

NCSX IPT Meeting Minutes

The minutes from the NCSX IPT meeting of Tuesday, Mar 20, 2007 at 11:30pm are as follows:

Attendees: DOE-PSO: J. Makiel, G. Pitonak, L. Dietrich, A. Indelicato, B. Bozarth

DOE HQ: B. Sullivan, K. Chao

ORNL: J. Lyon

PPPL: R. Templon, H. Neilson, R. Strykowski

1. DOE News (Barry/Greg/Hutch)

- a) Suneel Kapur from OECM has been assigned to all SC projects, including the NCSX Project. Suneel was previously involved with the NCSX Project during earlier critical decision phases. Barry has briefed Suneel on the current status of the NCSX Project and discussed the anticipated plan to re-baseline the project later this fiscal year. Greg provided the outline of events to support the re-baseline and the FY09 budget formulation process to Suneel;
- b) The continuing resolution remains in effect. The full PPPL portion of FY07 funds for NCSX will be made available to the project via temporary funding shifts within PPPL's overall annual budget. The funding shift will be effective during the April contract modification. For ORNL's portion of work, Jim Lyon will investigate the status budget availability for ORNL's portion of the FY07 work plan;
- c) The FY09 budget formulation process is underway. A Budget Planning Meeting was held last week in Germantown at which Hutch presented a brief on the NCSX MIE project, the NCSX research program and the NCSX upgrade planning program. The presentation also highlighted the possibility of a ~\$12M increase to the NCSX MIE project, that was discussed at the December, 2006 Lehman review.

PPPL will be requested to provide impact statements to the NCSX research and the NCSX upgrade planning program, as well as other PPPL laboratory and research activities to internally support a budget increase to the MIE project in FY09 and beyond. A letter to PPPL will be drafted by OFES/PSO;

- d) An HQ requirement to provide project cost data by the 10th day of the month after the close of a quarter is coming up for April 10th. The NCSX Project must post the CPI, SPI and Cost Performance Report on the NCSX web page;

2. Safety Management (Jerry via email)

- a) There was no new NCSX or lab-wide safety incidents. The lessons learned from a previous safety incident (lacerated hand while working with an NCSX winding form fixture) have been implemented;

- b) The NCSX Project received a safety recognition award from the State of New Jersey for two years without a safety incident that resulted in lost time, (i.e., DART incident).

3. SC Project Review (Jeff)

- a) A new date has been proposed for the upcoming SC Project Review. The proposed dates are for the last two weeks of July instead of July 10-12th. Hutch will coordinate with the Project Team to determine if there is a preferred week;
- b) One SC Review Report finding/recommendation is to establish a technical peer review to determine if additional cold testing of completed modular coils is required. Jeff will coordinate the Peer Review with Wayne and the appropriate technical members of the SC Project Review team;
- c) The preparation of a 'bottoms-up' cost-to-complete continues and is on-track. The engineers and job managers continue to provide their input to Project Management. PPPL's Head of Engineering has begun an internal review to validate the estimates. The Project has been directed to provide "high confidence" cost estimate, making reasonable allowance for problems, versus a "best-case scenario" estimate.

4. Project technical progress (Hutch)

The following provides a brief status on the major components:

MCWFs

Fifteen modular coil winding forms (MCWFs) have been delivered to date. A-6 is in final inspection with delivery anticipated very soon. Remaining winding forms are B-6 and C-6 which are in the machining operation.

In summary:

- 0 in foundry phase
- 3 in machining phase
- 15 delivered
- 18 total

MC Winding

Ten modular coils have been potted (vacuum pressure impregnated-VPI) to date. Status as follows:

- a) B-1 and B-2 completed VPI;
- b) B-3 and A-3 are in winding operations/ground wrap
- c) A-2 was electrically warm tested and found to have an area of low electrical resistance such that the 7.5 kV test voltage reduced to 6.0 kV after 45 seconds of testing. This was the 7th coil to be warm tested.

[Update: PPPL has determined that the voltage drop was due to particulate matter in the lead bock/terminal area of the coil which created a path of lowered resistance. This area is fully

accessible for cleaning. Further, PPPL is taking measures to correct this issue for all coils. This issue appears to have been resolved.]

Field Period Assembly

The Field Period (FP) Assembly effort continues as follows:

Station #1 (VV prep - diagnostics, h/c tubes)

- a) FP #1 was re-mounted in the fixture and h/c tube installation is underway. The issue regarding the h/c saddles in areas of tight radii was resolved;
- b) FP#2 continues with installation of magnetic loops;
- c) FP #3 has been dismantled from the fixture so that work on FP #1 can continue.

Station #2 (mating modular coils together)

- a) Preparations for Station #2 are underway. A June start up date is very tight because several engineering developmental tasks for the modular coil interface must be completed (shims, bladder, bolt design, bushings, etc);
- b) Of those tasks, progress has been made on the bolt assembly with a successful PDR and release of drawings for procurement;
- c) Also, another friction enhancement system for the modular coil interface is being developed using 'alumina' coating. Unlike diamond coating or using a mechanically interlocked shear plate, this system is more simplified and may provide adequate electrical isolation eliminating a G-11 composite 'sandwich' design. Much work remains to validate this concept and assess impacts to the project's cost and schedule baselines.

TF Coils

- a) The TF Coil contract with Everson Tesla Inc (ETI) continues. The first TF coil has been wound with copper conductor and will be placed in the potting mold later this week;
- b) A dimensional control issue exists involving 'spring back' along the straight leg of the coil upon removal from the winding mandrel. ETI will anneal the solid copper conductor on future coils to make it more pliable;
- c) Half of the wedge casting has been successfully cast by Osterby in Sweden (ETI's subcontractor). Machining issues between Osterby and Tesla (England) have been resolved;
- d) It is anticipated that the TF coil's delivery date will slip to May. PPPL's Procurement Division issued a letter to ETI noting the schedule delay. ETI responded by providing a new delivery schedule with deliveries beginning in April. However, it is believed that the proposed schedule may be optimistic. The TF coils are not a critical path item. No cost issues by ETI have been noted. PSO plans to visit ETI during and upcoming visit by project team members.

Other activities

- a) A new design concept for the cryostat is being investigated. The new design would be a 'soft shell' concept consisting of insulated blankets. The project team is also considering a developmental test to determine the effectiveness of nitrogen circulation within the cryostat.

5. Procurement (Rod)

- a) Procurement continues to support both major and minor material contracts including EIO/MTM and Everson Tesla Inc as discussed above. New part procurement requests are being received to support field period assembly. A new lift actuator system for the assembly crane is one example.
- b) DCAA audited MTM's costs as per the Energy Industries of Ohio (EIO) incentivized contract for the modular coil winding forms. DCAA determined that \$91K of incentive payments could not be substantiated. MTM is still challenging the finding.

6. Review of critical issues (Hutch)

- a) There are no Category I critical issues;
- b) New Category II critical issues:
 - Metrology issue on the B-type coils. The cause for the discrepancy between PPPL and Major Tool's metrology is believed to be a combination of interpreting the software's user coordinate system, and flexure of the winding form itself;
 - Review of manufacturing test voltage for warm electrical tests of modular coils as discussed in Section 4 of these minutes.
- c) Other open Category II critical issues are:
 - Modular coil winding form costs - contract proceeding as planned;
 - Modular coil winding cost - addressed by ECP53 release of contingency;
 - Parts for modular coil assembly - evaluation of gages complete and moving to procurement of gages and other small parts;
 - Clamp design - design complete and in procurement;
 - Modular coil joint design - test and assembly trials underway. May impact readiness for FPA Stage #2 June start;
 - Readiness for Field Period Assembly - a PDR was performed and continues as 'open'. May impact readiness for FPA Stage #2 June start.

7. Planning for the next 6 months (Ron)

The planned activities for the next six months as per ECP53 are:

- Modular Coil winding form fabrication and in-house winding activity;
- Field Period Assembly Stage #1, and Stage #2 including developmental trials for regarding interface design (bolts, shims, bushings, etc);

- Prepare a bottoms-up estimate for remaining work;
- First 3 TF coils received by April, with 14 total coils received by end of fiscal year;
- Preliminary design review (PDR) for poloidal field (PF) coils by September;
- Final design review (FDR) for coil structures by June.

Upcoming Level II milestones are as follows:

- Last MCWF delivered by Sep 07: On-track (anticipated delivery June 07)
- Begin FPA, July 2007

8. Project performance through Feb (Ron)

The following project cost performance data thru the end of February as per ECP53:

SPI=.99
CPI=.97

The CPI is due to additional costs associated with metrology issues on the B-type modular coil castings.

The SPI is due to delays experienced with the modular coil interface design.

Opportunities to increase the management reserve by \$964K continue:

- Sale of tooling material from MTM =~\$222K
 - Retroactive MHX adjustment =~\$232K
 - FY07 overhead rate reduction =~\$110K
 - Electrical work reprogrammed to GPP = ...~\$400K
- \$964K

9. ECP status (Ron)

The following are current and anticipated Engineering Change Proposals (ECPs) that require DOE approval:

- ECP53 was approved and increased budget to support coil winding and field period activities in FY07. ECP also authorized the developmental trials in support of Field Period Assembly.
- No other ECPs requiring DOE approval are planned at this time.

10. Planned IPT meetings (and other events) are as follows:

TBD.....Peer Review for Cold Testing of Modular Coils
 April 10th.....Next NCSX IPT meeting at 11:30am
 TBD.....Quarterly Briefing (sometime in April?)
 TBD.....Next NCSX SC Project Review/OECM Review