Plasma Start-up and Ramp-up remarks on PAC comments

- PAC understood importance of reducing low-Z impurities
  - Understood importance of metal electrodes and more CHI voltage
  - Understood what is important for current scaling
    - Due to a number of detailed questions and discussions in this area

- Wanted to know shielding requirements for magnets, insulator, coil currents (adequately answered this but we need to include this in the 5YR plan document)

- Recommended more emphasis on current ramp-up, but also emphasized more effort on 'Start-up/Ramp-up' in general because this is a very ST specific task.
  - Recognized that our plan includes plans for systematically investigating current ramp-up and that a clear scenario has been proposed.

- Wanted to know what we will do if ECH is delayed (need to expand on this in the 5YR document)
  - Need to go to higher CHI voltage sooner to use more injector flux, metal electrodes will also help (these all move us in the correct direction - can't say how much the Te will increase, so ECH may still be needed in the end) – so it may delay meeting our goals by 1-2 years

- Philosophical question on relevance to FNSF. (Need to address this in the revised document including supporting responses from previous PAC Chairman and Menard)
  - FNSF parameters not yet agreed upon, proposed plan is good
  - This research will provide information that should influence FNSF design parameters
  - Having 'a' demonstration result is a good thing to have in your pocket – irrespective of what method is eventually used in a FNSF
  - Our proposed plan also studies EBW start-up, plasma gun start-up, all of which will help us to come up with a viable FNSF design (the more experimentally demonstrated systems we have – the easier it will be for an FNSN system design – some methods may work synergistically to boost the start-up current level, reducing the load on ramp-up)