

Accelerator Systems Division Highlights for the Week Ending March 1, 2002

ASD/LBNL: Front End Systems

The MEFT infrastructure installation work is going ahead with placing power and signal cables in trays and wireways. Both MEFT chopper-structures have been installed in their beam boxes, and the entire mechanical system has been vacuum-leak checked.

The conditioning of the RFQ RF system towards full duty factor is progressing well; currently 650 kW pulse peak power are being applied at 1.5% duty factor, in the absence of beam loading.

Sparking inside one of the LEBT-chopper summation-boxes has been traced back to sparking at the LEBT electrodes themselves. We are designing minor mechanical modifications to improve this situation; the changes will be applied to the hardware when the system is taken out to attach the cooled electron shield to the extractor support, before the start of MEFT commissioning.

We have received the platform with mirrors of the Laser Profile Monitor system from BNL.

The Front-End Systems underwent a Cost/Schedule Progress review on 2/26; no serious issues were raised. After the November re-base lining, our cost and schedule indices now show perfect 1.00 values, each, over the last two months.

ASD/LANL: Warm Linac

We accepted the first 402.5-MHz transmitter system from Titan-Beta. It was scheduled to be shipped to LANL on March 1. (WBS 1.4.1.1)

We continue to support JLab staff to test prototype SRF fundamental power couplers. The RF test stand, powered by the prototype SNS high-voltage converter modulator worked well every day. Power up to 1 MW at full duty was provided. (WBS 1.4.1.1)

LANL personnel extended their stay at JLab over the weekend and for a second week to help turn on the modulator and klystron for the JLab high-power RF test stand. (WBS 1.4.1.1)

We now have all of the PMQ and empty drift tubes for DTL Tank 3. Coronado has had trouble repairing the stem on the BPM drift tubes. The new delivery date for the BPMs is 3/12/02. The two horizontal EMD drift tubes are expected on 3/15/02 and the two vertical EMD drift tubes are expected by 3/28/02. We are aggressively working the delivery schedule for the remaining drift tubes in an attempt to improve on these dates. (WBS 1.4.2.3)

We received the coils for the remaining dipoles and they are now at MBI to be vapor deposited. All of the drift tubes for Tank 1 are currently on schedule. (WBS 1.4.2.3)

All of the installed drift tubes (25) in DTL Tank 3 have been rough aligned. The x and z-position of the drift tubes are now within 0.002". The y-position is within 0.010". PMQ roll errors are being measured, and the physics team is computing its impact. (WBS 1.4.2.7)

All DTL vacuum pumps and controllers, with the exception of the RGAs, are ordered and many have been delivered to the RATS building. The RGA order will be placed next week. (WBS 1.4.2.4)

The DTL water skid FDR went satisfactorily this week. The vendor, Avantech, is proceeding well with production. We forecast DTL tank 3 water skid at ORNL in late April. Avantech is also proceeding with the fabrication of the DTL tank 3 water manifolds. We reviewed the drawing package with them and visited the shop where both the manifolds and water skids will be fabricated. (WBS 1.4.2.5)

The racks and PLCs for the tank 3 vacuum and water systems have been ordered. (WBS 1.4.2.4 and 1.4.2.5)

LANL approved two PCR this week. PCR LI 02 017 draws \$259K from contingency to support two change-of-station assignments this year at ORNL. PCR LI 02 018 is a zero-cost PCR that realigns schedules and budgets, without affecting the IPS. (WBS 1.4.6)

Anton Rohlev is starting his 1-year leave-of-absence assignment in the LLRF group at CERN. While on SNS, Tony has been a key person in the development of the SNS LLRF system, in particular the reference line and the RF field resonance control system RF daughter board. WE thank Tony for his contributions on SNS and wish him well on his new assignment at CERN. (WBS 1.4.6)

ASD/JLAB: Cold Linac

Prototype cryomodule assembly continues. Process piping is in place and leak tight. Functioning of tuners, both motor- and piezo-electric-driven, has been checked. Resonant frequencies of cavities and HOM coupler fundamental rejection filters have been checked and finally adjusted. Installation of multi-layer insulation has begun. Preliminary assemblies have revealed no significant issues with fit of components.

The first-article return end can was returned to the vendor. Faulty leak-check techniques prevented confirmation of the leak until JLab staff provided assistance. The leak was then quickly found (a faulty weld damaged a feedthrough) and repaired. The end can will be returned to JLab next week.

The 1 MW test stand produced RF during the week, reaching a peak power of 900 kW and a 1.5% duty factor (SNS requirements are 550 kW and ~8%) by Thursday evening.

The fundamental power couplers being processed at LANL were quickly conditioned up to 1 MW in matched transmission mode.

Two Kinney vacuum pumps and all gas storage/off-loading stations have been shipped to Oak Ridge. Operating and Maintenance manuals for the warm helium compressors were received and sent to Oak Ridge.

ASD/BNL: Ring

Controls:

RFP packages for CF Controls sensors were sent to 20 bidders, and the 90% Review package for the Ring CF Controls was completed. A meeting on power monitoring was held, and several issues surfaced for further discussion.

Four Sony monitors and a fileserver have been set up for the front-end test stand in the RATS building. This system has only two wires to the "outside" world: a power cable (120V) and an Ethernet cable.

The design for the Target Utilities PLCs and IOCs are being reviewed for CFC, and the CFC package will be posted by March 8. A contract with Sverdrup-Tullahoma to design mercury loop and Target Systems safety-significant PLCs is being negotiated and should begin by April 1.

The title II design drawings for the PPS Phase 0 control racks were completed by Innovative Controls and submitted this week. These drawings will be signed and issued CFC. Fabrication of racks will follow.

Tests on noise immunity of CAT5 network cable in the RF power supply environment were conducted at LANL and a preliminary report submitted for comment. Problems appear possible – more tests will be done. We may need to consider fiber, shielding/grounding options, or routing options.(This test was LANL controls milestone #51.)

A test board for the MPS system is now working in the Controls Lab. The bad news is that it found some faults. The good news is that it found some faults.

An all-day timing system review was held at LANL last week. As a result of this review, rev B of the utility module (“RTDL decoder”) will be delayed and some additional changes made. This will not affect the delivery schedule for

early boards. Tests on the 2101 interrupt latency at LANL have confirmed an occasional msec range latency that had been reported by ORNL at the LANL Review. Further tests will be conducted, as this long latency could present a serious problem for time-critical applications. BNL has completed incoming inspection and test of 10 new V124s ("Event decoder boards"). Eight will be sent to ORNL.

At LANL, database and device support for image capture in the DTL are under test. DTL rack layouts are being finalized. Screens are defined for the modulator test. Signal lists for the RCCS and vacuum are being updated after Significant supplier changes (at this late date). All DTL racks, CPUs and crates, all linac VXI crates and all linac PSIs and PSCs are ordered. Interrupt tests continued on the LLRF HPM Board.

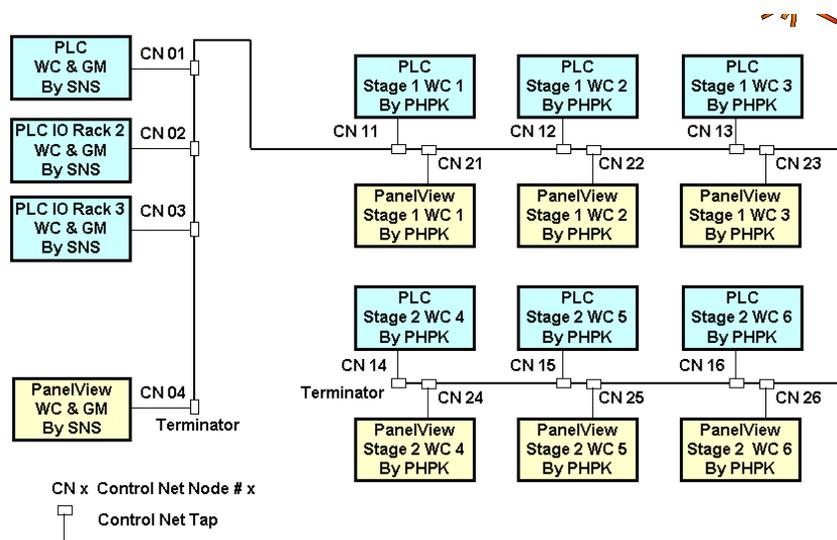
Also at LANL EPICS v3.14 large array support was fixed after a bug was noted during the review. XAL was modified to support shared channel behavior and more easily represent the relationship of things like beam position - and many power supplies. The CVS tree for applications (XAL) was also reworked. Network utilization was optimized in the channel object by using local information when appropriate.

At BNL, work progresses on the conversion of MEDM screens to EDM. A test report for the 16-bit and 24-bit ADC boards was completed. This report will go to the diagnostic group who will determine if the BLM requirements can be met with these devices. A trip has been arranged for Jeff Patton to coordinate database requirements between BNL and ORNL.

Final documentation for the PSC/PSI was received and copies will be sent to ORNL next week. The power supply software was installed in CVS at ORNL, and we started placing power supply documentation on the WEB.

At Berkeley, the 7-channel motor control Hoffman box for MEBT tuners, chopper target, and emittance measurements was completed. Efforts continue to complete the MEBT cooling Hoffman interface. The MEBT vacuum interface is undergoing checkout -all chassis are complete and cabling is underway. Preparations continue to cut over IOC-2 to the SNS standard PowerPC and ADE. (IOC-1 and IOC-3 are complete.)

The Central Helium Liquefier uses 6 warm compressors to pressurize helium to approximately 16 atmospheres. The vendor provided an Allen-Bradley ControlLogix PLC (SNS Integrated Control System Standard) for the controls of each of the 6 skids. These 6 PLCs communicate via ControlNet to a single SNS provided ControlLogix PLC. Thus, only a single coax cable is routed (daisy-chain) between the SNS PLC and the warm compressor skids. The compressors are now stored in the RATS building. Electrical power and ControlNet cable has been connected to each of the skids. The SNS PLC has been connected to the ControlNet Network and testing of data communication among all 7 of the PLCs is in progress. The next step in the checkout is the verification of the communication from each compressor skid to the EPICS operator interface screen. As with any start-up, while most equipment functions as expected, there are always opportunities to make improvements in operation. This experience with and checkout of the control system in RATS will decrease the amount of time required for control system checkout after the equipment is installed in the Central Helium Liquefier Facility.



Installation Services

The ASD Division Director held the first of ten planned system Installation Estimates. Reviews will be at 230 on Fridays. The Cryogenic System/CHL/Transfer Line and Building Prep estimates were reviewed. The Cryo/CHL/Transfer Line review went well and communicated additional detail with regard to the scope of the installation work and general understanding of the staffing situation. The result from the Building Prep review was that more detail was required. The Building Prep estimate will be presented again next Friday 3/8/02. It will focus on the estimates for the Klystron Building and the Ring Service Building as that is the bulk of the scope of work.

A test run of an IPS-ASD Installation Integration Links export file produced by Randy Musick was submitted by ASD to Project Controls. The test was successful. This file contained activities for DTL and CCL RATS Assembly.

The Lead Engineers for the Front End Installation (Hechler) and DTL/CCL (Johnson) will select a subset of tasks/milestones from their areas of responsibility in the ASD Installation Schedule for export to Project Controls. This next step in the IPS-ASD Installation Links process will be completed by Friday 3/8/02. All ASD Links will be submitted by 3/18/02.

Accelerator Physics

D. Jeon and S. Kim attended a workshop in S. Korea on a high intensity proton source project for S. Korea. The initial stage of this project is to build a CW, 2 ma, 100-MeV linac. Later it may be extended to higher energies. The purpose is for transmutation of nuclear wastes.

An orbit correction application was written using the new xal application programming environment. The application is Jython scripted and is being tested with the virtual accelerator.

The ORBIT code longitudinal tracking was benchmarked to experimental data taken from the PSR machine. There is good agreement in the profile shapes at the end of the injection. Space charge and inductive impedance from an insert are included in the model.

Operations

Met with Conventional Facilities on AC Power Monitoring and Control. Several problems were encountered with the proposed plan. Cost estimates to correct the inadequacies are being prepared by CF.

Met with Conventional Facilities on the switchover capability for one of the two coolers providing building air conditioning to supplement ASD equipment process cooling. Switch over capability will now be provided.

Met with PPS and Cryogenics on ODH Safety. The ODH safety system is still under discussion.

Met with Document Control and Management Information System personnel about file structure and location of ASD technical equipment documents.

Ion Source Group

Paul Gibson participated in the training course for electrical safety officers taught by Lloyd Gordon. They discussed NEC, NFPA, OSHA, and DOE codes and regulations, and how they apply in a laboratory environment as well as the inspection of non-certified equipment.

On Thursday and Friday after ASAC we had extensive discussions with STL Rod Keller who extended his ASAC stay.

The wiring of the Big Blue Box is almost complete. Conduit, distribution boxes, lights, status lights and a heat-sensor are installed.

The support stand for the ion source stand has arrived and was set up.

The Ion Source bellows adjustment assembly is ready to be welded.

John Monroe from Controls installed a 4-panel control station on a mobile computer station table. It is currently monitoring the Front-End at LBNL, but soon can start to monitor and control components of the Hot Spare Stand.

Robert Welton upgraded our Emittance Analysis Software with a feature that allows for determining the current offset out side an adjustable ellipse.

RF Group

The JLAB test stand produced 900 kW peak RF power at a pulse width of 550 microseconds and a rep rate of 30 Hz (1.6% duty factor). This morning we are hi-potting the modulator/klystron to determine the cause of occasional spikes in the modulator switch tube current that cause firing of the crowbar. We will continue pushing for higher peak and average power after solving this problem. All in all, it's been a very good week!

Hengjie was at LANL this week working on plans for resolving concerns to the LLRF modules and the reference line.

Mike McCarthy spent a few days this week at ORNL to receive his ORNL orientation and go over the Transmitter installation tasks. He was assigned the task of working on who does HPRF testing of components, LANL or ORNL.

David Anderson returned to Jlab on Monday to fix a regulation problem with the Power supply, he left ORNL on a moments notice.

Chip Piller attended a Linux class at ORNL

Our safety 2-hour stand down is scheduled for the 4th at 2 pm

Yoon is at LANL to get involved with DTL tuning

Two new SRF fundamental power couplers have been successfully conditioned up to ~1MW traveling wave and then up to ~600kW standing wave with a variable short at one position for > 5 minutes (locally 4x higher power, ~2.4MW) with 1mS 60Hz pulses. It was first time to test with such high power standing wave with the design. The short position will have to be moved in many more steps to complete the conditioning probably until next Monday.

Mechanical Group

We have interacted with Danfysik regarding shipment of the HEBT 12Q45/16CD20. This first article was shipped from Danfysik 2/25/02. Perhaps it will be here by 3/11. Tesla is working on HEBT Dipole #2 and should ship any day now. Meanwhile, we are making refinements to both measurement systems. We are also ordering parts for the SRF 8Q35 measurement system.

Preliminary vacuum analysis of SCL LEDP, HEDP and dummy cryo modules was completed and the initial analysis on the inter module cryo section revised.

A further design review of the SCL warm section was attended and the results of the revised analysis on the inter module cryo section presented together with a preliminary scheme for a portable soft wall clean room for installation and servicing of SCL equipment.

Set up of the vacuum shop in RATS was completed and limited operational capability for vacuum testing is now available.

Storage racks for the bonded receiving area have now ordered and delivery is expected in the next few weeks. The soft wall clean room, acquired from Y-12 surplus, has now been disassembled and is waiting shipment to RATS.

The equipment required for the vacuum cleaning station has now been defined and ordered with delivery schedule for mid March. The permit for the disposal of used Alconox (the alkaline cleaning solution to be used for vacuum parts) has been approved by the City of Oak Ridge.

The first HEBT chamber has now been physically inspected and surveyed. While the results appear satisfactory a comparison with the "as built" survey has yet to be completed to confirm this. Survey of the second HEBT chamber is planned for early next week.

Accelerator equipment received this week for the CCL's installation included; ion pump controllers, TMP's and controllers, NEG pumps and controllers and scroll pumps.

The first shipment of equipment to LANL for rack population of DTL tank No. 3 was made.

Three (3) JHA's covering vacuum operations in RATS have been approved and signed off.

Cryogenics Group

We are beginning to rearrange the shop to set up tooling for production of the cryomodule sections of the transfer lines.

The construction crew is concentrating on digging the compressor room trenching and footings for other areas of the CHL structure.

We have connected all the warm compressors in parallel to a common gas source and are preparing to measure the overall leak rate of the system.

The first two weld samples of copper buss bar have been machined at the shop and are being prepared for welding.

The 14" inner stainless pipe for the beam dump has been welded, leak tested and checked for alignment. The 20" outer jacket pipe is being prepped for installation.

We continue to interview selected candidates for the engineering and technical openings.

Electrical Systems Group

Danfysik power supply review in Denmark, Ken Rust representing SNS Power Supply group.

Visit of electrical commodity contract vendors to ascertain AC design parameters and deliveries, Teresa Toomey and Lee Rains.

Rack factory visit, Scott Fisher with John Mashburn.

A DC bus material was ordered by William Barnett et al.

Survey and Alignment Group

Beam Diagnostics Group

LANL Beam Diagnostics Report:

BPM pickups: Repairs continue on the two drift tubes with BPMs installed in them. We expect them back for mapping around March 12. The SCL prototype has been checked, mapped, and sent to JLab for further tests. The CCL BPM has not been checked yet.

BPM electronics: Work continues on the software front. The channel access software is installed and functioning. We are debugging the LabView software. Some problems were found on the DFE cards on the two units still here at LANL. They will be repaired before they are shipped to LBL.

WS actuators: Cycling tests and positioning accuracy tests of the prototype SCL actuator are complete. It has been sent to JLab for further tests. A conceptual drawing package was sent to Huntington for DTL/CCL actuator version 2. The spare SCL actuator bellows is due in about six weeks.

WS electronics: Work continues on the software.

ED/FC: We are ready for quotations to fabricate the first ED/FC.

D-plate: Final design work continues. We are working with Joe Error / ORNL to determine the best way to place the D-plate in the beam tunnel and align it.

CM pickups: Vacuum tests of the DTL CMs have shown excessive outgassing from the Kapton coax cables. We plan to test solid core Kapton insulated hookup wire. If successful we will ship a CM back to Bergoz to change the cables to twisted pair made from this new wire.

Misc: Preparations continue for the March 12-14 design reviews.

ORNL Beam Diagnostics Report:

We are working on Laser wire specifications. We had two videoconferences with the partner labs, one on the D-plate installation and integration and another one on the Laser wire. The BCM at Berkeley has been monitored for most of the week and is still running well. We are in contact with Kay Kasimer regarding CA reconnect issues that were observed at Berkeley. An EPICS screen for the Berkeley commissioning of the carbon wire is being prepared. For efficiency, Dave and Lisa's trip to Berkeley will be deferred until the week of the 18th.