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1400 Opus Place
Downers Grove, Illinois 60515

November 23, 1994

Office of Nuclear Reactor Regulations
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Document Control Desk

Subject: Braidwood Unit 1 Mid-Cycle Inspection Plans
NRC Docket Number 50-456

- References:
1. D. Saccomando letter to NRC transmitting request for Interim Plugging Criteria for Braidwood Unit 1 dated April 25, 1994
 2. R. Assa letter to D. Farrar transmitting Safety Evaluation for Use of Interim Plugging Criteria for Braidwood Unit 1 dated August 18, 1994
 3. G. Dick letter to D. Farrar transmitting Safety Evaluation for Use of Interim Plugging Criteria for Byron Unit 1 dated October 24, 1994
 4. H. Pontious Letter to NRC transmitting response to Safety Evaluation for Use of Interim Plugging Criteria for Byron Unit 1 dated November 23, 1994

Reference 2, transmitted Nuclear Regulatory Commission (NRC)'s Safety Evaluation Report (SER) for the Use of Interim Plugging Criteria for Braidwood Unit 1. In the SER, the Staff required Braidwood Station to perform a mid cycle steam generator (SG) tube inspection on Unit 1. Additionally Reference 2 requested that Braidwood Station submit plans for assessing the mid-cycle inspection data at least 60 days prior to the planned shutdown.

In order to develop a comprehensive plan, Braidwood performed a plant specific comparison of the Draft IPC Generic Letter requirements and the currently approved Cycle 5 Braidwood requirements. This comparison is included as Attachment A. It should be noted, that if the IPC Generic Letter is finalized prior to the Braidwood mid-cycle inspection, an assessment of the need for further revision of data analysis guidelines will be performed.

The following is a description of the Unit 1 SG mid-cycle tube inspection outage scope and the methods which will be used to collect, analyze, and assess the SG tube inspection data.

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Inspection Scope: Braidwood will perform a bobbin coil inspection of 100% of the Unit 1 SG hot-leg tubing through the top support plate on the cold-leg side, and at least 20% of the tubing will be examined full length. This is consistent with the Draft Interim Plugging Criteria (IPC) Generic Letter requirements. A 0.610" bobbin probe will be used to inspect all SG tube support plate intersections where IPC will be applied. All SG support plate indications with flaw-like bobbin coil signal amplitudes greater than 1.0 volt, will be inspected by a 3-coil Rotating Pancake Coil (RPC) probe.

Braidwood Station is aware that there is an industry concern that Primary Water Stress Corrosion Cracking (PWSCC) can occur at dented support plate intersections. To address this concern Braidwood will implement the following augmented inspection program during the Unit 1 SG mid-cycle tube inspection. This program is consistent with that approved for Byron Unit 1 as described in their Safety Evaluation Report (Reference 3).

RPC inspection will be performed on all dents located at tube support plate intersections identified during the SG tube IPC inspection that have bobbin coil voltage amplitudes greater than 5.0 volts. In addition, 20% of the dents located at tube support plate intersections having bobbin coil voltage amplitudes between 2.5 and 5.0 volts will be inspected using RPC.

The 20% sampling program will be expanded to 100% of the dent indications found during the IPC inspection if any dents examined by RPC confirm PWSCC indications.

All RPC confirmed indications will be plugged or repaired.

The NRC will be promptly notified if any PWSCC indications are identified at the tube support plate intersections.

The data analysts will be informed of the potential for PWSCC at dented support plates. The analysts will also be instructed to report occurrences of PWSCC to Braidwood Station management immediately.

Inspection Guidelines: The eddy current data analysis guidelines as revised for the Byron Unit 1 Fall 1994 refuel outage, will be used for the Braidwood Unit 1 mid-cycle SG tube inspection. These analysis guidelines have been submitted to the NRC and are discussed in Reference 3. ComEd realizes that there are several outstanding technical issues with respect to inspection

guidelines which will be resolved between the industry and the NRC prior to issuing the final generic letter on IPC. If the IPC Generic Letter is issued in its final form prior to the Braidwood Unit 1 mid-cycle inspection ComEd will assess this information and make revisions to the eddy current data analysis guidelines if it is deemed necessary.

Methodology for Braidwood Leakage Calculation: ComEd will use a method for determining the primary-to-secondary SG tube leakage during a postulated main steam line break which involves a Monte Carlo technique which accounts for the regression parameter uncertainties. This methodology has been reviewed and accepted by the NRC as documented in Reference 3, and was used during the Byron Unit 1 Fall 1994 outage. The leakage calculation will include the time interval between the mid-cycle inspection and the next refueling outage (A1R05) which is currently scheduled for September 1995. Leakage calculations based on the actual measured end-of-cycle voltage distribution will also be performed. If this calculation indicates that the leakage would have exceeded the leakage limit postulated during a MSLB, the Staff will be notified prior to returning the steam generators to service and provided with the safety assessment of the results.

Methodology for Braidwood Conditional Probability of Burst Calculation: ComEd will use the conditional probability of burst calculation identified in Section 5 of WCAP-14046, "Braidwood Unit 1 Technical Support for Cycle 5 Steam Generator Interim Tube Plugging Criteria," revision 1. Full Monte Carlo analysis will be performed. This analysis will account for parameter uncertainty per the methods described in WCAP-14046. The Probability of Burst will be calculated for the time interval between the mid-cycle inspection and the next refueling outage, A1R05. If the calculated probability of burst based on end-of-previous cycle voltage distribution exceeds the Draft IPC Generic Letter requirement of $1E-2$, the Staff will be notified prior to returning the steam generators to service and will be provided a safety assessment of the results. This assessment will include both probabilistic and deterministic information to support justification of Braidwood Unit 1 operation until its next scheduled refuel outage. Additionally, as requested by the Staff during the Byron Unit 1 Fall 1994 outage, Braidwood will also calculate the beginning-of-cycle probability of burst. This information will be used for comparison against probability of burst projections.

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Database for Leak and Burst Correlations: The database which will be used to support the leak and burst assessments for the Braidwood Unit 1 SG mid-cycle tube inspection is the same as that used for the Fall 1994 assessment of Byron Unit 1. The Staff has reviewed and accepted this data base as documented in Reference 3. If data from the recent Byron tube pull is available, and it meets the data exclusion criteria, it will also be included in the database.

Calculation of Offsite and Control Room Doses: As transmitted in Reference 1, Braidwood Station determined the offsite dose associated with the MSLB primary-to-secondary leakage limit. The Draft IPC Generic Letter has an additional requirement to determine the control room doses. Braidwood Station will complete this evaluation prior to the Unit 1 mid-cycle inspection

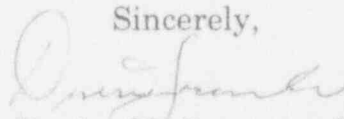
Tubes Excluded by Combined LOCA + SSE Event: As required by Reference 3 for Byron Station, Reference 4 transmitted a schedule to submit a plant-specific analysis of the effects on certain SG tubes of the loads from a safe shutdown earthquake in combination with a postulated loss-of-coolant accident.

Assessment of Indication Voltage Growth Rates: Braidwood will compare the eddy current indication growth rates calculated during the mid-cycle inspection (based on a linear scaled factor), to that seen during previous outages. This comparison will be used to assess the effectiveness of the various programs which have been put in place to mitigate degradation.

Pull Tubes: Braidwood does not plan on removing any tubes from the SGs during the mid-cycle inspection. Braidwood removed 4 tubes from the Unit 1 SGs during the fourth refueling outage, which fulfills all Draft IPC Generic Letter requirements until the sixth refueling outage.

Please address any questions that you may have to this office.

Sincerely,



Denise M. Saccomando
Nuclear Licensing Administrator

Attachment

cc: J. Martin, Regional Administrator, RIII
R. Assa, Braidwood Project Manager, NRR
S. DuPont, Senior Resident Inspector, Braidwood
Office of Nuclear Safety-IDNS

ATTACHMENT A

DRAFT GL SECTION(S)	SUMMARY OF DRAFT GL REQ	SUMMARY OF CURRENT BRWD REQ	DISCUSSION
1.b.4	Repair criteria do not apply to flow distribution intersections.	Not specifically addressed.	To date Brwd has not found indications in this region. IPC criteria will not be applied to this area, thus Braidwood will meet the Draft GL requirement.
2	Burst probability criteria limit is 1E-2.	Burst probability criteria limit is 2.5 E-2	For the Braidwood Mid-Cycle inspection the Draft GL requirement of 1E-2 will be used as the acceptance criteria.
2.a.1 and 2.b.3(2)	Certain leak/burst data exclusions should not be taken and the VC Summer data point should have a MSLB leakrate of 2476 l/hr, pending NRC review.	The calculations used in the Brwd IPC WCAP exclude this data point. The Braidwood SER which approved the use of IPC for Cycle 5 included this data point.	The data base which will be used to support the Braidwood mid-cycle leak and burst assesment is the same as that used for the Byron Unit 1 Fall 1994 outage. The Commission has reviewed and accepted this data base as documented in reference 2.
2.b.2(2)	Growth rates are to be taken from the most limiting of the last 2 inspections if both employed IPC guidelines or from the current inspection if it is the first to employ IPC guidelines. Negative growth rates should be included as zero in the distribution.	Braidwood growth rates were obtained by comparison of the data from the previous outage (A1R03), to to the current outage (A1R04). IPC guidelines were employed during A1R04 and data from the previous outage was corrected for calibration differences.	Braidwood will meet this Draft Generic Letter requirement as written.
2.b.4	Calculate Offsite and Control Room Doses every cycle based on calculated MSLB leakrate and reduced iodine limits to meet 10 CFR 100 requirements.	The Brwd specific MSLB leakrate limit is established based on 0.35 micro- curies/cc and 10CFR100 requirements. Control Room doses were not specifically addressed.	Braidwood will evaluate the control room doses prior to completion of the mid-cycle inspection, thus meeting the Draft GL requirements.
3	Inspection criteria should be consistent with the VC Summer Appendix A guidelines.	Byron/Brwd inspection guidelines are consistent with the Catawba Appendix A guidelines and the EPR/APC guidelines.	Braidwood will employ the inspection guidelines used by Byron during their Fall 1994 outage. These guidelines have been submitted to the NRC for information and are discussed in reference 2.

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3.a.1 and Model TS 4.4.5.2	inspection scope is to be 100% of hot leg tubes and a 20% random sample of cold leg tubes.	TS requires 100% of hot leg tubes to the lowest cold leg intersection with ODSCC.	Braidwood will meet the Draft GL requirements during the mid-cycle inspection.
3.b.1	All indications greater than 1.0 volt limit are subject to RPC inspection.	Current requirement calls for RPC of all indications between 1.0 and 2.7 volts. During ATR04 Brwd all indications were RPC inspected regardless of voltage.	Braidwood will meet the Draft GL requirements by performing RPC inspection on all TSP indications greater than 1.0 volt during the mid-cycle inspection.
3.b.2 and 3.b.3	Tubes with copper deposits at intersections should be RPC inspected and any indications detected should be repaired.	Copper is not found at Byron or Brwd	Requirement does not effect Byron or Brwd but is specifically addressed in the data analysis guidelines.
1.b.2, 1.b.3, 3.b.2, 3.b.4, and 3.b.5	Tubes with dents > 5.0 volts and with large mixed residuals are excluded from IPC requirements, should be inspected, and any indications should result in tube repair.	Tubes with dents > 5.0 volts and with large mixed residuals are required to be inspected by RPC.	Braidwood will meet the Draft GL requirement. Affected tubes with RPC flaw indications will be repaired.
3.c.2	Bobbin coil calibration is to be setup on 4-100% through-wall (TW) holes.	Current requirement calls for calibration of 4-20% TW holes consistent with the Appendix A guidelines. The Brwd calibration standards are normalized to a laboratory standard.	Braidwood will defer implementation of this requirement pending resolution of industry comments. Converting to 4-100% TW holes would result in a loss of comparison basis to other plants and Braidwood history.
3.c.3	New probe variability to be within +/- 10%	Not specifically mentioned for new probes.	Braidwood will defer implementation of this requirement pending resolution of industry comments.
3.c.4	For probes that do not meet wear measurement criteria, all tubes inspected since the last successful calibration should be reinspected with a new calibrated probe.	During ATR04 probe wear limit was +/- 15%. For probes that did not meet this criteria, indications measured since the last acceptable probe wear measurement that were within 5%, required reinspection.	Braidwood will defer implementation of this requirement above what was done during our ATR04, pending resolution of industry comments.

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3.c.6	Quantitative noise criteria is to be employed in the inspection guidelines.	Not specifically addressed.	Braidwood will employ quantitative noise criteria during their mid-cycle inspection.
3.c.8	Smaller diameter probes are acceptable if demonstrated to be statistically equivalent to larger probes for detection and response capabilities.	Application of IPC is limited to tubes inspected with a 0.610" diameter probe (larger probes only).	Braidwood will meet this Draft GL requirement. All TSP where IPC criteria will be applied will be inspected with a 0.610" diameter probe.
4.a	Six intersections of tubes should be pulled every other outage or participation in an industry program.	This requirement was met during A1R04.	Braidwood removed tubes during A1R04. There are no plans to remove additional tubes during the mid-cycle inspection. Thus, Braidwood meets the Draft GL requirements.
5.c	Tubes with known leaks must be repaired prior to returning SGs to service.	Not specifically addressed.	Braidwood will meet this Draft GL requirement.
6.a and model TS 4.4.5.d	Reporting required prior to startup for: 1. previous cycle MSLB leak rate exceeds the site leak limit. 2. Any unusual inspection results 3. Projected EOC burst probability greater than limit	Reporting required prior to startup for Cycle 5. 1. Listing of applicable tubes 2. location and extent of degradation 3. Projected MSLB leakage	Braidwood will meet the Draft GL reporting requirements.
6.b (a)	The results of metallurgical examinations of tubes removed are to be reported within 90 days following restart.	Not specifically addressed.	Braidwood does not plan on removing any tubes during the mid-cycle inspection. If tubes are removed Braidwood will meet the Draft GL
6.b(b) and Model TS 4.4.5.5.d	Report required 90 days after restart to include detailed information on growth rates, voltage distribution, leak/burst evaluations, and NDE uncertainty distributions.	Not specifically addressed. Other than the TS required 15 day report and the information stated above all other reports are due within 1 year.	Braidwood will provide sufficient information for tube integrity evaluation within 90 days after startup.
Model TS 4.4.5.4.a.10	Voltage acceptance criteria for an unplanned inspection may be greater than 1.0 volt based on equation supplied in Draft GL.	This is not currently in Braidwood Tech Specs.	Braidwood will incorporate this requirement into our next IPC Tech Spec amendment.