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C-A OPERATIONS PROCEDURES MANUAL

7.1.45 Warm Turbine “B” Train Online and “A” Train Offline

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Hand Processed Changes

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Approved: _____ *Signature on File* _____
Collider-Accelerator Department Chairman Date

D. Lederle

7.1.45 Warm Turbine “B” Train Online and “A” Train Offline

1. Purpose

- 1.1 To provide instructions for placing warm turbine train “B” online and taking warm turbine “A” train offline.
- 1.2 If desired, both trains can operate at the same time, with one or both trains being shut down at a later date.

2. Responsibilities

- 2.1 The Shift Supervisor, or an Operator designated by the Shift Supervisor, is responsible for conducting the procedure and providing documentation in the Cryogenic Control Room Log.
- 2.2 Should a problem arise in the process of this procedure, the Shift Supervisor shall report to the Technical Supervisor for instructions before continuing.

3. Prerequisites

None

4. Precautions

- 4.1 If there is liquid helium in the refrigerator pots, all personnel entering the refrigeration wing of 1005R must be ODH Class 1 qualified, have a Personal Oxygen Monitor (POM) and carry an escape pack.

5. Procedure

_____ 5.1 Date_____.

_____ 5.2 Isolate CR line from LSA/rings and align path to return as follows:

Close Valves:

H26A_____

H4659M_____

H849A_____

H741M_____

H4644A_____

H747A_____

Open Valves:

H4643A_____

H825M_____

H827M_____

H760M_____

H5M_____

_____ 5.3 Initialize “B” train per [C-A-OPM 7.1.41, “Warm Turbines “B” Train Initialization.”](#)

_____ 5.4 Set HX3 temperature balance control valves as follows:

5.4.1 Ensure valve H744A is in manual and closed_____.

5.4.2 Place valve H344A in manual and 100% open_____.

5.4.3 Ensure H153A is in auto_____.

Caution:

To prevent overspeed, turbine train pressures (PI700) must be less than 7 atm prior to turbine start up.

Note:

Leave balance HX controllers as is throughout this procedure. The “HX3M/HX3A,3B” controller should remain in auto. The “HX3A HX3B controller will automatically select its appropriate mode of operation.

_____ 5.5 Start warm turbine “B” train. Set flow to approximately 250 g/s.

_____ 5.6 When TI737 is within 10°K of TI337, and TI761 is less than TI3, slowly open H741M and close H825M.

_____ 5.7 When outlet temperature of turbine 4 (TI761H) is within 5°K of TI14H, place valve H780A in automatic at 1.40 atm. Monitor compressor return temperature (TI3063H), ensure it does not drop too low (alarms at 260°K).

_____ 5.8 When refrigerator is stable, slowly close H760M. Begin opening H744A as soon as H760M is shut.

_____ 5.9 Continue to open valve H744A until inlet temperature at HX 1/2 stabilizes (TI304 for 1A/2A, TI704 for 1B/2B).

_____ 5.10 Place valve H744A in automatic.

_____ 5.11 If both trains are to run, place valve H344A in automatic, and do not complete the remainder of section 5 at this time.

Note:
Monitor turbine seal gas flow while transferring heat shield.

- _____ 5.12 Ensure valve H9A in automatic, set point at 125 g/s.
- _____ 5.13 To transfer heat shield, slowly open valve H776M_____ and close H376M_____.
- _____ 5.14 To realign the CR line, open valve H4644A.
- _____ 5.15 Slow down and then shut down “A” turbine train.
- _____ 5.16 Place valve H344A in manual and close it.
- _____ 5.17 Place valve H380A in manual and ensure it is closed.
- _____ 5.18 Ensure “A” train turbine inlet filter valves H9136M_____ and H9144M_____ are closed. Purge inlet filters per [C-A-OPM 7.1.50](#).
- _____ 5.19 Shut down turbines 1A/2A and 3A/4A oil skids per [C-A-OPM 7.1.48, “Shutdown of Warm Turbine Oil Skids.”](#)

6. Documentation

- 6.1 The check-off lines on the procedure are for place keeping only. The procedure is not to be initialed or signed, it is not a record.
- 6.2 The Shift Supervisor, or designee, shall document the completion of the procedure in the Cryogenics Control Room Log.

7. References

- 7.1 Drawing 3A995001, 25KW Refrigerator P&ID.
- 7.2 [C-A-OPM 7.1.41, “Warm Turbines “B” Train Initialization”](#).
- 7.3 [C-A-OPM 7.1.48, “Shutdown of Warm Turbine Oil Skids”](#).

8. Attachments

None