

**PUBLIC MEETING WITH INDUSTRY TO DISCUSS
2/11/03 ORDER ESTABLISHING INTERIM
INSPECTION REQUIREMENTS FOR REACTOR
PRESSURE VESSEL HEADS AT PRESSURIZED
WATER REACTORS**

Presenters

Brian Sheron, Associate Director
Allen Hiser, Senior Materials Engineer
Steven Bloom, Project Manager



February 24, 2003
1:00 pm til 5:00 pm

Doubletree Hotel
Rockville, Maryland



Meeting Purpose and Agenda

Purpose: Discuss with industry, the Orders issued on February 11, 2003 concerning reactor pressure vessel head inspection requirements

Category 2 Meeting: Meeting with industry representative to discuss an issue which affects more than one licensee

Agenda:

NRC Opening Remarks
NRC Presentations

BREAK

NEI Questions and Comments
Industry Questions and Comments
Public Questions and Comments

NOTE: Questions will be solicited from the meeting room first, then the phone lines.

Public Meeting Concerning Reactor Pressure Vessel Head Orders
Monday, February 24, 2003



WHY ISSUE AN ORDER?

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Background

- Davis Besse Root Cause was qualitative and speculative:
 - Could not conclusively identify sequence of events, associated phenomena, and time scale.
 - As such, conditions under which corrosion will or won't occur are not known with certainty.
- Staff approach in Bulletin 2002-02 was to gain reasonable assurance that conditions that could potentially lead to corrosion and/or circumferential cracking do not exist (i.e., reasonable assurance that through-wall cracks would not occur).
- Staff identified an inspection regime in Bulletin 2002-02 that it believed would provide this assurance.



Background

Continued

- Most Licensee responses to Bulletin 2002-02 committed to one-time inspections in accordance with Bulletin 2002-02 guidance and then were either non-committal or committed to industry program.
- Industry was requested, in May 2001, to develop inspection plan which staff could endorse.
- Discovery of corrosion by Davis Besse in March 2002 prompted industry to consider corrosion potential in any inspection plan.



Background

Continued

- Industry submitted inspection plan (MRP-75) in August 2002.
 - Staff has provided comments, but NEI requested (i.e., verbally) the report be withdrawn from review based on Fall '02 inspection results.
- Currently unclear when successor to MRP-75 will be submitted, and if the staff can find it acceptable.
- Licensees who performed inspections in Fall '02 in accordance with Bulletin 2002-02 guidance are likely to begin planning their next outages soon, if not already.



WHY ISSUE AN ORDER?

- Given:
 - Lack of current regulations that adequately address the circumferential cracking and corrosion issues.
 - Uncertainty in acceptability of licensee's inspection plans beyond those currently committed to.
 - Uncertainty in when a staff-approved industry inspection program will be available.
- Staff concluded that an Order was needed to assure adequate protection related to primary system integrity.



Orders Are Interim Requirements

Continued

- Order is generally consistent with inspection guidance originally provided in Bulletin 2002-02.

- Order is considered an interim measure.
 - If industry submittal and staff approval of MRP-75 occurs in timely manner, staff can amend order to include approved MRP-75 method.
 - ASME working on revised inspection guidance. Presuming it is consistent with a staff approved version of industry inspection plan, staff would endorse revised code requirements and incorporate into regulations via 10 CFR 50.55a rule change with expediated implementation of inspection requirements.
 - If staff and industry cannot reach agreement on acceptable inspection program in reasonable amount of time, staff will consider incorporating augmented inspection requirements into 10 CFR 50.55a via rulemaking.



Impact of Order on Plant's License

- Order is considered part of a plant's license.
- If a licensee wants to take exception to the inspection requirements in the Order, licensee should submit a request for relaxation.
- Staff is available to answer question about the Order.



Need for Inspection Requirements

- Strengthen inspection requirements for RPV heads at PWR facilities thus ensuring reasonable assurance of adequate protection of the public's health and safety. Current ASME inspection requirements:
 - Inspections on insulated surface of reactor pressure vessel head every outage (i.e., VT-2) do not provide reasonable assurance.
 - May not detect small leaks that can lead to wastage/corrosion.
 - May not detect small leaks from cracks in the VHP nozzle or J-groove weld.
 - Do not detect leaks until after they have occurred.
 - Do not provide an extremely low probability of abnormal leakage (GDC-14).
- Provides a clear regulatory framework pending the incorporation of revised inspection requirements into 10 CFR 50.55a



Inspection Requirements

- Inspection requirements reflects additional information obtained during Fall '02 outages and consideration of this additional information.

- Evaluate susceptibility to primary water stress corrosion cracking, i.e., effective degradation years (EDY)
 - High - $EDY \geq 12$ or previous cracking identified
 - Moderate - $8 \leq EDY < 12$
 - Low - $EDY < 8$



Inspection Requirements

Continued

- 100% Bare metal visual (BMV) - beneath RPV head insulation
 - High: every RFO
 - Moderate: every other RFO
 - Low: every third RFO or every 5 years, whichever occurs first
 - * In some cases insulation will have to be removed.
- 100% Ultrasonic of VHP nozzle base material and assessment of leakage into interference fit zone
 - * From 2 inches above the J-groove weld to the bottom of the nozzle.

OR

- Eddy current or dye penetrant examination of all wetted surfaces (nozzle and J-weld)
 - High: every RFO
 - Moderate: every other RFO
 - Low: every fourth RFO or every 7 years, whichever occurs first



Inspection Requirements

Continued

- Moderates must conduct BMV and non-visual examinations during alternate RFOs.
- Lows complete first BMV within two RFO and first non-visual examination within five years
 - Orders also apply to new RPV heads, either Alloy 600 (e.g., Davis-Besse) or Alloy 690 (e.g., North Anna 2 and many others)
- Explicit requirements and criteria to inspect repaired nozzles/welds
- Flaw evaluation per NRC guidance (i.e., Strosnider letter - Fall '01)



Inspection Requirements

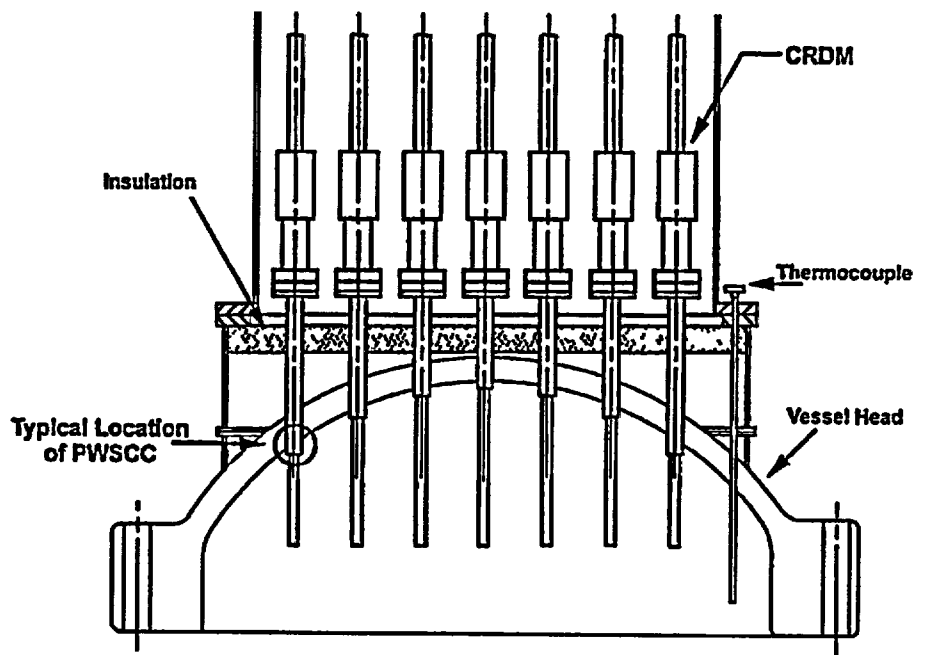
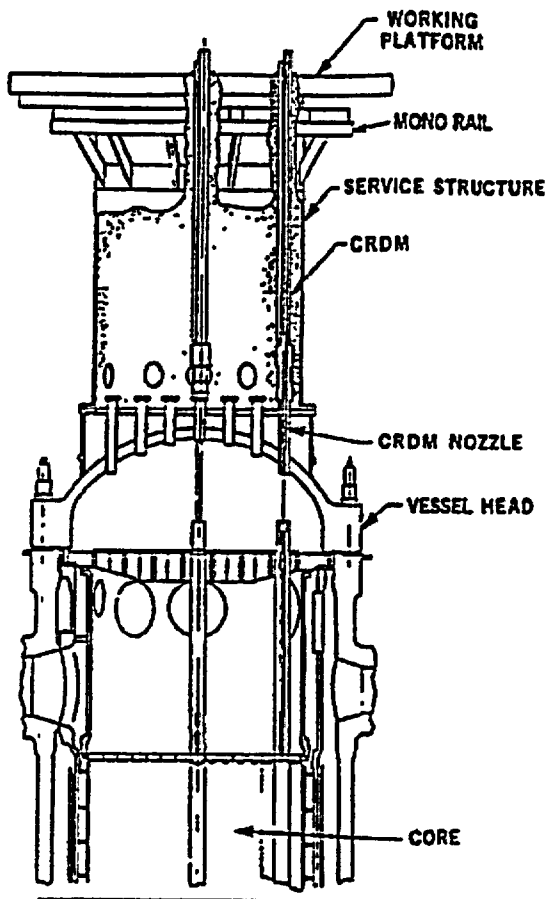
Continued

- Boric Acid Leak Inspection - All PWRs
 - Each RFO
 - Visual inspection for potential boric acid leaks in pressure retaining components above RPV head
 - If leaks onto head or insulation, then inspect affected RPV head surface and penetrations



Inspection Requirements

Continued

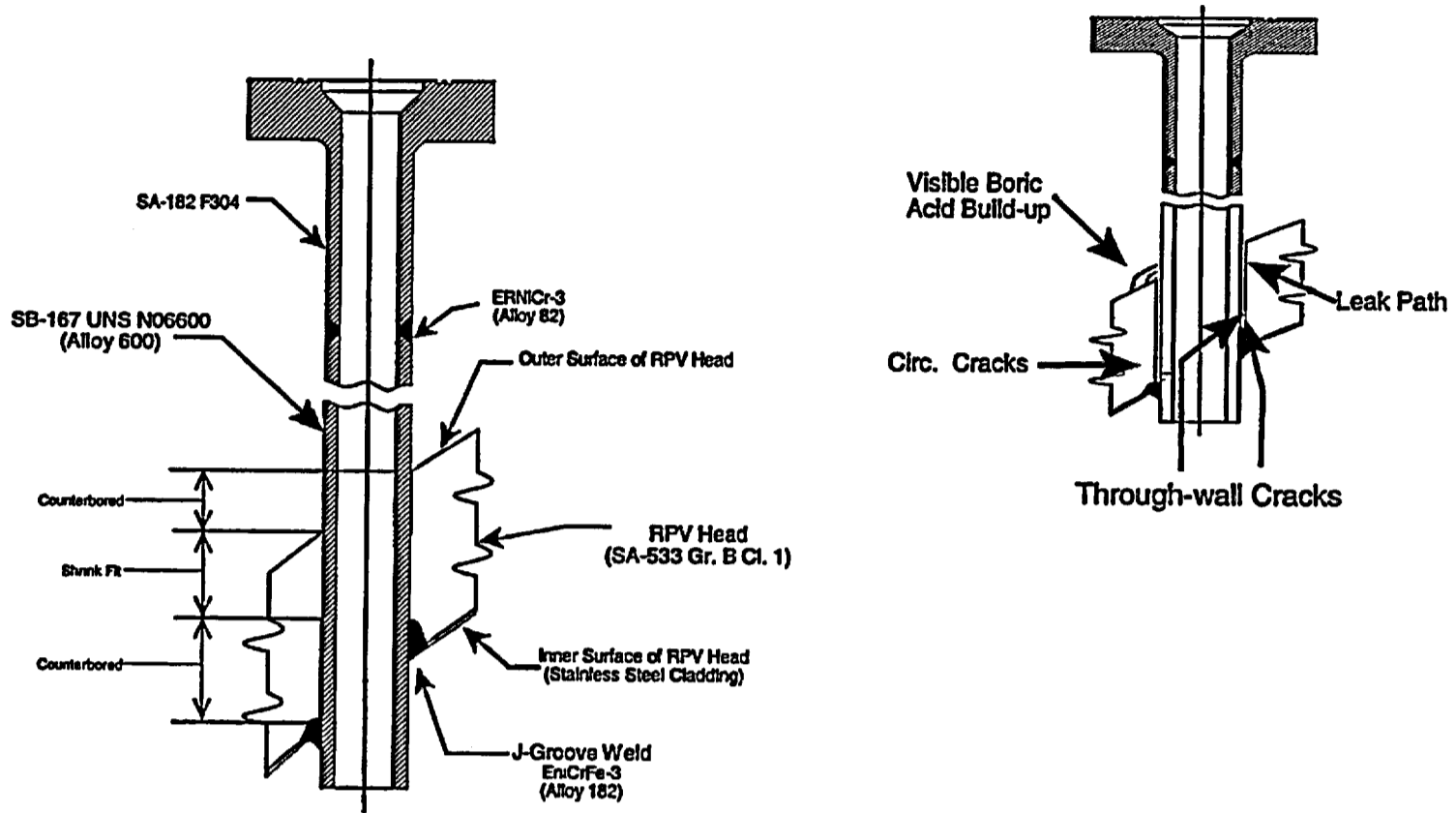


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Inspection Requirements

Continued



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Technical Basis of "Permanent" Requirements

- Work needed for technical basis of "permanent" requirements:
 - Corrosion Wastage Rates
 - Crack Growth Rates
 - Susceptibility Benchmarks
 - Inspection Baseline and Data
 - Consider Alloy 690 cracking behavior



Impact of Order on Other Regulatory Actions

- **Bulletin 2001-01**
 - Order Supercedes Post Outage Reporting Requirements
 - Bulletin Has Been Closed

- **Bulletin 2002-01**
 - Order Supercedes Post Outage Reporting Requirements
 - Boric Acid Corrosion Control Aspect Unaffected

- **Bulletin 2002-02**
 - Order Supercedes Post Outage Reporting Requirements
 - Bulletin Will Be Closed

- **Temporary Instruction 2515/150, Rev 01**
 - Scope of Inspections Will Not Change
 - Completion Schedule and Expiration May Be Changed



Impact of Order on Upper Head Inspection Commitments

- In response to Bulletins 2001-01, 2002-01, & 2002-02 licensees committed to various inspections of the reactor pressure vessel head.
- The requirements in the Order takes precedence over past commitments.
- Except for plants that received a written response to their Bulletin 2002-02 submittal stating that planned inspections for next outage provides reasonable assurance.



Expected Licensees' Responses

- **20-Day Response - Mandatory**
 - Submit an answer to the NRC as to whether or not the order will be followed
 - May request a hearing
 - May request time extension to prepare answer

- **20-Day Response - Optional**
 - Notify Commission if unable to comply with requirements
 - Notify Commission if compliance is unnecessary

- **60-Day Post-Outage Response**
 - After inspections required by Order
 - Describe inspection results
 - * Content similar to that requested in Bulletin 2002-02.

- **Request for Relaxation**
 - Approval of NRR Director, except for specific nozzles or set of nozzles, per the order
 - For specific nozzles or set of nozzles following the procedures for relief requests (LIC-102)



Contacts

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URLs:

<http://www.nrc.gov/reactors/operating/ops-experience/alloy600.html>

<http://www.nrc.gov/reactors/operating/ops-experience/vessel-head-degradation.html>

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