

UNITED STATES
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

DOCKETED
USNRC

July 20, 2007 (7:40am)

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

In the Matter of)	
)	
Entergy Nuclear Vermont Yankee, LLC)	Docket No. 50-271-LR
and Entergy Nuclear Operations, Inc.)	ASLB No. 06-849-03-LR
)	
(Vermont Yankee Nuclear Power Station))	

**NEW ENGLAND COALITION, INC.'S (NEC) SUPPLEMENT TO OPPOSITION
TO ENTERGY'S MOTION FOR SUMMARY DISPOSITION OF NEW
ENGLAND COALITION CONTENTION 3 (STEAM DRYER)**

Pursuant to the Board's Order (Granting Motion to Defer and Setting Schedule) of July 13, 2007, New England Coalition, Inc. (NEC) submits this supplement to its Opposition to Entergy's Motion for Summary Disposition of NEC's Contention 3 (Steam Dryer).

I. MATERIAL FACTS CONCERNING THE VALIDITY OF THE STRESS LOAD ANALYSIS THAT UNDERLIES ENTERGY'S STEAM DRYER AGING MANAGEMENT PLAN ARE IN GENUINE DISPUTE.

Both Entergy's proposed steam dryer aging management plan, and Entergy's management of the steam dryer during the remainder of its current VY license term, apparently rely upon stress load analyses Entergy performed as part of the Vermont Yankee (VY) EPU power ascension testing using the ACM and CFD models. *See*, Third Declaration of Dr. Joram Hopfenfeld, Exhibit 1 to NEC's Opposition to Entergy's Motion for Summary Disposition of NEC Contention 3 (Steam Dryer). Results of the first inspection of the VY steam dryer since the power uprate, conducted in May 2007, suggest that the VY steam dryer may have suffered fatigue-induced cracking since

commencement of uprate operation, and therefore cast doubt on the validity of Entergy's ACM and CFD-based stress load analyses.

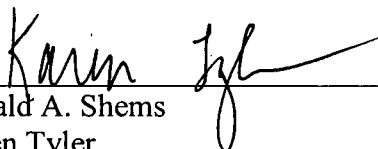
Entergy contends, in support of its Motion for Summary Disposition of NEC's Contention 3, that "fatigue-induced cracking of the VY steam dryer is not occurring." Entergy Statement of Material Facts Regarding NEC Contention 3 On Which No Genuine Dispute Exists ¶ 7. However, the May 2007 steam dryer inspection identified somewhere between twenty (20) and seventy-five (75) new cracks or incidences of crack growth or change. *See*, Exhibit 1, Second Declaration of Ulrich Witte (Witte Declaration 2) at ¶¶ 12-14. Based on the documentation of the May 2007 steam dryer inspection that Entergy produced to NEC, NEC's consultant was unable to conclude that none of these new cracks or incidences of crack growth or change were fatigue-induced, that Entergy is adequately managing fatigue failure of the steam dryer, or that Entergy can accurately predict stress loads on the steam dryer. *See*, Witte Declaration 2.

Material facts concerning the validity of the stress load analysis that underlies the steam dryer aging management plan Entergy proposes to implement during the license renewal period are in genuine dispute. Entergy's Motion for Summary Disposition of NEC's Contention 3 (Steam Dryer) should therefore be denied.

July 19, 2007

New England Coalition, Inc.

by:



Ronald A. Shems
Karen Tyler
SHEMS DUNKIEL KASSEL & SAUNDERS PLLC
Attorneys for NEC

EXHIBIT 1

**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

In the Matter of)	
)	
ENTERGY NUCLEAR VERMONT YANKEE, LLC)	Docket No. 50-271-LR
and ENTERGY NUCLEAR OPERATIONS, INC.)	ASLB No. 06-849-03-LR
)	
Vermont Yankee Nuclear Power Station)	

SECOND DECLARATION OF ULRICH WITTE

1. My name is Ulrich Witte. The New England Coalition (NEC) has retained me as a consultant with respect to the above-captioned proceeding. I am a mechanical engineer with over twenty-six years professional experience in engineering, licensing, and regulatory compliance of commercial nuclear facilities. I have considerable experience and expertise in the areas of configuration management, engineering design change controls, and licensing basis reconstitution. I have authored or contributed to two EPRI documents in the areas of finite element analysis, and engineering design control optimization programs. I have led industry guidelines endorsed by the American National Standards Institute regarding configuration management programs for domestic nuclear power plants. My 26 years of experience has generally focused on assisting nuclear plant owners in reestablishing fidelity of the licensing and design bases with the current plant design configuration, and with actual plant operations. In short, my expertise is in assisting problematic plants where the regulator found reason to require the owner to reestablish competence in safely operating the facility in accordance with regulatory requirements. My curriculum vitae was previously filed in this proceeding as Attachment A to my declaration in support of NEC's Opposition to Entergy's Motion for Summary Disposition of NEC's Contention 4 (Flow-Accelerated Corrosion).

2. This declaration concerns my review of the results of a visual inspection of the Vermont Yankee Nuclear Power Plant (VYNPS) steam dryer conducted during VYNPS Refueling Outage (RFO) 26, with closure documents dating June 15, 2007, by VYNPS personnel together with a General Electric (GE) inspection team. I submit the following comments in support of NEC's Answer to Entergy's Motion For Summary Disposition of NEC Contention 3.

3. Based on the materials I have reviewed, as detailed in this Declaration, I cannot concur with the representation Entergy made in its Motion for Summary Disposition of NEC's Contention 3 that "fatigue-induced cracking of the VY steam dryer is not occurring." *See*, Entergy Statement of Material Facts Regarding NEC Contention 3 On Which No Genuine Dispute Exists ¶ 7. I am unable to conclude that Entergy is adequately managing fatigue failure of the steam dryer. Finally, I cannot conclude that Entergy fully understands or can predict stress loads on the VYNPS steam dryer.

4. I have attempted to reconcile the documents Entergy has produced to NEC regarding its RFO 26 inspection results against Entergy's commitment to NUREG 1801 Rev. 1, and the GE SIL 644, Rev. 1, as well as the industry accepted approach for implementing the involved analysis typically required to implement the SIL.

5. I began my review of the steam dryer inspection results by examining the documentation of the RFO 26 steam dryer inspection that Entergy produced to NEC on July 18, 2007. These documents included: (1) sixteen GE Nuclear Energy Steam Dryer Indication Notification Reports (INRs); (2) two additional GE Nuclear Energy reports -- GE-NE 0000-0068-4787 (May 29, 2007), and GE-0000-0068-7307 (June 4, 2007); and (3) Entergy's Engineering Report No. VY-RPT-07-00011 (Rev. 0, June 15, 2007), entitled "Evaluation of New RF026 Steam Dryer Indication."

6. The sixteen GE Nuclear Entergy INR Reports identify the location of steam dryer flaws examined during the RFO 26 inspection. They also indicate whether these flaws are new or larger since the RFO 25 dryer inspection. These reports identify a number of new or larger flaws.

7. GE Nuclear Energy Reports No. NE 0000-0068-4787 (May 29, 2007), and GE-0000-0068-7307 (June 4, 2007) contain GE's evaluation of steam dryer flaws reported in a total of only four of the sixteen INR Reports referenced in paragraph 5 of this Declaration. To my knowledge, Entergy has not produced to NEC GE's assessment of new or larger steam dryer flaws identified in any of the twelve other INR Reports referenced in paragraph 5 of this Declaration.

8. For example, INR-IVVI-VYR26-07-10 Rev. 1 reports one new "relevant indication." Entergy's Condition Report, CR -VTY-2007-02133, addresses this new indication. A copy of this Condition Report is attached hereto as Attachment A. It cites the above INR for resolution, but cites an Engineering Report, VTY-RPT-07-00011 rev. 2, dated June 15, 2007, to disposition and close the fatigue review needed by GE to close the item. The Engineering report, in turn, cites a GE Nuclear Entergy report, GENE-0000-0047-2767, the latest version of which appears to be rev 1 from October 2005. The GE report therefore does not address the new indication within its scope.

9. Entergy's "Evaluation of New RF026 Steam Dryer Indication," Engineering Report No. VY-RPT-07-00011, (Rev. 0, June 15, 2007) states Entergy's conclusion that "the flaw indications reported in the steam dryer INFs from RFO26 will not likely result in any lost parts at operating conditions...there is no safety concern with continued operation based upon . . . indications left as is." It appears that none of the new or larger flaws identified on inspection were dispositioned as requiring repair. I find it troubling that this report does not

provide the primary set of references for the analysis supporting its conclusions regarding accepting new crack growth "as is," and does not discuss the conservative stability or prediction of durability of the steam dryer through to the next outage inspection. Finally, the report does not reconcile the indications found as meeting specific acceptance criteria, including, for example, Calculation VY-3001, Rev 3 "Acceptance Criteria For The Steam Dryer," provided to NEC on June 22, 2007. In my former position as Manager of Configuration Management Programs responsible for configuration management and engineering programs for New York Power Authority with respect to operation of the Indian Point 3 and the James A. Fitzpatrick Nuclear Power Plants, I would have rejected this report as incomplete for failure to provide primary references for all reportable indicators, and complete reconciliation to all relevant and current GE documents against the acceptance criteria.

10. On June 27, 2007, I visited Entergy Nuclear's corporate offices for VYNPS in Vernon, Vermont, and met with the following Entergy VYNPS staff regarding the RFO 26 steam dryer inspection: Mr. John Dreyfuss, Acting VYNPS Site Vice President; Mr. Larry Lukens, a VYNPS Engineering Supervisor; and Mr. Scott Goodwin and Mr. Neil Fales, VYNPS Engineers. Mr. Dreyfuss, Mr. Lukens, Mr. Goodwin and Mr. Fales explained that Entergy's RFO 26 inspection plan was to identify any new cracks or changes in previously documented cracks in the steam dryer since it was last inspected during RFO 25.

11. During this meeting, I spent approximately six hours reviewing video tapes of the VYNPS steam dryer recorded during the RFO 26 inspection. I reviewed these tapes with reference to two documents that Entergy has not otherwise produced to NEC.

12. The first document was a 1-2 page summary of the preliminary RFO 26 steam dryer inspection results. Mr. Fales summarized these results as:¹

- (1) There were 75 relevant steam dryer indications that required follow-up analysis.
- (2) There were 47 indications previously not identified.
- (3) There were 17 cracks that had some apparent growth propagation requiring additional analysis.
- (4) There were 29 new relevant indications [of cracking].

13. The second document was entitled "IVVI Component Log," and was central to my review of the video tapes. This log was described to me as listing all RFO 26 steam dryer inspection points, and stated whether or not a "relevant indication" was identified at each point. It is my understanding that "relevant indications" include new cracks and cracks that have increased in size or otherwise changed, where additional analysis was necessary to determine what corrective action plan to implement. For each "relevant indication" identified, the log cross-referenced all relevant GE Nuclear Energy INRs, Entergy Condition Reports, and GENE report numbers, and stated the summary disposition of the relevant indication -- typically one sentence stating that it was in some manner resolved and acceptable for start-up "as is." These relevant indications were start-up restraints to the outage and it appeared that Condition Reports were initiated for all of them. Entergy staff explained that there is not a one-to-one correspondence between relevant indication and condition report -- some condition reports address more than one relevant indication. It was clear that the IVVI Component Log was a key index that would allow me to link a specific relevant indication found on the video to the corresponding condition report, analysis (if done), and disposition that removed the item from the start-up list as not requiring repair. I was permitted to make notes on the IVVI Component Log as I reviewed the inspection videos.

¹ This information is taken from my notes transcribed from the discussion of the summary.

14. I noted that the IVVI Component Log included approximately 20 “relevant indications,” and focused my review on these relevant indications. It was not clear to me why the IVVI Component Log identified only 20 relevant indications, while the summary results document, discussed in paragraph 12 of this declaration, referred to 75 relevant indications.

15. I also noted one discrepancy between the IVVI Component Log and the steam dryer inspection video I reviewed. On audio accompanying video tape of a 14-inch crack that appeared to follow a seam weld about half an inch beyond the Heat Affected Zone (HAZ), the inspector is heard to observe that the crack appears to “have a little bit of growth.” The IVVI Component Log indicates that this crack showed “no apparent growth,” and was dispositioned as acceptable “as-is” and not requiring repair. I have not seen or reviewed any documentation explaining how Entergy reached this conclusion, contrary to the inspector’s observation.

16. During my June 27, 2007 meeting, and again at its conclusion, I requested copies of a) the summary of the RFO 26 inspection results; b) the IVVI Component Log that I had annotated; and c) all Condition Reports, GE INR reports, GENE reports, and other criteria or analysis performed in support of the disposition of the 20 “relevant indications” identified on the IVVI Component Log, and indicating how each specific RI was removed from the start-up restraint list.

17. In response to my request for this documentation, Entergy produced twenty Condition Reports to NEC on July 6, 2007. Entergy did not produce the summary report. It also did not produce the IVVI Component Log, and I am therefore unable to determine whether the Condition Reports produced are those I requested. I nonetheless reviewed these Condition

Reports. They do not discuss analysis performed in support of the disposition of the relevant indications, only background information on some but not all of the items requested.

18. In summary, the VYNPS RFO 26 inspection identified at least 20 new cracks or incidences of crack growth or change that required further analysis. I say "at least" because the preliminary results summary report that I reviewed at Entergy's VYNPS corporate offices stated a much larger number of "relevant indications:" 75 in total, including 47 not previously identified. I have not reviewed analysis from which I could conclude that none of these new cracks or incidences of crack growth or change were fatigue-induced. I have not reviewed analysis supporting Entergy's disposition of every relevant indication. I reviewed no documentation that would support a 2-3 year inspection interval.

19. Finally, the documentation of the RFO 26 inspection results that I have reviewed does not demonstrate that Entergy fully understands or can accurately predict stress loads on the steam dryer. This is not surprising. Indeed, one of the most recent NUREGs addressing this topic, a report prepared by an international team of experts assembled by Brookhaven Laboratories under contract to the Nuclear Regulatory Commission, concluded that modeling under mechanistic algorithms for steam dryers is in the "red zone," meaning analytical techniques are very unreliable in predicting accurate results. See, NUREG NUREG/CR-6923 BNL-NUREG-77111-2006, "Expert Panel Report on Proactive Materials Degradation Assessment," and in particular Appendix B17.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 19 day of July, 2007 at Westville, Connecticut.

A handwritten signature in cursive script, appearing to read 'U. Witte', is written above a horizontal line.

Ulrich Witte

Entergy

CONDITION REPORT

CR-VTY-2007-02133

Originator: Fales, Neil

Originator Phone: 8024513057

Originator Group: Eng P&C Codes Staff

Operability Required: Y

Supervisor Name: Lukens, Larry D

Reportability Required: Y

Discovered Date: 05/28/2007 17:06

Initiated Date: 05/28/2007 17:11

Condition Description:

Steam Dryer Inspection Indications

During RFO26 reactor vessel inspections, linear indications on the Steam Dryer Interior Vertical Weld HB-V04 were identified by General Electric. Most of these indications were previously identified in RFO25 with no discernable changes noted in RFO26. One new relevant indication was observed of similar appearance, orientation and size as those previously seen. These were documented via GE's process by INR-IVVI-VYR26-07-10. See attached GE INR's for details.

Immediate Action Description:

Notified Supervisor and generated CR.

Suggested Action Description:

The new indication will need to be evaluated.

EQUIPMENT:Tag Name

STEAM-DRYER

Tag Suffix Name Component Code Process System Code

REACTOR MR=Y NB

TRENDING (For Reference Purposes Only):Trend Type

KEYWORDS

INPO BINNING

KEYWORDS

REPORT WEIGHT

EM

HEP FACTOR

Trend Code

KW-PRE-SCREENED FOR MRFF

ER1

KW-ISI

I

ESPC

E

Attachments:

Condition Description

GE INR 10

Entergy**ADMIN****CR-VTY-2007-02133****Initiated Date:** 5/28/2007 17:11**Owner Group :**Eng P&C Codes Mgmt**Current Contact:** vw**Current Significance:** C - INVEST & CORRECT**Closed by:** Taylor,James M

6/18/2007 16:06

Summary Description:**Steam Dryer Inspection Indications**

During RFO26 reactor vessel inspections, linear indications on the Steam Dryer Interior Vertical Weld HB-V04 were identified by General Electric. Most of these indications were previously identified in RFO25 with no discernable changes noted in RFO26. One new relevant indication was observed of similar appearance, orientation and size as those previously seen. These were documented via GE's process by INR-IVVI-VYR26-07-10. See attached GE INR's for details.

Remarks Description:**Closure Description:**

CR closure review performed.

Attachment Header

Document Name:

untitled

Document Location

Condition Description

Attach Title:

GE INR 10



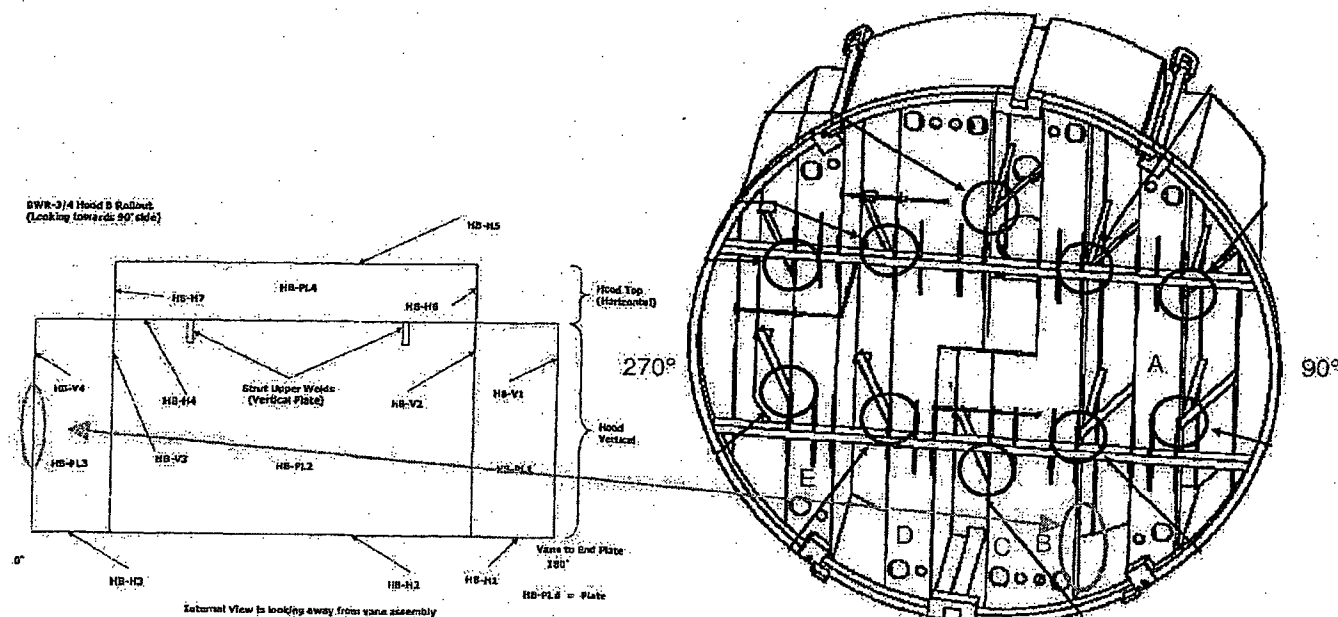
INR-IVVI-VYR26-07-10- Steam Dryer Interior HB-V04

Indication Notification Report

Plant / Unit	Component Description	Reference(s)
Vermont Yankee RFO26 Spring 2007	Steam Dryer Interior Vertical Weld HB-V04	DVD DISK IVVI-VYR26-07-58 Title 4 RFO-25 IVVI Report INF # 002.

Background

During the Vermont Yankee 2007 refueling outage, in accordance with the Vermont Yankee VT-VMY-204V.10 Rev 2 Procedure, the Steam Dryer was inspected. The dryer inspection included inspection of the Steam Dryer interior welds and components. These inspections were done with GE's Fire-Fly ROV with color camera. During the inspection of the HB-V04 weld (Dryer Unit Hood End Panel to HB-PL3 Plate weld), relevant linear indications were observed in the heat affected zone on the Dryer Unit side of the weld. Most of these linear indications were previously seen in RFO-25, Reference INF # 002. When comparing this outage with last outage, one new relevant indication is seen (3rd indication) of similar appearance, orientation and size as those previously seen; one indication was not seen (RFO25: 3th indication). No discernible change was noted in those indications which correlates to those of RFO26. See attached 2007 photos and sketches.



Sketch on the left shows the weld map rollout. The sketch on the right shows a bottom view of the dryer.

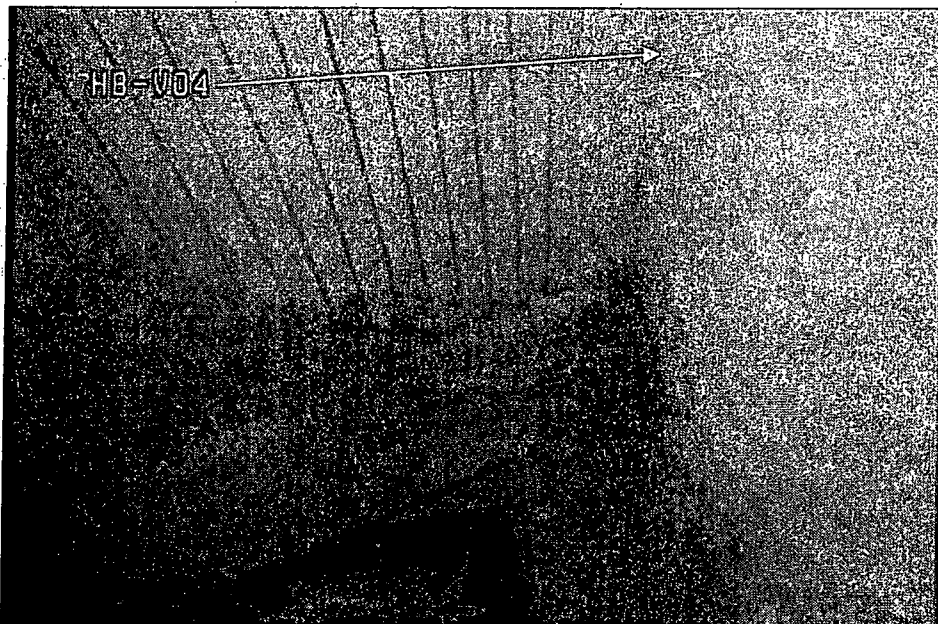
Prepared by: Dick Hooper Date: 05/27/07
Utility Review By: R. Pardo Date: 5/27/07

Reviewed by: Rodney Drazich Date: 05/27/07

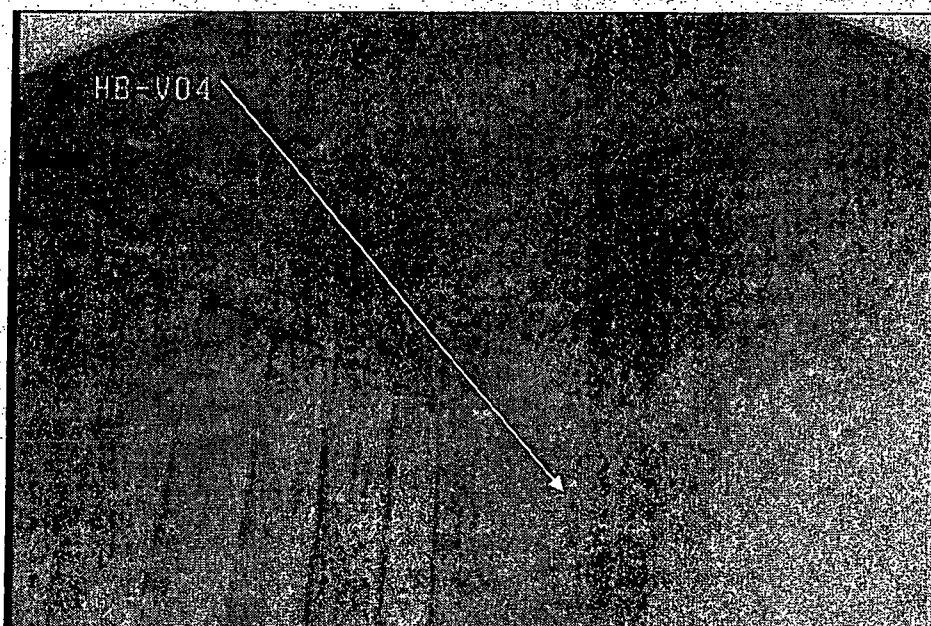


INR-IVVI-VYR26-07-10- Steam Dryer Interior HB-V04

Indication Notification Report



This 2007 photo shows the interior of the dryer and the location of HB-V04 vertical weld.

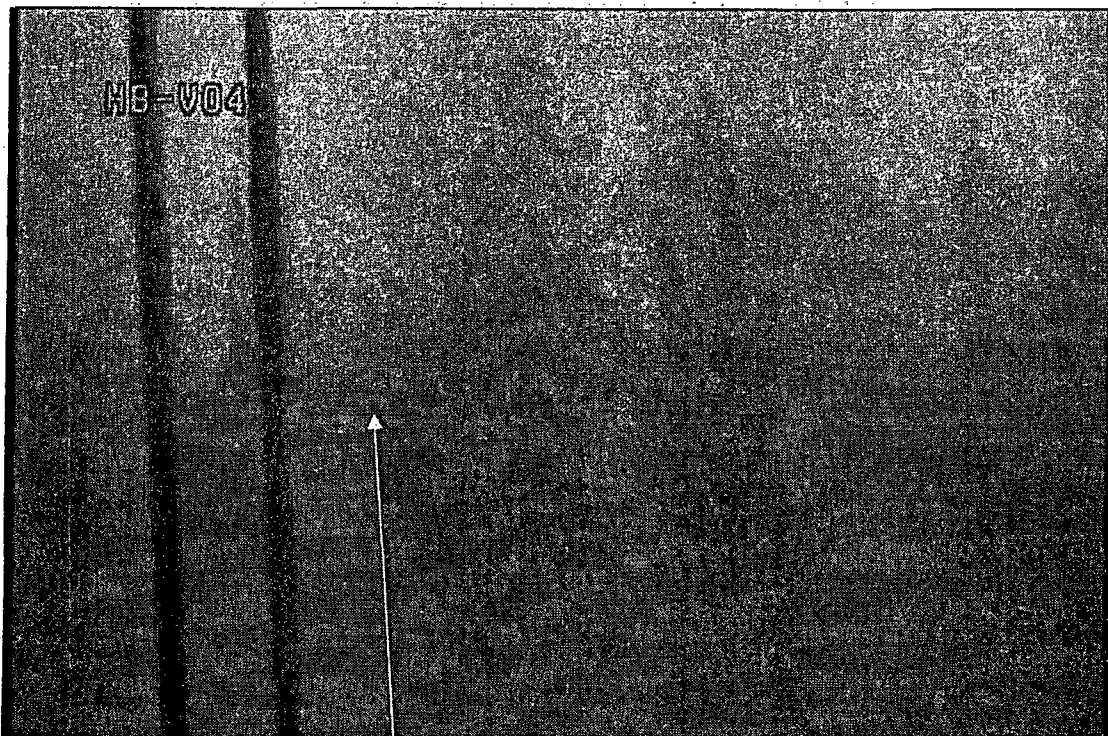


This 2007 photo shows the top of the vane bank (on the left) and the end panel (on the right) and the vertical weld in the center

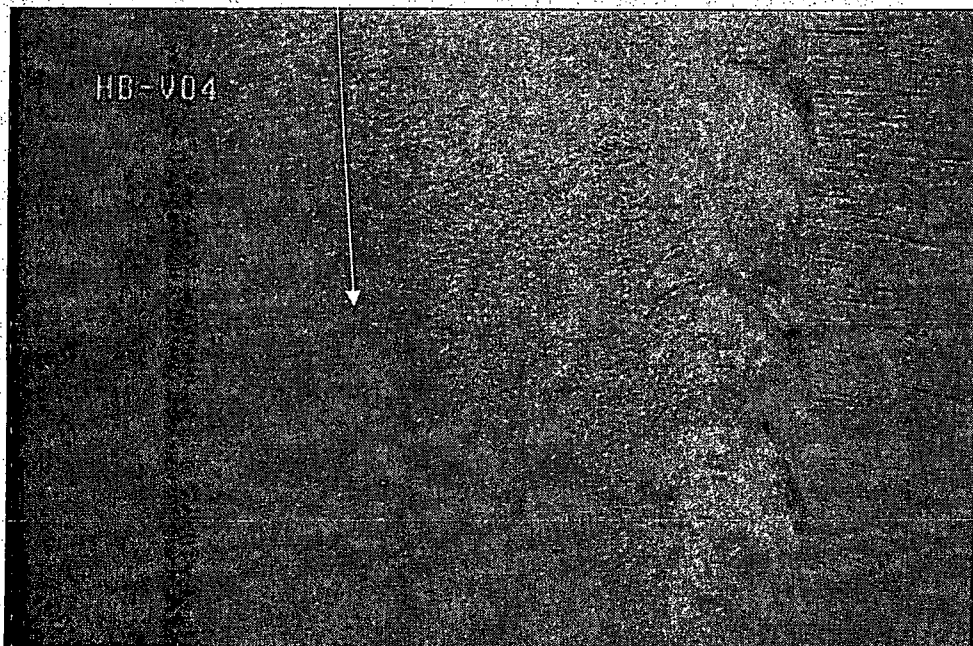


INR-IVVI-VYR26-07-10- Steam Dryer Interior HB-V04

Indication Notification Report



This 2007 photo is of the 1st indication from top down (Correlates to RFO25: 1st indication).

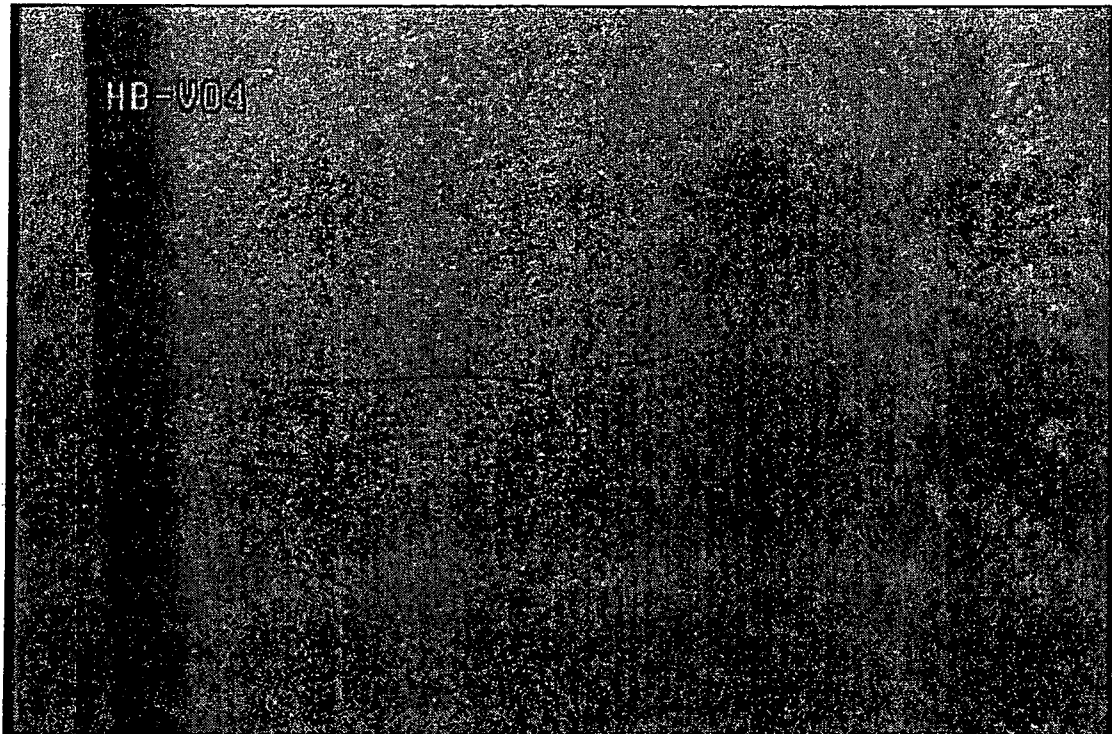


This 2007 photo is a close-up of the 1st indication (Correlates to RFO25: 1st indication).

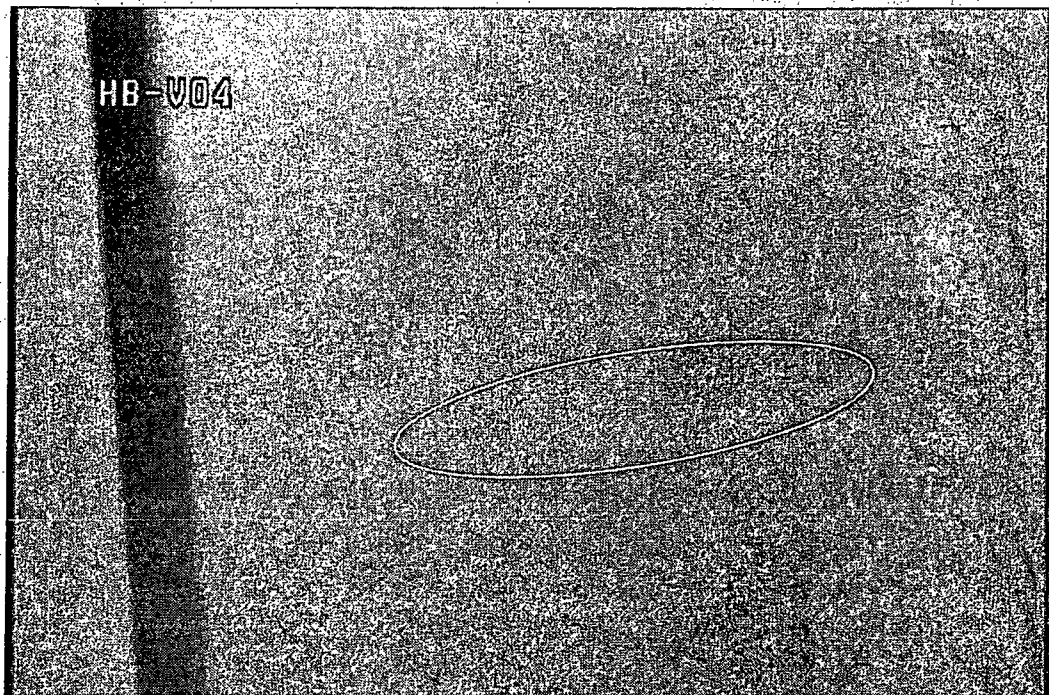


INR-IVVI-VYR26-07-10- Steam Dryer Interior HB-V04

Indication Notification Report



This 2007 photo is the 2nd indication (Correlates to RFO25: 2nd indication).

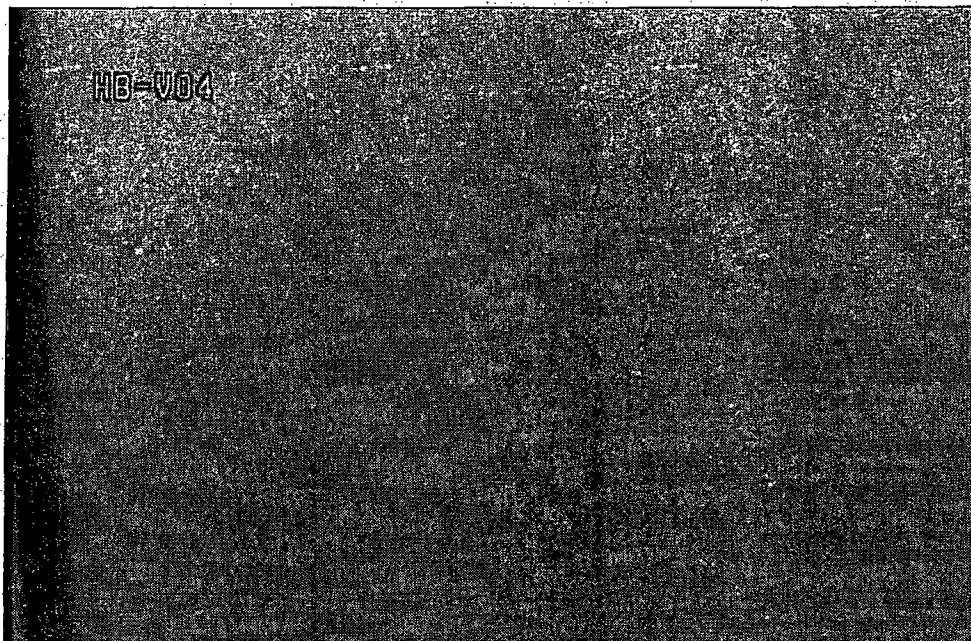


This is a 2007 photo of the 3rd indication and is a new RFO26 indication.



INR-IVVI-VYR26-07-10- Steam Dryer Interior HB-V04

Indication Notification Report



This is a 2007 photo of the 4th indication (Correlates to RFO25: 3rd indication)

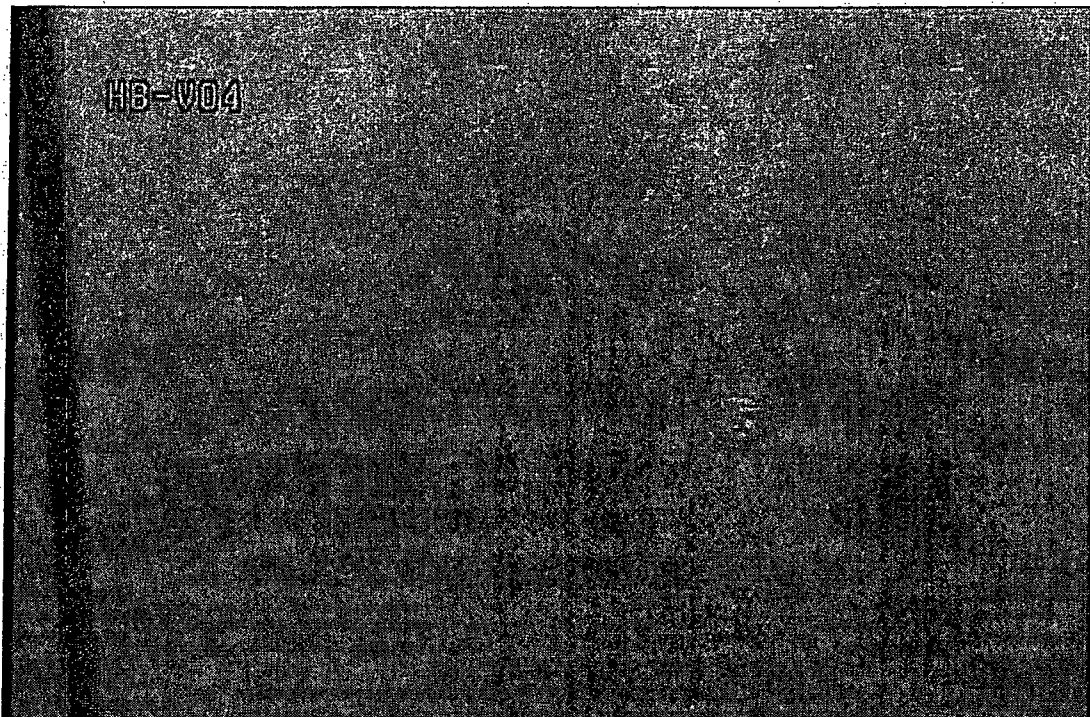


This is a 2007 photo of the 5th indication (Correlates to RFO25: 4th indication).

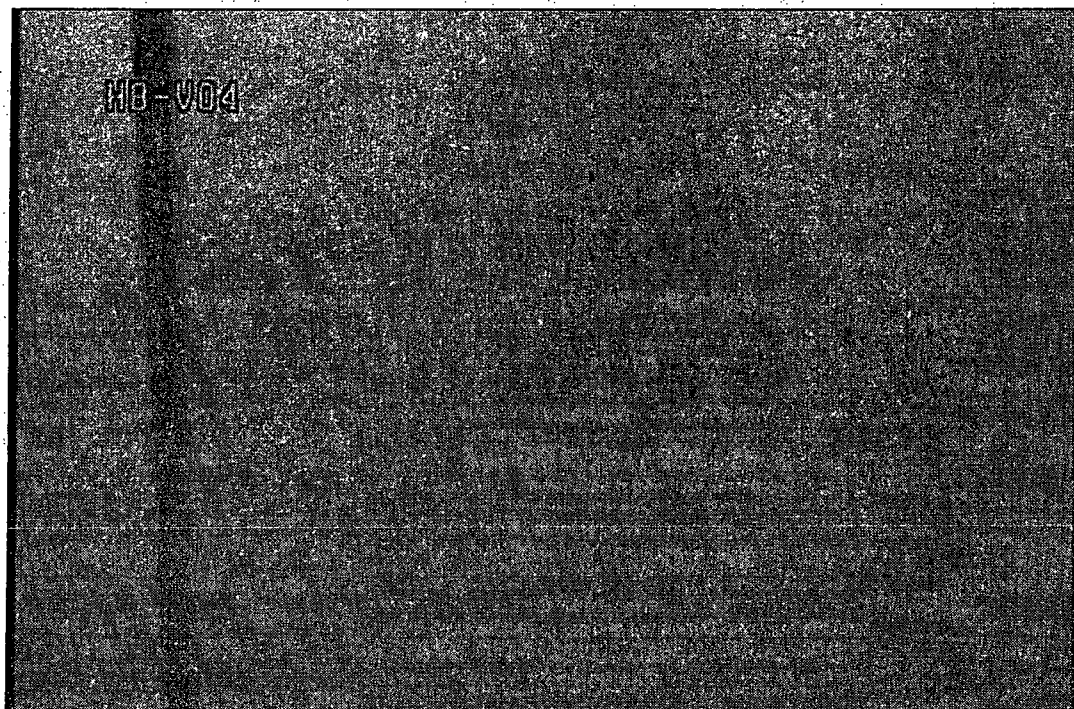


INR-IVVI-VYR26-07-10- Steam Dryer Interior HB-V04

Indication Notification Report



This is a 2007 photo of the 6th indication (Correlates to RFO25: 5th indication).

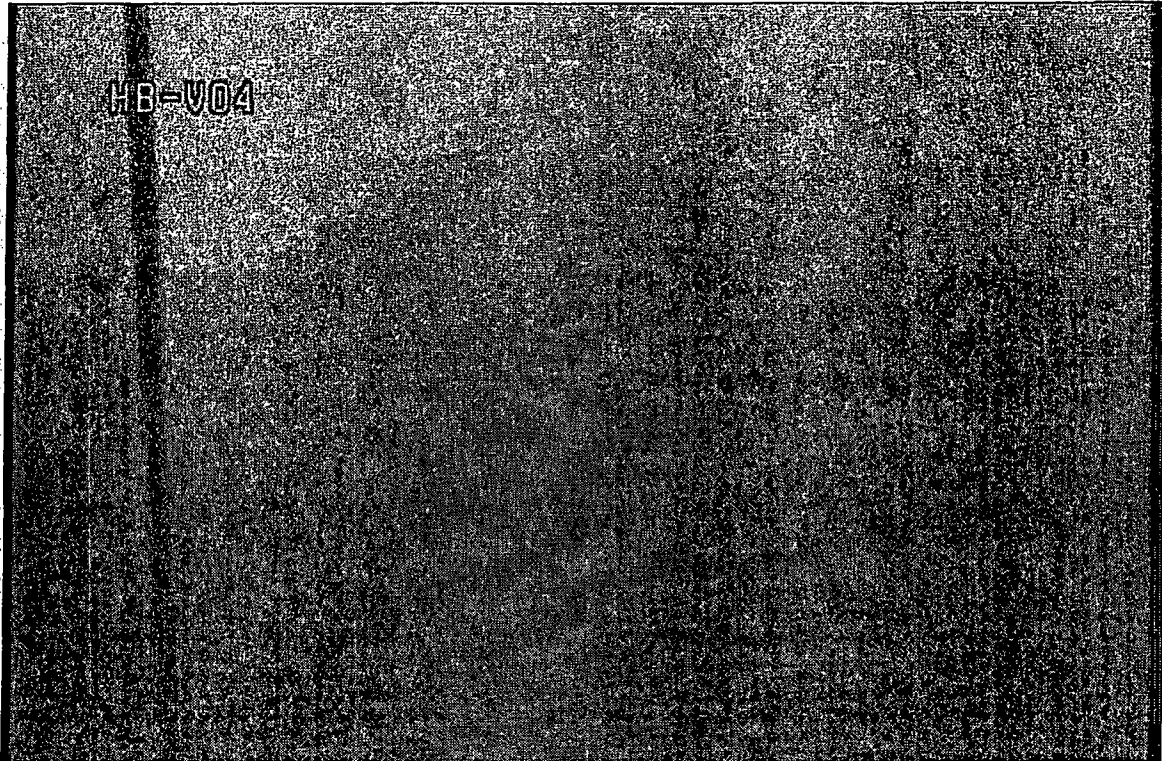


This is a 2007 photo of the 7th indication (Correlates to RFO25: 6th indication).

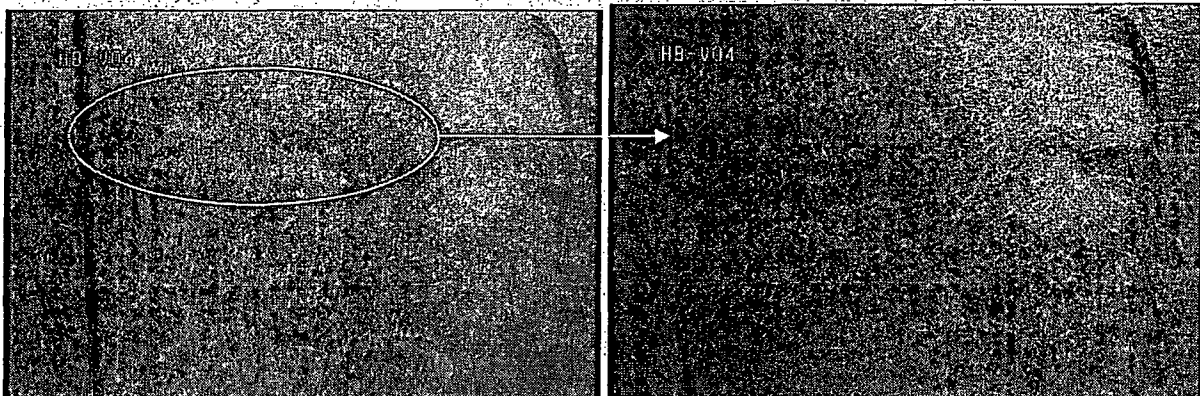


INR-IVVI-VYR26-07-10- Steam Dryer Interior HB-V04

Indication Notification Report



This is a 2007 photo of the 8th indication (Correlates to RFO25: 7th indication).

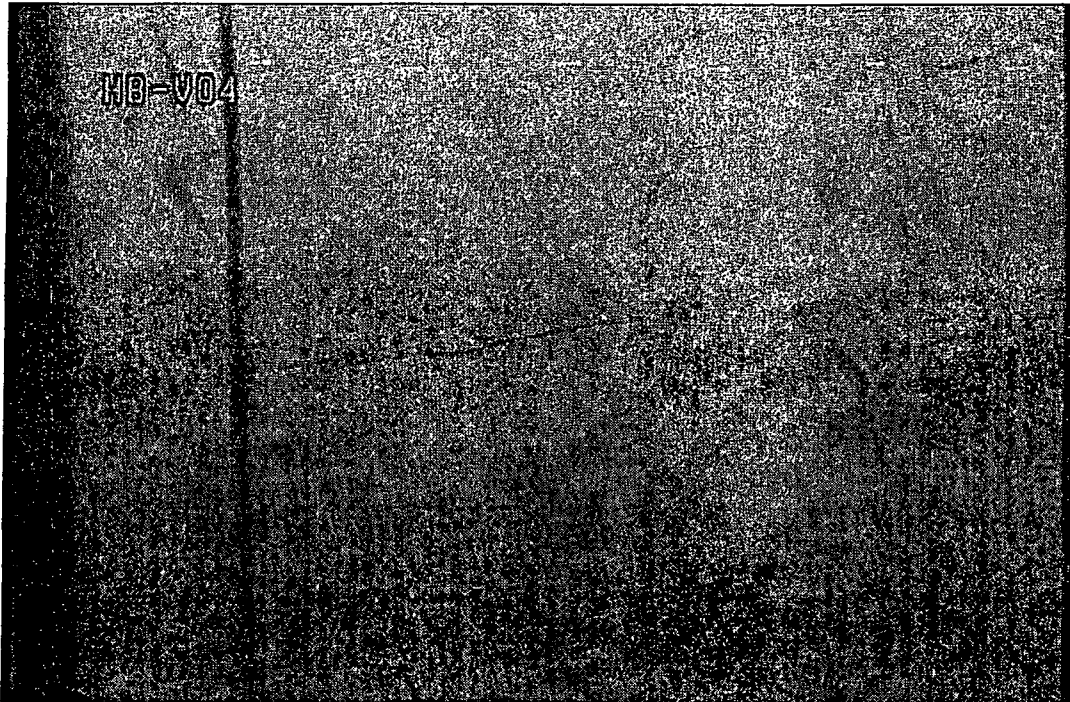


These 2007 photos show a linear indication and change of lighting and show a non-relevant indication (Correlates to RFO25: 9th indication).

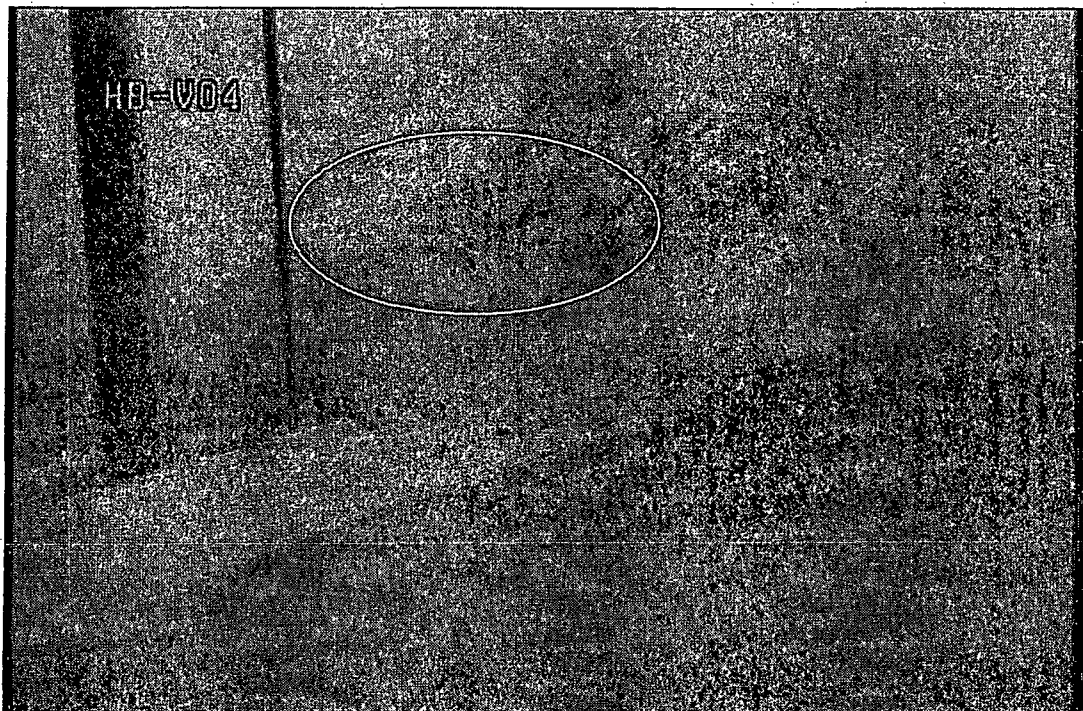


INR-IVVI-VYR26-07-10- Steam Dryer Interior HB-V04

Indication Notification Report



This is a 2007 photo of the 9th indication (Correlates to RFO25: 10th indication).



This is a 2007 photo of the bottom weld area and crud line.

OperabilityVersion: 1**Operability Code:** EQUIPMENT FUNCTIONAL**Immediate Report Code:** NOT REPORTABLE**Performed By:** Brooks,James C

05/29/2007 21:07

Approved By: Faupel,Robert F

05/30/2007 00:30

Operability Description:

Currently the plant is shutdown with the bolt in place. The bolt has one crimp fully engaged preventing the bolt from backing out. The need for having both crimps fully engaged will have to be evaluated prior to startup.

Approval Comments:

Entergy

ASSIGNMENTS

CR-VTY-2007-02133

Version: 2

Significance Code: C - INVEST & CORRECT

Classification Code: C

Owner Group: Eng P&C Codes Mgmt

Performed By: Wren,Vedrana

05/30/2007 13:04

Assignment Description:

Entergy

ASSIGNMENTS

CR-VTY-2007-02133

Version: 1

Significance Code: C - INVEST & CORRECT

Classification Code: C

Owner Group: Eng P&C Codes Mgmt

Performed By: Lukens,Larry D

05/29/2007 04:46

Assignment Description:

self identified
outage constraint

Entergy

REPORTABILITY

CR-VTY-2007-02133

Reportability Version: 1

Report Number:

Report Code: NOT REPORTABLE

Boilerplate Code: NOT REPORTABLE

Performed By : Devincentis,James M

05/29/2007 08:09

Reportability Description:

Not reportable - This condition does not meet the Reportability screening criteria contained in AP0010 or AP0156. The Steam Dryer is NNS and performs no safety related functions. VY has a commitment to provide the results of the steam dryer inspections to the NRC following startup.

Entergy**CORRECTIVE ACTION****CR-VTY-2007-02133**

CA Number: 1

Group

Name

Assigned By: CRG/CARB/OSRC

Assigned To: Eng P&C Codes Mgmt

Lukens, Larry D

Subassigned To: Eng P&C Codes Staff

Fales, Neil

Originated By: Wren, Vedrana

5/30/2007 13:00:53

Performed By: Lukens, Larry D

6/15/2007 13:17:25

Subperformed By: Fales, Neil

6/15/2007 11:49:49

Approved By:

Closed By: Taylor, James M

6/18/2007 16:02:38

Current Due Date: 06/28/2007

Initial Due Date: 06/28/2007

CA Type: DISP - CA

Plant Constraint: 0 NONE

CA Description:

C - INVEST & CORRECT (Review CR for full details)

☐ The CRG has initially classified this CR as "C" INVEST & CORRECT☐☐ Per the CRG, Perform an Investigation of the issues identified in this CR and determine if additional actions are required within 30 days.☐☐ Ensure all Screening Comments have been addressed in the investigation - (CR assignment tab)☐ Develop adequate corrective actions and issue CAs. (Due Dates per LI 102 Attachment 9.4)☐ LT CAs Require Approval from Site VP/ GMPO or Director prior to initiating. Completion of Attachment 9.9 LTCA☐ Classification Form is required.**Response:**

Approved. No additional corrective action required. Therefore, this CR may be closed. LI-102 Closure Statements follow:

CR CLOSURE STATEMENTS FROM LI-102:☐ The root cause or apparent cause is valid. VERIFIED☐ The specific condition is corrected or resolved. VERIFIED☐ Overall plant safety is not inadvertently degraded. VERIFIED☐ Generic implications of the identified condition are considered, as appropriate. VERIFIED☐ Actions were taken to preclude repetition, as appropriate. VERIFIED☐ Any potential operability or reportability issues identified during the resolution of the condition have been appropriately addressed. VERIFIED☐ All corrective action items are completed. VERIFIED☐ Effectiveness Reviews have been initiated via use of Learning Organization CR, when applicable. VERIFIED**Subresponse :**

The new indication was evaluated by Code Programs, see the attached document. The evaluation accepts the indication as is with no repair required. The steam dryer will be inspected per the same scope in RFO27 and RFO28 per letter BVY 04-097, therefore the area of this indication will be inspected again during the next two outages.

Neil Fales 6/15/07

Closure Comments:

Entergy

CORRECTIVE ACTION

CR-VTY-2007-02133

Attachments:

Subresponse Description
Evaluation

Attachment Header

Document Name:

untitled

Document Location

Subresponse Description

Attach Title:

Evaluation

Engineering Report No. VY-RPT-07-00011 Rev 2

Page 1 of 3



ENTERGY NUCLEAR
Engineering Report Cover Sheet

Engineering Report Title:
EVALUATION OF NEW RFO26 STEAM DRYER INDICATION

Engineering Report Type:

New ☒ Revision ☐ Cancelled ☐ Superseded ☐

Applicable Site

IP1 ☐ IP2 ☐ IP3 ☐ JAF ☐ PNPS ☐ VY ☒ WPO ☐
ANO1 ☐ ANO2 ☐ ECH ☐ GGNS ☐ RBS ☐ WF3 ☐

DRN No. ☐ N/A; ☒ EC 1772

Report Origin: ☒ Entergy ☐ Vendor
Vendor Document No.: _____

Quality-Related: ☒ Yes ☐ No

Prepared by: Neil Fales/ N: F
Responsible Engineer (Print Name/Sign)

Date: 6/15/07

Design Verified/ N/A
Design Verifier (if required) (Print Name/Sign)

Date:

Reviewed by: Scott Goodwin/ SGoodwin
Reviewer (Print Name/Sign)

Date: 6/15/07

Reviewed by*: N/A
ANII (if required) (Print Name/Sign)

Date:

Approved by: Larry Lukens/ Larry Lukens
Supervisor (Print Name/Sign)

Date: 6/15/07

*: For ASME Section XI Code Program plans per ENN-DC-120, if require

Evaluation of Steam Dryer Indication

Introduction

During RFO26 steam dryer visual inspections, flaw indications were reported in the dryer end plates for the internal vane assemblies. Most of these indications were previously identified in RFO25 and were evaluated by GE as being acceptable to leave as is per Reference 11. The intent of this paper is to evaluate one new indication identified during RFO26 and determine whether it should be accepted as is.

Discussion

One new indication was found adjacent to weld HB-V04, located on bank B at the 0° end and is labeled as the 3rd indication on INR-IVVI-VYR26-07-10 Rev.1 (Reference 2). This indication is of similar appearance, orientation and size as those previously seen. Because of this it is being treated similar to those indications identified in RFO25. The remainder of indications on the steam dryer listed as References 1-10 were previously identified and show no signs of growth. These indications are acceptable to leave as is per GE evaluation GENE-0000-0047-2767 (Reference 11) performed in RFO25. Therefore, the one new indication described above is the only one requiring an evaluation.

It should be mentioned that not all indications identified in RFO25 were re-identified in RFO26. The reasons for this vary, but can be the limitations of the equipment, crud layers masking the surface of the indication or the technique of different examiners.

Evaluation of Indications

GE's evaluation in RFO25 cites IGSCC as being the likely cause of most of the indications previously observed. This is based on the jagged appearance and location in the weld heat affected zone (HAZ). The unit end plates may have cold work resulting from cold forming. Cold working Type 304 material can promote initiation of stress corrosion cracks when exposed to the BWR environment. The dryer unit end plates are located in the dryer interior and are not subjected to any direct main steam line acoustic loading. Continued growth is unlikely because all of these indications appear to have stopped without propagating into the vertical weld; this is indicative of IGSCC behavior as opposed to fatigue, since weld material is more resistant to IGSCC. The flanges have experienced a near infinite number of fluctuating load cycles and if fatigue driven, more significant cracking is likely to have occurred after many years of operation. IGSCC in steam dryers has been typically limited in depth and length since in many cases it is caused by cold work or weld induced residual stress.

The dryer unit end plate, with the indication, is securely attached and captured within the structure of the steam dryer bank assembly. The vertical edges of these end plates are attached to the dryer assembly with 3/16" fillet welds, each weld approximately 48" long.

There were no relevant indications reported in these vertical welds. The geometric configuration of the unit end plates is such that the steam dryer assembly mechanically captures the upper and lower edges. The reported horizontal indications were seen in the inlet side end plate flange. The vanes prevent inspection of the central end plate surface, but inspection of the outlet side end plate flanges at both locations found no indications. If it is postulated that the end plate horizontal indications propagate across the entire 8.75" unit end plate width including both the inlet and outlet side flange, such full width, through-thickness cracks would have no structural impact. Nor is there any concern for loose parts. The separated end plate sections are still attached and will continue to function.

Safety

The steam dryer assembly has no safety function. See BWRVIP-06A for additional discussion of steam dryer assembly safety. The flaw indications reported in the steam dryer INR's from RFO26 will not likely result in any lost parts at operating conditions. Therefore, there is no safety concern with continued operation with the Reference 1-10 indications left as is.

Conclusions and Recommendations

The dryer unit end plates flaw assessment is based on the following factors: (1) it is a highly redundant structure and there is no structural consequence of the cracking and (2) postulated significant flaw extension leading to the flaw reaching the full section of the channel geometry would not create the opportunity for loose parts. Field experience supports this as-is operation decision in the context that the indications will be re-inspected at the next outage. It is recommended that the new visual indication given in Reference 2 be accepted as is. Repair is not recommended.

References

1. GE INR-IVVI-VYR26-07-09 Rev. 1
2. GE INR-IVVI-VYR26-07-10 Rev. 1
3. GE INR-IVVI-VYR26-07-11
4. GE INR-IVVI-VYR26-07-12
5. GE INR-IVVI-VYR26-07-13
6. GE INR-IVVI-VYR26-07-14
7. GE INR-IVVI-VYR26-07-15
8. GE INR-IVVI-VYR26-07-16
9. GE INR-IVVI-VYR26-07-18
10. GE INR-IVVI-VYR26-07-19
11. GENE-0000-0047-2767

Entergy**CORRECTIVE ACTION****CR-VTY-2007-02133**

CA Number: 2

Group

Name

Assigned By: Constraint Group

Assigned To: Eng P&C Codes Mgmt

Lukens,Larry D

Subassigned To : Eng P&C Codes Staff

Fales,Neil

Originated By: Wren,Vedrana

5/30/2007 13:02:05

Performed By: Corbett,Patrick B

6/1/2007 17:50:21

Subperformed By: Fales,Neil

6/1/2007 16:58:55

Approved By:

Closed By: Wanczyk,Robert J

6/1/2007 17:54:13

Current Due Date: 06/01/2007

Initial Due Date: 06/01/2007

CA Type: ACTION

Plant Constraint: 2 STARTUP/HOTSTANDBY

CA Description:

Address Startup Constraint-due 6/1-Disposition and evaluate

Response:

approve

Subresponse :

The plant can start up with the dryer indications left as is. The new dryer indication is of the same appearance, orientation and size as those previously observed. Since this new indication is located in the heat affected zone and is consistent with the other indications, this is most likely caused by IGSCC. This is consistent with the evaluations by GE. See the INR and evaluation provided.

Neil Fales 6/1/07

Closure Comments:**Attachments:**Subresponse Description
EvaluationSubresponse Description
GE INR 10

Attachment Header

Document Name:

untitled

Document Location

Subresponse Description

Attach Title:

Evaluation

Evaluation of Steam Dryer Indications

Introduction

During RFO26 steam dryer visual indications, flaw indications were reported in the dryer end plates for the internal vane assemblies. Most of these indications were previously identified in RFO25 and were evaluated by GE as being acceptable to leave as is per Reference 11. The intent of this paper is to evaluate one new indication identified during RFO26 and accept it as is.

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It should be mentioned that not all indications identified in RFO25 were re-identified in RFO26. The reasons for this vary, but can be the limitations of the equipment, crud layers masking the surface of the indication or the technique of different examiners.

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GE's evaluation in RFO25 cites IGSCC as being the likely cause of most of the indications previously observed. This is based on the jagged appearance and location in the weld heat affected zone (HAZ). The unit end plates may have cold work resulting from cold forming. Cold working Type 304 material can promote initiation of stress corrosion cracks when exposed to the BWR environment. The dryer unit end plates are located in the dryer interior and are not subjected to any direct main steam line acoustic loading. However, continued growth by fatigue cannot be ruled out. Nevertheless, all of these indications appear to have stopped without propagating into the vertical weld; this is indicative of IGSCC behavior as opposed to fatigue, since weld material is more resistant to IGSCC. The flanges have experienced a near infinite number of fluctuating load cycles and if fatigue driven, more significant cracking is likely to have occurred after many years of operation. IGSCC in steam dryers has been typically limited in depth and length since in many cases it is caused by cold work or weld induced residual stress.

The dryer unit end plate, with the indication, are securely attached and captured within the structure of the steam dryer bank assembly. The vertical edges of these end plates are attached to the dryer assembly with 3/16" fillet welds, each weld approximately 48" long. There were no relevant indications reported in these vertical welds. The geometric

configuration of the unit end plates is such that the steam dryer assembly mechanically captures the upper and lower edges. The reported horizontal indications were seen in the inlet side end plate flange. The vanes prevent inspection of the central end plate surface, but inspection of the outlet side end plate flanges at both locations found no indications. If it is postulated that the end plate horizontal indications propagate across the entire 8.75" unit end plate width including both the inlet and outlet side flange, such full width, through-thickness cracks would have no structural impact. Nor is there any concern for loose parts. The separated end plate sections are still attached and will continue to function.

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Conclusions and Recommendations

The dryer unit end plates flaw assessment is based on the following factors: (1) it is a highly redundant structure and there is no structural consequence of the cracking and (2) postulated significant flaw extension leading to the flaw reaching the full section of the channel geometry would not create the opportunity for loose parts. Field experience supports this as-is operation decision in the context that the indications will be re-inspected at the next outage. It is recommended that the new visual indication given in Reference 2 be accepted as is. Repair is not recommended.

References

1. GE INR-IVVI-VYR26-07-09 Rev. 1
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3. GE INR-IVVI-VYR26-07-11
4. GE INR-IVVI-VYR26-07-12
5. GE INR-IVVI-VYR26-07-13
6. GE INR-IVVI-VYR26-07-14
7. GE INR-IVVI-VYR26-07-15
8. GE INR-IVVI-VYR26-07-16
9. GE INR-IVVI-VYR26-07-18
10. GE INR-IVVI-VYR26-07-19
11. GENE-0000-0047-2767

Attachment Header

Document Name:

untitled

Document Location

Subresponse Description

Attach Title:

GE INR 10



INR-IVVI-VYR26-07-10-Rev 1 Steam Dryer Interior HB-V04

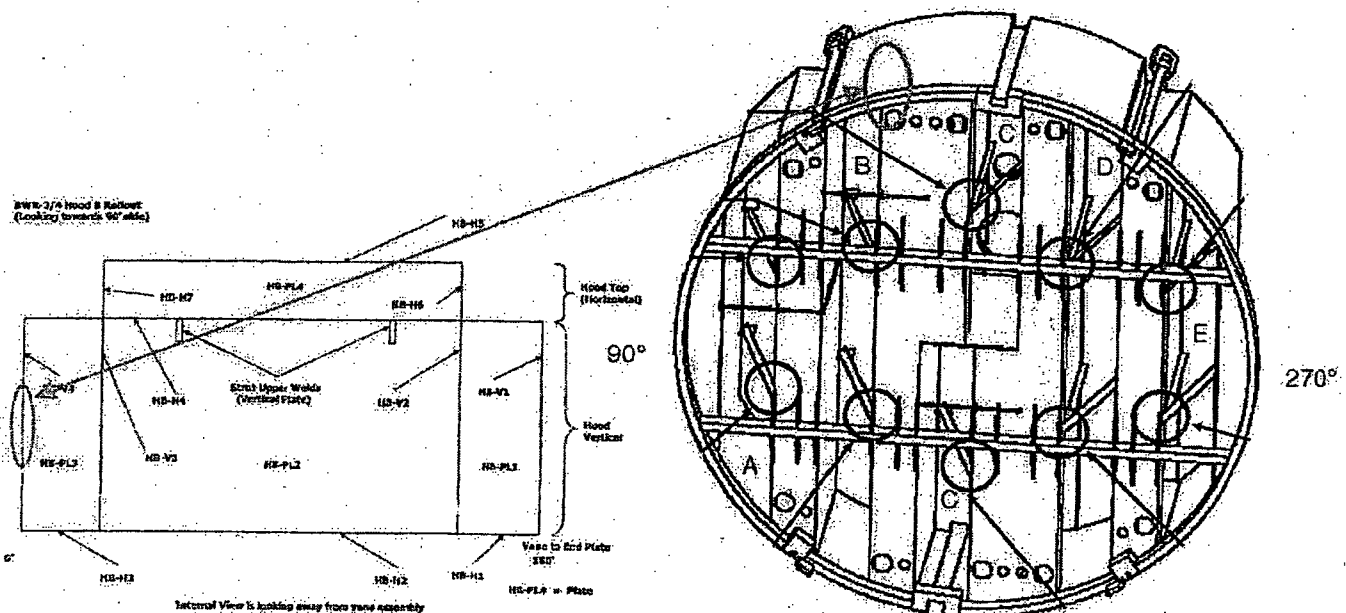
Indication Notification Report

Plant / Unit	Component Description	Reference(s)
Vermont Yankee RFO26 Spring 2007	Steam Dryer Interior Vertical Weld HB-V04	DVD DISK IVVI-VYR26-07-58 Title 4 RFO-25 IVVI Report INF # 002.

Background

Revision 1: Incorporates photos from RFO-25 and corrects the sketch.

During the Vermont Yankee 2007 refueling outage, in accordance with the Vermont Yankee VT-VMY-204V10 Rev 2 Procedure, the Steam Dryer was inspected. The dryer inspection included inspection of the Steam Dryer interior welds and components. These inspections were done with GE's Fire Fly ROV with color camera. During the inspection of the HB-V04 weld (Dryer Unit End Panel to HB-PL3 Plate weld), relevant linear indications were observed in the heat affected zone on the Dryer Unit side of the weld. Most of these linear indications were previously seen in RFO-25, Reference INF # 002. When comparing this outage with last outage, one new relevant indication is seen (3rd indication) of similar appearance, orientation and size as those previously seen; one indication was not seen (RFO25: 8th indication). No discernible change was noted for those indications which correlates to those of RFO26. See attached 2007 photos and sketches.



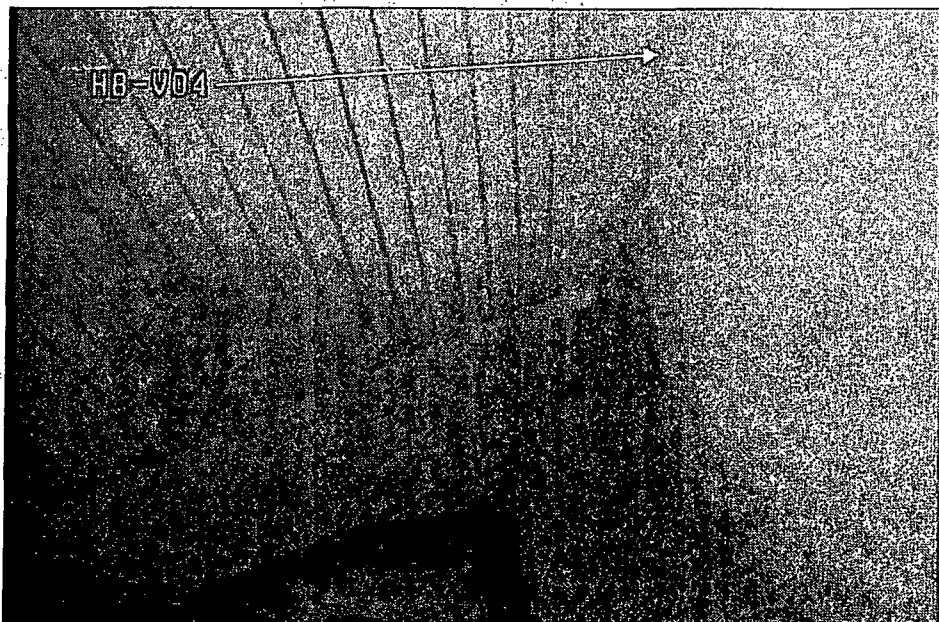
Sketch on the left shows the weld map rollout The sketch on the right shows a bottom view of the dryer.

Prepared by: Dick Hooper Date: 05/31/07 Reviewed by: Rodney Drazich Date: 05/31/07
Utility Review By: Mike Rose Date: 05/31/07

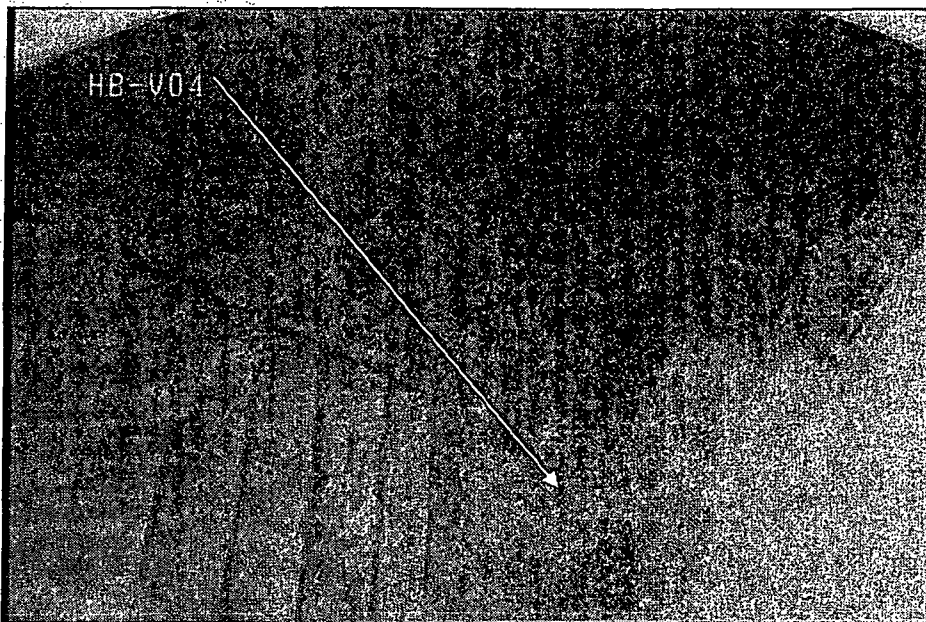


INR-IVVI-VYR26-07-10-Rev 1 Steam Dryer Interior HB-V04

Indication Notification Report



This 2007 photo shows the interior of the dryer and the location of HB-V04 vertical weld.

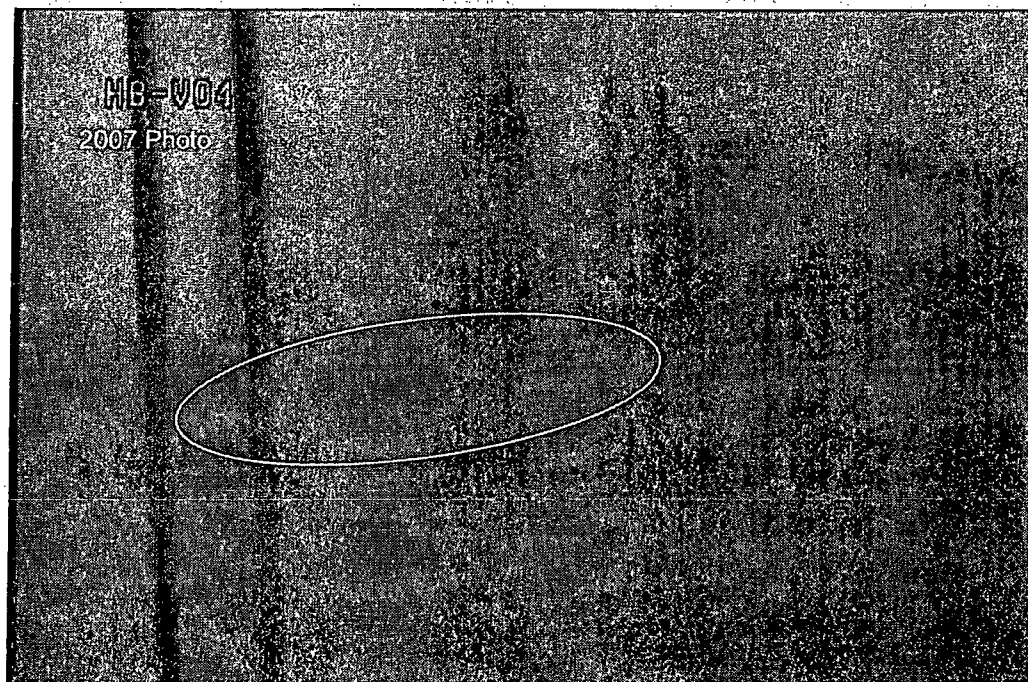
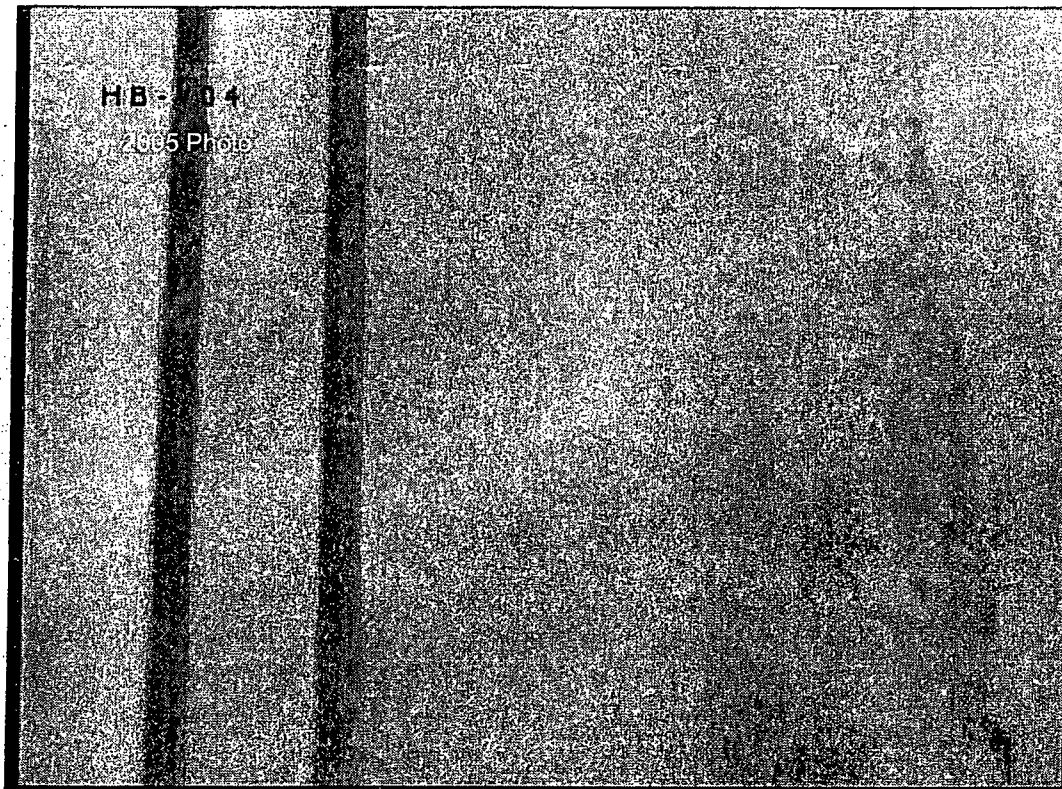


This 2007 photo shows the top of the vane bank (on the left) and the end panel (on the right) and the vertical weld in the center



INR-IVVI-VYR26-07-10-Rev 1 Steam Dryer Interior HB-V04

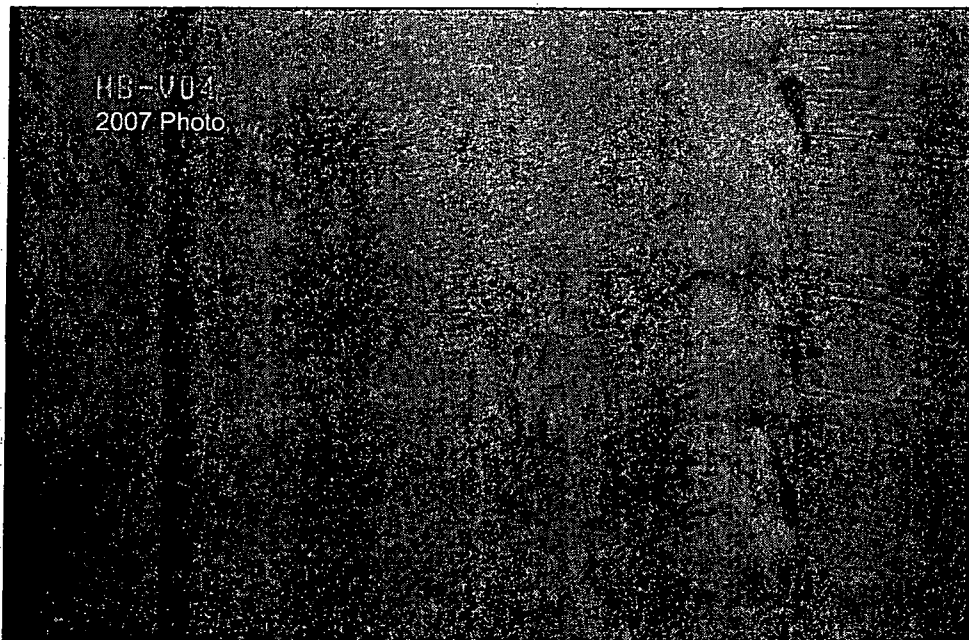
Indication Notification Report



This 2007 photo is of the 1st indication from top down (Correlates to RFO25: 1st indication).



INR-IVVI-VYR26-07-10-Rev 1 Steam Dryer Interior HB-V04
Indication Notification Report

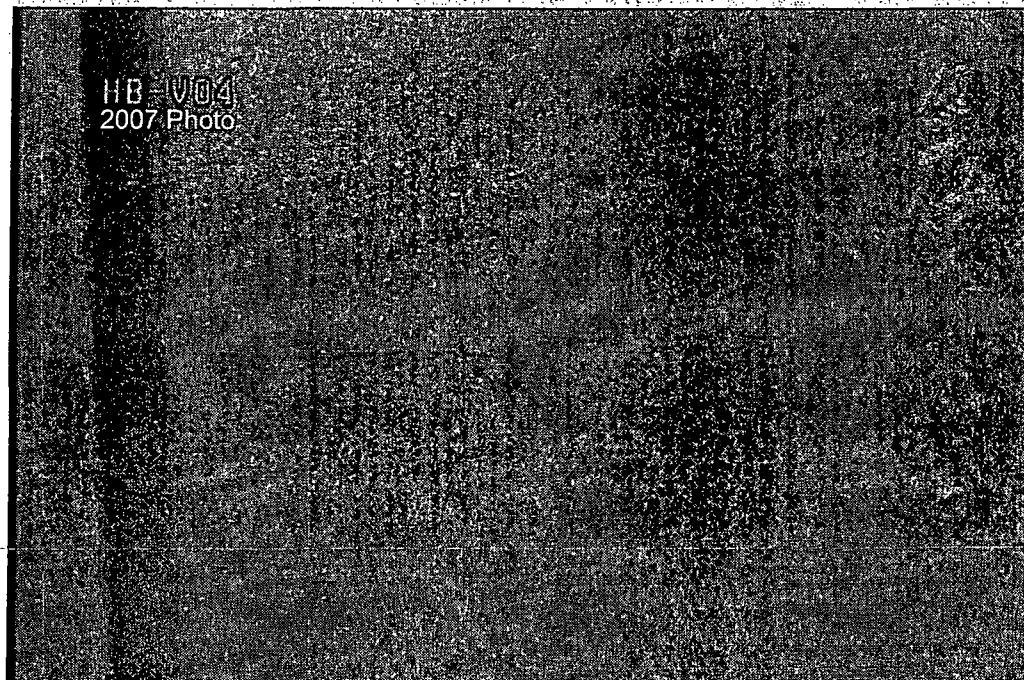
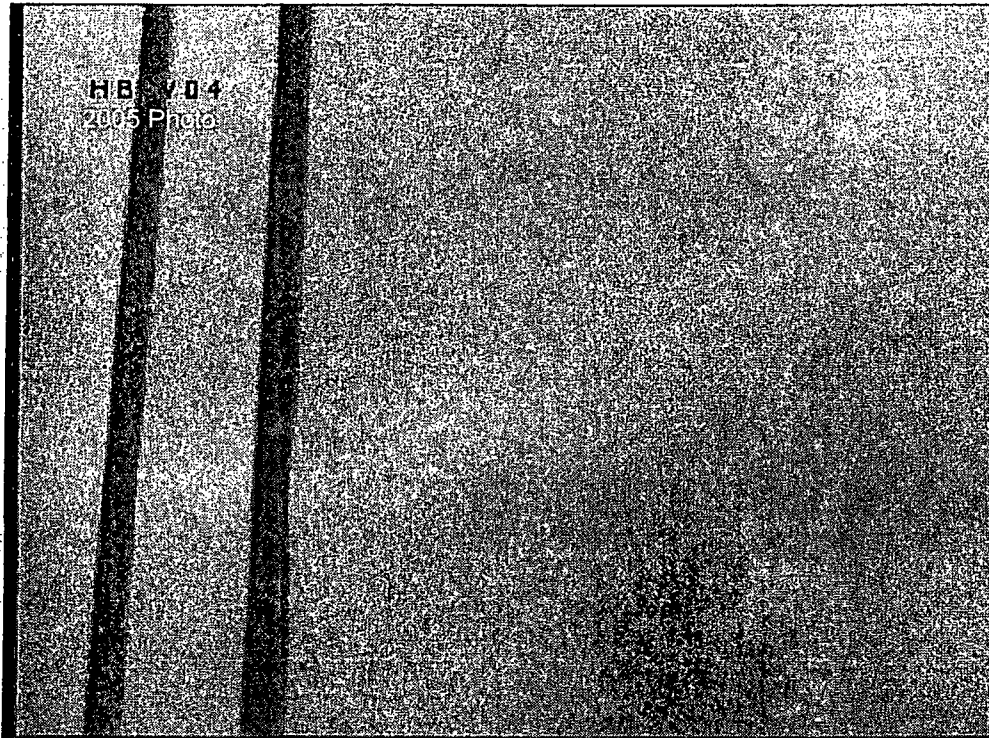


This 2007 photo is a close-up of the 1st indication (Correlates to RFO25: 1st indication).



INR-IVVI-VYR26-07-10-Rev 1 Steam Dryer Interior HB-V04

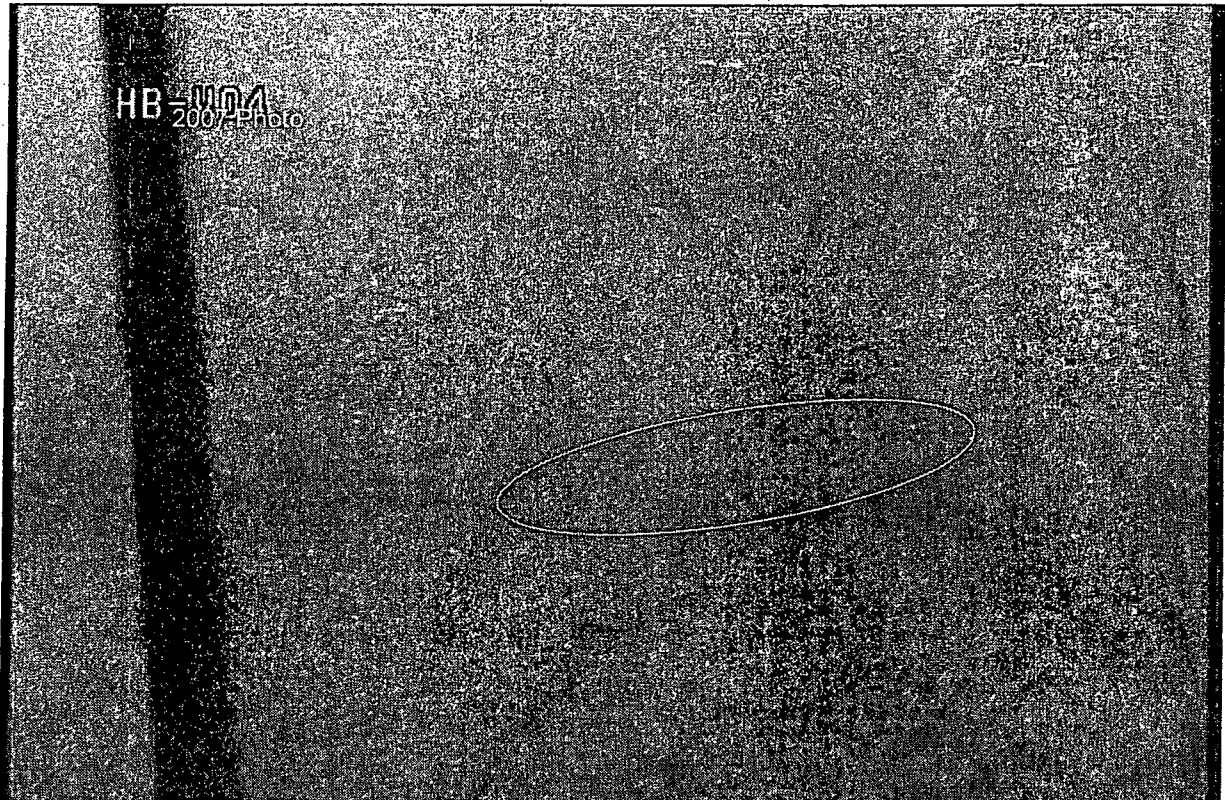
Indication Notification Report



This 2007 photo is the 2nd indication (Correlates to RFO25: 2nd indication).



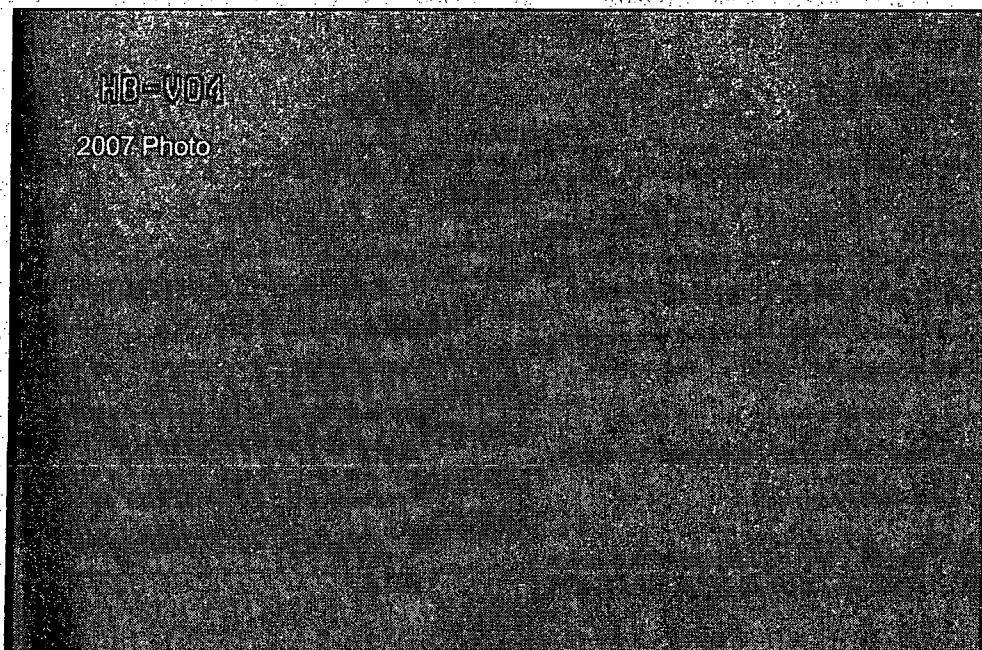
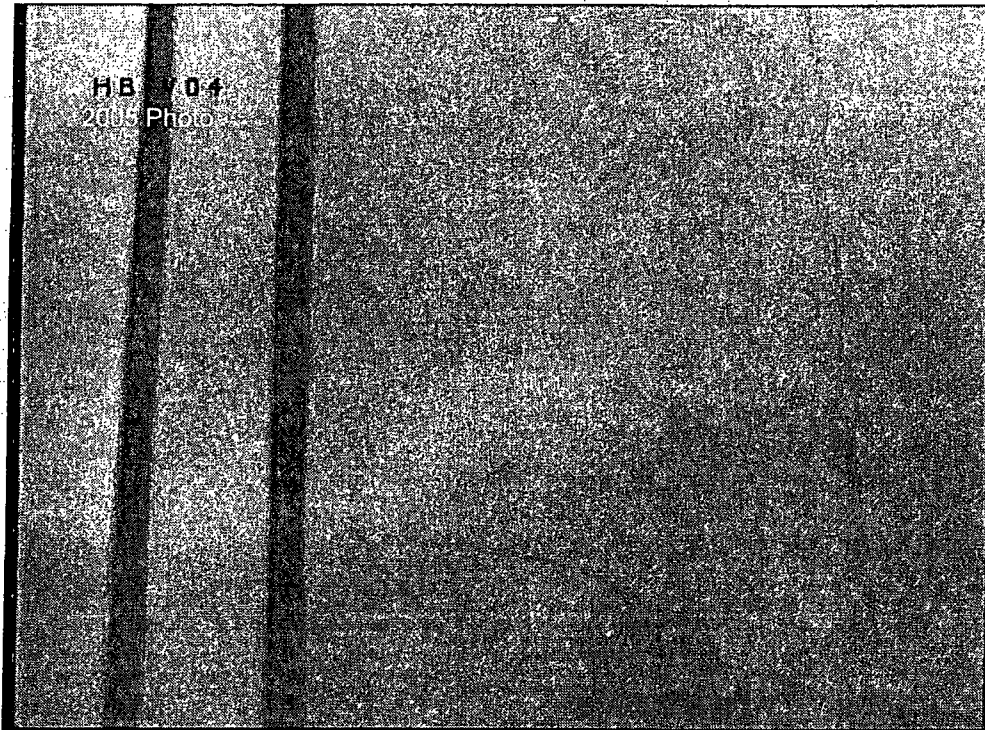
INR-IVVI-VYR26-07-10-Rev 1 Steam Dryer Interior HB-V04
Indication Notification Report



This is a 2007 photo of the 3rd indication and is a new RFO26 indication.



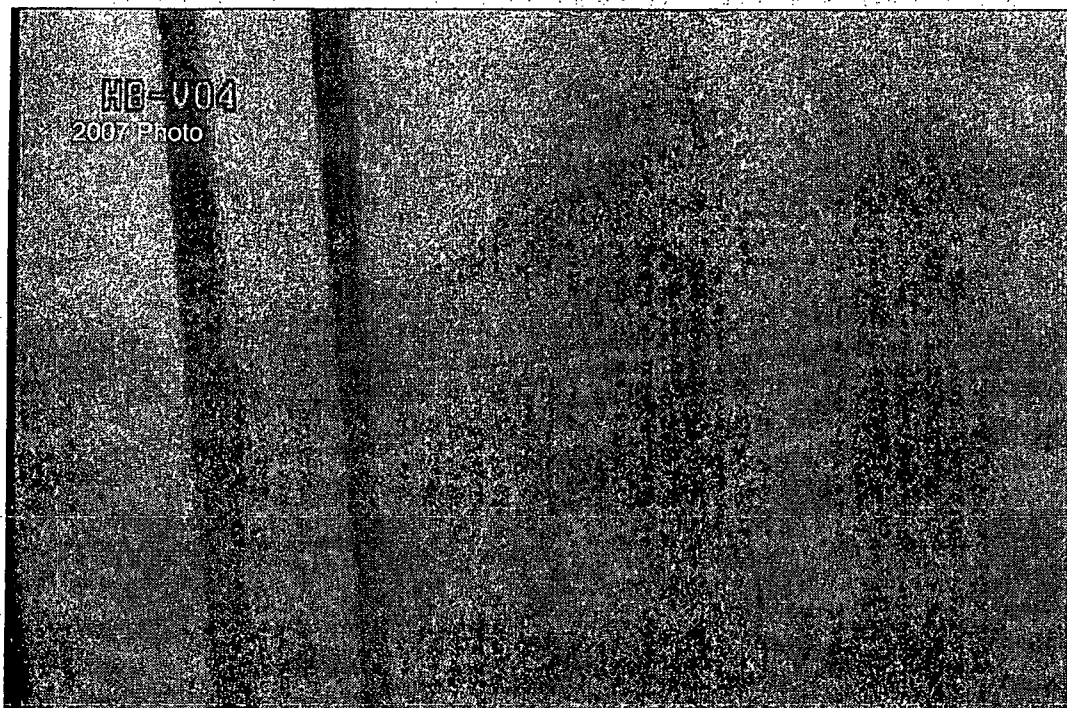
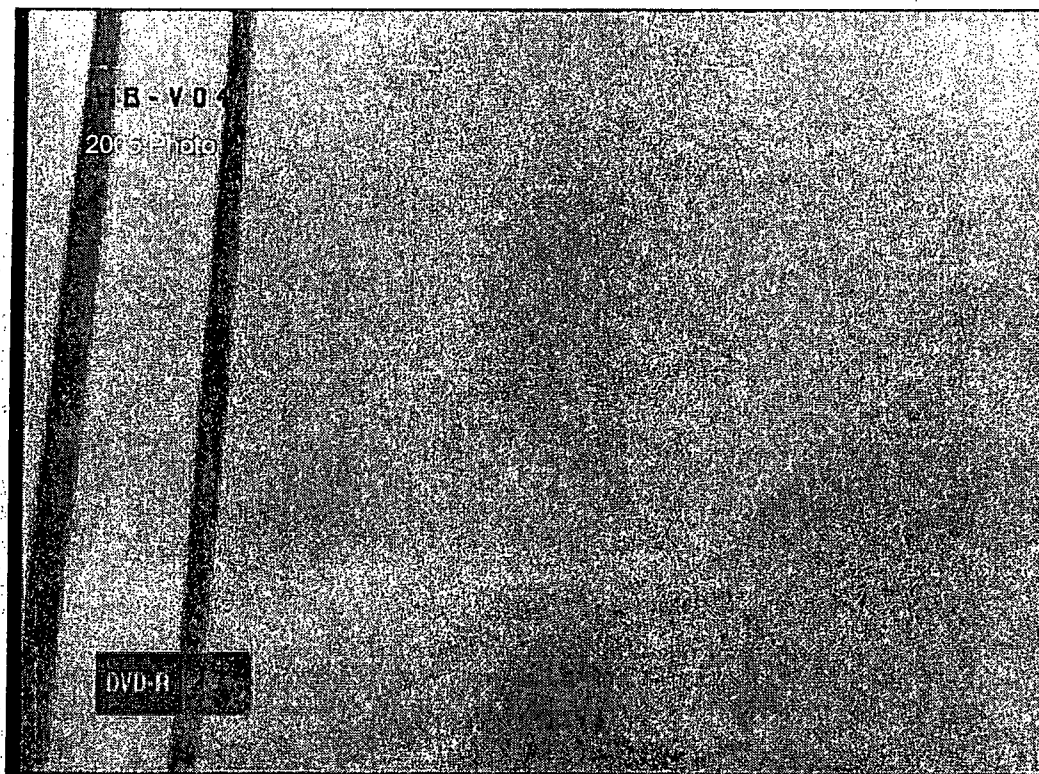
INR-IVVI-VYR26-07-10-Rev 1 Steam Dryer Interior HB-V04
Indication Notification Report



This is a 2007 photo of the 4th indication (Correlates to RFO25: 3rd indication)



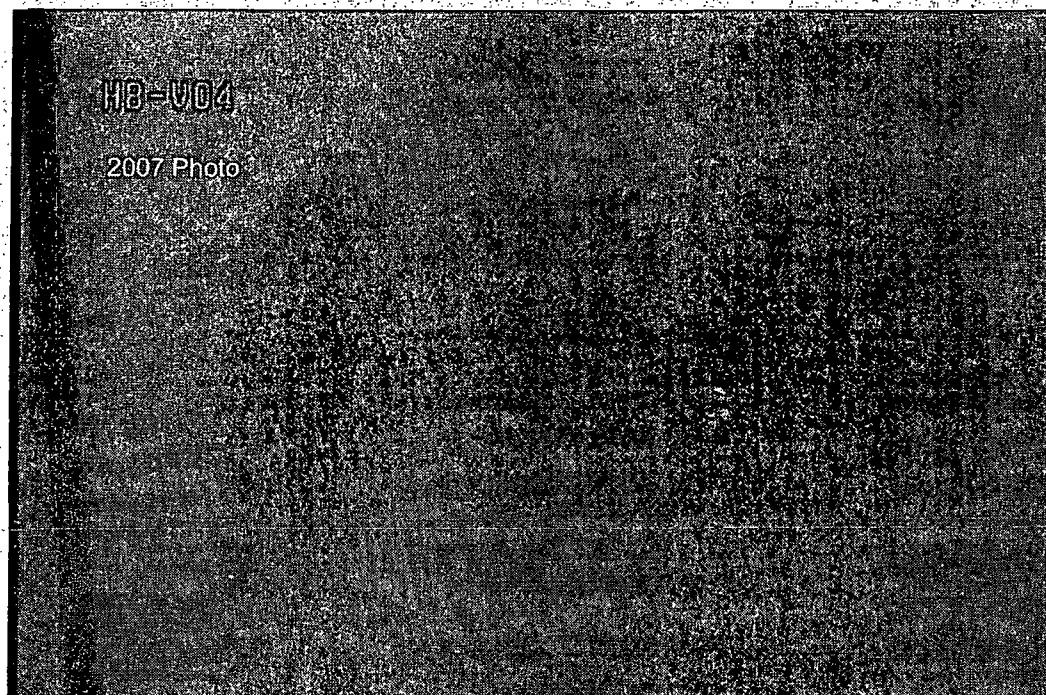
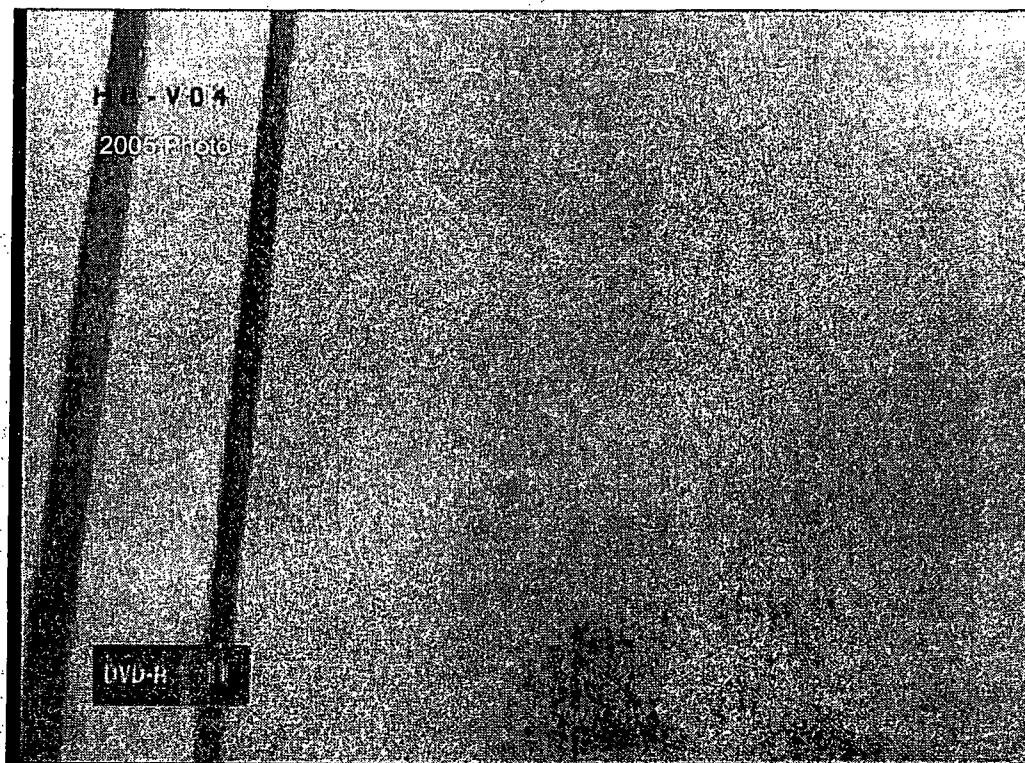
INR-IVVI-VYR26-07-10-Rev 1 Steam Dryer Interior HB-V04
Indication Notification Report



This is a 2007 photo of the 5th indication (Correlates to RFO25: 4th indication).



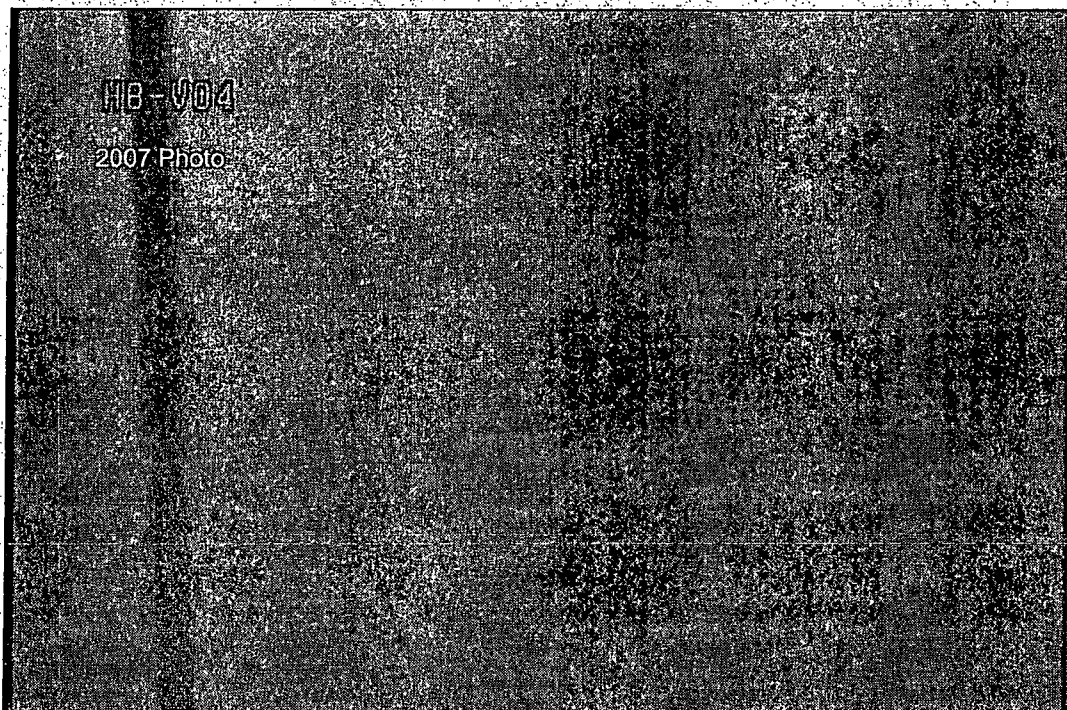
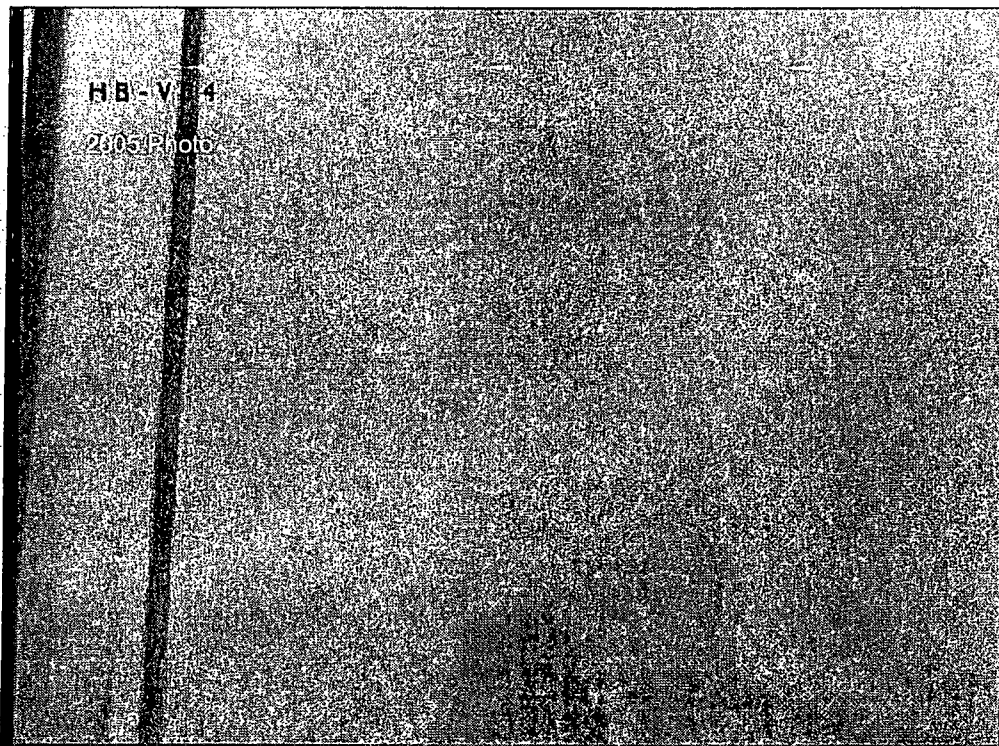
INR-IVVI-VYR26-07-10-Rev 1 Steam Dryer Interior HB-V04
Indication Notification Report



This is a 2007 photo of the 6th indication (Correlates to RFO25: 5th indication).



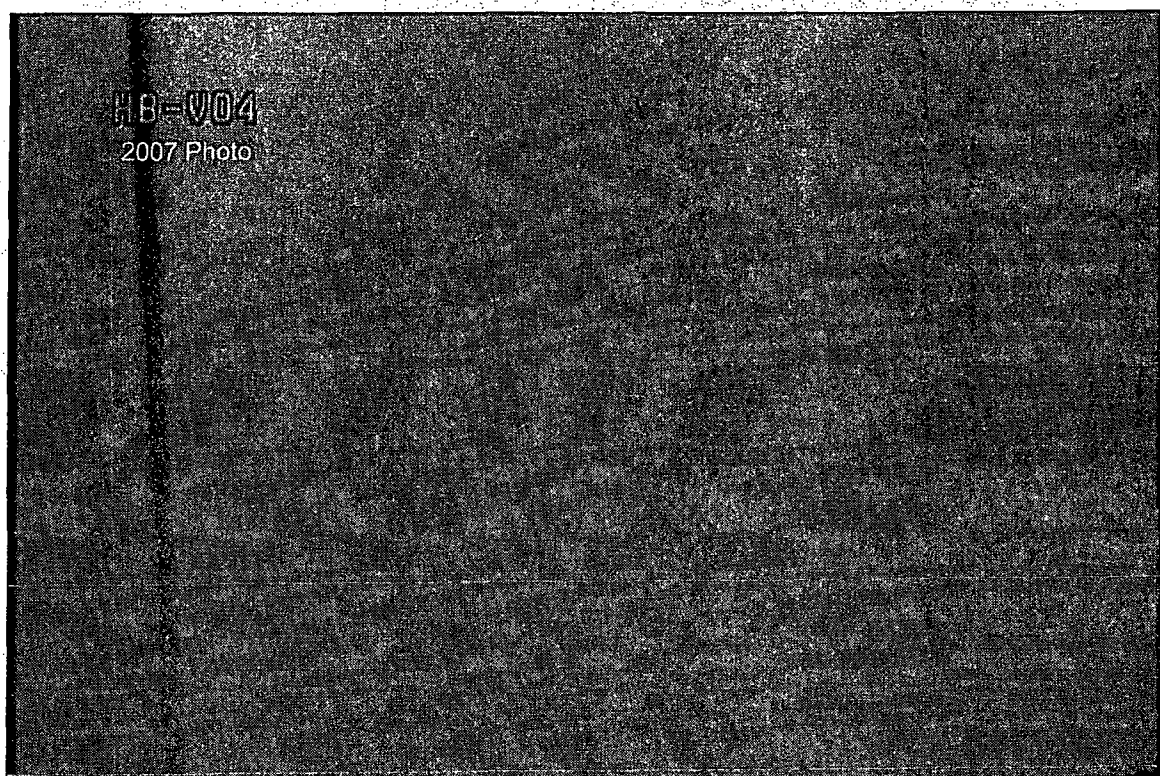
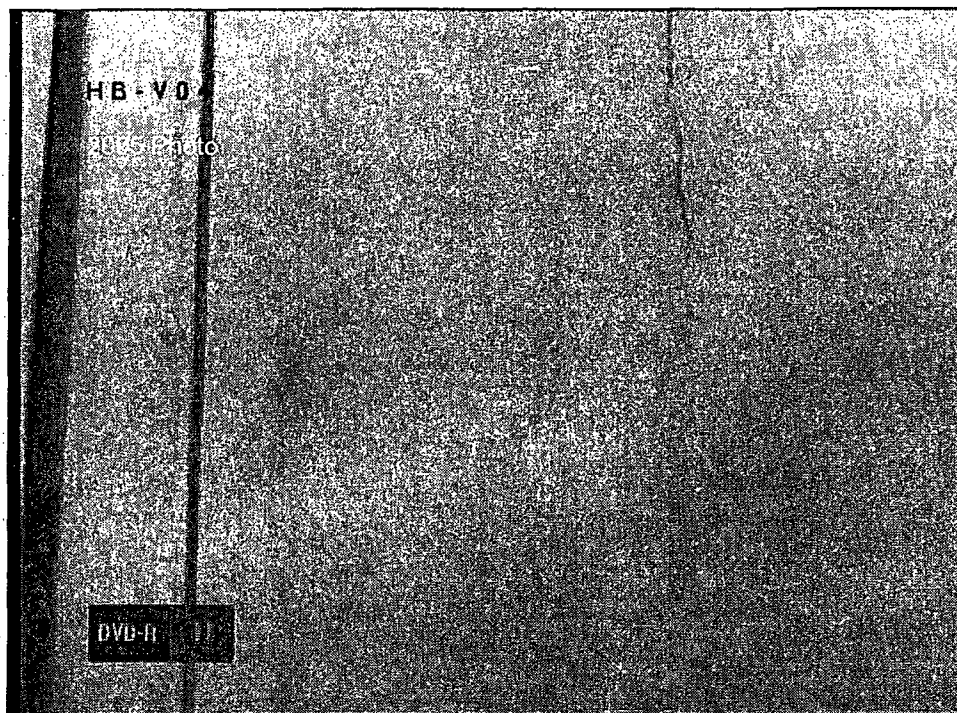
INR-IVVI-VYR26-07-10-Rev 1 Steam Dryer Interior HB-V04
Indication Notification Report



This is a 2007 photo of the 7th indication (Correlates to RFO25: 6th indication).



INR-IVVI-VYR26-07-10-Rev 1 Steam Dryer Interior HB-V04
Indication Notification Report

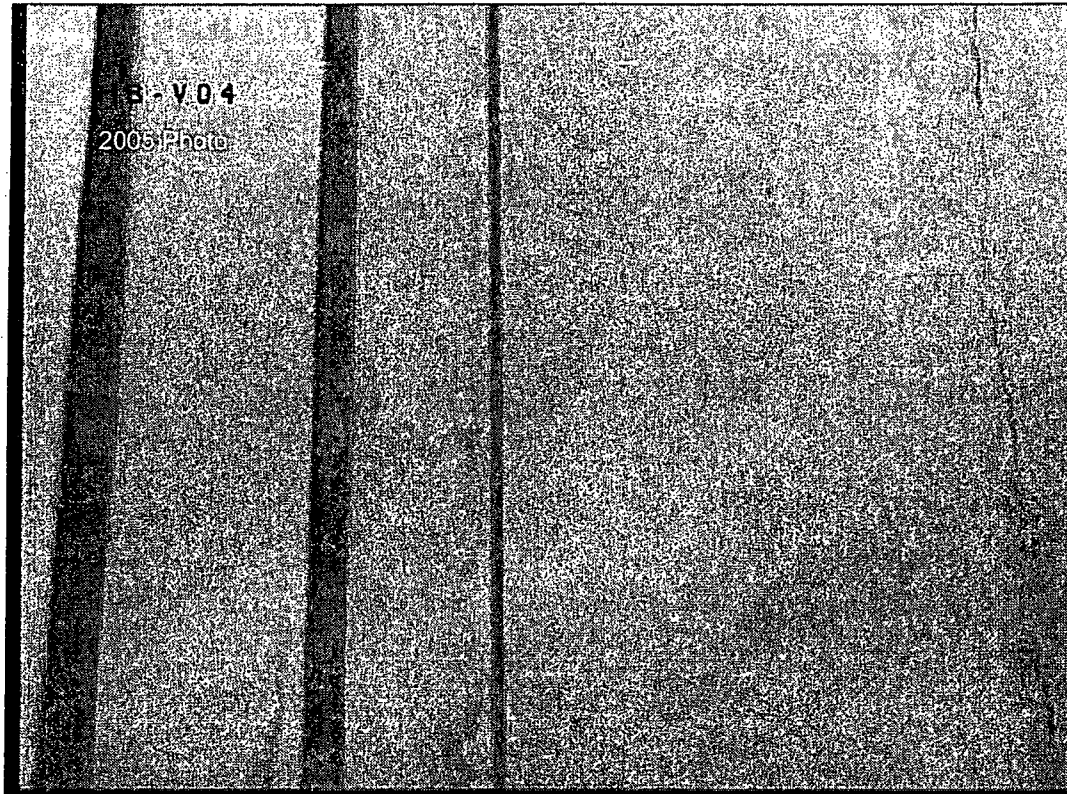


This is a 2007 photo of the 8th indication (Correlates to RFO25: 7th indication).



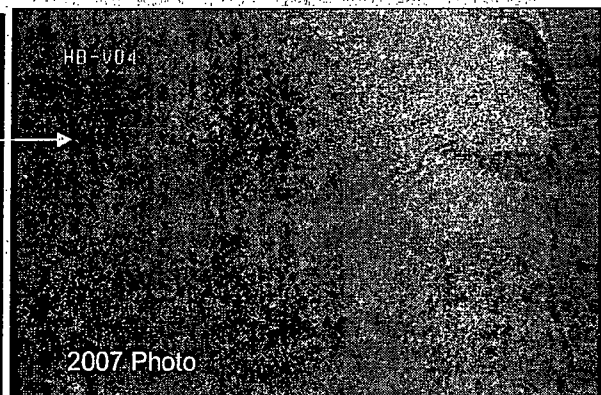
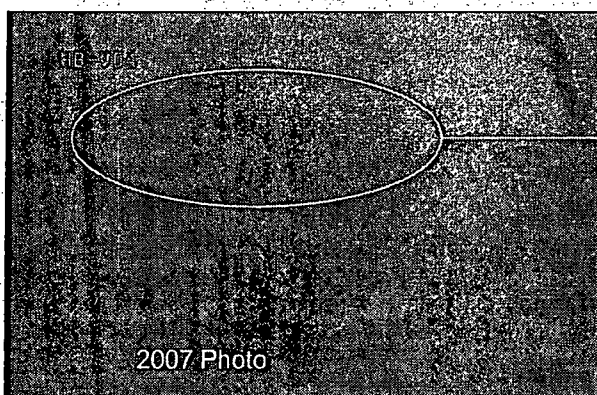
INR-IVVI-VYR26-07-10-Rev 1 Steam Dryer Interior HB-V04

Indication Notification Report



RFO 25
8th
Indication

RFO 25
9th
Indication

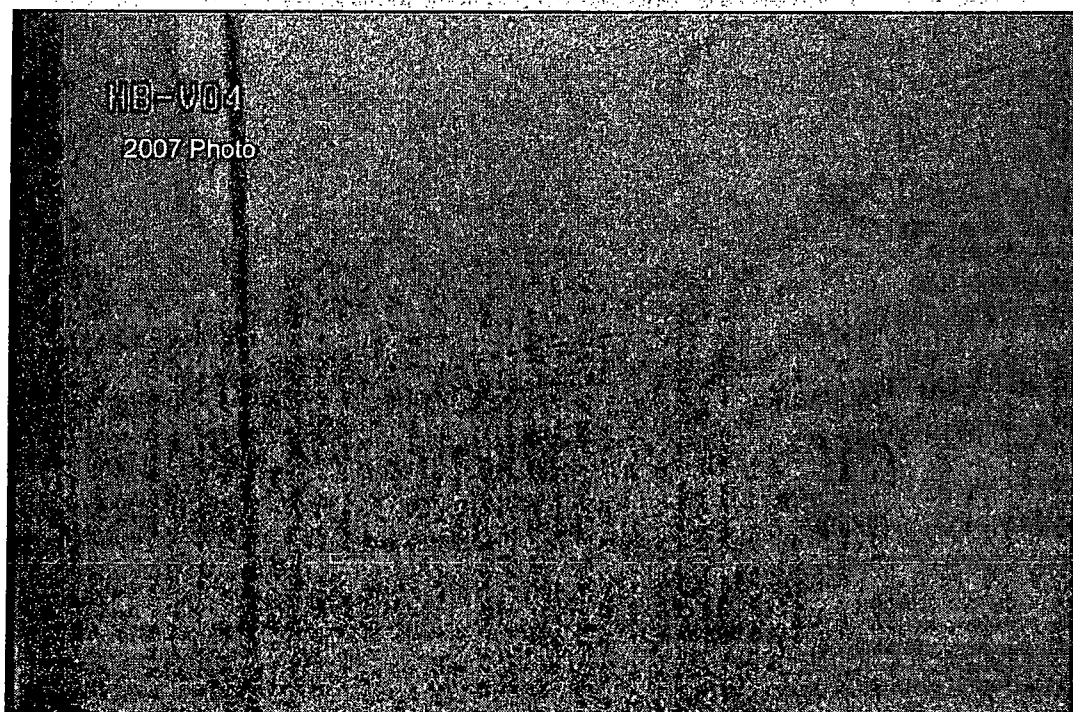
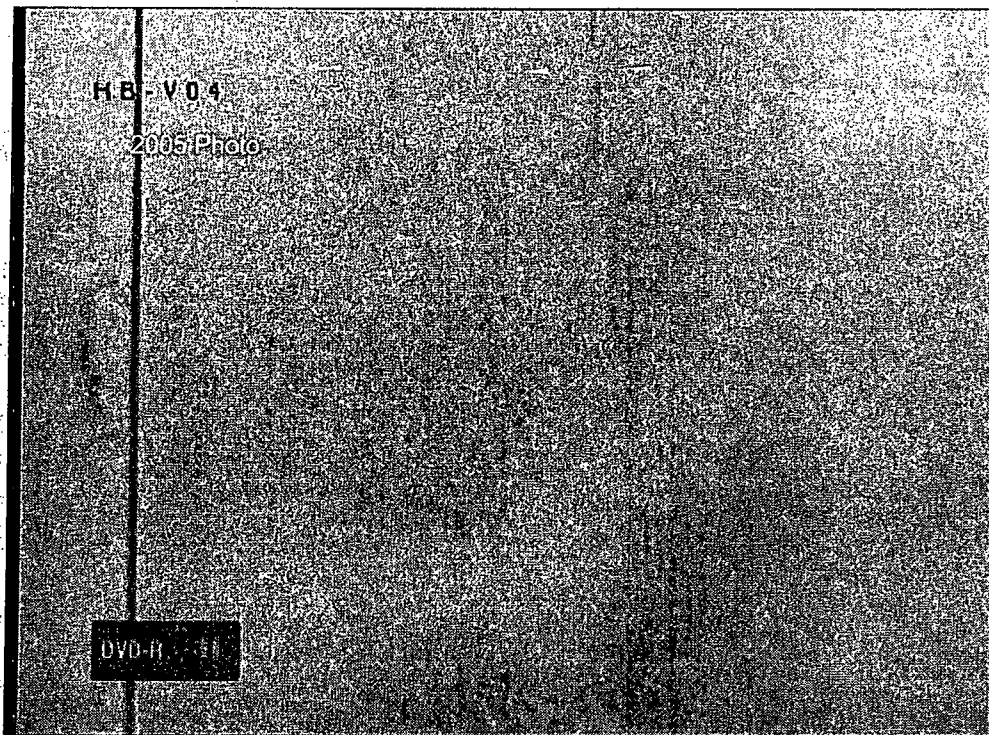


These 2007 photos show a linear indication and with a change of lighting there is no indication. This indication is considered non-relevant. (Correlates to RFO25: 9th indication).



INR-IVVI-VYR26-07-10-Rev 1 Steam Dryer Interior HB-V04

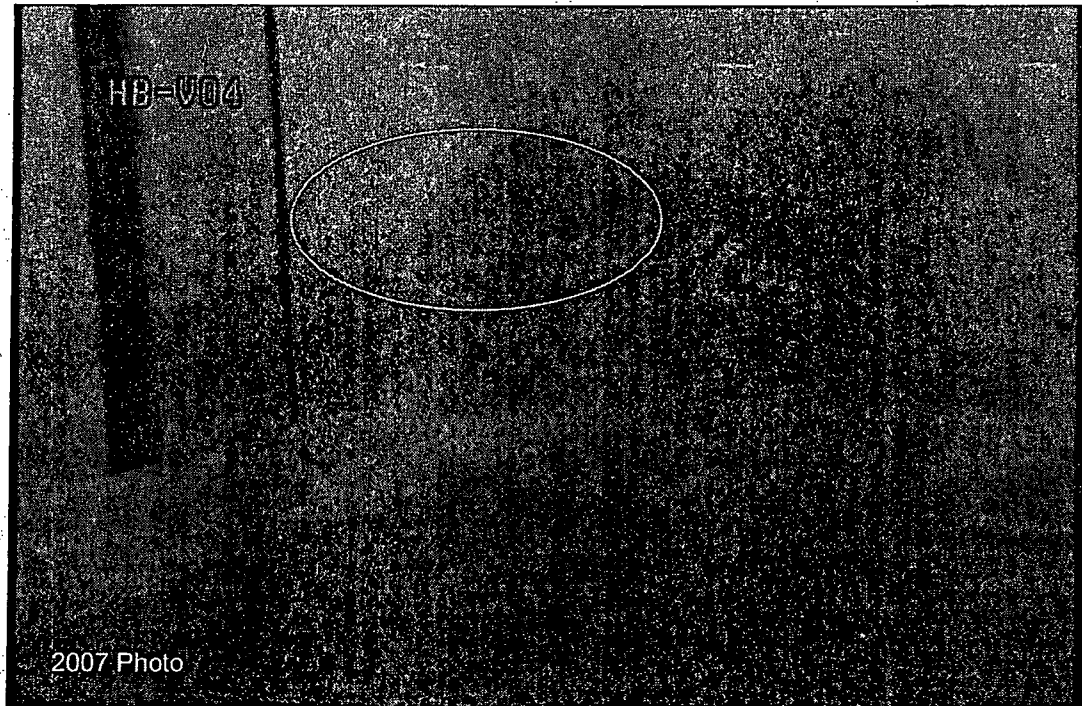
Indication Notification Report



This is a 2007 photo of the 9th indication (Correlates to RFO25: 10th indication).



INR-IVVI-VYR26-07-10-Rev 1 Steam Dryer Interior HB-V04
Indication Notification Report



This is a 2007 photo of the bottom weld area and crud line.

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

Before the Atomic Safety and Licensing Board

In the Matter of)	
)	
Entergy Nuclear Vermont Yankee, LLC)	Docket No. 50-271-LR
and Entergy Nuclear Operations, Inc.)	ASLBP No. 06-849-03-LR
)	
(Vermont Yankee Nuclear Power Station))	

CERTIFICATE OF SERVICE

I, Michelle Cronin, hereby certify that copies of the NEW ENGLAND COALITION, INC.'S (NEC) SUPPLEMENT TO OPPOSITION TO ENTERGY'S MOTION FOR SUMMARY DISPOSITION OF NEW ENGLAND COALITION CONTENTION 3 (STEAM DRYER), in the above-captioned proceeding were served on the persons listed below, by U.S. Mail, first class, postage prepaid; by Fed Ex overnight to Judge Elleman; and, where indicated by an e-mail address below, by electronic mail, on the 19th day of July, 2007.

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U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
E-mail: ask2@nrc.gov

Administrative Judge
Thomas S. Elleman
Atomic Safety and Licensing Board Panel
5207 Creedmoor Road, #101
Raleigh, NC 27612
E-mail: elleman@eos.ncsu.edu

Office of Commission Appellate Adjudication
Mail Stop: O-16C1
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
E-mail: OCAAmail@nrc.gov

Administrative Judge
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Atomic Safety and Licensing Board Panel
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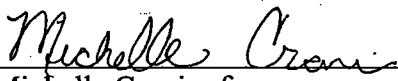
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