

Accelerator Systems Division Highlights for the Week Ending August 27, 2004

ASD/LBNL: Front End Systems

ASD/LANL: Warm Linac

DTL Highlights

1. The Beam Dump has been installed, leak tested, aligned, and shielded. The chiller is operational and leak tight. All of the block has been painted yellow and posted as Configuration Controlled Temporary Shielding. The Beam Dump installation on the newly built roller base went extremely well. Additional shielding has been added throughout the Linac tunnel per the results of radiation simulations. The tunnel has been cleared for the upcoming run.



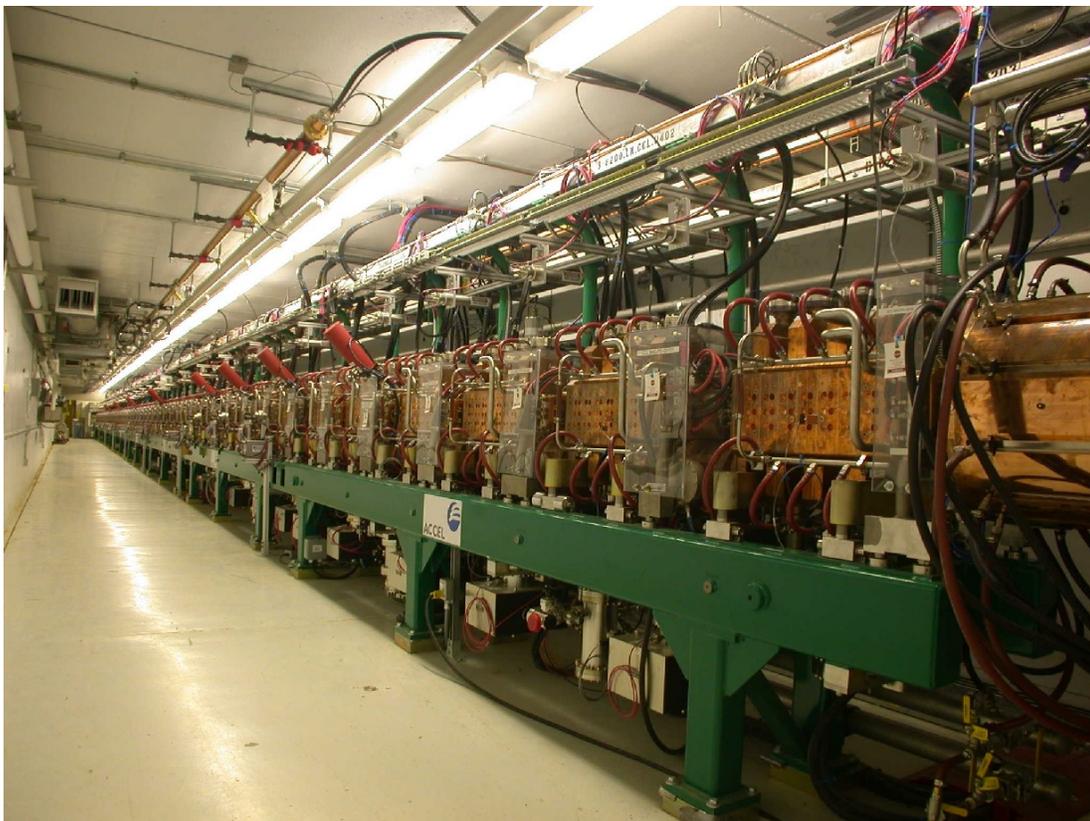
2. All DTL Systems as well as the Front End System are ready for commissioning to begin. There are a few minor diagnostic details to clean up but none that will impact the current schedule.

CCL Highlights

1. CCL installation is complete and the tunnel is clean.



DTL-CCL



CCL-1 thru -4

ASD/Jlab: Cold Linac

- String assembly for H-8 is complete. The string has been turned over for cryomodule assembly.
- Four cavities have been qualified for the H-9 string and all auxiliary components are available. String assembly will begin next week.
- One cavity has been qualified for the H-10 string.

- Assembly of the H-6 cryomodules is complete. H-7 cryomodule assembly continues on schedule.
- Testing of the H-1 cryomodule was successfully completed. The module has been removed from the test cave and is being prepared for shipment to ORNL. The H-5 cryomodule has been installed in the cave and is being prepared for cooldown.

ASD/BNL: Ring and Beamlines

ASD-ORNL activities

- Weekly progress report for HEBT, ring, and RTBT commissioning, for week ending 27/Aug/04
- We're considering the possibility of adding some beam diagnostics in the vicinity of the RTBT harp, to improve our ability to characterize the beam incident on the target. An additional BPM would improve our beam position measurement, and some wires at the periphery of the beam would improve our ability to continuously monitor the beam size.
- Good progress was made this week on an updated set of global coordinates for the RTBT magnets.

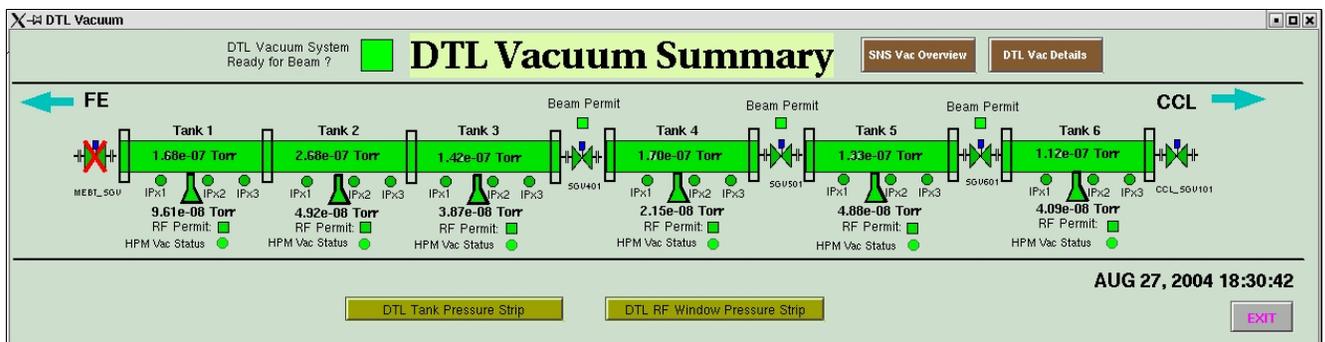
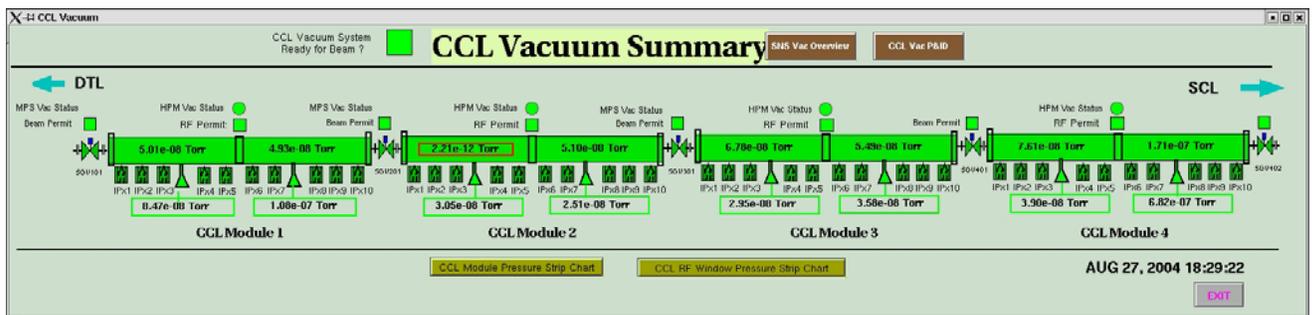
BNL activities:

- John Hauser reported the successful transfer of remaining BA (FY04) into BNL/SNS accounts.
- Chip Piller was at BNL this week working with Kevin Smith on Ring LLRF.
- Larry Hoff (BNL/SNS Controls Group) is at SNS/OR this week to assist with commissioning operations.
- The chicane #1 has been measured with the first set of Z-bumps. The sextupole has improved considerably from -79 units to -16 units (center, 10.5cm radius). However, the decapole has gone from +2 units to nearly -60 units. Other allowed terms (b6 and b8) have also undergone significant changes. AP to advise next week after N. Tsoupas returns from vacation.
- A review of Diagnostics' systems was conducted with ASD. BNL's Tom Russo presented an overview including status, scope, schedule and cost. The Diagnostics Production Plan, issued in April 2004, will be revised to reflect the current status.
- Performance testing of PFN supplies continues at Applied Power Systems (APS). Testing of unit #11 was completed this week. APS plans to ship four units (#8 – 11) the next week. The remaining three PFNs are scheduled to be tested by October 1st.
- Work continues on a test set-up to measure the overall impedance of one complete extraction magnet assembly (coated ferrite magnet in vacuum chamber) with its PFN. Our aim is to have system measurements complete in time for ASAC.
- Joe Tuozzolo visited Alpha Magnetics and Allied Engineering to witness production status of the Extraction Lambertson Septum magnet. His initial report from Alpha indicated that all is going well.
- The QMM and Tune Kicker vacuum chambers were delivered to the Vacuum Group for TiN coating.
- H. Hseuh has finished TiN coating the #3 extraction kicker magnet.
- Injection Kicker PS - #6 has been successfully tested at IE Power. Work on units #7 and 8 is in progress.
- Installation drawings for the RTBT line are complete and are now in "checking" for final review.

**ASD/Controls:**

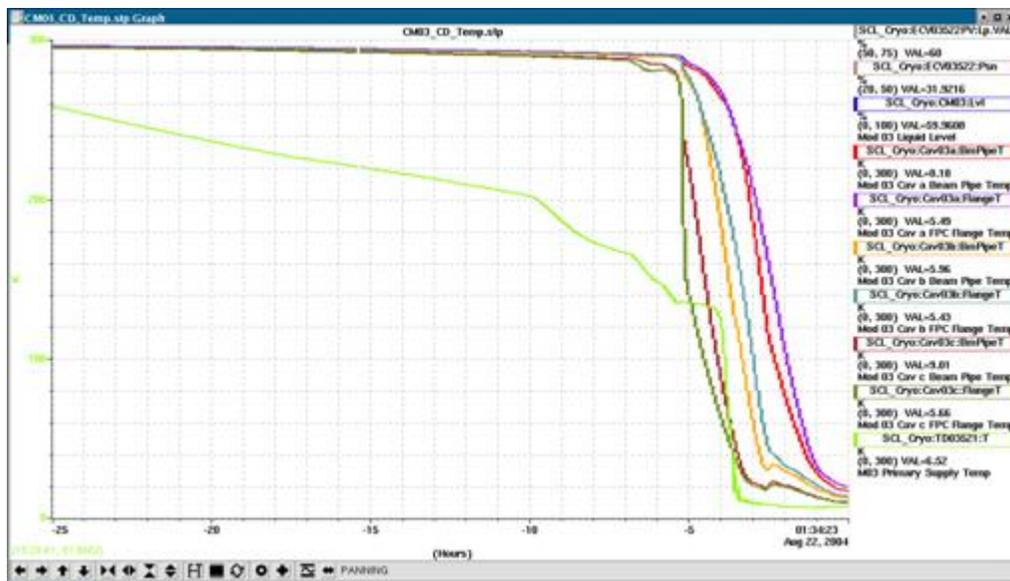
- The PPS and MPS Systems were presented to the ARR Committee this week. The MPS and the two PST systems (PP & ODH) reviewed by the ARR passed with flying colors with no pre-start and only one post-start activity worthy of mention.
- LANL continued to do no SNS work this week – there is nothing to report.
- Larry Hoff, SNS controls team leader at BNL, visited the site this week. He assisted with the generation of a ring controls handoff plan. He also helped with updating the ring magnet power supply IOC configuration data to fix issues found while correcting PV names. We are now ready to generate cable pull lists.
- The Ring LLRF test IOC is now running in the RFR Test Cave, and a test rack for the injection and extraction kickers is being set up in the test lab.

- A utility was developed to measure archiving rates and project future train wrecks. The archiver is presently filling ~5Gbytes/day, about half of which is diagnostics. At this rate we would exhaust disk space in the middle of the upcoming run. Short term mitigating action is in process. Longer term strategies involve “smarter” archiving and a data management plan. In the meanwhile some archiver monitor/notification tasks have been implemented. We now get email notifications of the status of the archiver three times a day, including engine status, process status (CPU/Memory utilization), and disk status by subsystem and in total. Alarm condition notification for the archiver will be on line soon. Work is also proceeding on a more convenient way to retrieve data from more than one system as if it were one archive. The “JERI” tool was used to generate archive request files for CCL and DTL magnet power supply controls from the Oracle database. Archive request files for conventional facilities will be next.
- Working on the linac LLRF systems, a problem was found with wrong polarity of the "Pre-Pulse" timing signal after the timing update, which caused the High-power Protection Module (HPM) to ignore arcs. Shell scripts were added to compare official HPM settings with current values.
- A time-response problem with the SCL vacuum-to-LLRF interlock was identified last week: There was an unacceptable delay in the control chassis response to a coupler cold cathode gauge vacuum excursion. The problem was determined to be due to the wrong capacitor size used to set a “debounce” chip’s oscillator frequency. This week JLAB replaced the capacitors on 27 boards they had in their possession and then over-night-shipped them to us. Modified boards have been installed in the first control chassis (which provides controls for cryomodules 1 through 4), and now we’re back in business. Field testing was in progress on Friday and should be complete before Monday. Thanks are due to JLAB for their quick response in fixing this problem.
- The warm linac vacuum control system is ready for the upcoming run after the CCL beam dump isolation SGV was tested and verified this week.



- Communications cable termination restarted in the HEBT Service Building this week. Communications cable installation continued for Klystron Building rack rows 13-17.

- The cryogenic control system is operating as needed to control the operation of the CHL and the cryomodules. It was used to track the cooldown of the cryomodule. The level control loop for the cryomodules is being tuned and is currently maintaining the level within 0.2 % of the set point (requirement is 1.0%). This loop has a long time constant and tuning is a slow process. The coupler window heater control routine is also operating as expected.



Accelerator Physics

- Commissioning Activities: Beam Commissioning Plan was finished and signed off, Fault Studies plan was finished and signed off. The group reviewed the analysis of commissioning results from the DTL1-3 run. An analysis of MEBT wire scanner data continues to show that the RFQ output twiss parameters in the vertical plane are far from design. Nevertheless, it is straightforward to re-match into the MEBT.
- A renewal proposal was prepared for the Laser-stripping Lab Directors R&D (LDRD) project for FY2005. A presentation was given to the review committee. An engineering drawing package for the beamline insertion consisting of 2 magnets, a vacuum chamber and support stands was prepared by BINP and acceptance checking of the design is underway. The laser transport system taking light from the laser room to the optical table in the linac dump area was completed and first laser light was transported to the optical table.
- The Aps Programming group demo'ed new applications for the upcoming run. The PASTA application acquires data and performs an analysis using the online model of BPM phase scan data to determine DTL/CCL setpoints. A new application (SADDAM) provides the capability for "on the fly" group knob definition and control.

Operations

- ASD Operations hosted the site visit of the ARR Team for the Accelerator Readiness Review for commissioning of DTL Tanks 4-6 and CCL Modules 1-3. The ATT team began arriving Monday afternoon. Tuesday morning was spent completing the formal presentations by ASD. Tuesday afternoon and Wednesday were used for interviews, site inspection and document review. The closeout with ASD and DOE was held Thursday afternoon from 1:00 to 2:00.

- The committee congratulated ASD on its maturity of procedures, documentation and overall preparedness for the Accelerator Readiness Review.
- There are eleven pre-start action items that we hope to clear the week of August 30. We hope to begin commissioning Tuesday, September 7, the day after the Labor Day holiday weekend.

Installation

Water Installation

- Installation of the cooling lines to the PS racks in ME2, 3 & 4 was completed.
- Installation of the DI piping to the second set of SCL-ME6 klystrons continued.
- Installation of the DI piping to the first half of SCL-ME7 continued.
- Installation of the SCL QMCS header continued.
- Installation of the HEBT Service Building PS cooling lines continued.
- Water maintenance activities this week included refining and tuning the water chemistry on the RCCS skids and replacement of a leaking bellows in the 3rd DI pump room.

Ring Installation

- The HEBT 21Q40 magnet assemblies #15 & 17 were surveyed.
- The RING "A" arc was placed under vacuum.
- The RING "B" arc was placed under vacuum.
- The third RF Cavity support stand was set in place.
- The first 5 - 21Q40 Magnet support stands were set in place in the RTBT.
- The beam pipe end shielding for RTBT Collimator #2 was installed.
- The installation of diagnostic cables into the HEBT tunnel continued.
- The lift plan for delivery of the Duratek shielding blocks to the HEBT pad was reviewed.

Magnet Measurement Group

- We have two 21Q40/27CD30 assemblies ready for alignment.
- We have two SRF Warm Sections ready for Beam tube installation and a third ready for alignment.

Ion Source Group

- We have measured and analyzed more emittance data. The new data are of superior quality without inverted signals and with rather low noise. A report is being prepared.
- Additional emittances were measured with 10 mA and 20 mA beams, the highest current that could be achieved after the source was vented to replace the current transformer and to modify the emittance scanners. Therefore the ion source was replaced and will be conditioned over the weekend.
- The borrowed current transformer was returned to the diagnostics group.

RF Group

- CCl 4 HPRF, LLRF, epics, timing check out into shorted waveguide in gallery, as time allows.
- SCL-ME-1, RF systems static and dynamic checkout complete, ready to apply power
- SCL-ME-2, RF and controls static checkouts complete, dynamic testing ready to begin next week.
- Cryo module 4 is having power coupler to waveguide transitions installed.
- Cryo module 3 waveguide final connections being made. Cryo module 4 final waveguide components being fabricated.
- Mebt REF is ready.

HPRF

- Mark Cardinal generated a detailed procedure to install transitions on the cryomodule couplers. HPRF technicians installed three coupler to waveguide transitions on MB4. Custom fit waveguide was fabricated locally to connect the transitions to the main waveguide runs.
- Cavity resonance and Q measurements were performed for MB3 cryomodule.
- Installation of waveguide elbows were completed on the MB5 klystrons for the pipefitters.
- Cable termination was completed on the CCL4 RF Station and the initial startup procedure has begun.
- An inventory of waveguide components uncovered a shortage of a number of pieces to complete the runs on SCL ME7. Spare long sections and flanges are being cut and welded to fit.

Cryogenics Group

- The 4.5K coldbox run is continuing. The system is operating stably and cooling the tunnel transfer lines. Cryomodule M-03 (in slot MB-04) was cooled down on Saturday and shows good vacuum and temperature readings.
- The cavities were tuned to 805.000 MHz, and additional low power RF measurements were made. High power testing is scheduled for next week.

Mechanical Group

Power Supply Group

Power Supplies:

- Installed 30 corrector magnet power supplies in the ring service building.
- Completed cabling and terminations in linac tunnel for SCL Module MB-6.
- Continue with cabling in Modulator areas MB-3 and MB-4.
- Diagnostic terminations ongoing in HEBT.

HVCMs

- Checkout of SCL-ME3 was halted after being ~65% completed due to the switchgear failing closed. CF was contacted, and the 13.8 kV feeder was racked out until the repair can be performed (scheduled for Monday of next week).
- The last two CCL's and the other functional SCL modulators are also on this feed, so operation of those systems will also be delayed. Significant progress was made on the preparation of SCL-ME4 tank basket assembly.

Survey and Alignment Group

DTL/CCL

S&A completed the alignment of the beam stop located at the end of the CCL section and the informational data has been submitted to the appropriate personnel.

SCL

S&A completed alignment of the two 8Q35 magnet's (#42 and #46) on a second warm section raft located in Magnet Measurement.

HEBT

S&A has begun the alignment of the first 21Q40/27CD30 magnets on to their respective rafts. These rafts will be located in the HEBT tunnel between the HEBT dipoles. The alignment is being performed in Magnet Measurement before being transported to the HEBT tunnel.

TARGET

S&A had to reestablish their reference line in the hot cell area due to continuing construction in this area.

The target cart rail base plates were as-built for elevation and the measurements were submitted to the appropriate engineer in charge.

Another core vessel insert, which was installed in the core vessel, was measured to confirm proper installation. This leaves one core vessel insert, of the ones that have been installed, to be measured.

MISC

S&A is continuing the Linac elevation re-observation campaign. The processing of the data collected to date shows a 1.7 mm subsidence around the Linac dump region over the last 5 months. We continue to see differential settlement between the center of the tunnel floor and the portions of the floor close to the walls. Typically, the floor adjacent to the wall will undergo 30% more settlement than the settlement at the center of the tunnel.

Diagnostics Group