

Accelerator Systems Division Highlights for the Week Ending January 17, 2003

ASD/LANL: Warm Linac

HIGH-POWER RF (WBS 1.4.1.1)

Accomplishments this week: (1) Superconducting linac klystron S/N 8 is in the test stand at CPI- testing starts next week. (2) The first SC linac transmitter is completing dry runs for acceptance tests - final acceptance test start next week.

Concerns & actions: (1) We need to make up for lost testing time caused by the prototype HV converter modulator shutdown over last two weeks; our test stand is anticipated to return to operation as early as this weekend. We have staff scheduled to begin operation Saturday. We will start with the heat run on CPI SC klystron S/N 5. In parallel, we will run Marconi DTL klystron S/N 6 and process a pair of DTL windows that have not been through bakeout. Two and three-shift operations are planned for next week.

HIGH-VOLTAGE POWER CONDITIONING (WBS 1.4.1.2)

Accomplishments: (1) H. Pfeffer (Fermilab) spent 2 days reviewing our HV converter modulator design, status, and results. He reviewed the transformer secondary casting issue and prefers the uncast secondary design. He didn't believe a "dry" design (a cast unit) would be reliable at 140 kV. He also suggested electrical tests to determine any resonances in the secondary winding stack. He reviewed IGBT performance parameters and felt that the thermal performance is safe. The failure-in-time (FIT) rate has uncertainties, but manufacturer's data suggest a 15-year lifetime for the SNS facility. (2) D. Anderson (ORNL) spent a day reviewing the modulator diagnostic and testing procedures on our prototype unit. He also reviewed our "dynamic saturation" results and measurement technique, and he reviewed our plan for future tests needed to confirm the switching models. (3) We met with Sorrento Electronics to determine a production schedule for possible modulator capacitor upgrades. (4) We tested the IGBT driver printed circuit card for the possible "dual" IGBT unit. Results were satisfactory.

Concerns & Actions: (1) Delivery of the second production converter modulator is delayed until next month pending resolution of the secondary transformer casting problem. We completed the design of the boost transformer secondary reinforcement method that is suitable for the cast bobbin design. Acceptance rests at Dynapower will resume in two weeks. Meanwhile we continue with installation of the accepted subsystems (safety enclosures, oil tanks, and cooling manifolds). (2) Troubleshooting on the 13-kV utility pad began this week. Procedures to restart the LANL prototype converter modulator were written and reviewed. Authorizations to energize the system are pending.

DRIFT-TUBE LINAC (WBS 1.4.2)

Accomplishments: (1) Weld repairs were completed on all tank-3 drift tubes water channels. (2) Machining of a "fast prototype" tank-1 drift tube progressed into the cavity and cap stages; unit will include a PMQ for full process emulation. (3) Water channel welds for tank-1EMD dummy DT's were completed. (4) Diverter braze qualification was completed with satisfactory results. (5) LANSCE-2 hydrogen brazing furnace came on line on schedule with a successful test run. (6) Initial plating of the Iris/RL wave guide for tank-1 was completed; unit is currently undergoing stress relief combined with the first hydrogen furnace brazing operation. (7) Machining continues on replacement tank 3 and 1 drift tube mounts ("top hats"). (8) Valves are being included in Iris/RL wave guide NEG pump spool. Layout is underway. If no problems are incurred, we will order first required valve (for tank 3) to keep schedule. (9) Gentzlinger and Fox visited Hanford and negotiated a reduced cost estimate for e-beam welding. Hanford appears to have plenty of e-beam welding capacity; we will not keep them busy.

Concerns & Actions: (1) On 1/17/03 during post machining inspection of a group of drift tube linac (DTL) tank three drift tube water channel repair welds it was discovered that there is little or no cap joint weld present in these units. Additional tank three drift tubes were inspected and the problem appeared to be systematic due the original welding and machining process used to produce these drift tubes. These flawed processes have already been abandoned and therefore subsequent groups of drift tubes currently being built or rebuilt are not subject to this problem. Cognizant project engineers discussed the problem and after consultation with the DTL chief scientist elected to begin an additional repair process to restore these flawed tank three drift tubes. A proven ring weld repair process will be used. An engineering change notice was issued and transmitted to the fabrication vendor at close of business on 1/17/03. Repairs are commencing immediately; presently it is believed that the repairs may be affected and still permit delivery of the required tank three drift tubes according to the required schedule. (2) Aster informed us that of a two-week delivery delay for replacement PMQs due to a subcontractor error (permanent magnet material

magnetized in the wrong direction); at this time, there is no impact on schedule as we will be using spares and/or magnets originally slated for installation in other DT's. (3) Schedule analyses revealed that we need to accelerate the tank-1 brazing operations to meet the Apr 1 delivery schedule. Negotiations are underway to accelerate schedule. (4) Redesign of the intertank region to accept vacuum valves with bellows-sealed stems is underway; beam box machining and modification are required. End wall o-ring modifications are not possible for first few tanks. We need to proceed soon with the vacuum valve order. (5) We are preparing leaking tank-3 BPM drift tubes with silver solder and/or copper plating. The production of a "dummy" tank-3 BPM drift tube was initiated in case the repair is not successful.

COUPLED-CAVITY LINAC (WBS 1.4.4)

Accomplishments: (1) ACCEL is qualifying a brazed flange process to replace the plated flange process for the segment and bridge coupler large end flanges, if required. So far all brazed flanges have been tight with no leaks under the copper. (2) A large quantity of segment internal plates was completed and production of these components is progressing favorably. (3) Support stand manufacturing for the module-1 assembly is underway at Backerworks in Albuquerque and the additional material for the remaining modules has been ordered. This material is destined for Germany to support fabrication for stands for modules 2-4. ACCEL will produce these through a subcontract to a local firm. Module-1 is schedule critical and thus we are handling that unit closely through our staff here at LANL. (4) Bids are being received on the beam tube welded assemblies and we plan to issue a contract for those components within the next week.

Concerns & Actions: Given the problems encountered so far, ACCEL considers the plated flanges on the segment endplates to be suspect and have decided to remove the plated flanges from all existing segment endplates to prevent the possibility of leaks occurring on these components. They continue to work the problem thoroughly.

ASD/JLAB: Cold Linac

Cryomodule M-1 assembly continues with completion of helium process piping, installation of cold instrumentation, installation of inner magnetic shields and attachment of the bridges between the Fundamental Power Couplers and the vacuum vessel. See photo.



Figure 1 Production Cryomodule M-1 in Assembly.

Two of the three cavities for cryomodule M-2 has been qualified. A third cavity will be tested today and a fourth will be tested on Tuesday. We are confident that one of the two will meet requirements. M-2 cavity string assembly will begin Tuesday.

Three cavities for cryomodule M-3 have been inspected and heat-treated. One has had its helium vessel attached.

Three cavities for M-4 have been inspected and heat-treated. Cavities for M-5 and M-6, as well as one cavity for M-7, are on hand and have passed incoming inspection. Vendor production is proceeding smoothly.

Problems with the electropolish power supply have been corrected. The acid pump has been returned from the vendor.

ASD/BNL: Ring

ETC efforts are underway for all Ring sub-systems.

Medium Range PS: First article testing of the first model of the medium range power supplies took place this week at Danfysik. The unit tested fell short of meeting specifications. A plan was made to fix the problems; the unit will be re-tested in February '03. During this same trip, engineers successfully tested the first article RF Tune PS; three of the four units will be shipped directly to Oak Ridge.

Low Field PS: A capacitor in a Low Field Corrector failed during factory tests at IE Power. Investigations revealed the cause to be insufficient ratings on this part and two transistors. The manufacturer is going to send a technician to ORNL to remove the capacitor and replace two transistors in each delivered unit. New deliveries will include the change.

A pre-production design review was held this week with our vendor, Applied Power Systems, on the High Field PS for the Ring dipoles.

Engineers from our EE Group traveled to our vendor, Lambda, to inspect their production process and resolve specific issues related to the RF Anode PS.

BCM: Failure of MEBT BCM electronics appears to have resulted from application of high voltage to the signal input. The Diagnostics Group is trying to understand how this might have happened. The IFE has been repaired and the unit shipped via overnight mail to Paul Gibson.

The movable shield has been shipped to Oak Ridge with all QA travelers and related documentation.

A contract for the 26S26 (8) high field sextupole magnets has been awarded to Alpha Magnetics, located in California.

21Q26: The last six phase-I production quads (#28) arrived from Tesla today. In our weekly teleconference with them, Tesla reported that they are working on the second phase of this production contract. They aim to ship the first six units to us in March.

Field measurements have been resumed on the 21Q26 magnets. A total of twelve magnets are now measured; three since last week's testing restart.

36CDM30 – Acceptance testing of the vendor repaired 1st article continues. Experts are analyzing the inspection / test data.

Half-cells – assembly of unit #2 is in progress. Unit #3 is being pre-surveyed for assembly.

Work continues on equipment L/O and space for the BIG and the Tune Kicker at the Extraction and Collimator straight sections in the Ring.

Chicane #4 (with added z bumps) is being prepared for field mapping.

36Q85 - the last magnet core (#4) arrived this week from Raynor.

A trial winding of a radiation hardened corrector magnet coil section was recently started.

The last of the Ring arc vacuum chambers was welded this week. Assembly of the quad doublets is in progress.

The ASD report on recommended spare vacuum chambers is under review by concerned parties.

Earlier this week, we helped Mike Nekulak celebrate the start of his retirement and new life away from BNL and SNS. Mike was most grateful for all the cards, gifts and kind words that were sent to him on this occasion. He was particularly fond of the SNS squirrel tail hat that was given to him by his friends at Oak Ridge. Well done!



Controls

Two controls team members participated in the US Particle Accelerator School at Baton Rouge as instructors (of EPICS) and a third participated as a student (of Accelerator Fundamentals). Yury Eidelman arrived from BNL to assist in the implementation of an Alarm Handler Configuration Tool.

This week was spent primarily in developing strategies to respond to operational issues uncovered during the current run. Although the system has run fairly well and there are very few hardware or software failures, it is clear that there are insufficient high-level summary screens available to operations to help in the diagnosis of problems.

The leading operation request was for easier access to archived data, which could only be viewed from the control room. A “mirror” was set up so that the archive is now available outside the control system firewall. Graphical archive retrieval tools are now easily accessible from a pushbutton on the top-level operator screen. These improvements were described at the weekly ASD staff meeting.

A number of minor changes were made during the weekly maintenance period. The version of EPICS running in the IOCs was upgraded to a more recent version that allows more complete operational statistics to be tracked. This upgrade revealed a number of problems, most of which (hopefully) have been fixed. Timing gates for the laser wire and a trigger gate for the control room scopes were added. Additional summary information was added to the top level MPS screens, and “bumpless reboot” was added to MPS systems.

The GPS timing generator is under test in the controls laboratory, and some interesting anomalies detected. Timing is accurate to the nanosecond, but it gets confused about what year it is.

At Los Alamos, work continued on the implementation of lattice view for XAL. The Los Alamos team is preparing to support the D-Plate installation and commissioning. Cooling and P&ID mimic are complete for the D-Palate and for DTL1. A test plan for the cooling and vacuum systems is under development. The token/response portion of the Residual Gas Analyzer (RGA) driver is complete and running on Linux. Design work is proceeding on SCL vacuum I/O devices. A desktop shunt test for the CCL power supply system has been set up and is operational. The steering/corrector rack is also ready for test, as is the magnet cycling software.

Cable lists and block diagrams were provided to Installation Services for installation of control system cables for the first 4 medium beta cryomodules, the CHL warm compressors and gas management system, the 4.5 K main cold box, purifier, and guard vacuum systems. Hardware and Software Documentation and EPICS Screens were updated in preparation for the upcoming Cryogenic System commissioning review.

Installation

Craft Snapshot 1/15/03

ASD craft workers	49.0
Foremen, ES&H, etc	8.5
Less WBS 1.9 controls	1.0
Less absent	1.0
TOTAL	55.5

The Laser Wire Device was installed in the Front End System.

Preparation for acceleration of Ring Installation was continued. The requisition for Main Ring Dipole copper bus material was initiated in preparation of approval soon.

Installation planning for the upcoming shut down/maintenance period was developed. Major modifications are planned in both the DTL #1 and #3 klystron piping systems in addition to CF DI Room #1.

The Division Director's Weekly Installation meeting included a discussion of the SNS Labor Standards Determination (Davis Bacon) and current utilization of crafts in installation tasks.

Advanced planning of accelerated Ring Installation was also reviewed with emphasis on procurement preparation.

Accelerator Physics

Several members of the group worked on reconciling the MEBT trajectory model with measurements. Successful results were obtained for matching the observed trajectory to initial position and angle errors, as well as obtaining corrector response matrices that agreed with the model.

A high-level parameter list for a 3 MW SNS energy upgrade was compiled.

S. Kim has begun evaluating the power dissipation limits for the MEBT chopper target in the context of LEBT chopper failure scenarios.

Operations Group

Running Commissioning

Rolled out a new version of the electronic logbook

Participating in the ASD LOTO Audit

Preparing the revised ARR Plan of Action for submission to DOE

Working on CLO Planning

Working on the Computer Maintenance Management System

Ion Source Group

The 13 MHz amplifier failed Thursday morning. As this happened shortly before the planned maintenance shutdown, the source was operated without it for the remaining two hours.

Unsuccessful cesiation attempts suggested that the Cesium getters might have been poisoned during extended operation with a significant air leak. The leak developed when the source position and angle were varied to recover the lost beam. As the cesium cartridges could not be easily removed from the cesium collar it was decided to replace the entire source.

With the ion source removed it was found that lens 1 might have been out of place due to a loose screw. In addition it was found that the entire LEBT with extractor was miss-aligned with the ion source. This may have been the problem that caused the beam to emerge from the RFQ with a tilt angle.

Mechanical Group

Magnet Task

This week we completed mapping on HEBT Quad # 20. Thus far we have mapped and fiducialized six 12Q45 quads.

We also performed measurements on the 1st article CCL Quad. The Quadrupole field is fine, however, we discovered a short between the steering winding and the Quad winding on one pole. The magnet also fails resistance to ground specifications at the same pole. We are returning this magnet to the vendor who will install a new coil.

We also receive the DTL/CCL R175QN45 Quadrupole. We will start measurements on it next week.

Work continues on HEBT dipole re-brazing.

Overall Magnet Task status is given below:

33 HEBT 12Q45's have Coil Clamps Replaced. 33 HEBT 12Q45's have had water fittings re-brazed. 6 HEBT 12Q45's have been field mapped. All 12Q45's have been pressure checked

There are 15 16CD20's on the floor. We have field mapped one of them.

9 HEBT 8D533 Dipoles have been field mapped. 1 HEBT 8D406 Dipole has been field mapped. The process of re-brazing HEBT Dipoles is underway.

Drawings are underway for a measurement coil that will be used for measuring 21Q40 Quadrupoles.

The SRF 8Q35 Quadrupole has been field mapped.

The CCL 1st article Quadrupole is being field mapped. This Quad has a short between the steering winding and Quad winding on one pole. There is also an unacceptable short to ground on the same coil. We will send this magnet back to the vendor and get the coil replaced.

The DTL/CCL R175QN45 Quadrupole has arrived.

We have field measured all DTL Tank 1 & 3 Drift Tube PMQ's. These are not re-worked or new Drift Tube Quads.

Linac HPRF

Linac LLRF

ORNL

FE Commissioning Support

The failed MEBT Rebuncher LLRF controller was restored to service on Wednesday night, Jan. 15.

Team Videoconference

A team videoconference was held on Wednesday, Jan. 15. The topics for discussion included:

Brief commissioning status report

- RFQ performance measurements
- MEBT controller problems
- Self-Start development and implementation (one button operation)
- who, when, how
- Status report on hardware development at LANL
- Status report on FPGA code conversion for new hardware
- Update on JLab test
- schedule & personnel
- Response to design review reviewer comments
- discussion/comments on write-up
- Reference Line
- plan for 402.5 MHz system
- discussion
- Error Budget
- strategy for completion

System Error Budget

The error budget for the LLRF control system is being examined in detail. A spreadsheet was distributed and numbers are being assigned. We intend to complete this work by the end of January.

Reference System

The reference system was discussed at length during a teleconference on Thursday, Jan. 16. The 402.5 MHz line will be used as a test bench to compare the system performance in two configurations: down conversion in tunnel and down conversion in the klystron gallery. However, the baseline design still calls for down conversion in the tunnel. We agreed to use the Mini-Circuits ZFM-4H level 17 mixers.

Design Review Report

The Dec. 17 hardware design review report was categorized and assigned to the appropriate team members for addressing the concerns of the reviewers. We will provide a written response by Jan. 24.

FPGA Code Development

The Matlab Compiler software was received this week. This software will be used to support FPGA code simulations in conjunction with Matlab system models that have already been developed. A simple test case will be attempted initially as a proof of principle.

LANL

Accomplishments: (1) Work continues on producing Rev 0 of the new hardware platform. Circuit boards are expected to go into fabrication and assembly February 24 and we expect the first prototype platform in mid-March. The schedule so far is being met: (a) The analog front end (AFE) design is based closely on the BPM AFE. Tests of the just received BPM boards so far indicate the feasibility of meeting LLRF requirements. Our latest specifications were sent to GMW (Bergoz) last week for a delivery date of first week of March. (b) The Digital front-end design was frozen. The completed schematic was distributed for external review. The LANL CAD group is laying out the board. (c) The RF Output module schematic is under development and board layout has started. (d) The motherboard schematic capture will start next weeks. (2) I. Debaca and M. Prokop visited Suntron Corp, an electronic manufacturing company in Phoenix. The goal was to review the company's production facilities and quality control procedures. The company specialized in aerospace and mil-spec grade electronics. They have an extensive Q/A program to catch board and design errors before processing. Every step of the manufacturing is documented and they have passed strict production audits. They also have an extensive facility to test manufactured boards in details before shipment to customers. They have received early design of our boards and will work with LANL throughout the process. (3) We are tightening specifications by developing a more thorough error budget for the entire LLRF system. There is also an updated set of requirements for the AFE to support the work being done by

Bergoz. (4) Mark Prokop traveled to LBNL for a two-day discussion on applications firmware and software with Larry Doolittle including: (a) review of current Verilog code in detail; (b) review of outline for FPGA specifications; (c) review of changes required for porting to new board; (d) general discussion on approach. (5) The interface control document (ICD) is in progress to completely specify the firmware specifications including interface between the hardware, firmware and software. This will be the blueprint for adapting the LBNL firmware to the new board as well as adding the extra functionality. (6) Our MATLAB model was modified to allow reconciling system models with measured data. This has been tested on a batch of preliminary data from RFQ at ORNL and looks promising as a tool during system commissioning. (7) An independent analysis of resonance control has essentially verified the existing MATLAB models. (8) We are investigating developing an "autostart" procedure.

Concerns & Actions: (1) The project is in need of a LLRF expert systems engineer to ensure technical integrity from specification to design, signal processing, RF issues, implementation and ultimately commissioning. (2) Specifications are still not firm and this could affect the final hardware and firmware design. (3) We have identified two potential VHDL engineers who could come on board by the end of January.

LBNL

The 805 filters have arrived. This is the only long lead item that was missing to complete the chassis to be used in the JLAB tests. We don't anticipate delays in delivering the controller to JLAB when needed.

We shipped a spare digital board and a spare nanoengine interface to ORNL to help troubleshooting the MEBT unit that is having problems.

We received a visit from Mark Prokop (LANL) who discussed with us extensively issues concerning the current FPGA codes requirements, as well as reviewing the existing Verilog code. He requested documentation for some items, and Larry provided this.

A description of the desired autostart function has been written and circulated among collaborators for comments.

We initiated procurement of all parts to load ten more digital boards, as well as connectorized components for one more chassis.

Good progress was made in the FPGA programming of the interface to EPICS for the new chassis. We anticipate this being complete by next week, unless Larry's travel prevents this.

Budgetary numbers for December came in line with projections.

Electrical Systems Group

Survey and Alignment Group

The eight HEBT dipole magnets have been fully fiducialized. BNL/Ted Hunter have also provided us with the proper order of placement within the HEBT Ring. As a result, the magnet data has been translated into the global coordinate system. From a Survey & Alignment perspective, these magnets are ready for placement within the HEBT Ring.

The fiducialization of 12Q45 Quadrupole Magnets in the RATS BLDG is progressing well. 15 Magnets have now been fiducialized.

Last week the exterior of the Emittance Scanner was mapped with the laser tracker. Four fiducials were added to the component to relate the location of the flange centers to the beam and help in future installations. Additional optical tooling tests were conducted yesterday with results to follow ASAP. One thing we can state at this time; however, is the physical location of the Emittance Scanner with respect to beam based upon flange centers on beam line. The flange centers on beam z-axis, were positioned 4 to 4.5 millimeters low with respect to beam center. More information will follow next week.

Survey & Alignment supported this effort in the placement of the DTL Tank 3 within the Linac Tunnel. Although conditions are not perfect for alignment, every effort was taken to warrant that the tank was placed in its optimum position for current conditions.

Installation of Laser Scanner Warm Section began yesterday (Thursday) and is still continuing. Holes have been laid out and drilled on both the ceiling and the floor. The base table is also in place and has been set to proper elevation. As soon as the other components are delivered to the site, they will be installed and aligned.

Survey & Alignment has attended a number of meetings with Target/Instrument group in support of their installation and alignment needs.

Cryogenics Group

The main CHL helium compressor piping is completed. Pressure testing of the installed piping has begun.

The main CHL air supply tank has arrived and has been set in its final location.

The south wall CHL piping and the storage tank piping contractors are being hampered by inclement weather.

The following transfer lines have been shipped to the tunnel:

- The west end box (Medium beta return module MB1/MB2)
- Return High Beta Module HB9/HB10
- Return High Beta Module HB11/HB12
- Return High Beta Module HB13/HB14

Work is 25% completed on Return High Beta Module HB15/HB16. Work continues on the assembly of the transfer line supply expansion can.

Return modules HB9 through HB14 have been placed on stands and welding of the primary 6" lines has started on the west end can.

Beam Diagnostics

ORNL Beam Diagnostics Progress Report:

Laser Profile Monitor: The Laser profile monitor team successfully integrated the first article SCL system at the end of the MEBT. Peter Ladd's group leak checked and oversaw the vacuum work. The mechanical team led by Graeme Murdoch and Dan Stout oversaw the installation of the vacuum diagnostic box. Installation went extremely well. Kerry Potter (design lead) installed the optics boxes and hand over the system to the alignment group and the diagnostic group. We aligned the optical components; the laser is tested and ready for beam. Craig Deibele and Jim Pogge have a new integrator for the electron collector with 2.5 ns rise-time. Paul Gibson assisted us all day. The figure below shows the entire laser test stand.



Below is the first result from the ORNL laser system. The electron collector works as advertised. The magnet performs per spec. The entire setup is done professionally. Laser and optics is very stable. My congratulations to the design team.

Craig Deibele is preparing a number of fast Faraday cups for the MEBT tests.

LANL Beam Diagnostics Progress Report:

BPM pickups: Work started this week to map 10 ea. SCL BPMs. We are on track to deliver these BPMs by the end of January.

BPM electronics: The order for 15 each digital front ends (DFEs) should be placed today (16/Jan). The order for approx. 15 each PCI motherboard cards will be placed soon. Two members of the diagnostics team will travel to ORNL next week to work on the BPM with the new IOC core.

WS electronics: Work continues to stuff the PC boards for the DTL-1 and D-plate wire scanner signal processors. Two PCs have been prepared to go with these electronics, and all software is loaded with the exception of the final LabView code. The chopper driver chassis are assembled and ready for testing. An SNS wire scanner user guide has been prepared -- LA-UR-02-5057.

WS actuators: The first actuator was shipped to ORNL this week. It will be installed on the D-plate. Work continues to prepare the other actuator, destined for DTL-1. We are applying the final touches to the statement of work needed to place the production order for the DTL and CCL actuators.

D-plate: A member of the diagnostics team traveled to ORNL this week to install water-cooling hoses, water fittings, the steering magnet, and the first actuator. Work continues to prepare the slit and harp actuator assemblies. Two members of SNS-3 began work this week on the LabView programming for the halo scraper / beam stop electronics and controls. The electronics chassis is ready for testing.

ED/FC: Two members of SNS-3 also began work this week on the LabView programming for the ED/FC electronics and controls. The electronics chassis is also ready for testing.

Software: We have the initial DMA test code for timing board added to the driver and compiled. Members of the diagnostics team will test it with hardware next week while in Oak Ridge.

BNL Beam Diagnostics Progress Report:

General: Preparations continue for the upcoming design review. Tentative date is March 25th and 26th.

1.5.7.1 BPM: Delivered 4 more 26cm BPMs to the vacuum group. Assembling more 12cm BPMs for brazing. Shop fabrication of 30cm BPMs for the spare vacuum chambers continues. BPM base-band PCB is being stuffed. Expect boards to be available for testing late next week. RF/mixer section design continues. PCI interface cards needed for this system were requested from LANL. None are available, but BNL has the artwork and will make appropriate modifications and manufacture the boards. We will acquire parts and construct/stuff/program the boards here. A rack-mount PC for the BPM system has been located after an extensive search. One of the many complicating factors is the non-standard size of the PCI interface card. Project-wide commonality on rack-mount PCs is a desirable goal, which has not yet been reached.

1.5.7.2 IPM: Design work continues on the IPM detectors. A single MCP will replace the original concept of a 14cm wide detector array. The beam, however, is 12cm wide at the IPM, and now a 19 cm array is under consideration. This would require two MCPs. Some complications with gain are introduced in this design, but for now the detector is being built large enough to accommodate the large format with the 14 cm array as a fallback. Beam tests with the rebuilt RHIC IPMs using the Laird Electro Vent panels for RF isolation show that this material prevents measurable RF coupling from the beam while allowing electrons to pass. This technique will be applied to the SNS IPM.

1.5.7.3 BLM: The purchase order for all Rexolite cable ends and bulkhead connectors has been submitted. We have agreed to use the Times Microwave cable for the HV bias distribution; a compatible cable end was suggested by ORNL. The PCB design for the AFE board is nearly complete. Assembly of the AFE module test box continues. Discussions continue with our Russian colleagues regarding processing the neutron detector signals through our AFE chassis.

1.5.7.4 BCM: Failed MEFT BCM electronics was received, failed components were identified, repairs were completed, a report has been written and submitted, some RF protection was added, and the equipment was shipped overnight delivery to ORNL Tuesday (1-14-03). Cause of failure was determined the application of over-voltage to the signal input. It remains a puzzle how this happened. Expected levels from the transformer are of the order of 10's of millivolts. Several orders of magnitude more would have been required to cause the observed damage. Preparation for Linac DTL BCM system deliveries continues. Changes to the BCM schematic to accommodate replacement parts for those being obsolete have begun.

HEFT BCM mechanical design is under review. Some deficiencies in the design are being addressed.

1.5.7.5 Tune: received quotes from Meggitt Systems and Ceramaseal for the HVN feedthroughs. Additional manpower has been assign to accelerator physics oversight and detailed design of timing and control.