



## Detector Support Group Weekly Report, 2016-02-17

Glossary: EDC = Estimated Date of Completion.  
MFC = Mass Flow Controller.

### Ongoing Projects

#### I. Hall B SVT (Amanda, Brian, Mary Ann, Peter)

Task: Study reason for increased current draw.  
EDC: 02/29/2016  
Work done: DAq code to acquire and record HV currents from the eight modules once every 10 minutes completed.  
Initial data analysed.  
Strip chart and table of dead module is in Amanda's section  
Comments: Modules P54<sup>†</sup>, P67<sup>†</sup>, P70<sup>†</sup> are dead.  
Long term test is to continue till end of July 2016.  
**Status:** DAq Completed. Data taking in progress till 07/31/2016.

#### II. Hall D PLC Systems (Peter, Tyler, Amanda, Mary Ann, Marc)

Task: Locate and document (including spares) the eight PLC systems in use.  
EDC: 03/15/2016  
Work done: Started looking at Allan-Bradley reports to locate unidentified Process Variables.  
Comments: Except for a few Process variables, which still have to be located, all PLC systems have been documented.  
Spares are yet to be tallied.  
Need photo of Tagger, Target, BCAL\_DS Point I/O, BCAL\_US Point I/O, FDC/CDC Point I/O.  
**Status:** Work in progress.

#### III. Hall B Gas System Hardware (George, Sahin, Mindy, Anatoly)

Task: Install Gas System hardware.  
EDC: **TBD**  
Work done: Nine mass flow controllers installed in the gas shed.  
Forward carriage rack has been delivered to the Hall.  
Comments: Rack need to be installed by Hall B Engineering.  
Once rack is installed, cRIO chassis and the interface chasis can be installed.  
No news about procurement of C<sub>4</sub>F<sub>10</sub> for LTCC.  
Note, lead time for C<sub>4</sub>F<sub>10</sub> is about six to nine months.  
**Status:** Work in progress.



## Detector Support Group

### Weekly Report, 2016-02-17

- III. Hall B Gas System Slow Controls (Brian, George, Marc, Mary Ann, Amanda, Tyler)  
Task: Perform PID controller test with new MFCs.  
EDC: 02/15/2016  
Work done: Replaced, wired, networked, and leak tested three MFCs.  
Comments: The PID controller works with the new MFCs.  
**Status:** Done.
- IV. Hall B Magnet Slow Controls (Brian, Peter, Amanda, Tyler)  
Task: Test Power supply.  
EDC: 2/12/2016  
Work done: DSG team had a meeting with Josh Ballard and Glenn Young.  
Comments: **No progress with wiring of Power Supply.**  
**Status:** Work in progress.
- V. Hall B HDICE (Peter, Brian, Mary Ann, Amanda, Tyler, Mindy, Sahin)  
Task: Fabricate RF box.  
EDC: **TBD**  
Work done: Receiving RF box components.  
Comments: “We just finished testing the noise level for short cables in several conditions (frequency, power, NMR coils) and started the all Molex cable test today. All tests so far were at room temperature. A quick look of the results shown a big improvement over the old cables. We just start to do careful noise analysis today. We'll finished testing the new 10 feet cable with room temperature dewar (NMR coils) this week. The short Molex cable connected NMR rack runs quiet and stable so far. **Mindy's newly modified Molex cables are good, she should make more. Please say thanks to her.**” Wei  
**Status:** Work in Progress
- VI. Hall B HTCC (Mary Ann, Mindy, Anatoly, Sahin)  
Task: Fabricate cables.  
EDC: 07/31/2016  
Work done: All cables for which connectors were available completed.  
Comments: “Dear Amrit, Thank you very much indeed for the **excellent work of your group** helping us in our project. We expect delivery of the remaining 50 LEMO connectors later this month after Feb 19. Regards, Youri”  
**Status:** Waiting for new components.



## Detector Support Group

### Weekly Report, 2016-02-17

#### **Antonioli, Mary Ann**

##### **Hall B**

###### **HDice**

- Completed retesting of Rotation of Target Polarization software.

###### **HTCC**

- HV cable (50) fabrication completed by Mindy.
  - ★ Testing and labeling completed by Sahin.

###### **SVT**

- Input mid-February module data into spreadsheet and imported data into SQLite.

###### **Gas System**

- Began Visio diagram of DC gas system.

##### **Hall D**

###### **PLC System**

- Using reports, began adding missing tags to spreadsheets.

##### **DSG**

- Began formatting and editing Gas System Development note in InDesign.
  - ★ Made Visio diagram for document.

#### **Arslan, Sahin**

##### **Hall B**

###### **DC**

- Assembled storage rack in gas shed.

###### **HTCC**

- Tested continuity of the 50 HV cables and labeled.
- Labeled 48 signal cables then bundled them.
- Cables are transferred to room 108.

#### **Bonneau, Peter**

##### **Hall B**

###### **Magnet Systems**

- Meeting on Tuesday 2/16/16 regarding testing of PLC controls on the Hall B Torus magnet. Meeting also reviewed other magnet programming tasks including the checkout of the distribution box controls. The work on the distribution box controls is expected to start ~ April 10th. The request for PLC programming on the Solenoid Bore Heater Control has been canceled.

###### **HDice**

- Reviewed HDice work in progress with Xiangdong Wei.

###### **RF Switching/Attenuation Unit**

- Started receiving & testing new components being received for the 3<sup>rd</sup> RF Switching/Attenuation Unit.



## Detector Support Group

### Weekly Report, 2016-02-17

- Started reviewing and update of the LabVIEW test program for the RF Switching/Attenuation Unit.

#### Rotation of Target Polarization Program

- All tests on the revised / updated Rotation of Target Polarization Program have been completed.

#### SVT

- Completed DSG note on the SVT Hardware Monitoring System.
- Monitored SVT Hardware Monitoring System Interlocks on a daily basis.
  - \* System has worked continuously and flawlessly since installation in mid-August of 2015.

#### **Hall D**

- Using the Rockwell PLC project files used by Hall D, added / revised module signal definitions on PLC report layout files.
- Submitted PR for replacement PLC computer to be located in the DSG Control Room.

#### **DSG**

- Trained A. Hoebel and T. Lemon on Allen Bradley PLC systems.
  - \* Showed how generate tags for signals used in PLC program.
  - \* How add and program basic function block diagrams into PLC project files.
- Trained A. Hoebel \ M. Antonioli \ T. Lemon on LabVIEW programming
  - \* Covered first steps on the creation of a GPIB device driver for the CT box calibration test.

#### **Eng. Brian**

#### **Hall B**

#### SVT

- Debugging R4 S9 after a bit over a full day of running at 85V after Yuri burned it, now HV+ and LVD+ are tied together through an intermittent connection (not a dead short, but much lower resistance than other modules).

#### Gas System

- Debugging cRIO to EPICS communications from .86 to .160 subnet.
  - \* Wesley found that it had used broadcast IP to talk to IOC, so might be firewall issues.
  - \* Confirmed working on LabVIEW from Windows computer, but still can't get EPICS client to work on cRIO.
- Confirmed PID works with new network MFCs, auto-tuning PID not working yet.

#### Magnets

- Stopped work on power supply when turning on the control side PS there was a bunch of noise, initially Doug Tilles thought to be the main contactor, turned out to be the dump switch.
- Mark Todd has since disabled this (confirmed no more noise from MPS), but that switch is needed to put power through the supply, so now waiting on go ahead from Sarin to resume testing.



## Detector Support Group

Weekly Report, 2016-02-17

### Hall D

#### PXI

- Sent Tim & Nick more detailed information on bit-mask for first integer PXI sends PLC, some of the bits are tied to the dumping part in PLC, but for the PXI it comes from EPICS (no calculations on the PXI itself).

### DSG

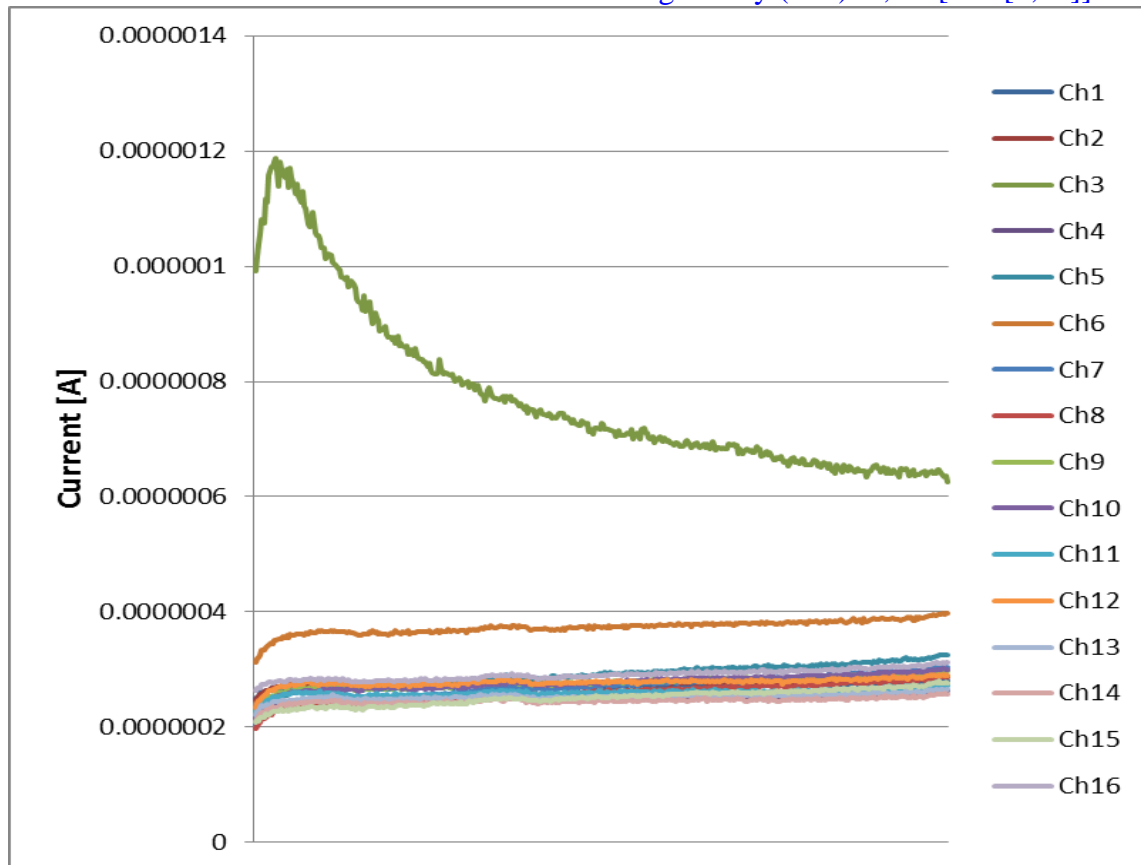
- Hiring panel and interview evaluations.

### Hoebel, Amanda

#### Hall B

#### SVT

- Wrote C program to read currents and voltages from 8 spare modules.
  - \* Values read directly from MPOD crate.
  - \* Program saves values into SQLite database every 10 minutes.
  - \* Created chart of current draws.
    - X – Axis is time. Data taken over 60 hours. Channel numbers, n, which are odd are for the top side of the modules, those that are even are for the bottom side. Module number is given by  $(n+1)/2$  ;  $n \in [\text{Odd}[1,16]]$ .





## Detector Support Group Weekly Report, 2016-02-17

- ★ Created table of poorly performing modules in assembly.
  - Columns are: Region, Sector, Side, Module ID, Voltage, and current. Dead modules are highlighted in red.

12/15/2015					1/15/2016					2/1/2016					2/15/2016									
					1	8 B	P70	35	450	1	7 B	P67	50	498	1	7 B	P67	50	553	1	8 B	P70	17	460
2	2 T	P83	85	291	2	6 B	P25	65	250						2	6 B	P25	35	305					
2	6 T	P25	85	292	3	9 T	P11	85	293	3	9 T	P11	85	229	3	9 T	P11	85	228					
3	9 T	P11	85	328	3	9 B	P11	85	273															
3	9 B	P11	85	300	3	10 B	P87	85	317	3	10 B	P87	85	240	3	10 B	P87	85	243					
3	10 B	P87	85	348	3	11 T	P16	85	298	3	11 T	P16	85	234	3	11 T	P16	85	235					
3	11 T	P16	85	328	3	11 B	P16	85	287	3	17 B	P13	85	248	3	17 B	P13	85	230					
3	11 B	P16	85	314	4	1 B	P10	25	325	4	1 B	P10	25	490	4	1 B	P10	15	342					
3	17 B	P13	85	352																				
4	1 B	P10	21	279	4	2 B	P14	85	293															
4	2 B	P14	85	293	4	5 B	P15	85	279															
4	5 B	P15	85	305	4	9 B	P54	65	237	4	9 B	P54	20	129	4	9 B	P54	0	22					
4	9 B	P54	10	208	4	11 B	P69	85	405	4	11 B	P69	85	348	4	11 B	P69	85	341					
4	11 B	P69	85	468	4	12 B	P30	15	226	4	12 B	P30	65	474										
4	12 B	P30	15	226	4	15 B	P47	85	304	4	15 B	P47	85	260	4	15 B	P47	85	249					
4	15 B	P47	85	331	4	18 B	P9	85	273						4	18 B	P9	85	222					
4	18 B	P9	85	298																				

Table shows SQLite query results for modules whose current exceeded  $1\sigma$  from the mean value of all currents recorded on the dates listed. Modules highlighted in yellow refer to a module that drew current above this  $\sigma$  value each time the data was recorded. Modules highlighted in red are declared dead, these are modules whose depletion voltage was continuously lowered in an attempt to control current. Voltage for module P54B reads 0[V] because the module is turned off.

- Attended SVT meeting.
  - ★ Discussed poor performance of module P54B.

### Slow Controls

- Discussed purchase orders.

### Hall D

#### Detector

- Monitored logbook.
  - ★ Accidental slow-dump to magnet was initiated.

### DSG

- Met with Peter and Tyler to discuss PLCs.
  - ★ Made controller tags.
  - ★ Discussed ladder logic and function block diagram.

### Jacobs, George

#### Hall B

#### Gas Systems

- Fabricated suction manifold for LTCC pumps.
- Ordered misc fittings to connect LTCC pumps to manifolds.
- Fabricated discharge manifold for LTCC pumps.
- Moved win7 pc from EEL rm 124 clean room to 96B.
- DCGAS PID loop troubleshooting for test.



## Detector Support Group

### Weekly Report, 2016-02-17

#### **Leffel, Mindy**

##### **Hall B**

###### **SVT**

- HFCB cable work.
  - LV cables: repaired broken wires on three connectors; replaced a 37 pin D-sub connector with a nine pin; and retested one surplus cable from Fermilab, before adding it to the spares.
  - Repaired broken wires on one HV connector.

###### **HTCC**

- Terminated all 50 HV cables.
- Terminated BNC end of 15 signal cables.

##### **Hall D**

- **Attended tech meeting.**

#### **Lemon, Tyler**

##### **Hall B**

###### **Gas System**

- Deployed with Marc and Brian advanced autotuning PID controller VI.
  - VI did not work properly when deployed.
  - Mass flow controllers not regulating the flow into the tanks properly.
  - Debugged power supply box and insured proper voltages for pressure transducer.
  - Basic PID controller VI still works with new mass flow controllers.

###### **Magnet**

- Reviewed PLC code report for MPS control.
- Attended Torus controls status meeting.
  - Discussed status of tasks requested.

###### **Slow Controls**

- Attended bi-weekly meeting.
  - Discussed hardware being purchased for the hall.

##### **Hall D**

- Monitored Logbook.
  - ★ Noted that an accidental slow dump of the solenoid was initiated the morning of 2/13/2016.

#### **DSG**

###### **PLC Test Station**

- Attended lessons with Amanda given by Pete.
  - ★ Covered how to create and configure program tags, how to create and use subroutines, and how to create function blocks.



## Detector Support Group

Weekly Report, 2016-02-17

### McMullen, Marc

#### Hall B

##### Gas System

- Worked with Anatoli, Jacobs, Lemon, Eng, and Arslan on troubleshooting issues with the PID and Gas Controls.
  - \* PID controls to within 0.025 [inH<sub>2</sub>O].
  - \* MFC flow can be changed, and monitored.
  - \* Faulty pressure transducer was replaced.
  - \* Mass flow transducer shows R1-2 has a flow of ~6 [slm] and R3 has 3 [slm], when the MFCs are set to 10 [slm].

### Sitnikov, Anatoly

#### Hall B,

- Bundled 6 bundles for HTCC with Sahin.
- Assembled rack in gas shed and cleaned gas shed with Sahin.