

**Attachment 5**

**Request 1.d – Steam Dryer Repair Information  
(GE Nuclear Energy DRF Section: 0000-0053-3398, “Extent of Dryer  
Repair,” Revision 1)**



# GE Nuclear Energy Engineering Calculation Sheet

Sheet 1 of 3

Subject: NRC RAI Question #1(d) – Extent of Dryer Repair

Originator: G. Longren

DRF Section: 0000-0053-3398 Rev 1

Verifier: A. Nisenbaum

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**Problem:** NRC request for additional information, Item 1(d) from April 12, 2006 meeting on the Q2R18 steam dryer repairs is as follows:

(d) licensee's justification for the steam dryer repair, including the extent of the repair, impact of the repair on steam dryer structural characteristics, and evaluation of remaining steam dryer

This document will discuss the extent of the repair to the steam dryer.

### Discussion:

The majority of the repair work done on the Quad Cities Unit 2 steam dryer was performed in response to emergent conditions, apparent only after the start of the outage.

All four of the dryer hold down latch arms (at 40°, 140°, 220°, and 320°) were modified per FDDR RMCN08241 (ref 1). The hold down latch assemblies were disassembled from the dryer, some material was removed from the surface of the latch arm that contacts the bottom of the dryer support lugs on the reactor pressure vessel (RPV), and then the hold down latch assemblies were reassembled. This was done to correct difficult operation of the latch arm that was experienced when unlatching the dryer.

FDDR RMCN08242 (ref 2) removed some metal from the skirt base ring cut out at 20°. This was done in response to damage reported in INR Q2R18-IVVI-06-12 (ref 9). Damage caused by the dryer interfering with the guide rod for the shroud head. The damaged area was ground away and the surface was blended in and then visually inspected.

A large section of the dryer skirt and skirt base ring were repaired at approximately the 140° azimuth per FDDR RMCN08324 (ref 3). This repair was performed in response to indications



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Sheet 2 of 3

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reported in INR Q2R18-IVVI-06-02 (ref 10). The damaged sections of the skirt and base ring were removed and replaced with new pieces of the same thickness and type as the original material. The new sections were secured to the dryer with full penetration welds. Backing strips were used to facilitate these welds. A similar repair was performed at 220° per FDDR RMCN08404 (ref 4). This was done as a pro active measure because the skirt base ring at 220° had undergone a similar deformation during initial dryer installation as had been seen at 140°.

The latch box at 220° was repaired per FDDR RMCN08435 (ref 5). This was done in response to an indication reported in INR Q2R18-IVVI-06-29 (ref 11). The indication was removed by grinding and then the area was built back up by welding.

Additional lugs were added to extend the guide rod blocks per FDDR RMCN08436 (ref 6). This was done to mitigate the possibility of the dryer getting caught in the vessel should the guide rod come loose of the guide rod block when the dryer was positioned on the extreme edge of its freedom of movement.

Loose lifting lugs, as reported in INR Q2R18-IVVI-06-01 (ref 12), were the reason for the repairs made by FDDR RMCN08456 (ref 7). This repair removed the original lifting lug set screws, an enlarged flat was machined on the lifting rod, and replacement set screws were installed and welded into place.

The gussets around the openings in the skirt base ring were removed per FDDR RMCN08458 (ref 8).

Several other repairs had also been planned prior to the outage and were implemented. Vibration instrumentation was removed per FDI-0160 (ref 13). More changes were made per FDI-0148 (ref 14). The changes include:

- Plugging holes left over from the removal of vibration instrumentation.



# GE Nuclear Energy Engineering Calculation Sheet

Sheet 3 of 3

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-Installing Base Ring boxes at 20° and 200° to close the openings caused by the shroud head guide rod clearances.

-Installing swing arm protectors and latch protectors at 40°, 140°, 220°, and 320°.

-Enlarging the cutout in the skirt base ring at 40°, and 320° locations to ensure that the base ring could not get caught on the RPV dryer support lugs when the dryer is being removed from the vessel. Note, the cutout enlargement for the 140° and 220° locations was incorporated in the design of the replacement base ring sections (refs 3 and 4).

The general intent of these repairs was to make the dryer installed at Quad Cities 2 be of the same configuration as the dryer installed at Quad Cities 1.

## References:

- |                           |                                     |
|---------------------------|-------------------------------------|
| 1. FDDR RMCN08241, Rev. 0 | Latch Assemblies                    |
| 2. FDDR RMCN08242, Rev. 0 | 20° Damage from Separator Guide Rod |
| 3. FDDR RMCN08382, Rev. 0 | 140° Skirt and Base Ring Repair     |
| 4. FDDR RMCN08404, Rev. 0 | 220° Skirt and Base Ring Repair     |
| 5. FDDR RMCN08435, Rev. 0 | 220° Latch Box Repair               |
| 6. FDDR RMCN08436, Rev. 0 | Guide Rod Block Extensions          |
| 7. FDDR RMCN08456, Rev. 0 | Lifting Eye Repair                  |
| 8. FDDR RMCN08458, Rev. 0 | Gusset Removal 40° and 320°         |
| 9. INR Q2R18-IVVI-06-12   | Skirt Base Plate at 20°             |
| 10. INR Q2R18-IVVI-06-02  | Steam Dryer Skirt at 135°           |
| 11. INR Q2R18-IVVI-06-29  | Steam Dryer Latch Box 220°          |
| 12. INR Q2R18-IVVI-06-01  | Steam dryer Lifting Lugs            |
| 13. FDI-0160, Rev. 1      | Vibration Instrumentation Removal   |
| 14. FDI-0148, Rev. 2      | Field Disposition Instructions      |