Ops & PSS

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I asked all Operators and Crew Chiefs what bugged them most about the PSS.

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Outline

- Hall D not part of Multi-hall ops.

- Use of gun HV as part of PSS.

- Beam Transport Monitor.

- Inline Dump operations.

- Changes developed in a vacuum.

Hall D and Multi-Hall Operations

PSS operations wise, Hall D is a separate entity from the other three (A, B, C) halls.

Whenever Hall D goes in or out of Beam Permit, the Injector must not be in Beam Permit.

To take the Injector in or out of Beam Permit the gun must be ramped down and back up. This ramping takes time with a corresponding interruption of beam to **all** halls.

The same is true if Hall D and only one other A, B or C hall is running and the solo other hall wants an access. Hall D loses beam time while the other hall is processed.

This leads to one hall affecting another hall's beam time for simply needing an access.

Single hall ops, not a problem.

More than one hall running and one of them is Hall D, then there is the potential for cross-hall interruptions.

Reason for Hall D being left out of multi-hall operations is due to the increase in the complexity of the PSS logic when Hall D and the Hall D Tagger were added in.

Must the halls forever pay the price for simpler, cleaner PSS logic?

Gun High Voltage & PSS

Ramping gun high voltage for PSS state changes adds additional time to the process.

~2 min. down and ~4 min. up. This is just the voltage ramp times.

As new gun voltages go higher, ramp times will get longer.

Sudden dropping of HV due to dropping of the Injector PSS state can potentially cause damage to the gun.

Beam Transport Monitor

Other than Tribal Knowledge passed down through the ages from SSO to SSO, no documentation is available on BTM operation.

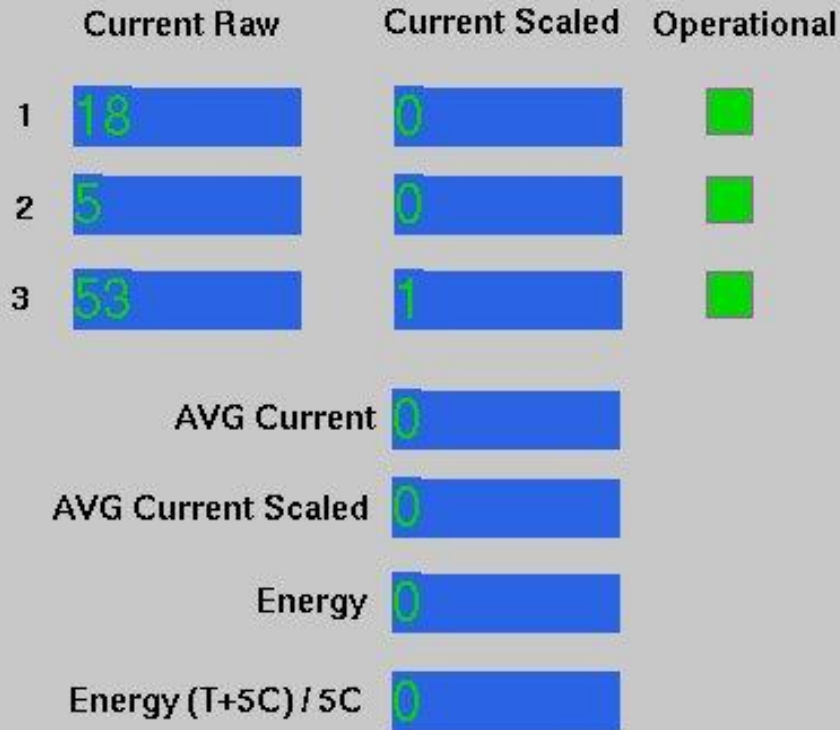BTM screen shows calculated values but not the window around these values.

Though it is for equipment protection not personnel protection, faults drop the PSS state of Hall D & the Tagger. This leads to dropping gun high voltage which leads to an unhappy Joe Grames.

Use of the BTM forces the Hall D state change process to be different from Halls A, B & C. With Halls A, B & C, turning On the hall dipole is the last step in the process. With Hall D the dipole must be cycled and at setpoint while in Power Permit before pulling the stopper.
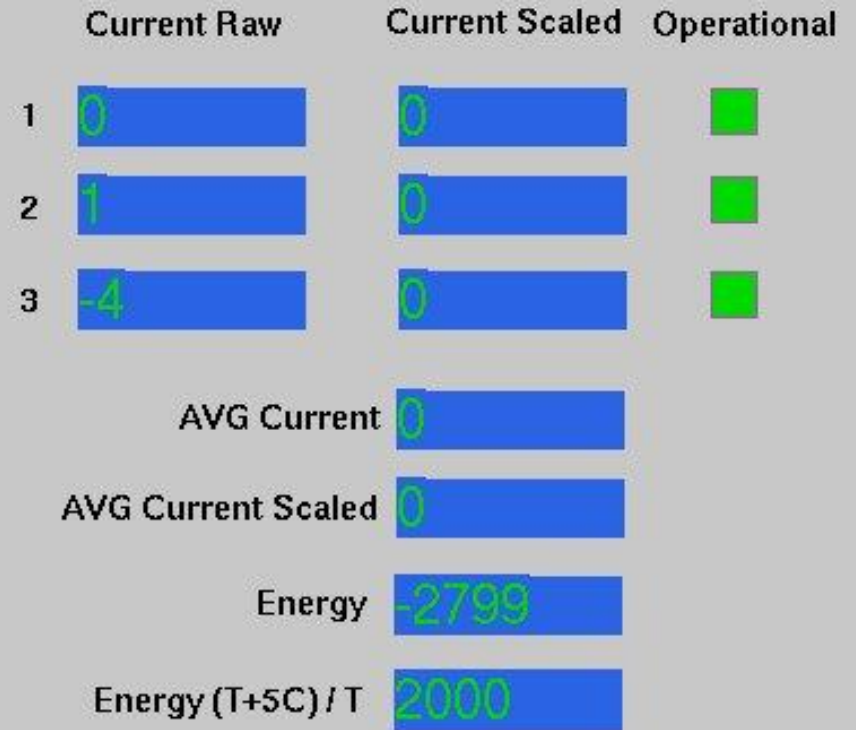
Beam Transport Monitoring System

5C Magnet

	Current Raw	Current Scaled	Operational
1	18	0	🟩
2	5	0	🟩
3	53	1	🟩

AVG Current: 0

AVG Current Scaled: 0

Energy: 0

Energy (T+5C) / 5C: 0

Tagger Magnet

	Current Raw	Current Scaled	Operational
1	0	0	🟩
2	1	0	🟩
3	-4	0	🟩

AVG Current: 0

AVG Current Scaled: 0

Energy: -2799

Energy (T+5C) / T: 2000

Status	Warning	Fault
	🟩	🟩

Tommy Michaelides 06/16/14

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Inline Dump Operations

Operation of the 0R08 Inline Dump (ILD) was changed to require the Injector segment to be out of Beam Permit when the dump is inserted or retracted.

This changes a simple process that took seconds into one that takes several minutes.

Before: Insert the ILD, reset the FSD, investigate the Injector problem, retract the ILD, reset the FSD, restore beam.

Now: Ramp down the gun HV, Injector to Power Permit, insert ILD, Injector to Beam Permit, ramp up gun HV, reset FSD, investigate the Injector problem, ramp down the gun HV, Injector to Power Permit, retract ILD, Injector to Beam Permit, ramp up gun HV, reset FSD, restore beam.

Designed in a Vacuum

Recent changes to the PSS have come as a surprise to Ops.

▶ Hall D integration with A, B & C logic

▶ Beam Transport Monitor operation

▶ Inline Dump (0R08) operation

Most of these were a change to processes that had been in place for >10 years.

The changes came about without prior input from Ops and without new procedures or existing procedures being updated and/or in place before implementation. This resulted in a very steep learning curve causing needless trips and downtime.

The new processes add a downtime burden that does not appear to have been discussed among those affected.

Over an extended time frame (years) how much will this cost compared to what is being saved?

Are they (the users, both process and beam) willing to accept this?

Are there other options?

Olive Branch Extended

Previous Ops Liaisons to SSG were not very outgoing or proactive. They focused mainly on making sure SSO bi-annual training was completed, training material was updated and procedures were up to date.

The current Liaison is very proactive and more likely to actively work with SSG towards a compatible solution for both groups.

SSG looking to work with Ops to place training material into Moodle, an online training management system.

Comments?

Ops-Pr

This limitation is intentional. In order to keep the PSS logic simple and safe the Injector should drop (or be manually changed) to Power Permit when the PSS is being reconfigured for a new beam destination. For example, typically it drops when OPS is reconfiguring the BSY Beamstops. With the addition of the Tagger/ Hall D branch (5C) off of the N. Linac segment the complexity of its logic increased significantly. This required some changes to how we do business.

- The new logic was implemented last March (Kelly/Tommy) to drop the Injector when the Critical Devices in the N. Linac changes state (similar to the BSY.) The N. Linac is now the switchyard for Straight - East Arc - Hall D configurations.

- During the last Certification we modified the logic to allow the insertion of the ILD when the machine was in Mode 2 (beam to BSY Dump), because we saw the need to allow Straight Ahead beam mode during Arc Box Supply/Magnet hot check out. At that time we felt that the need for allowing the ILD to be moved in during Mode 3 (beam to A, B, & C) and Mode 4 (beam to D) were unnecessary, and that it would not be a significant burden on OPS to reconfigure for the intended beam destination.

For future reference it would be useful for the SSG to know what the intended purpose is for moving the ILD to the IN position when the machine is configured for a different beam destination. Supporting complex PSS configurations to save a few minutes of reconfiguration effort can be burdensome. However if there is a good case to be made that will not compromise the intended function of the PSS, this topic can be discussed further.