

National Spherical Torus eXperiment Upgrade

Recent M&RP and ASO Progress

NSTX-U Team Meeting – September 20, 2019

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Maintenance and Run Prep (M&RP) and ASO Implementation Support Recovery Project Commissioning and KPPs

- M&RP
 - Maintain areas, safety, housekeeping, equipment, operating staff, procedures, training, and NSTX-U Test Cell operations
 - Manage down obsolescence and build spares across subsystems
 - Improve signage, labeling, MECH-15 pressure system code compliance
- As part of M&RP Neutral Beams and RF will also be prepared for restart
- As part of the Recovery project, ASO Implementation is required by contract to support commissioning and safe operations of NSTX-U; full implementation in progress
- Recovery machine reassembly, M&RP, and ASO converge and synchronize to allow commissioning of NSTX-U and completion of Recovery KPPs

Maintenance and Run Prep (M&RP)

- **Power**
 - MG#1 in service; quarterly run up completed
 - Maintenance up to date
 - MG#2 mothball maintenance up to date
 - FCPC ground and line switch maintenance complete
 - AC Power maintenance on track
 - Transformers received (SQT10&11) for house power
 - Preparing for production coil testing, dummy load, and machine coil testing
- **Cooling Water Systems**
 - In service with background repairs and maintenance
 - NBI IS and ID operational on back up systems
 - Supporting MG ops
 - Ready to support PF production coil testing in FCPC

Maintenance and Run Prep (M&RP)

- **Central Instrumentation and Control**
 - Managing CAMAC, CODAC DARM upgrade, Network, Windows upgrade
- **Real Time Protection & Control**
 - SAD2 changes in progress
 - Successful design reviews on DITS and FIMM to develop adequate spares
 - Digital Input & Time Stamp (DITS)
 - “FPDP Input Multiplexor Module” (FIMM) module
 - DCPS software maintenance; algorithm development for gas system
 - Autotester updates
- **RF HHFW**
 - HHFW systems 3&4, 5&6 repaired and maintained; dummy load testing completed
 - HHFW system 1&2 prep for dummy load in progress

(M&RP) NBI is not part of the Recovery Project but is required to qualify shielding and resume research

- **NBI M&RP activities include:**

- Beamlines reassembled; BL2 exit duct repair awaiting resources
- NBI Armor quadrant plate fabrication in progress and nearing completion
- Ion source refurbishment and spares builds continue
 - 3 sources have failed in place since 2016 and were removed from NTC
 - 1 source refurbished and tested; ready for installation
 - 2 sources assembled and awaiting testing
 - 1 source in decon; prep to be reassembled
 - Shop on hold for Facilities HVAC and controls; completed this summer
 - Testing on hold now awaiting new turbopump delivery - on order
 - Resources supported massive clean up for DR2 and IPR
- Fiber optics telemetry refurbishment in progress; HVE feedthroughs removed; new cables started
- ModReg control electronics prototyped; ready for initial dummy load tests
- Cryo plant repaired and tested; NB Liq He Refrig. Turbine controller - rebuild electronics started

Maintenance and Run Prep (M&RP)

- TVPS backing pump, vacuum and fueling GDC, RGA data logging efforts in progress or complete
- Procedures supporting restart
 - Steady progress, great participation by MG, FCPC, NBI, RF, and COEs
- Operator Training
 - New training for D site orientation, NTC accessor procedures, and Operator training in progress; building a better TQ platform for safe operation
- Operations support
 - NTC Operations; WCC; DSSS; fall protection, platforms
 - Clean up efforts for Directors Review and IPR
 - D Site Shift Supervisor and WCC coverage
 - LOE, HP, Electricity

Accelerator Safety Order Implementation

- ASO Implementation Plans (ASO IP, Procedures, TQ, ACC, ARR, Commissioning, TTO)
 - All approved
- Hazard Analysis Report - done
- Safety Assessment Document - rough rough draft in progress
- Internal Review (ACC) starting next year
- Accelerator Readiness Review planned to mesh with commissioning process
- Accelerator Safety Envelope will derived from SAD for PSO approval
- Accelerator Safety Workshop last week
 - Participated on planning committee
 - Presented 3 PPPL NSTX-U talks
 - Good feedback
 - No showstoppers!

M&RP and ASO Summary and Next Steps

- M&RP in progress and on pace for restart
 - All subsystems at the table for weekly status meetings
 - Preparing for production coil testing; tests start next summer
 - Rectifier Dummy Load testing starts ##/##/##
- Resources diverted for Recovery and urgent tasks
- New hires in progress to improve staffing and to re-establish operating team
- Procedures and training supporting needs now and preparations for restart
- ASO implementation on point, getting stronger, with good feedback
 - Gaining credibility with community through outreach and ASW participation
 - Preparation of SAD, ASE and prep for ARR moving forward
- Commissioning plan in place
- KPP #4 First plasma 5/20/2021