

NSTX-U Weekly Report (May 19, 2017)

FY 2017 status: NSTX-U is in a maintenance and repair outage.

NSTX-U Recovery Project (R. Hawryluk)

The second Extent of Condition review was held this past week. The review committee that participated included Tom Todd (retired CCFE) [Committee Chairman], Dennis Youchison (ORNL), Brian LaBombard (MIT), Ron Parker (retired MIT), Heinrich Boenig (retired LANL), Remmelt Haange (retired ITER), Michel Huguet (retired ITER), Martin Cox (CCFE), David Humphreys (GA), Arnie Kellman (GA) and Rich Callis (GA). Reviewer recommendations are being evaluated and work plans will be generated.

Recommissioning of the coil winding facility continued this week with mounting of an upper PF1A mandrel in the winder, and trials of conductor bending and setting into a lead block. Installation of insulation on the oven extension as needed for the VPI of a PF-1A prototype has been completed, and the oven is in bake-out operations.

The sealing of the FIRETIPS diagnostic waveguides has been completed, and preparations are underway for the metrology of the outer PF coils and the tiles on the centerstack.

Leak checking of the Neutral Beam #1 calorimeter bellows assemblies has been successfully completed, and reassembly of drive mechanisms is in progress. The three freshly rebuilt Helium Cryo-plant compressors have been lifted into place on their skids, and piping is being reconnected.

Voith Hydro continued to make good progress this week on the cleaning of the Motor Generator (MG#1) bearing journal. GE has presented a proposal to PPPL for the modernization of the MG set cyclo-converter system. Other proposals are expected.

NSTX-U Research (J. Menard)

The article "Multi-species impurity granule injection and mass deposition projection in NSTX-U discharges" by R. Lunsford, A. Bortolon, A. L. Roquemore, D. K. Mansfield, M. A. Jaworski, R. Kaita, R. Maingi, and A. Nagy has been published in Nuclear Fusion, Vol 57, (2017) 076008 [<https://doi.org/10.1088/1741-4326/aa6cd3>]. In this paper the duration of ablation events recorded on experiments performed at DIII-D are used to calibrate a neutral gas shielding(NGS) model for lithium, boron, and carbon granules. This species-specific granule shielding constant is then used to model granule ablation within NSTX-U discharges. Simulations of 300, 500 and 700 micron diameter granules injected at 50 m s⁻¹ are presented for NSTX-U L-mode type plasmas, as well as H-mode discharges with low natural ELM frequency. In H-mode discharges these simulations show that the majority of the injected granule is ablated within or just past the edge steep gradient region. At this radial position, the perturbation to the background plasma generated by the ablating granule can lead to conditions advantageous for the rapid triggering of ELM crashes