XXX-YYDDMM-ZZ-01

***TO: J. Menard, S. Kaye, S. Gerhardt***

***FROM: R. Perkins and J. Hosea***

***Subject: impact of potential polar region modifications on research and scenarios for wave heating and current drive Topical Science group***

1. Polar region change impact:

The polar region changes could affect the wave heating and current drive TSG research objectives if significant changes are made to rows 2 – 4 of the outer divertor tiles. We have probes in these tiles that we would like to maintain in any new tile design if it is required. These probes are necessary to measure the RF field amplitudes at the divertor and for us to be able to quantify deposition on the tiles due to far field RF rectification.

1. Plasma parameters needed for HHFW experiments:

Our experiments are compatible with all plasma parameters except for the outboard antenna – separatrix gap. For robust operation with the antenna it is important that the gap should be large enough to avoid bombardment of the antenna by energetic beam ions lost across the SOL and/or that an outboard limiter be added to shield the antenna from the energetic ions in the SOL. In the 2016 experimental campaign of NSTX-U, it was observed that it was not possible to startup the plasma well away from the antenna due to the larger radius of the center stack. Beginning at a gap of one to two cm at discharge initiation, it was necessary to develop a relative high elongation over time to produce a sufficiently large outer gap. Thus an outboard limiter is needed to shield the antenna. This outboard limiter, if placed away from the antenna, should also result in less gas entering the antenna and thus more robust coupling into high power NB heating conditions.

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