D-Zero Air Dryer Filters Change Lockout Procedure

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1.0 EQUIPMENT LOCATION: D-Zero Assembly Building, Pump Room & Room 604.

2.0 EQUIPMENT IDENTIFICATION / DESCRIPTION:

2.1 Two Balston Filter housings (F-767 & F-770) used to protect the Instrument Air Dryer beds from oil & liquid water carryover from compressors. Units are located in piping above the dryer unit against the north wall of the Pump Room.

2.2 Two Balston Filter housings (F-6053 & F-6055) used to protect the Silicon Purge Air Dryer beds from oil & liquid water carryover from compressors. Units are located in piping tree to the right of the dryer unit located in Room 604.

2.3 Two Balston Filter housings (F-6214 & F-6215) used as final filters for the Silicon Purge Air system, located in Room 215.

3.0 SCOPE OF WORK:

3.1 In general this procedure applies only to intermediate pressure (<150 psi.) air system filter changes for prefilters having isolation, bypass and vent valving, as listed above.

3.2 .Dryer afterfilters are not covered by this procedure. This is normally done when the dryer is taken offline for bed changes or other reason. The Silicon Purge Air system dryer after filter (F-6084) does have isolation, bypass and vent valving which would permit change using a procedure similar to this, but generally, it would not be necessary except after a dryer bed change. The Instrument Air afterfilter (F-786) does not have such valving, and requires isolation & depressurization of the dryer to change.

3.3 Final Filters for the Silicon Purge (F-6214 & F-6215) may use this procedure. Due to location, draining of condensate from bypass is not an issue.

4.0 AUTHORIZED PERSONS:

All D-Zero Cryogenic Operating Crew and supervisors, with current LOTO Level II training are authorized to perform this procedure.

5.0 NOTIFICATIONS:

5.1 **Instrument Air System:** Operating crew on shift must be notified before initiating any of this procedure. Under normal circumstances, no other notifications are required.

5.2 **Silicon Purge Air System:**
- **5.2.1** Shift Captain (x8800)
- **5.2.2** Operating Crew on shift (x2849)

5.3 **Silicon Purge Final Filters:**
- **5.3.1** Shift Captain (x8800)
- **5.3.2** Operating Crew on shift (x2849)

6.0 SOURCES OF HAZARDOUS ENERGY:

6.1 **Pressurized Air** at up to 150 psig from **upstream** of filters. May also contain small amounts of water condensate mixed with SSR Ultra-coolant carryover from compressor.

6.2 **Pressurized Air** at up to 150 psig from **downstream** of filters. May also contain small amounts of water condensate mixed with SSR Ultra-coolant carryover from compressor.

6.3 **High noise levels** from compressors close by.

6.4 **Hot Surfaces** on regenerating bed of dryer close by.

6.5 The MSDS for SSR Ultra-coolant makes fairly benign claims regarding toxicity and skin / eye irritation, but does recommend safety glasses, and, if in contact with eyes, to irrigate with water for 5 minutes.

7.0 LOCKOUT / TAGOUT CONTINUITY:

7.1 After filters have been bypassed and isolated, lockout devices shall be applied to isolation ball valves at inlet and outlet of filter(s) piping.

7.2 A lock and tag shall be placed on one valve lockout device: The tag to read “Group Lockout see MV-xxxx” (xxxx to be the number of the of the second isolation valve).

7.3 The key to this lock shall be captured on the ring portion of a group lockout device which secures the lockout device on the second isolation valve.

7.4 Each person working on the job shall place their lock and tag on the group lockout device.

- **7.4.1** When the job extends past the end of shift, and is passed on to the next crew, **the relieving shift must place its locks and tags on the group lockout before the departing shift is permitted to remove their locks,** such that, at no time is the group lockout without any locks.
- **7.4.2** When the job extends past the end of shift, but is not passed on to the next crew, personnel shall leave their locks and tags on until the job is completed.
- **7.4.3** Prior to removing their locks and tags, the crew which completes the job shall inspect the equipment and the work done on it, to

verify that the equipment has been returned to safe operating condition. This inspection shall include checks that:

- Tools materials & debris have been removed.
- Filter housings have been properly reassembled.
- All drains and vents have been closed.
- Individuals on the notification list and any other affected workers have been notified of the intent to return the equipment to operational state.

8.0 PREREQUISITE ACTIONS:

8.1 Planning & coordination

8.1.1 Consult with system users to coordinate equipment shutdown to minimize interference with operations.

8.1.2 Meet with authorized persons performing the work to review this procedure and plan job tasks.

8.2 Performance documents:

- Lockout procedure (this document)
- MSDS for SSR-Ultra-coolant

8.3 Prepare tools, supplies and equipment

- Correct filter cartridges
- Safety Glasses, Hearing protection & other PPE
- Wipers & catch can for condensate in filter housings & bypass piping.
- Ladder (Pump room only)

CAUTION:

Instrument and Silicon Purge air are vital to numerous detector & support functions and components (some of which are irreplaceable) and therefore, are linked to several alarms, interlocks and the autodialer. Failure to establish a bypass prior to isolating filters can threaten those functions, trip interlocks and set off alarms.

WARNING:

Failure to establish a bypass prior to isolating filters will DEAD HEAD the air compressors, causing the discharge relief to vent pressurized air and oil into the room. If in the vent path, you could be injured by vented materials.

8.4 ACCEPANCE CRITERIA:

8.4.1 Filters shall be put off and online without interrupting air service or causing a line pressure drop below 85 psig.

8.4.2 Bypass line to be drained prior to use so as to avoid running a slug of water into a drier bed or tripping any dewpoint alarms or interlocks.(See note in 8.5.6.1)

8.4.3 Replacement filters to be installed without damage to filter cartridge, housing o-ring or automatic drain.

8.4.4 Final assembly to be leak tight to a bubble solution check.

8.4.5 Work area cleaned up.
8.4.6 Required log entries filled out.

8.5 BYPASS FILTERS AS FOLLOWS:

8.5.1 Locate the bypass valve MV-765-I (MV-6051-I) (MV-6217-I).
8.5.2 Upstream of the bypass valve, locate a small ¼" drain tap at the low point.
8.5.3 While holding a catch can beneath, ease open the drain just until the liquid begins to run out. Close it as soon as air starts blowing out.

CAUTION

Failure to drain accumulated condensate from the bypass leg before opening the bypass can result in injecting the dryer bed with a slug of water which can cause premature bed aging and possible high downstream dewpoints, alarms and interlock trips (particularly on the Silicon Air system).

8.5.4 Ease open the bypass valve MV-765-I, until it is fully opened.
8.5.5 Close Filter Inlet valve MV-763-I (MV-6052-I) (MV-6212-I).
8.5.6 Close Filter Outlet valve MV-771-I (MV-6056-I) (MV-6216-I)
8.5.6.1 For the Room 215 Final Filters only: also close dewpoint sensor isolation valve. **(Consult Bill Cooper first, regarding the possibility of placing Chiller Interlocks in Bypass Mode during changeout of filters.)**
8.5.7 Vent filter housings by opening MV-768 & 733-I (MV-6054-I) (MV-6213-I) Leave vent valve open during changeout.

9.0 LOCKOUT CHECKLIST:

9.1 Apply lockout devices to inlet & outlet valves, per section 7.0.
9.2 Apply locks and tags per section 7.0.
9.3 Each employee to work on the job: apply his/her lock & tag to group lockout per section 7.0.

10.0 VERIFY LOCKOUT:

10.1 Attempt to ease open inlet valve. (It should not move enough to cause pressure to begin venting again from the open filter vent valve.)
10.2 Repeat test with the outlet valve. (If either test causes leakage, reapply lockout device to a tighter locking perforation, and perform tests again.).

11.0 FILTER CHANGEOUT

11.1 Depresurized filter housings are now safe to disassemble.
11.2 Remove filter housing cover by unscrewing the collar nut, and drain any liquid into a catch can for disposal.
11.3 Wipe the inside of the cover clean and set aside.

11.4 Remove old filter by unscrewing bottom retainer nut and pulling filter straight down.

11.5 Check replacement filter for correct grade (DX, BX, OR CI) marking, and slide it up inside the guard screen onto the upper seat step. It should hold itself in place if installed correctly.

11.6 Replace the bottom retainer nut hand tight; snug but avoid crushing the element.

11.7 Replace the cover, being careful not to push the o-ring out of its groove. (Favoring the backside first, helps to keep the final seating visible in front to assure no o-ring jump-out or damage.) Tighten collar nut hand tight.

11.8 Close filter vent valve .

12.0 RETURN TO SERVICE:

12.1 Verify all housings are on correctly and collar nuts snug.

12.2 Check that automatic drain fittings have not been cracked or damaged, and that nuts are snug. (Caution: threads are plastic and easily stripped.)

12.3 Verify that drain lines have been reconnected if they had been removed for any reason.

12.4 Perform notifications, and remove locks & tags per section 7.4.3

12.5 Crack open the filter inlet just until pressure gauge for filter section begins to rise. (Where no gauge is present, leave the vent valve open until flow is detected, then close vent.) Allow pressure to rise slowly until the filter section is up to line pressure.

12.6 Open inlet fully, then open outlet fully.

12.7 Close Bypass valve.

13.0 POST PERFORMANCE ACTIVITIES:

13.1 Log filter changes in the OPS Log.

13.2 Log changes in the Utilities Log in the applicable Dryer section.

13.3 Update filter hang tags with Last Done & Next Due dates. (Next due will normally be 3 months hence, except final filters which go by filter indicators.)

13.4 Dispose of condensate oil/water waste in the Waste Oil carboy marked "SSR Ultra-coolant / water mix".

13.5 Old filters and used wipers can go in the regular trash.

13.6 Return locks to lockout station and complete lockout log entries.