Accelerator Systems Division Highlights for the Week Ending September 14, 2001

ASD/LBNL: Front End Systems

The International Conference on In Sources, ICIS '01, last week in Oakland, CA, kept many FES people busy, and very good information could be gathered on rf antennas and H- production. The conference ended in a tour of the LBNL facilities, and more than 30 visitors passed by the SNS Front-End Systems. Several visitors came back during this past week, notably the Frankfurt University ion-source group and J. Peters from DESY.

Analyses of two Ion Source #2 antennae (CP recipe #2) were performed, and the best explanation for the conductive, gray discoloration is surface modification due to preferential sputtering of some porcelain components, rather than deposition of some metal. It turned out that this discoloration does not interfere with RF impedance matching and plasma generation.

The endurance test on IS #2, using CP antenna #3, is continuing with 42 hrs logged so far and counting. R. Welton of the SNS Ion-Source Group took part in these operations during his one-week visit and got some operations training.

The spectroscopic diagnostic, performed while the endurance test was carried on, revealed spectral lines of cesium whose intensities scale with the supplied RF power and of copper in minute quantities. This strongly suggests that a destruction-free assessment of the antenna status can be developed for SNS operations.

The Blue Box internal cabling is completed; we are now reassembling the LEBT and Ion Source #4 for operations and emittance measurements.

RFQ M1-2, mounted on the support frame, was moved into Integrated Testing area; M 4 is now fully power conditioned at full duty factor.

The RFQ power-coupler window conditioning still proceeds at a slow pace.

MEBT Raft #3 was assembled with quads, beam pipes, diagnostic boxes, and the antichopper box and then mounted on the MEBT support frame. Assembly of Raft #2 has started.

We were notified by LANL that the wire scanner electronics are not currently in their budget.

L. Price of DOE-ORO visited us on Monday for discussions of the FES status and a tour of the FES facilities.

This Friday the FES underwent an Estimate-To-Complete review conducted by C. Strawbridge.

ASD/LANL: Warm Linac

The vendor continues to manufacture the production 402 MHz klystron transmitters (Fig 1). A Nov. '01 delivery is still forecast. Because of the tragic events on the East Coast this week, we cancelled our travel to conduct a review of the SRF transmitter work. (WBS 1.4.1.1)

We continue to work on the LANL portion of the JLab high-power RF test stand. The modulator tank (Fig. 2) for the LANSCE klystron, has been modified, cleaned and painted. (WBS 1.4.1.1)

LANL is supporting ORNL in evaluating the condition of several 402.5-MHz circulators shipped from the vendor to the RATS facility. William Roybal was at ORNL this week to help in the acceptance tests. (WBS 1.4.1.1)

We received 8 coils for the EMD drift tubes (Fig. 3). The current plan for the EMD coils is to vapor deposit each of the coils, and then slide a kapton tube over the stems followed by a mylar tube. The coil assembly will then be potted, before being placed in the EMD drift tubes. (WBS 1.4.2)

Fig. 1: 402 MHz klystron transmitter manufacturing.

Fig. 2: Modulator tank and lid for LANSCE klystron being prepared for the JLab test stand.

Fig. 3: Horizontal EMD Coils

An RFQ was issued for the DTL and CCL ion pumps. Our intention is to use purchase the SNS standard established by Brookhaven. (WBS 1.4.2)

We placed three contracts for the fabrication of the DTL slug tuners, support stands, and vacuum spools. (WBS 1.4.2)

Kirk Christensen was at ORNL this week to complete negotiations for the DTL and CCL mechanical systems acceptance criteria, handoff, and FTE transfers from LANL to ORNL. (WBS 1.4.6)

Norbert Holtkamp, Mark Champion, Hengjie Ma, and Bill Merz visited LANL this week to discuss a number of issues including RF systems, the JLab test stand, handoff, LLRF integration, ETC. (WBS 1.4.6)

The five LANL presentations for next week's ASAC meeting were prepared, reviewed through dry runs, and submitted to ASD. (WBS 1.4.6)

ASD/JLAB: Cold Linac

Engineering and design of the CHL gas storage installation package continues. The package includes the gas delivery off-loading station, the gas storage tank piping, the gas storage valve stations, and the tank manifold crossover valve station.

The Cryogenic System Installation Co-ordination meeting was held by video conference to define the subsystem installation task schedule.

Disruption of air travel associated with this week's tragic events has delayed the return of JLab participants from the SRF Workshop in Japan.

Electro-Polish Bids for the cabinet are being evaluated. Contract award will be delayed into FY02 for lack of budget authority.

Welding of the prototype cryomodule stand was completed. Fabrication of the prototype cryomodule warm-to-cold stainless steel beam pipes is complete.

JLab representatives traveled to LANL to view and discuss details of the 1 MW RF test stand hardware.

ASD/BNL: Ring

Preparations are underway for next week's ASAC Review.

Medium Field Power Supplies: six bid packages have been received. The technical evaluation is complete. Best and final prices will be requested of all bidders to reflect non-critical variations requested by one or more of the vendors in their original bid proposal. The deadline for final prices will be early next week.

Issues related to vendor qualification verification for the Budker Institute of Nuclear Physics (BINP) remain a topic of agreement between BNL and SNS/OR. BINP, located in Russia, was added to our bidders list under the stern directive of the SNS Project Office. It appears that BINP is the low bidder for the twenty-one quad magnets (30Q44/30Q58) needed for the Ring Systems. BNL has no history with this vendor and no way to assure reasonable success of technical, production or QA issues for which we will be responsible.

Bob Lambiase has been working with Dave Gurd and our vendors to confirm price guarantees for additional procurements of SNS equipment, including PSI/PSC modules and low field power supplies.

A contract has been placed with SDMS of France for a 1st article collimator for the Ring Systems.

BNL's Mel Van Essendelft was host to Mike Skonicki, SNS/OR QA Manager, for the recent BNL/SNS Quality Assessment Audit. Mel provided objective documentation as evidence of the implementation and integration of quality within the BNL portion of the SNS project. It is our understanding that a formal report will be forth-coming from the Project Office.

Tom Nehring and P.K. Feng provided written comments to Jack Stellern on construction drawings for Ring conventional.

At PO request, Mike Nekulak provided info to K. Boudwin on WBS 1.5 baseline spares that have been approved by PCR.

Hans Ludewig conducted a mechanical/physics design review on the HEBT collimator.

A design review of the extraction kicker magnet system is being rescheduled in October. The Project Office will be advised of the new date.

Assembly work is underway on the 21cm Ring BPM.

Drawings for the 41CDM26 corrector magnet are complete and are awaiting checking.

Mechanical drawings for the high field sextupole magnets (21S26 and 26S26) are in progress.

BNL/SNS group leaders participated in a videoconference with Paul Holik and Rudy Damm on Installation and Documentation for Ring Systems.

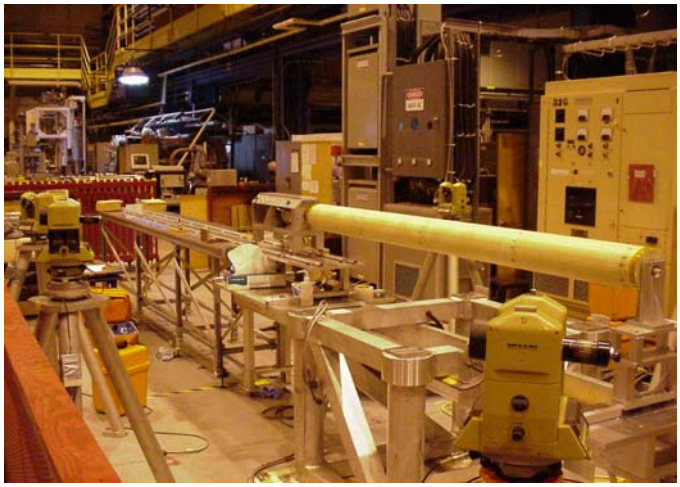

Fig. #1 – Harmonic coil measuring station being setup for production field quality measurements of Ring magnets.

Controls

The Machine Protection System Final Design Review was completed successfully.

TDL Master System from BNL is now integrated here at the ORNL.

Channel Access Name Server from JLAB is integrated here at ORNL and is undergoing testing.

90% of the reworked Source/LEBT electronic interface has been debugged.

Work continues at LBNL to adapt the Allan-Bradley driver for use with PowerPC.

ASD/ORNL: Integration

ASD participated in a workshop with ESS/Saclay visitors to discuss the technical basis for conventional facilities. They found the RATS mockups particularly interesting.

We participated in a coordination meeting regarding the transfer line chases to the CHL and reviewed survey results prior to backfill.

The draft SNS turnover plan and associated acceptance criteria were sent to BNL and ASD leads for review and comment.

Installation Support

Accelerator Physics

Initial commissioning plans for the MEBT and DTL (http://www.sns.gov/projectinfo/operations/commissioning/dtl_v1_3.htm) have been drafted. These are being used as a basis for discussion and formulation of the more detailed commissioning plan.

J. Holmes visited FNAL for discussions on the ORBIT code and modeling of the FNL booster. FNAL personnel are enthusiastic about using and developing ORBIT in collaboration with SNS. Discussions on how to proceed are continuing.

Preparation for the upcoming ASAC meeting continued, including draft runs of the presentations.

Operations

Finalized presentation version of SNS RAM Analysis and worked on Commissioning Program Plan.

Was a reviewer at the Machine Protection System Preliminary Design Review. Reviewed Human Machine Interface standards for CF Controls. Reviewed Commissioning AC Power loads for ASD with CF.

Ion Source Group

Following last week's International Conference on Ion Sources Robert Welton stayed in Berkeley, were he was able to witness the Cherokee antenna endurance test, presently being conducted at LBNL. It also gave him more time to interact with Jens Peters from DESY and Joe Sherman from Los Alamos, who work on the development of H- sources.

Paul visited a potential vendor in Cookville, TN. The vendor submitted very favorable quotations for the vacuum vessel and other mechanical vacuum components for our hot spare stand.

An updated analysis of the lifetimes of 21 P&G antennas published by DESY revealed 37% infant mortality on top of an age-independent 1.2% daily failure rate. The data do not show any sign of increased failure rates at old age. The antenna were operated with 45 kW power of 2 MHz RF and a 0.02% duty cycle.

RF Group

Cryo Transfer Line Group

We have completed the first 80-foot section of supply transfer line that will be installed between the Central Helium Liquefier (CHL) and the accelerator tunnel.

The machine shop contracts for machined components of both the supply and return "T" sections of transfer for the CHL to accelerator tunnel line have been let after a competitive bid process was held.

The pull ends of the transfer lines are approximately 50% completed.

An all day video session was held between Jefferson Lab and SNS to replace the CHL scheduling workshop that was to be held at Jefferson Lab on the 13th. The session spilled over to the 14th but general feeling was the long sessions were fruitful.

The first by-weekly video conference cryo meeting between Jlab and SNS has been scheduled for the 21st of September in room 15 at the RATS building.

Mechanical Group

Magnet Measurement Group

Power Supply Group

Survey and Alignment Group

Beam Diagnostics Group

LANL beam diagnostics report:

D-plate: Final design work continues. Work to monitor temperature of beam stop continues. Design work on the emittance collector continues.

BPMs: Fabrication continues on the DTL BPM pickups. Delivery is now expected late next week or early the next week. Work continues on the bidding package for the CCL, TR, and SCL pickups. Work continues on rev. 3 of the DFE PC board. The PCI motherboard is still on track for delivery to BNL by 1/Oct. It now works in pulsed mode. We are planning for a mini FDR for the DTL pickups on 19/Sep/01.

WSs: We received the prototype Huntington actuator. It looks good. Testing will now commence. The revised PC board design was sent out for fabrication. The SCL actuator and beam box prototype drawing package has been released and we are ready for fabrication.

Energy degrader / Faraday Cups: The DTL Tank 1 ED/FC detailing is complete and ready for checking. The D-plate detailing is now in progress.

BNL beam diagnostics report:
General: Group members made contributions to ASAC presentations

1.5.7.1 BPM: Flange material for all PUEs has been annealed and received at BNL.A revised RFQ has been submitted for approval to add two more units (one 21cm Ring and one 26cm Ring BPM) for spare vacuum chambers. Partial Deliver of feed-throughs has been received from Ceramaseal, and the remainder is expected in a few weeks. A stress analysis of the 12cm HEBT BPM was performed based upon the latest vacuum chamber design. Work necessary to have trim quads on the 12cm HEBT quads (the only quads that didn't have trims as a result of the coil package being the same as the Ring package) was completed. Discussion continues with power supply group regarding trim quad powering for beam-based alignment.

1.5.7.2 IPM: IPM magnet preliminary design was completed, detail design is in progress. Collecting information on the MCP plate configuration, collector plate, and shield. Efforts continue to understand and correct recently observed unexplained ringing in RHIC IPMs. Alternate IPM design is under investigation.

1.5.7.3 BLM: Continued examining the Front End circuitry. Contacted LND to consider them as an alternate source to Troy-Onics for the loss monitor bottle assemblies. Due to a change in personnel, there have been quality and delivery problems from TroyOnics. This could result in a cost increase in the BLM system.

1.5.7.4 BCM: Noise investigations continue. An alternate protected amplifier configuration is under investigation in an attempt to reduce noise in this stage. Work has started on the revised schematic for the BCM printed circuit board.

1.5.7.6b Laser Wire Scanner: The 200MeV laser wire to be installed in the BNL Linac is now fully wired. The computer is fully interfaced to the stepping motors and everything is prepared for testing the software. The MEBT LPM base and cover have been submitted to the shops. The shops will provide an estimate and work is expected to start next week.

ORNL/SNS beam diagnostics report:

Saeed outlined the diagnostic plans per baseline schedule to the MPS final design review. Loss monitors and Harps/wire scanners were presented. Tom was gathering the relevant information to be presented to the ASAC committee. He worked on his presentation. Craig is working on the Faraday cup refinements.