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W3F1-2005-0045

July 19, 2005

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

SUBJECT: 60-Day Report for Waterford Steam Electric Station, Unit 3 Reactor  
Pressure Vessel Head and Pressurizer Inspection for the Spring 2005  
Refueling Outage  
Waterford Steam Electric Station, Unit 3  
Docket No. 50-382  
License No. NPF-38

- REFERENCES:
1. NRC letter dated February 20, 2004, *Issuance of First Revised Order (EA-03-009) Establishing Interim Inspection Requirements for Reactor Pressure Vessel Heads at Pressurized Water Reactors*, (IN040024)
  2. NRC letter dated May 28, 2004 NRC Bulletin 2004-01: *Inspection of Alloy 82/182/600 Materials Used in The Fabrication of Pressurizer Penetrations and Steam Space Piping Connections at PWRs* (IN040068)
  3. NRC letter to Entergy dated March 22, 2005, Waterford Steam Electric Station, Unit 3 (Waterford 3) - *Relaxation Request from U.S. Nuclear Regulatory Commission (NRC) First Revised Order EA-03-009 for Control Element Drive Mechanism (CEDM) Nozzles (TAC No. MC2643)* (IN050036)
  4. Entergy letter dated July 27, 2004, *Response to NRC Bulletin 2004-01 Regarding Inspection of Alloy 82/182/600 Materials Used In Pressurizer Penetrations and Steam Space Piping Connections* (W3F1-2004-0058)

Dear Sir or Madam:

On February 20, 2004, the Nuclear Regulatory Commission (NRC) issued the revised Order addressing inspection requirements for reactor pressure vessel (RPV) heads at pressurized water reactors (Reference 1). Section IV.E of the Order requires licensees to submit a report detailing the inspection results within sixty (60) days after returning the plant to operation. Entergy requested relaxation from portions of the Order and was granted relaxation on March 22, 2005 (Reference 3). In addition, on May 28, 2004, the NRC issued Bulletin 2004-01 (Reference 2) requesting licensees to perform bare metal visual (BMV) inspections of the pressurizer penetrations. If leaking penetrations were discovered, additional non-destructive examinations of the penetrations were to be performed. Entergy Operations, Inc. (Entergy)

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provided its response on July 27, 2004 (Reference 4) where Entergy committed to comply with the bulletin.

Waterford Steam Electric Station, Unit 3 (Waterford 3) resumed operation on June 11, 2005. The results of both the RPV head Order and Bulletin 2004-01 inspections are summarized in the attachment.

In summary, Entergy did not identify any boric acid leakage or primary water stress corrosion cracking of the reactor vessel head during the inspections. However, two pressurizer heater sleeves were identified to be potentially leaking. NDE of the two heater sleeves revealed two axial flaws in one sleeve and no flaws in the second sleeve. Therefore, no NDE expansion to other heater sleeves was required.

Note that mid-wall repairs were performed on all but one of the 30 pressurizer heater sleeves. The one heater sleeve not repaired had previously been plugged and remains plugged. These repairs were proactive except for the one leaking pressurizer heater sleeve as discussed in the attachment. Proactive repairs/rework was also performed on the side shell temperature element and two steam space instrument nozzles. These proactive repairs are discussed in the attachment.

This letter contains no NRC commitments. If you have any questions or require additional information, please contact D. Bryan Miller at 504-739-6692.

Sincerely,



AJH/DBM/ssf

Attachment: 60-Day Report for Reactor Vessel Head and Pressurizer Inspection for the Waterford 3 Spring 2005 Refueling Outage

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**Attachment**

**To**

**W3F1-2005-0045**

**60-Day Report for Reactor Vessel Head and Pressurizer Inspection for the  
Waterford 3 Spring 2005 Refueling Outage**

**60-Day Report for Reactor Vessel Head and Pressurizer Inspection for the Waterford 3 Spring 2005 Refueling Outage**

Waterford Steam Electric Station, Unit 3 (Waterford 3) is a Combustion Engineering (CE) designed unit with Alloy 600 reactor pressure vessel (RPV) head and pressurizer penetrations which are subject to NRC First Revised Order EA-03-009 and NRC Bulletin 2004-01 (References 1 and 2) respectively. Entergy either complied with the Order or sought relaxation in accordance with the Order and committed to perform NDE per NRC Bulletin 2004-01 (References 3 and 4). Entergy performed inspections of the Waterford 3 RPV head and pressurizer during refueling outage 13 (RF-13) (spring of 2005). The RPV head inspections were conducted in accordance with Section IV.C of the Order (with relaxation per Reference 3) and the pressurizer inspections were conducted in accordance with Response 1(c) of Entergy's response to Bulletin 2004-01 (Reference 4). The following provides the results of the RF-13 inspections.

**Table 1 Summary of Waterford 3 Spring 2005 Refueling Outage Alloy 600 Inspections**

Inspection Area	Inspection Method	Extent of Inspection	Status
BMV Inspection of RPV Head  [NRC Order]	RPV Head BMV	Inspect the RPV head surface 360° around each penetration for boric acid.	BMV performed on 91 CEDM nozzles, 10 ICI nozzles, vent line, and general head condition. No boric acid deposits were identified.
	Pressure Retaining Components	Inspect the CEDM and ICI housings for potential boric acid leakage	No boric acid deposits were identified.
NDE of CEDM Nozzles  [NRC Order and NRC approved Relaxation]	UT/ECT of 91 CEDM nozzles	Inspect 2" above the J-weld to the blind zone of the CEDM nozzle	91 CEDM nozzles were examined and analyzed from the ID using Westinghouse UT/ECT probes. No flaws were detected.
	UT of nozzle Annulus (leak path)	Review interference fit in nozzle annulus above J-weld for leakage path	As part of the CEDM ID exams a zero degree UT probe was used to establish that there was no leak path (wastage) from the nozzle annuli.
NDE of ICI Nozzles  [NRC Order]	UT/ECT of ICI nozzles	Inspect 2" above the J-weld to the end of the ICI nozzle	The 10 ICI nozzles were UT/ECT examined from the ID. No flaws were detected.
	UT/ECT of ICI Nozzle Face	Perform UT/ECT exam of ICI nozzle face where ID delivered UT/ECT tooling does not provide inspection coverage.	An automated UT/ECT on the face of the ICI nozzles was performed. No flaws were detected.

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Inspection Area	Inspection Method	Extent of Inspection	Status
<b>NDE of Vent Line</b>  [NRC Order]	ECT of wetted surface area	Perform ECT of entire wetted surface of vent line	The ECT exam of the vent line did not reveal any flaws.
<b>Pressurizer Inspections and Repair</b>  [Bulletin 2004-01]	Heater Sleeve BMV	Inspect all Pressurizer heater sleeves and MNSA-2 installations for potential leakage	Thirty heater sleeves were visually inspected and two were identified that were potentially leaking. No leakage was observed on either of the MNSA-2 seal assemblies which were previously installed during RF-12 (fall 2003).
	Heater Sleeve NDE	Perform NDE of heater sleeves that had been identified to be potentially leaking	Eddy Current examination performed on heater sleeves C4 & D2 revealed two axial flaws only on sleeve C-4. NDE did not detect a flaw on the D-2 sleeve.
	Heater Sleeve Repair	N/A	Proactively implemented mid-wall repairs on 29 of 30 heater sleeves that removed Alloy 600 materials from the pressure boundary. One previously plugged pressurizer heater sleeve (F4) remains plugged.
	Side Shell, Steam Space, Bottom Instrument Nozzles BMV	Perform visual inspection of Alloy 600 side shell, steam space, and bottom instrument nozzles	A BMV of the pressurizer side shell nozzles, steam space nozzles, bottom instrument nozzles and associated welds was performed. No leakage was detected.
	Side Shell, Steam Space & Bottom Instrument Nozzle Repair	N/A	The Side Shell TE and the two (2) bottom instrument nozzles were proactively repaired using a partial nozzle design that replaced Alloy 600 pressure boundary materials. In addition two (2) steam space instrument nozzles were proactively reworked to remove Alloy 600 weld filler material.

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Inspection Area	Inspection Method	Extent of Inspection	Status
	Pressurizer nozzle to safe end welds and large bore steam space welds BMV	Removed insulation and reviewed butt weld configurations for future inservice inspection and potential weld overlay in RF-14 (fall 2006)	BMV of large bore nozzles and safe ends did not reveal any leakage.

Legend:

BMV = Bare Metal Visual

CEDM = Control Element Drive Mechanism

ECT = Eddy Current Examination

ICI = Incore Instrument

ID = Inside Diameter

MNSA = Mechanical Nozzle Seal Assembly

NDE = Non-Destructive Examination

RPV = Reactor Pressure Vessel

TE = Temperature Element

UT = Ultrasonic Examination