July 4th, 2009

Procedure to stop recirculation mode, start Ar purge, in preparation to shut the gas system down for the summer.

STOPPING RECIRCULATION MODE

1. Make sure all TPC high voltages are ramped to zero and turned off.
2. In the mixing room, in Rack 1, input 79 into the hardware alarm keypad and push the * button (block alarms). The bottom row of red LEDs should now be lit - all alarms are blocked. [Top row indicates alarm – bottom row indicates if blocked]
3. On the PC control GUI, click on the "Alarms Enabled" button. The button should now read "Alarms disabled".
4. On the PC GUI click on SV13 (should turn from red to green.)
5. On the PC GUI, click on SV14 (should turn from green to red.) This switches the input gas for the meters from return gas to fresh gas. (Oxygen should drop to ~5.)
6. If SV16 is green, first click on SV17 (red to green) then click on SV16 (green to red). This switches the monitor line from recirculation to fresh gas. (The plumbing has changed. Is this still correct?)
7. Click on BC1 (big compressor) and immediately click on SV18 (red to Green). This stops the recirculation pump and opens the main vent valve. PT8 will drop.
8. Click on the "HV" button (green to red). This drops the HV interlocks at the AB panel and sets off the alarm. Silence the alarm by pushing the acknowledge button in rack 4.
9. Raise the lower redline for PI7 (Rack 2) until it trips the indicator needle - this will latch the BC1 off. Lower the redline back to the set point. Push the red button on SV18 to unlatch BC1. This will allow computer control of BC1.

At this point the system is in P10 purge mode with the normal 16 lpm refresh flow. If the plan is to purge the TPC and shutdown for the summer, proceed as follows:

STARTING ARGON PURGE

1. On the PC, kill the PID control program (scrolling display).
2. Turn off the PID power supply (inside Rack1 on the bottom right, silver toggle.)
3. Turn off the purifier using the GUI.
4. On the gas pad, close the 6 bottle valves for the methane 6-pack that is currently in use. Check the other 6 pack and close these valves if necessary. Do not close main valve, yet.
5. In the mixing room, wait for the methane line to bleed down - M3 and M4 will eventually go to zero. This will take several minutes.
6. When the methane reads zero, go to the gas pad and close the main output valve on the 6 pack, and close the corresponding input valve on the manifold.
7. Using the GUI, open SV22 and close SV21 - this puts Argon into the methane line.

8. Close the manual methane input valve (MV25, behind rack 3)
9. Close manual methane inlet valve MV8 (Rack 2)
10. Open manual Ar inlet valve MV6 - this is the inlet valve for the 500 lpm flowmeter.
11. On the PC, set FM5 to 0 and set FM3 to 100 and click on "Set flowmeters".
12. Close inlet valve MV4 at Rack 2
13. On the Hastings mass flowmeter controller select FM3 - confirm that the setpoint is 100 and that the flow is some value other than 0.
14. Once flow starts in FM3, raise the Ar delivery regulator pressure (PCV5) on the wall of the mixing room. Maximum pressure on this regulator should make the flow reach 100 lpm.
15. Open the bubbler bypass valve (MV14a). This will purge the supply stub that goes to the bubbler. Close MV9, fully, to prevent purge from going backward.
16. We typically run this purge flow until ~ 6 volumes have been exchanged. TPC volume = 50,000 l, so 6 volumes is ~ 48 hours. Since this is for the summer shutdown, you can probably switch to a N2 purge after 24 hours.
17. CAD mandates that we maintain a gas watch as long as the methane is > 8 %. To check the return flow from the chamber during purge:
    1. Open manual valve MV9 fully (Rack 2)
    2. Lower the PI7 red line to zero.
    3. Reset the BC1 latch (red button, Rack 2)
    4. Using the GUI start big compressor 1 (BC1). Make sure SV18 is OPEN!
    5. Using the GUI, open SV14 and close SV13. This will sample the return gas - M3 will measure the return methane percentage.
    6. The system can run in this mode stably so you can watch the methane drop. Caution: the system is stable but no alarms are active – no automatic actions will be taken to protect the system.
    7. To go back to straight purge mode, open SV13, close SV14, stop BC1 and fully close MV9.
18. Once the methane percentage is < 8%, call the RHIC MCR and ask for the operations coordinator. Tell him that the chamber is purged of P10 and ask him to send the CAD watch down with the STAR bluesheet. When the watch comes, sign the bluesheet in the appropriate box (chamber purged).
19. Turn over the two flammable gas signs on the doors to the WAH, and remove the signs that are posted in the WAH. Unplug the TPC gas/water alarm box in the STAR control room.
20. Send emails to Bill Christie, Bob Soja, Al Pendzick, Peter Ingrassia and Paul Sampson stating that the chamber is purged and the gas watch is cancelled. Make an entry in the electronic log and also send mail to star-ops mailing list.
21. Turn the bubbler valve MV14a back off after 24-48 hours of purge.

Go to the procedure for the "Complete Shutdown of the TPC gas system and setup of summer N2 purge"