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BVY 08-085

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: **Vermont Yankee Nuclear Power Station**
Docket No. 50-271 (DPR No. 28)
Vermont Yankee RFO 27 Steam Dryer Inspection Results

Dear Sir or Madam:

This letter provides information in accordance with Vermont Yankee (VY) Operating License Conditions M.5 and M.6 regarding the results of steam dryer inspections.

During the fall 2008 refueling outage (RFO-27), a visual inspection was conducted of the VY steam dryer. The inspection examined accessible, susceptible portions of the dryer as recommended in General Electric Co. Service Information Letter (SIL) No. 644, Revision 1. The inspection also included past modifications and prior indications that were dispositioned use-as-is. The attached report provides a summary of the inspection results.

The indications identified during the inspection have been entered into the VY Corrective Action Program. Each indication was evaluated and determined to be acceptable for continued operation. The detailed results are available for inspection.

There are no new commitments contained in this submittal.

If you have any questions or require additional information, please contact Mr. David Mannai at (802) 451-3304.

Sincerely,

A handwritten signature in black ink, appearing to read "Michael J. Colomb".

Michael J. Colomb
Site Vice President
Vermont Yankee Nuclear Power Station

Attachment : Vermont Yankee RFO 27 Steam Dryer Inspection Results
cc: (next page)

A047
MRR

cc: Mr. Samuel J. Collins
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Docket 50-271

Attachment

Vermont Yankee Nuclear Power Station

Vermont Yankee RFO 27 Steam Dryer Inspection Results

VERMONT YANKEE RFO 27 STEAM DRYER INSPECTION RESULTS

General inspection results

The Vermont Yankee (VY) Steam Dryer inspections satisfied VT-1 inspection requirements as recommended by SIL No. 644, Rev.1 which requires inspection of accessible, susceptible portions of the dryer as well as previous indications and modifications. The RFO-26 and RFO-27 inspections included all accessible and susceptible locations as well as previous indications and modifications. In addition, RFO-26 and RFO-27 inspections included roughly 30% more inspections each outage than required by the Operating License. The results of the Steam Dryer visual inspection indicate that the dryer is in good condition. This conclusion is based on relatively few newly identified indications found during RFO-27 which are acceptable to "use-as-is" and previously identified indications that have not grown. The areas where these indications were identified will be re-inspected during RFO-28, consistent with VY's Operating License.

AREVA performed the steam dryer inspections during RFO-27. These inspections utilized new tooling which improved the inspection quality. The interior inspections were performed from a crawler with a telescoping mast to access all points of inspection. The exterior inspections were performed off of a trolley which moved on a rail clamped to the curb of the dryer separator pit. This improvement in technology provided steady and stable inspection footage which resulted in higher quality images from which to make an assessment of indications. RFO-27 Indication Notification Reports (INRs) 1 through 24 document the identified indications.

Based on the RFO-27 examinations, VY's Steam Dryer is free of damage that would challenge structural integrity. These inspections included the modifications made on the Steam Dryer in RFO-24. The Steam Dryer condition is consistent with the analysis and data evaluation performed before and during power uprate which demonstrates VY's steam piping does not create the conditions to induce structurally damaging loads on the Steam Dryer.

Past modifications

The Steam Dryer design changes, implemented during RFO-24, included modifications to vertical hood plates, reinforcing gussets, upper and lower horizontal cover plates, bracing brackets and tie bars. The RFO-24 Steam Dryer modifications are intact as demonstrated by the visual inspection results.

Prior "use-as-is" indications

Fifty eight (58) indications from RFO-26 were re-identified with no discernable changes observed. Forty three (43) of these indications were on the dryer interior and fifteen (15) were on the dryer exterior. Previous evaluations from RFO-24, RFO-25 and RFO-26 are still valid for dispositioning these indications "use-as-is."

The interior of the dryer cannot be cleaned by brushing due to inaccessibility. Therefore, the normal material layer on the interior surface of the dryer cannot be removed for inspection, as it is on the exterior. This does not affect the ability to perform a VT-1 inspection.

Additional Indications

Eighteen (18) new relevant indications were observed during RFO-27. Each of these indications has been evaluated by GE and Entergy and determined to be acceptable to "use-as-is" for continued operation. They will be inspected again next refueling outage.

Two (2) newly identified indications were identified on Vertical Guides at 324°. These are documented on INR 13 Rev. 1. The indications are perpendicular to the vertical guide channel welds, consistent with Inter-Granular Stress Corrosion Cracking (IGSCC) and stress relief. Based on the images of the 324° location, it appears that the surface of the drain channel and skirt plate have been cold worked, as evidenced by grinding marks. Therefore, it is probable that these are surface indications, which are evaluated as IGSCC, and are not expected to propagate significantly in the future. In the unlikely event that these indications were to propagate at each crack tip, they would have an insignificant impact on the skirt and guide channel structural integrity.

Four (4) newly identified indications documented in INRs 2, 8, 10 and 24 are on the dryer lifting rods at 215° and 324° and the dryer leveling screws at 215° and 324°. These welds are not structural welds, but were installed to prevent rotation of the lifting rods and leveling screws. The jagged configuration of the indications in these welds still prevents rotation; therefore the welds are still performing their intended function. The lifting rod stitch weld indications are most likely fatigue, possibly resulting from a cyclic loading condition imposed during removal and replacement of the steam dryer during refueling outages. In the unlikely case that a lifting rod were to rotate during operation, it cannot become a loose part because the steam dryer hold down bracket in the Reactor Pressure Vessel closure head limits the upward motion of the lifting rod. Similarly, the leveling screw can only move upward by two inches as that is the length of internal thread and the remaining four inch deep counter bore will prevent the screw from becoming a loose part.

Three (3) newly identified indications were identified above the existing DC-V-4C indication. These are documented on INR 5 Rev. 2. These indications are in the same heat affected zone as the original DC-V-4C indication, but are separate indications and have been evaluated as IGSCC.

Six (6) newly identified indications are located in the heat affected zones of several dryer vane end panels. Three (3) of these indications were identified on dryer vane end panel weld HA-V05, documented on INR 1. The faintness of these indications gives credence that these are not new but are simply newly identified by the improved inspection techniques. One (1) of these indications was identified beside dryer vane end panel weld HC-V07-180 and is documented on INR 19 Rev. 1. Review of previous outage footage revealed that this was present but regarded as non relevant in RFO26. Two (2) of these indications were found on dryer vane end panel HC-V06-000 and are documented in INR 18 Rev. 1. These two (2) indications were clearly visible in RFO-26 and regarded as non-relevant indications at that time. However, the better inspection footage allowed the inspectors to determine these were relevant indications in RFO-27. Comparison of the RFO-26 and RFO-27 inspection videos show that the indications have not grown and are IGSCC related.

Several dryer vane end panel indications were re-identified during RFO 27. These included six (6) indications on HA-V05 that showed no changes which indicates there is no active IGSCC. There are no structural consequences on the vane end panel indications and postulated indications extending the full section width of the channel geometry would not create a loose part. Also, one (1) previous indication was re-identified beside the dryer vane end panel weld HC-V07-180. Comparison of the RFO-26 and RFO-27 inspection videos show that the indications have not grown and are IGSCC related.

One (1) newly identified indication was discovered on weld DC-H-27 and is documented on INR 3 Rev. 1. This indication is close to the DC-V-4C indication and was incorrectly identified as the upper end of the DC-V-4C indication in RFO-24. The new inspection tooling was able to better identify and separate the indications located in this area. The evaluation determined that this indication, after being trended since 2004 and having 26 months of EPU operation continues to be acceptable as is.

Two (2) newly identified indications discovered on Dryer Drain Channel Vertical Weld DC-V-05 is documented on INR 9. Both of these indications were determined to be less than one (1) inch in length and are IGSCC.

There were eleven (11) indications documented in RFO-26 as relevant which have been determined to be non-relevant in RFO-27. This is primarily due to the higher quality inspection tooling allowing for a better evaluation of whether indications are relevant or not. Non-relevant means that they were observed by the inspector, but are determined to not actually be flaws. Also, seventeen (17) indications were not observed during RFO-27 that were recorded in RFO-26. The primary reason for this is because the exterior of the dryer was cleaned using a power brush and surface layers could be cleaned off such that RFO-26 indications, which turned out to be due to surface conditions, were no longer present.

Conclusion

The VY Steam Dryer inspections were extensive and the results show that the dryer is in good condition. The RFO-26 and RFO-27 inspections included all accessible and susceptible locations as well as previous indications and modifications. In addition, RFO-26 and RFO-27 inspections included roughly 30% more inspections each outage than required by the Operating License. This adds an additional measure of confidence that the steam dryer is in good condition by inspecting nearly 100% of the welds. The improved inspection tooling provided higher quality footage of the dryer and provided a high level of confidence that the steam dryer is good condition. The indications re-inspected during RFO-27 have not grown and remain acceptable per previous evaluations for continued operation. None of the indications evaluated challenge the structural integrity of the VY Steam Dryer or its function. New indications have been entered into the VY Corrective Action Program, evaluated and are acceptable as-is for continued operation. The Steam Dryer will be inspected again in RFO-28 and the results provided at that time, consistent with VY's Operating License.