina Ludescher at ludescher@pppl.gov.

ENGINEERING AND INFRASTRUCTURE (M. WILLIAMS):

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

Construction: Welding of the vessel leg mounts on the east side have been completed. The lower east cable trays can now be re-installed. All aluminum castings on TF coils on the machine have been counterbored. Installation of barrel nuts and threaded rods is underway. The electricians continue on the rack to rack wiring in the north gallery and have started the re-installation of cable trays in the NTC. The bay L mid-plane area has been prepped for the installation of the new nozzle.

Center Stack: TF Conductor - The last 5 conductors were completed in the soldering area and transported to the CS Coil Winding shop. The new Quadrant Mold cover was completed and successfully vacuum leak tested. The installation of wrapped conductors into the mold commenced on February 1.

Inner PF Coils: The first of the bids for fabrication of the Inner PF Coils was received this week.

Centerstack Casing: The lift procedure to lift and rotate the casing has been written and is in the approval process. Bids for the ceramic break were received and are being evaluated.

Coil Support Structures: A BPA release for the CS lower pedestal was signed. A vendor visit was made to Astro machining, who is working on the OH coil support and the TF inner conductor extensions for the upper conductors.

OH preparations: The OH winding tension station fabrication continued in the Tech Shop.

Passive Plate Modifications: A drawing of the reinforcement gussets around the PCHERS openings has been generated and is in the review process.

Bus Bars: The bus bars design and analysis is in progress. A first draft calculation for the CHI Bus Bars was prepared. Additional analysis is being performed. The TF bus bars will be re-designed to connect to the TF-8 coils in the south side of the NSTX TC. The bakeout power connection will be placed on the 1.5" SQ Water Cooled Bus near the Bus Tower. A bottom-Up estimate is being prepared to create a work package for all bus bar activities.

NBI Upgrade: Procurement, fabrication, and implementation of Bay JK VV corner reinforcements are in progress. The final armor plate in-vessel fitup was completed. The armor supports were tacked in place and the backing plates were removed and forwarded to the braze shop. Final tasks on the ion dump and magnet are being addressed. Relocation and installation in the BL are scheduled for next week. Calorimeter drives delivery are expected next week. The BL upper tier source platform was installed on the BL. Lifting fixtures for HVEs are in progress. Procurement packages for cable and tray and for water piping are in development and drawings

for these packages are nearing completion. A WCC package for installation of NTC platform 109 and 119 bridges is in progress. Fabrication and leakchecking of LHe cryo line continues in the NB shop. LHe cryogenics line installation on the TFTR Test Cell South wall continues. Fabrication in the Tech Shop continues on the central spool section for the NBI duct. Cable tray installation for BL controls and instrumentation is in progress in the NTC.

Office of Project Management (T. Stevenson):

The Work Planning online system rollout was successful with no reported problems. Several additional requests for minor additions are planned for a version 6.1 The EVMS self assessment report has been completed and is in approvals. System Engineer training with the online package is in progress. Development of the COG/RLM online supplemental training package continues. Work planning process review of the work associated with the Lithium dropper exothermic reaction continues including responses for action item JONs.

Facilities and Site Services (M. Viola):

Engineering Services: Meeting held for SLI with D. Shoe, R. Strykowski, F. Morrison and M. Donohue. This will be a weekly meeting driving toward developing the required documentation to hold the CDR on the aspects of SLI not covered by the CDR held with HDR. This includes aspects such as CAS RESA to MG move, and Mod 6 to offices move. Internal department review of the steam station in the carpentry shop took place.

Fire Protection: Work proceeds on executing Fire Protection observation items. Posted FPE position announcement on DOE FPE Forum. Dan Corbett will schedule time to update FHAs. We contacted Gosline Fire Protection with respect to evaluating Warehouse sprinkler system. There has been no response yet. We began work on redundant EVES white paper. A response to a NFPA technical question has concluded with the response that do not require heat on the water tower. We will need to provide a low temperature alarm.

Telecommunications: The Avaya phone system software revision is performing successfully. We have gone 90 days with no intermittent dead analog phone lines. We have concluded that these problems occurred from faulty ground wiring configurations in the phone room affecting the phone system equipment. Work continues on the new electrical power transformer and new electrical power outlets in the Telephone Equipment Room, A117 to completely isolate the electrical power source. The Telecommunications Office created a detailed schematic of the Lab's LTR UHF Narrowband Radio and Antenna System. The schematic includes all system equipment and the entire fiber antenna network at D-Site and A/B Sites.

Energy Management: Another curtailment has been declared as of February 1. Natural Gas has been procured for the first day of this curtailment. A meeting was held with Siemens to discuss their DemandFlow energy conservation product.

BUSINESS OPERATIONS (E. WINKLER):

The Accounting and Procurement Division heads conducted their regularly scheduled monthly walkthrough of the first floor East Wing Annex and associated Accounting, Procurement and Business Computing offices and records storage areas in the LSB east wing.

Representatives from Business Operations and Information Technology met with representatives from the DOE Site Office to discuss the current status of the Laboratory's business computing risk reduction initiative, and to review possible next steps in the selection of a replacement technology for the Laboratory's aging Great Plains software.

The Accounting Division responded to a data call to provide post retirement benefit cost projections and plan information to the Department of Energy. The information was directly input into the DOE iBenefits system.

S. Drapkin and T. Bleach attended an introductory training session, hosted by the Princeton University Office of Finance and Treasury, which provided an overview of the University's new chart of accounts structure and fields.

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

B. Slavin attended a scaffold safety course on Main Campus on January 29-31.

R. Sheneman attended the Annual National Export Controls Forum on Deemed Exports and Technology Transfer. He met with representatives of other universities and the President's Export Council regarding input to the Export Control Reform initiative addressing the conduct of fundamental research at universities, national labs and other institutions.

Emergency Services Engine 66 responded to one mutual aid assignment in Princeton and one mutual aid assignment in Plainsboro. Ambulance A166 responded to five mutual aid assignments in Plainsboro. ESU, Industrial Hygiene and Materiel Services responded to the PPPL Warehouse for a suspicious package that turned out to be legitimate mail.

The Site Protection Division (SPD) responded to a DOE data call regarding our response to a potential 5% sequestration reduction in 2013 funding for Safeguards and Security.

The Emergency Response Organization membership was updated to fill two vacancies.

SPD issued all-staff e-mail messages regarding (1) a high wind warning and (2) slippery conditions on-site.

This past weekend Captains H. Caruso, D. Thompson, and K. Rhoades along with Officer R. Walker attended EMT Airway Management Refresher training held at the University Medical Center of Princeton at Plainsboro. This training class counts as one-third of their EMT Core CEUs.

INFORMATION TECHNOLOGY (S. BAUMGARTNER):

The PTOLEMY computer's data acquisition system supported a successful result from a proof-of-principle experiment. The data showed the end-point energy of beta radiation that was generated from a small tritium source.

A new EPICS software application called Control System Studio (CSS) was installed and integrated with the NSTX software environment. Hundreds of NSTX Operator Displays were automatically converted to the CSS file format. CSS is collaborative open-source code used at BNL, ORNL, ITER, and other research facilities around the world.

A new PPPL Procedure, GEN-034, has been approved for managing the sharing of engineering software. W. Davis will develop a website to catalog and manage the code-sharing process.

A. Kelley and S. Baumgartner participated in a conference call with SLAC to discuss their PeopleSoft upgrade project to learn how PPPL might benefit from their experience and process of upgrading their business system.

A. Kelley gave a presentation to DOE reporting the status of the Business System Upgrade Project.

S. Baumgartner began a conversation with ITER to assist in improving ITER's cyber security program implementation.

OFFICE OF COMMUNICATIONS: (K. MACPHERSON):

C. Cane attended Drupal "Training Camp" on main campus Jan. 25 - 26 to learn the latest in the wide-ranging applications stemming from the content management system.

G. Czechowicz designed and produced the ESH&S quarterly newsletter.

J. Jackson DeVoe and G. Czechowicz edited, designed and produced the PPPL Weekly, including a "Director's Corner" column by S. Prager on budget discussions in Washington, DC, and a story on a Penn State experiment at PPPL on energy conservation.

J. Greenwald wrote a description of the TRANSP and PTRANS computer codes in response to a request for examples of important technologies developed at national laboratories for a database being prepared by the NLDC's Chief Communications Officers working group. He interviewed R. Budny, R. Goldston and S. Jardin for this effort. John also led a planning meeting for Quest, the Princeton Alumni Weekly insert that the Office of Communications is preparing.

K. MacPherson prepared a one-pager summarizing the story behind the development of MINDS, as well as collaborating institutions and societal impacts in conjunction with C. Gentile. The story and photos/graphics will be part of a database being created by the NLDC's CCO working group.

DeVoe, Greenwald, and MacPherson attended a meeting of Princeton University campus communicators on February 1, at Princeton University's Office of Human Resources for a discussion on communications initiatives supporting new health programs.

E. Starkman provided images from last year's Max Planck-Princeton signing ceremony for the annual report of the German Center for Research and Innovation. She also took many

photographs, including those of: K. Mastromarino; the latest new employees; A. White and J. Graham for a story on a Penn State energy conservation experiment at PPPL; and candid shots at the Laboratory's Super Bowl party on February 1.

DeVoe organized the following tours:

J. DeLooper led a tour of Boy Scouts and their parents from Scout Troop 46 in Belle Mead on the evening of January 28. The tour was one of the activities the scouts do to earn their nuclear science badge.

There were two tours on January 30: About 15 sophomores and teachers from Montclair High School and about 20 seniors from Pilgrim Academy, a private school in southern New Jersey, along with three guests of the Office of Communications from Princeton University's Digital Print Center. A. Zwicker and A. Dominguez gave all of the students and guests a presentation in the auditorium, after which the groups split up and Andrew led the students from Montclair High School and the Digital Print group on a tour and C. Gentile led the students from Pilgrim Academy on a tour.

A. Zwicker led a group of 15 hosted a group of teachers from the Bergen County Technical Schools & Special Services on February 1.

BEST PRACTICES & EXTERNAL AFFAIRS (J. DELOOPER):

512 people from the general public attended the February 2 Science on Saturday lecture. Professor R. Shankar, of Yale University, shared his talk titled: "From 0 C in 60 Minutes: A Crash Course in Einstein".

The following PPPL Reports were posted to the web:

Transverse Focusing of Intense Charged Particle Beams with Chromatic Effects for Heavy Ion Fusion PPPL-4846

Authors: James M. Mitrani, Igor D. Kaganovich, Ronald C. Davidson

Presented at: 45th APS Division of Plasma Physics Conference, Providence, RI, (October 2012)

Formation and Stability of Impurity "snakes" in Tokamak Plasmas PPPL-4847

Authors: L. Delgado-Aparicio, et. al.

Submitted to: Physical Review Letters (July 2013)

Reduced-Order Model Based Feedback Control For Modified Hasegawa-Wakatani Model PPPL-4848

Authors: I.R. Goumiri, C.W. Rowley, Z. Ma, D.A. Gates, J.A. Krommes and J.B. Parker

Submitted to: Physics of Plasmas (January 2013)

Negative-mass Instability in Nonlinear Plasma Waves PPPL-4849

Authors: I.Y. Dodin, P.F. Schmit, J. Rocks and N.J. Fisch

Submitted to: Physical Review Letters, (January 2013)

1.5D Quasilinear Model for Alpha Particle-TAE Interaction in ARIES ACT-I PPPL-4850
Authors: K. Ghantous, N.N. Gorelenkov, C. Kessel, F. Poli
Submitted to: PPPL Reports

Zonal Flow as Pattern Formation: Merging Jets and the Ultimate Jet Length Scale PPPL-4851
Authors: Jeffrey B. Parker and John A. Krommes
Submitted to: Physical Review Letters (January 2013)

OFFICE OF ACADEMIC AFFAIRS (N. FISCH):

On January 24, N. Fisch gave a colloquium in the Department of Physics at Ben Gurion University on "Uses of Plasma Waves."

On January 27, N. Fisch gave a colloquium on "Energy Generation through Nuclear Fusion", in the Colloquium Series of the Alternative Sustainable Energy Research Initiative, at the Weizmann Institute of Science.

DIRECTOR'S OFFICE (B. SOBEL):

January 28 – January 30, M. Zarnstorff, S. Gerhardt, and R. Wilson attended the DIII-D PAC meeting in San Diego, California - along with the PPPL staff assigned to DIII-D.

On January 30, A. Cohen attended a Chief Operating Officers (COO) meeting in Washington, DC.

On January 30, Dr. Gabriel Vecchi, Research Oceanographer, Geophysical Fluid Dynamics Laboratory presented a colloquium entitled "Past and Future Hurricane Activity".

On January 31, S. Prager and M. Zarnstorff attended the FESAC Meeting in Gaithersburg, MD. Also attending were D. Gates, J. Menard, A. Bhattacharjee, H. Ji, and H. Neilson.

On February 1, Stewart Prager attended a meeting of the magnetic fusion program leaders group, held in Gaithersburg, Maryland.

On February 1, Mike Zarnstorff chaired a meeting of the PPPL Research Council.

On February 1, the Director's Office hosted a pre Super Bowl party for the staff.

This report is also available on the following web site:
<http://www.pppl.gov/polWeeklyHightsExternal.cfm>