

## Accelerator Systems Division Highlights for the Week Ending February 7, 2003

### ASD/LANL: Warm Linac

#### HIGH-POWER RF (WBS 1.4.1.1)

Accomplishments this week: (1) We successfully finished the high power testing of the first two 402.5 MHz windows for the DTL with the completion of the sliding short test. (2) We conditioned the first 5-MW, 805-MHz CCL klystron to full peak beam power (9.1 MW). Pulse parameters achieved were: 134 kV, 57 Hz, 860 microseconds FWHM. The RF output was raised to 1.3 MW peak. At levels above 1.3 MW, waveguide arcing occurred. The waveguide assembly is being reworked to minimize the potential for arcing (larger waveguide, WR-1150, where the smaller waveguide, WR-975, had been installed, fewer transitions, *etc.*). We also set up to flow dry air through the waveguide. (3) The first superconducting linac transmitter acceptance test continues at Titan Pulsed Power Systems. They should be completed next week.

#### HIGH-VOLTAGE POWER CONDITIONING (WBS 1.4.1.2)

Accomplishments: The prototype HV converter modulator (HVCN) operated to its highest level ever in the tests of the 5 MW klystron. Peak levels achieved are: 9.1 MW peak, 134 kV, 860 microseconds FWHM. This represented about 500 kW of average input power (the design level for full power operation is 800 kW). The klystron experienced multiple conditioning arcdowns during the operation, and the system performed as required (with no crowbar). The operation saw significantly cooler operation of the equipment because it was operating nearer its design point. The IGBT losses were 1/3 of that seen with the single 2.5 MW tube. There was no noticeable temperature increase of the cable, the IGBT bypass capacitors, or the IGBT switch plates. This is all different than what was seen with the lower power operation. This result will be rechecked when operation resumes. The higher power operation moved the IGBT switching into a soft, high-current switching regime where there are less Fourier components produced, and therefore less heating. Sideband production (especially at 20 kHz) appeared better than before, but more measurements are needed to confirm this. The primary limitation for proceeding to higher average power was the prototype cap bank (0.053 F). We shut down on 2/5 to install the production cap bank (0.112 F), which will give much less voltage droop, and expect to restart operations on 2/10.

Concerns & Actions: (1) We are addressing quality control and schedule delays with the delivery of the production HVCNs. LANL personnel traveled to Dynapower to assist in boost transformer fabrication, and discovered problems with the winding build of the secondary. This has resulted in a production delay until we can determine the problem and find a solution. A potential solution to the winding problem is to increase the number of turns, which will actually help the modulator maintain soft switching over a broader range of voltages and PWM conditions. The trade-off with this solution is slightly higher IGBT "turn-off" losses and slightly higher buss voltages

#### DRIFT-TUBE LINAC (WBS 1.4.2)

Accomplishments: (1) Twenty-four (of 27) repaired (cap weld ring repair) tank-3 drift tubes were profiled machined and inspected and at least 18 were high-pressure vacuum leak checked. Two are at the plating vendor and the 3-2 dummy BPM is being machined for water channel weld repair and cap welds. All 25 tank-3 drift tubes on hand at CMI are being measured for stem straightness and a straightening rig is being constructed. Ten tank-three drift tubes were flow tested and eight had their magnets mapped; no drift tubes have been cleaned yet. (2) The twenty replacement PMQ units ordered from Aster were shipped to LANL. (3) Twenty additional tank-1 diverters (including six 1" type for the EMP dummy drift tubes) are scheduled to be delivered at COB today to LANL along with 10 tank-1 drift tube bodies. Upon arrival, they will be checked, "alloyed" and two furnace heats will be run either on 2/10 or 2/11. (4) A total of nineteen tank-1 drift tube bodies with diverters were brazed and leaked checked with 100-psi helium internal pressurization; all passed and were dispatched to CMI for internal cavity machining. Machining is scheduled to commence today on the internal cavity and end caps for drift tubes R1-20, R1-21, R-23, R1-24, R1-26, R1-27, R1-29, and R1-30. Drift tubes R1-22 and R1-31 in this group are "solid empties" and can go directly to final profiling. (5) Eighteen tank-3 drift tube mounts ("top hats") were plated and are at CMI for final cleanup and machining; the completed units are expected Feb. 11. (6) Five kits of modified drift tube mount parts are being fabricated and will be shipped as soon as possible (2/14?) to ORNL for trials; this modification is very simple, will enable additional drift tube adjustment, and may further eliminate drift tube stem installation forces. (7) Inter-tank beam box and valve modification design work continues; new valves were ordered. (8) Brazing of the EMD and BPM drift tube stems is being considered; to increase reliability and simplify manufacturing. Brazing of the copper ring carrying the stem RF connection element is being considered for all stems not yet welded to drift tubes. (9) Machining continues at CMI on the internal features for the two halves of Iris/RL waveguide for tank

one. It is projected these pieces will go early to mid next week to Theta Plating for cyanide copper plating the braze joint surfaces which will join the two halves. (10) The tank-3 post couplers are scheduled to be dispatched today to ESCO for final e-beam welding (stems to body).

Concerns & Actions: (1) The attempt at electroless nickel-plating repair of the temporary tank 3 iris/RL wave guide that developed the water to vacuum leak during final cleaning was completed and was unsuccessful. An electroless copper process is currently being done with the leaking surface externally sealed with a rubber gasket and with the unit in a more favorable orientation. (2) Current forecast show a three-week schedule variance with a 4/21/03 delivery of the last tank-1 drift tubes to ORNL. We are working with the manufacturer, and reevaluating test, shipping, and installation plans to make up schedule without compromising quality. We have also asked for help from the Pierre Grand Committee in developing an effective strategy.

#### COUPLED-CAVITY LINAC (WBS 1.4.4)

Accomplishments: The first segment braze has been completed on segment #2 (IPS Milestone). The water passages have been leak tested (non-pressurized) and that found to be tight. Flanges were welded (Fig. 1) on and leak testing of the RF cavity region is underway.

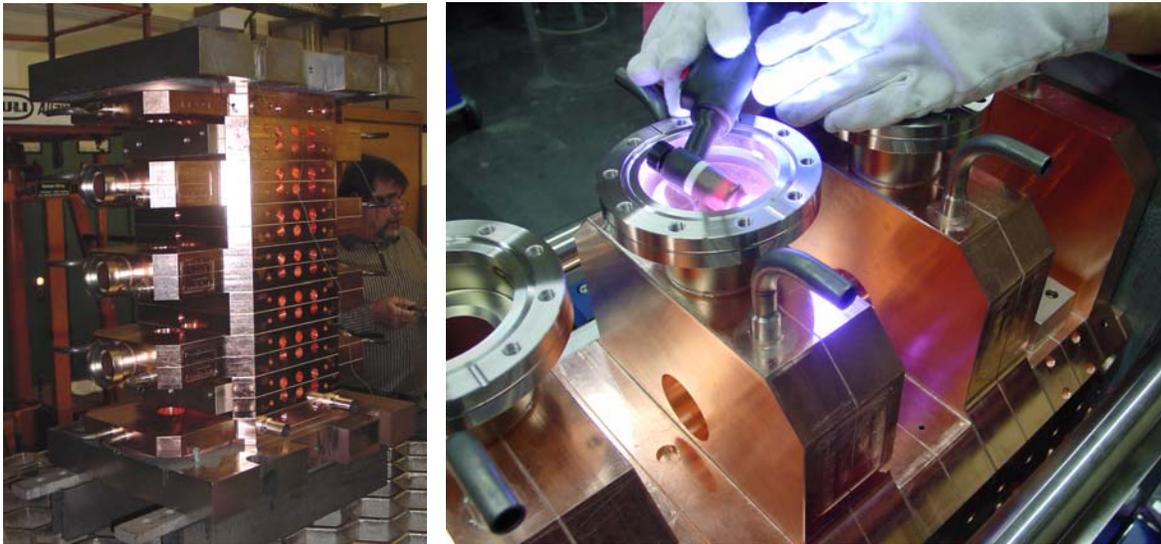


Fig. 1: First CCL segment following stack braze and during welding of flanges.

#### ASD/JLAB: Cold Linac

#### ASD/BNL: Ring

The BNL/SNS Project Controls Group received initial ETC inputs from all Ring disciplines, and have started to process, audit and scrub the estimates with the Group Leaders. Effort has also begun on revamping both the Ring and the Controls schedules to make them easier to update and maintain here at BNL, and more responsive to ORNL's efforts to link activities.

Bob Lambiase and Steve Savatteri were at IE Power this week to help with testing of the 1<sup>st</sup> article Medium Range PS (4ka). Upon acceptance, this unit will be shipped to SNS/OR.

Tom Owens was at BNL earlier this week to visit with the BNL/RF Group. A. Zaltsman reported that testing of the RF Power Amplifier #2 is underway.

BNL engineers await the arrival of the first article RF Tune power supply that was shipped by Danfysik last week.

Field measurements continue on the 21Q40 quads. A total of 21 magnets are now fully measured (21/29).

Chicane #4 field mapping with “z” bumps: efforts towards a 2<sup>nd</sup> (measurement) iteration are underway.

The Ring Injection Septum magnet is being set-up for magnetic testing (see photo).



Ring half-cells magnet assembly: work continues on units #2, 3 and 4.

Alpha Magnetics reported the shipment to BNL this week of the 1<sup>st</sup> article 21S26 (12) high field sextupole magnet.

Alpha also reported that they have started winding the first production magnet coil for the 41CDM30. Four magnet cores are already machined.

We continue to work with Stangenes to resolve “out of tolerance” issues related to the 26Q40 magnet pole pieces. All QA data are being reviewed in conjunction with proposed assembly options.

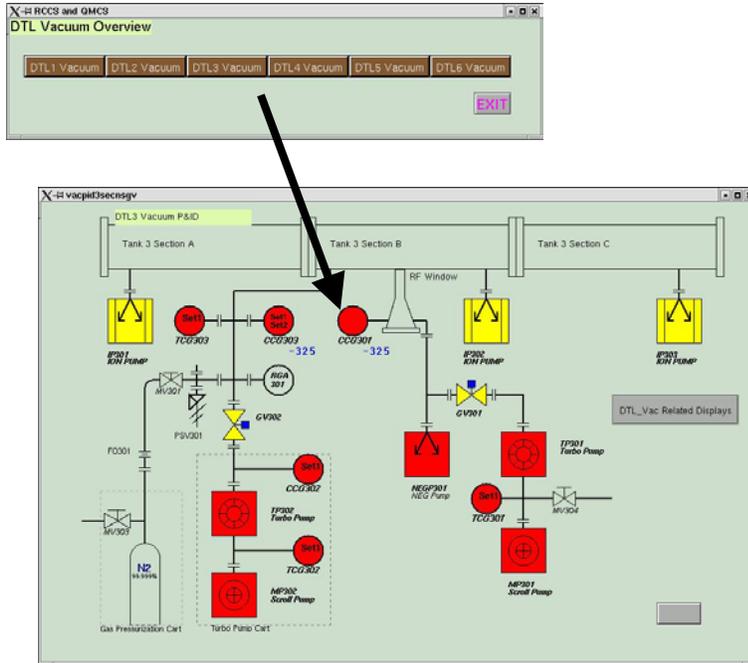
Drawings for the HEBT Collimator Shielding were “signed” this week. SOW and Specs are complete. Work on RFQ is in progress.

Completed fabrication of the last half-cell (Ring arc) vacuum chamber. NiT coating continues on the remaining half-cell chambers and the injection (ceramic) beam tube is being set-up for coating.

Testing of the Injection Kicker PS is nearly complete. Our plan is to ship it to SNS/OR in the near term.

### **Controls**

A team from LANL spent the week working on the DTL3 RCCS and vacuum system controls. A number of lessons were learned which should improve future coordination of these efforts. Nonetheless, at the end of the week the RCCS system had been successfully run from EPICS and the vacuum system wiring was closer to completion. An improved version of DTL vacuum and RCCS IOC software was installed and used to test the DTL3 water skid. The DTL vacuum EPICS control software was used to verify wiring from vacuum instrument controllers to PLC.



Dave Gurd and John Cleaves traveled to BNL to review the Estimate to Completion for WBS 1.9.5. The team there was well prepared, and the work went well. The main concern remains with specification of diagnostics interfaces. A proposal will be made to return this work to the Diagnostics team, as was done earlier in the LANL case.

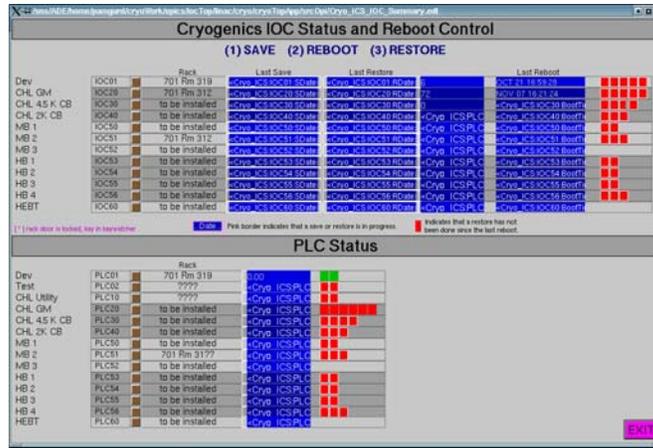
Taking advantage of the end of the running period, considerable effort was spent at the site to remove dust from workstations and IOCs, and to vacuum filters. Work continued on configuration of the Alarm Handler and the Archiver, in particular with a view to upcoming DTL and D-Plate operation. A “cursor finder” was installed on the control room consoles, as well as a fourth screen for “comfort” screens and the Alarm Handler. Migration to EPICS 3.14 has begun. Many features of this version have been developed specifically for SNS.

All the EPICS screens have been updated to incorporate comments made by the process engineer responsible for the overall design of the Central Helium Liquefier and Transfer Line Systems. They now reflect a design and operating philosophy that is consistent with the overall process requirements of the cryogenic system. These screen updates will facilitate checkout and operation of the system. A main overview menu screen allows quick navigation of the entire Cryogenic Control System.

A Main Alarm Screen is included that allows the operator to quickly determine the source of any alarm condition. This high level screen summarizes alarms from all subsystems and provides links to more detailed alarm information. Alarms may be made inactive to eliminate nuisance alarms from equipment that is not operating. Alarm setpoints are easily maintained. The delay time before an alarm condition is latched is adjustable. This is to prevent multiple alarms from a signal that is oscillating around its alarm limit. The alarm system includes alarm indication for both the process parameters and the health of the ICS Cryogenic Control System itself.

Work began in support of the upcoming cryomodule test at Jlab. LLRF Software for the LBL LLRF Hardware for the JLAB Test-Stand was installed, and support was given to configure the timing system appropriately.

The cryogenic process system operates best when small changes are made to control devices. Unless special software is installed, reboot of an IOC may cause a large change (bump) in the output to a control device. The cryogenic control system will have its own dedicated IOC boot servers. A boot server has been implemented for installation in the Central Helium Liquefier Control Room. Bumpless reboot of a Cryogenic Control System IOC has been demonstrated using this boot server.

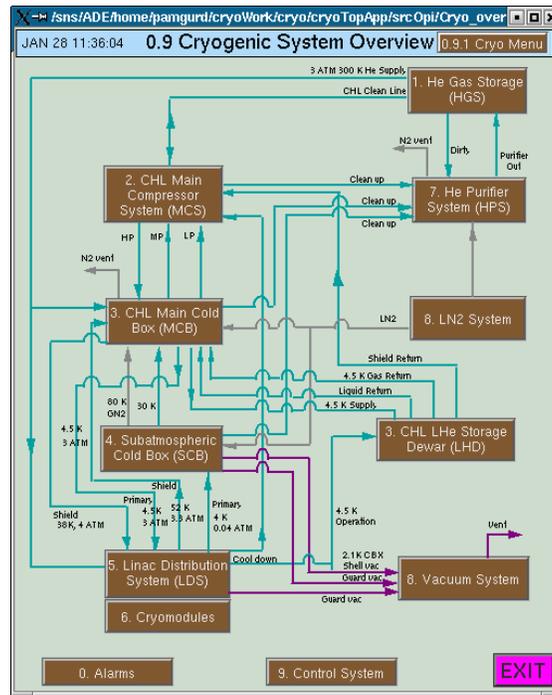


The control cabinet for the Central Helium Liquefier Vacuum System has been fabricated on the CHL Mezzanine.

A purchase order for the acquisition of the medium beta cryomodule junction boxes has been awarded to DCS. These junction boxes provide the termination point for trunk cables from the ICS Cryogenic Control System racks in the Klystron Building. The requisition includes the junction boxes and the cables that route from the junction box to connectors on the cryomodule. JLab has purchased all connectors and SNS will provide them and the cable to the vendor for fabrication. The PLC and IOC control racks for the Medium Beta Cryomodules were received from DCS.

The pre-operational review of the cryoplant controls took place this week, with three members of the controls team presenting. Reviews were favorable. Below are a number of cryoplant control screens that were presented at this review.

EPICS Cryogenic System Overview Screen (Main Menu)



Cryogenic System Main Alarm Screen



Alarm Setpoint Screen



Alarm Latch Time and Delay Screen



Installation

Craft Snapshot 2/5/03

ASD craft workers	54.0
Foremen, ES&H, etc	9.0
Less WBS 1.9 controls	2.0
Less absent	3.0
<b>TOTAL</b>	<b>58.0</b>

The 02/0703 0830 Friday Morning Installation Meeting included an in depth review of the DTL3 and DTL1 compressed installation, testing and commissioning schedule. This schedule requires a substantial comment of personnel, i.e. 52days of 24 hour operations for certain tasks, that must be carefully reviewed. A final review with the Division Director is planned.

This schedule is also being integrated with a LANL DTL schedule that has DTL #1 Drift Tubes delivered later that 04/01/03. This places IPS Activity DTLINK31 Install and Test DTL Tank #1 in jeopardy. That activity is scheduled to be finished 21MAY03.

A study was completed that will allow ASD to withdraw from RATS I by 30SEPT03. This will be difficult, but relocation ASD installation staff to the sit will improve communication and logistics associated with FY04 installation activities.

Installation Services participated in the review of a set of revised Klystron Hall General Arrangement Drawings prepared by Mechanical Engineering. These drawing revisions are based on installation lessons learned, as built dimensions of KH technical components and maintenance considerations. They will improve the efficiency of KH installation activities significantly.

### **Accelerator Physics**

Completed Front-end commissioning. Achieved 51 mA, 100-microsecond pulse at 6 Hz.

S. Kim completed MEBT chopper target fault study analysis. He finds a limit of 150-microsecond pulse length for the case where the LEBT chopper fails but the MEBT chopper continues to operate.

Global coordinates for the facility have been updated and published.

The AP group has submitted a proposal to Diagnostics and Mechanical groups for the addition of diagnostics to the front-end anti-chopper box. The group requests an inline emittance device (baseline), a current limiting aperture, a fast-faraday cup (successfully tested during FE commissioning at ORNL) and a view-screen.

Benchmarking of the ORBIT code's new thin-lens (Teapot) package with UAL is underway.

### **Operations Group**

#### **Ion Source Group**

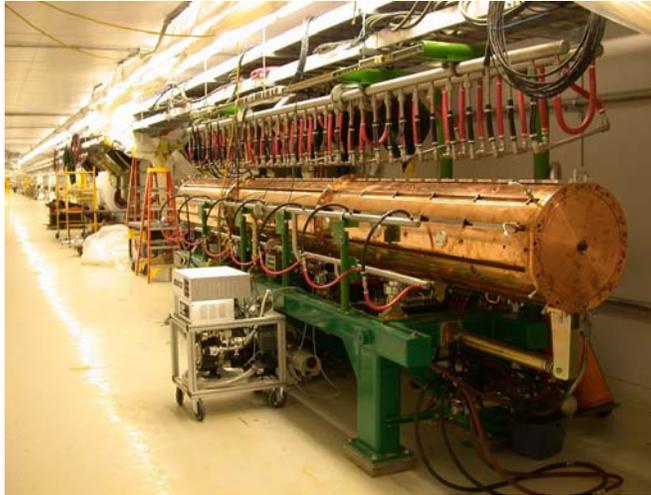
We received the third ion source from LBNL.

We started a three-month effort to maximize ion source lifetime and readiness for DTL commissioning. Based on the experience and lessons learned during front end commissioning, we came to the conclusion, that we need to have 3 ion sources, fully interchangeable, fully tested, and ready to be installed on the front end. To enhance readiness will develop IS vacuum storage and transport containers that can also be used for off-line leak-testing.

To fully prepare 3 ion sources we need to rapidly refurbish the hot-spare stand, which currently is inoperable due missing components transferred to the front end. The hot spare stand will also be used to fully test the 600 C air heating system. If successful, the system will be implemented on the front end. The 600 C air heating system eliminates the need for plasma heating and therefore substantially simplifies and expedites the cesiation process. If time permits we will work on a number of other desirable improvements.

#### **Mechanical Group**

Initial flow testing of the DTL-3 Resonate Control Cooling System (RCCS) was completed on Friday. A team from LANL, headed by John Bernardin, was at the site this week to lead this effort. The system was run up to maximum flow (~285 gpm) and performed as expected. The system is very quiet during operation, both in the tunnel and in the gallery. Vibration measurements were made and are being evaluated, but there is no indication of excessive vibrations.



DTL-3 with Cooling Line Jumpers



DTL-3 RCCS Initial Testing

Significant progress was made this week, installing components in the DTL-3 vacuum cabinet, making cable terminations, and checking software. This effort will continue next week.



DTL-3 Vacuum Cabinet Checkout Team

## **Magnet Task**

### **Linac HPRF**

Removed the RFQ HVCM to RF Building for repair/removal of failed components. Cleaned carbon deposits on unit, and started testing other components to determine if secondary failures occurred. Finished fabrication of coincidence detector that is now being tested. Received 2 more SCR units and some oil tanks from Dynapower. Recommended modification of RFQ and SCL modulators to incorporate open-winding design on transformer secondaries.

### **Linac LLRF**

#### **ORNL**

We continue to plan for testing of the LLRF control system with the first production cryomodule at Jlab beginning the week of Feb. 24. Mark Crofford and Hengjie Ma visited Jlab to install and setup all hardware necessary to carry out the tests. EPICS support was provided concurrently by Kay Kasemir and Ernest Williams.

Chip Piller and Taylor Davidson are preparing for the installation of the reference system. Chip has been working with Teresa Toomey regarding cable routing and installation. The slides from Chip's reference system presentation were distributed. They will be posted on the LLRF web site next week.

The first draft of Hengjie Ma's jitter and drift error analysis of the LLRF control system was sent out for comment.

The P3 resource loaded schedules for ORNL, LANL and LBNL are nearly complete. The PCR that will establish project funding through FY05 will be issued next week.

A team teleconference was held Wednesday afternoon.

Craig Swanson will visit LANL next week to work with Mark Prokop on VHDL coding.

#### **LANL**

Work continues on producing the Rev 0 of the new hardware platform for the LLRF system. The schedule so far is being met:

- a. Analog Front-end: Awaiting the delivery of the first two prototype units by the end of February.
- b. Digital Front-end: Reviewers' comments were incorporated in the design and the schematic is now complete and finalized. The board is also routed at 100% completion. The final review material will be sent out on February 10. This will include assembly drawings, parts lists, Gerbers, etc. Next week we will do formal checking of the documents before proceeding to fabrication and assembly on February 19 as planned. The two initial prototypes are expected mid March.
- c. RF Output module: The initial schematic was completed and sent to the reviewers. The initial cut of the schematic is complete. We are currently looking at parts placement on the board. This will also go to fabrication and assembly on February 19.
- d. Motherboard: The initial schematic is complete and the board design will start on Monday.

The above three boards are expected to go into fabrication and assembly February 19 and with a lead-time of three weeks we expect a prototype platform in the middle of March.

The three HPM test sets have been checked out and declared functional. One will be shipped to ORNL next week. We are revising the HPM test plan to reflect how it actually works.

The first of the new HPMs (S/N 005) have been calibrated at 402.5 MHz and are undergoing checkout. A scheme was developed to cut the fall time of the MPS\_PERMIT output to under one microsecond as measured against the simulated MPS input circuit in the lab. We will retrofit the three REV D's we have at LANL with the speed-up

modifications and rotate them out to the field. The EPICS screens were modified so the ADC parameters and limit settings may be entered in ADC counts rather than as 0.00001 kW. This will speed up the checkout process.

Developed a MATLAB model and algorithm for resonance control. Three algorithms were coded and tested with ORNL's RFQ measurement data. These algorithms were also verified for an SRF cavity, by using data generated by an SRF resonance control Model. This work included developing an adaptive frequency stepping algorithm via MATLAB and SIMULINK model. This algorithm will be tested at JLAB. This could also be a part of the autostart, preconditioning for the resonance control (DDS programming).

Additionally, in response to comments from reviewers, performed a closed loop system bandwidth analysis for an SRF cavity and sent the report to reviewers.

The draft of the interface control document (ICD) specifying the firmware specifications including interface between the hardware, firmware and software is nearly complete and will be sent to reviewers early next week. The first draft will be ready on February 7. Next week work will start on translating the LBNL application firmware to VHDL and retrofitting it to the new platform. That is expected to be done by the end of February and the entire set of phase I functionality will be verified in March. The conversion will include members of the ORNL and LANL teams as well as the new FPGA engineer from the NIS-3 group at LANL.

Work has also continuing on implementing NC resonance control in an EPICS IOC.

LANL team helped setup the LLRF and the motor drive software. At least one team member will be at JLAB later in the month to help with the actual tests.

We have successfully setup LBNL LLRF test facility here at LANL. This includes the EPICS software and screens. This will be a test bed for developing the autostart function.

LBNL

We completed the procurement of the last batch of boards. Marco and Mark visited the vendor, which is a high-class facility in San Jose. They showed us much more complicated boards than what we're asking for and look to be up to speed with the tools required to support complicated high density boards. We also delivered them a full set of parts, which has been inventoried and accepted by the company. We're expecting a very quick turnaround, and they'll give us a final delivery date on Monday, when they'll know exactly how much involvement is in the parts (SMA connectors...) that they cannot place/solder automatically. One more chassis is now under fabrication.

Larry tested the first version of an autostart algorithm, which is still work in progress. He will continue with this on the 402.5 MHz cavity in the Berkeley test stand. He also worked with Kay at Los Alamos, who is now successfully running a system at LANL. This confirms the readiness of the infrastructure that needs to be operational at JLAB. It is my understanding that the JLAB system is still under EPICS configuration.

We reviewed the RFO schematic and noise budget spreadsheet from LANL and ORNL respectively.

We also provided to a local software company the information needed to model the DFE and give us an assessment of its expected performance and potential problems.

The proposed P3 resource loaded schedule arrived at Berkeley and is being checked because it needs to be consistent with a prior PCR processed to cover work done at Berkeley for the RFQ and JLAB systems.

No issues to be reported. The only concern is how to strengthen the communication and collaboration at engineering level with both LANL and ORNL.

### **Electrical Systems Group**

Ken Rust visited IE Power to witness the Ring Medium Power Supply First Article acceptance tests. The power supply (5000A, 20V) passed these tests and will be shipped shortly.

An additional 40 corrector power supplies arrived from Danfysik, bringing the total here to 176. A technician from Danfysik will arrive next week to change out the sub-spec. components in the corrector power supply relay circuits - this should take about two weeks.

### **Survey and Alignment Group**

Survey and Alignment group has proceeded with the development and testing of the vector rod (for alignment of the DT's). New parts required redesigning and manufacturing. Initial tests were promising.

We attended a meeting with the Target/Instrument group to discuss fiducialization/alignment of the core vessel inserts and shutter inserts.

The level 3 meeting indicated that the alignment group was needed to validate the position of the first dump station on the linac. The delivery date for this item has moved three times and the latest for the delivery direct from the SNS buyer is that the dump will be delivered on the 14th and installed on the morning of the 17th of February.

Further we met with Danny Williams and some of his guys to discuss how to align/determine the position of the core vessel inserts and shutters. Various locations for fiducials were presented for the shutter and the use of a collimator mirror for the core vessel insert. Danny and group to discuss and we will meet again for the final resolution. June of 2004 is the scheduled date for the first shutter insert.

Had meeting with Harry B., Scott and Sandy of the general contractor to discuss the position of the local monument system and the timetable for the installation of the same. Found out that the instrument shelf is to be installed before Survey and Alignment will have a chance to use the monuments. A decision was made to postpone the installation of the monuments until the shelf is poured and cured. At this time the monuments will be cored and installed. A discussion was held about the Target Cart Liner and it was decided that a pre survey should be conducted. The general contractor is to position the liner on the instrument floor after all of the steel work is completed and erect a structure over it. S&A will then have the opportunity to pre survey.

Fiducialized 4 12q45 magnets in RATS. Performed verification/validation tests on same.

Set up magnet measuring fixturing for CCL Quads in RATS. Measured first CCL magnet, found deviations, details will follow.

Determined flange location on end of MEBT, within +/- 2 mm. Obstructions from gate valve made more accurate measurements impossible.

Observed added monuments for LEBT, vertically and horizontally. These will be added to our reference file for future use.

Removed protective caps from HEBT floor monuments proceeding with observation campaign.

Ran elevations from PP2 back through the FE to strengthen network numbers in Linac tunnel providing better support for upcoming DTL work.

### **Cryogenics Group**

CHL: The building contractor has installed the last roll up door in the compressor area. Also they have corrected the problem with the roll up door in the cold box room. The concrete access pads to all doors have been poured. The contractor replacing the 480 Volt electrical cables in the CHL needs the area near the motor control center to set his equipment. This is holding up the installation of all the purifier equipment ready to install in that area. HE is estimating completion by 2/11/03.

Weather has delayed the installation of the gas storage tank piping. King Mechanical, the south wall piping contractor, is preparing to pressure test the south wall piping. The cryo technicians are helium leak testing portions of the compressor piping previously pressure tested by King.

Work continues to locate vacuum leaks on the LN2 dewar. We have located leaks on the threads to the main vacuum valve and have contacted the manufacturer for recommendations on a repair procedure.

The contractor completion date has slipped once again from 2/21/03 to 3/7/03.

There was a problem with welding the #2 8" connection of the return modules. Impurities in the base material caused welding problems. The affected area was removed and new material was welded in place.

Installation of the gas taps on the warm gas header has started. Dirt in the inside of the bellows pieces has caused all of them to be returned to the Rats shop for cleaning and inspection.

Assembly of HB17/18 is progressing normally. The anchor bayonet is welded in place and assembly of the expansion bayonet is under way.

Assembly of MB 15/16 has encountered some problems. The expansion bayonet had a vacuum leak that was repaired. After cold shocking the expansion assembly an 8" bellows was found to be leaking. This will necessitate the disassembly of the expansion section to replace the leaking bellows.

The internal piping and shield of the supply expansion can were telescoped into the outer vacuum vessel. See attached picture.



## **Beam Diagnostics**

BNL SNS Beam Diagnostics Progress Report:

General: Preparations continue for the upcoming Design Review. Tentative date is March 25th and 26th. Preparations are underway for ASAC Review. ETC and schedule work was completed.

1.5.7.1 BPM: A stuffed base-band board was received and is in testing, interfaced to a LANL PCI card. Work continues on the RF portion of the BPM electronics. Delivered 12 more 12cm BPMs to the vacuum group (running total for 12cm BPMs is 21), sent out 10 units of 30cm BPMs to the brazing shop, continued assembling other BPMs

to be ready for copper brazing, continued machining parts for the additional 6 units of 30cm BPMs in the shop. LANL-design PCI interface cards needed for this system are in fab. A rack-mount PC for the BPM system was located and ordered after an extensive search, and has been received.

1.5.7.2 IPM: Design work continues on the IPM detectors. The inclusion of the electron calibration source in the SNS IPM will require switching of high voltages used to generate the electron sweep field. An electrical engineer has started to work on this design.

1.5.7.3 BLM: New ion chambers from LND are late, have been promised delivery next week. Thus far this delay has not impacted our ability to meet the DTL commissioning schedule. Preparations for DTL commissioning continue. We need an MPS board from ORNL to test our interface to MPS. So far it has not been possible to get one.

1.5.7.4 BCM: Testing of DTL BCM electronics continues. Working on conceptual design to meet the request for differential current measurements. Additional boards have been sent out for stuffing, are due back from the vendor next week. LANL version of the PCI card is in fab. DAC boards received for DTL calibrators Integrated BCM card in layout, a meeting with Controls resolved questions about implementation of the timing decoder. Need a V124S module from ORNL for system development work. Detail drawings of HEBT pickups are in progress

1.5.7.5 Tune: Considerable progress on system architecture, utilizing a BPM module.

1.5.7.6a Carbon Wire Scanner: Provided the shop dwgs and the spec of the custom-made beam boxes (to accommodate the LANL request for no fork intrusion in the aperture) for the bidding process among vendors. Awarded a contract to Key Vacuum Product to fabricate the beam boxes. Expected to receive the parts by mid March.

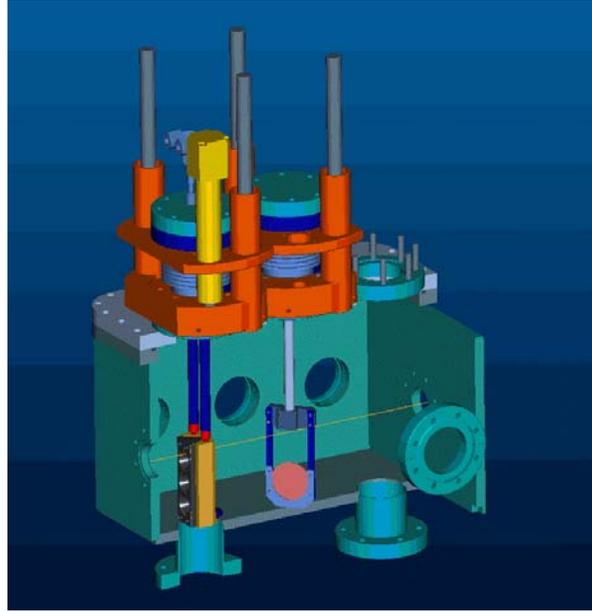
1.5.7.6b Laser Wire Scanner: Enjoyed and appreciated the ORNL presentation of the excellent results on laser wire measurements in MEBT. A job well done by the ORNL team.

1.5.7.7 BIG: Detailed kicker drawings are in progress. Vendor contact continues in preparation for the pulser purchase.

#### ORNL SNS Beam Diagnostics Progress Report

D-Plate: We are preparing for the D-plate installation and integration. All D-plate cables are bar-coded. We will start terminating the cables on Monday. Wim continues work on the data acquisition of the Laser-wire.

MEBT diagnostics: Based on the AP's request, the mechanical group designers and the diagnostic group are working on the "D-box system". Figure one shows the conceptual design of the D-box and two of the actuators holding the viewing screen and the aperture limit. This device will be mounted in the anti-Chopper box.



Craig is working on the design of the new and improved Fast Faraday Cup, Dave Purcell is writing the video capture program, Wim is working on the data acquisition of this system.

Miscellaneous: Andrei Liou has begun his one year appointment with the diagnostics group as a visiting engineer. He is familiarizing himself with the loss monitor documentation and will also assist with tests of the latest embedded timing circuit. A LLRF Advisory Board phone conference was held on Friday. Preliminary dates for the ring diagnostics review have been circulated (March 26. 27). ICALEPCS (the control systems conference) preliminary session descriptions and invited speakers were reviewed. Interviews are being arranged for technician candidates. Organizational information is being collected for the 2004 Beam Instrumentation Workshop. This workshop will be hosted by ORNL. A maintenance plan was prepared for front end and DTL D-plate diagnostics.