



5X-960304-CLN-01

TO: DISTRIBUTION
FROM: C NEUMEYER
SUBJECT: MINUTES OF MEETING ON WBS 5

The following is a summary of the 3/1/96 meeting.

Status:

- 1) A draft SRD has been produced for WBS 5.
- 2) Walk throughs of the C-site power supply buildings (ESAT, OH, MG) have been conducted with the cognizent engineers.

Issues:

1) Preliminary analysis indicates that existing C-site OH rectifier cannot supply OH waveform given in preconceptual design documentation. It was noted that the analysis assumed Glidcop in some of the coil, and included PF1a in series with OH. Therefore it is hoped that with some design adjustments and perhaps some reduction in the plasma ramp rate it will be possible to match the requirements with the existing power supplies, or maybe an alternative scheme (see next item).

2) Existing C-site OH rectifier is of obsolete design and not reliable or maintainable; need to find alternative. It may be possible to use the HF and VC rectifiers from TFTR (2kV/24kA each).

Action: C Neumeyer to investigate feasibility of use of TFTR HF & VC rectifiers and an OH interruptor for NSTX OH.

3) Based on OH waveform given in preconceptual design documentation, will need resistor insertion (OH Interruptor) during plasma initiation, and system for reversing the polarity of the rectifiers.

4) The existing ESAT rectifiers are rated for 1.8 second pulse duration. It is not known what their 5 second rating is. The manufacturer has been contacted for design information concerning the thyristors and heat sinks in order that a thermal simulation can be performed.

5) Taking the maximum current required from each PF circuit from all of triangularity/elongation flexibility points, the existing ESAT rectifiers cannot supply the system in a fixed configuration, if it is assumed that the 1.8 second rating can be applied to the required current. If 5 second operation requires a derating, the situation will be worse. It may be possible to demonstrate, however,

that the ESAT rectifiers can be reconfigured in a unique way for each flexibility point such that the ampacity requirements can be satisfied.

Action: C Neumeyer to decide on proper specification of power supply constraints for upcoming flexibility calculations by D Strickler.

6) Assuming that all PF currents must ramp to their maximum values (per 5) above) in 200mS, the voltage and power requirement exceeds that of the ESAT PF rectifiers. Again it may be possible to look at unique configurations of the rectifiers for each flexibility point. However, more exact scenario information is required. This assumption is very conservative; more information is needed.

7) Besides the scenario voltage demand outlined in 6) above, additional control voltage will be required to react to disturbances in plasma position, and instabilities. This needs to be specified.

8) The C-site MG voltage response is limited in derivative, during both the normal and fast shutdown scenarios. The exact description of the behavior has not yet been supplied by M Awad. It is important that this be considered when choosing the TF conductor characteristics.

Major Components of the Design Effort:

- 1) Computation of current, voltage, power, and energy requirements based on coil geometry and plasma scenarios.
- 2) Preparation of schematics.
- 3) Design of DC connections from power supplies to magnets (cable and/or bus).
- 4) Dynamic simulation of power system and NSTX machine operation.
- 5) Power supply short circuit and voltage drop characterization.
- 6) Bus bar physical layout.
- 7) Design of bipolar OH power supply with DC circuit breaker and resistor insertion.
- 8) Design of CHI power supply.
- 9) Design of miscellaneous AC power connections.
- 10) Design of I&C interface

Deliverables for Engineering Review:

- 1) Computation of current, voltage, power, and energy requirements based on coil geometry and plasma scenarios.

2) SRD/SDD for WBS 5

3) Cost Estimate

4) Schematic Diagrams

Other Items Discussed:

None

cc: * = meeting attendee

D Bashore

T Egebo

P Heitzenroeder

R Katia

S Kaye

M Ono*

R Parsells

E Perry

J Robinson

J Spitzer

R Wilson

NSTX File