6X-960229-CLN-01

TO: DISTRIBUTION
FROM: C NEUMEYER
SUBJECT: MINUTES OF MEETING ON WBS 6

The following is a summary of the 2/28/96 meeting.

Status:

1) DRAFT A of the SRD for WBS 6 was prepared on Feb. 14, 1996 and forwarded to Tom Egebo and John Robinson.

Issues:

Long-Pulse Operational Requirements:

1) Need to establish the maximum operational requirements (i.e. the number of 5 second shots in a 24 hour period, the number of 60 second shots, etc.)

2) Need to establish the requirement for the maximum display update time for "real-time" display of data (50 msec?).

Action: S Kaye to consider what the requirements may be for quasi-real-time data display, for both the baseline (5 sec) and long pulse (60 sec) operational modes.

Process Control System:

3) Need to qualify each WBS's Process Control System I/O Requirements for "bottoms-up" estimate (Table A). Process Control I/O points will be verified and added to the NSTX Central I&C Point List Summary as information becomes available.

4) Gather requirements for the number of engineering consoles required in the NSTX Control.

5) Need to establish the requirement for the duration that historical trend data must be maintained on-line.

Note: A scheme for logging the machine state at a low sample rate (e.g. once per hour) is envisioned. More thought is needed with regard to how this would be done. Perhaps a fixed interval (e.g. once per hour) scan of the complete machine state would be sufficient. On the other hand, maybe different scan rates could be established for different signals. The former scheme would be much simpler than the latter.

6) Need to add a section to the SRD to document the interface philosophy between the Central I&C Process Control System and subsystems. Subsequently communicate to WBS Managers.

7) Action Diagrams for Logic/Program Review.

Note: The "Process Control System" component of WBS 6 will not actually be required to perform any real time feedback control. Generally speaking it will be too slow, asynchronous, and not sufficiently reliable. Instead we will depend on distributed local controllers. However, Central I&C will be expected to provide services to the other WBS elements in terms of recommending hardware/software, and assisting implementation of distributed local controllers.

Synchronization System:

8) Need to establish simultaneity requirement between systems (10.0 usec?).

Note: Probably need clock rate of 0.1 ≈ 1 μSec. D Bashore should judge what is available with today's technology at modest cost and propose it.

9) Need to establish absolute time accuracy requirement (+/- 5 usec with respect to Coordinated Universal Time?).

Note: Probably should assume that the latency is +/- 0.5 of the clock rate.

10) Delay time requirement to detect and transmit an asynchronous event (100 usec?).

Note: After some discussion it was decided that there should exist a Critical Data Network which will be fast, synchronous, and highly reliable, to permit communication of real time data and status information between real time controllers. This would be similar to the High Speed Data Link/Discharge Fault System on TFTR. In the TFTR case the update rate was 1kHz. D Bashore should judge what rate is available with today's technology at modest cost and propose it.

11) Required number of supported events

Note: Probably should assume same as TFTR.

12) Requirement for fixed pulse trigger width (1 usec?).

Note: This is a detail which needs to be resolved later. There will probably be many varied requirements.

13) Shot number format.

Note: This is a detail which needs to be resolved later.

14) Clock frequency (1 MHz?).

Safety Interlock System:

15) Identify all systems that will require supervisory interlocking.

16) Radiation Interlock for 3rd and 4th floor. Is this needed for NSTX?

Access Control System:

17) Establish appropriate access modes.

Network System:

18) Need to quantify block transfer of data to establish bandwidth and storage requirements.

Control Room Facility:

19) Central I&C will need magnetic field contour maps (for both PBX-M and NSTX) for the NSTX Control Room to determine the viability of using CRT screens in the area. Contour Maps of the NSTX Test Cell will be needed to design equipment rack placement.

20) Central I&C must provide requirements for the new Control Room floor height (6 or 12 inches) to WBS 81.

21) Quantify the Computer Room space needed for Control System and Data Acquisition System hardware. Provide requirements to WBS 81 if site modifications are required.

Data Acquisition System:

22) Need to qualify each WBS's Data Acquisition System I/O Requirements for "bottoms-up" estimate (Table B). Data Acquisition I/O points will be verified and added to the NSTX Central I&C Point List Summary as information becomes available.

23) Gather requirements for the number of physics consoles required in the NSTX Control.

24) Determine the number of concurrent remote physics consoles that must be supported.

25) Establish "off-site" physics console requirements (if any) for "remote collaborations".

26) Need to add a section to the SRD to document the interface philosophy between the Central I&C Data Acquisition System and subsystems. Subsequently communicate to WBS Managers.

27) Gather requirements for Audio/Video.

Major Components of Design Effort:

1) *Qualify Process Control and Data Acquisition I/O Point Requirements.*

2) *Central I&C Interface Block Diagram.* This diagram will identify all discrete pieces of the Central I&C System and all subsystems that will interface with Central I&C. A scheme to highlight existing PBX-M systems that will be shared with NSTX will be developed.

3) *NSTX Control Room Design and Layout.* Determine the viability of using CRT screens in the NSTX Control Room. Optimize CRT location if viable. If not viable, provide alternative display types.

Deliverables for Engineering Review:

1) An approved SRD for WBS 6.

2) An SDD for WBS 6. This document will include the following items for presentation at the EDR:

Central I&C Interface Block Diagram.

A general schematic of the proposed Central I&C System. Will include classes of hardware and software -- not specific vendors, brands or model numbers for the EDR.

General Arrangement of Control Room.

3) Cost Estimate

Other Items Discussed:

1) The plasma control task (hardware, software, and algorithms) falls under WBS 72.

Action: S Kaye to ensure that he is prepared to cover this work.

cc: * = meeting attendee

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M Ono*	R Parsells	E Perry	J Robinson*	J Spitzer

R Wilson NSTX File