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July 25, 2006
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U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Braidwood Station, Unit 1
Facility Operating License No. NPF 72
NRC Docket No. STN 50-456

Subject: Braidwood Station, Unit 1 Twelfth Refueling Outage Steam Generator Inservice Inspection Summary Report

In accordance with Technical Specification 5.6.9, "Steam Generator (SG) Tube Inspection Reports," item b, Exelon Generation Company, LLC is reporting the results of the SG inspections, which were completed during the Braidwood Station, Unit 1 twelfth refueling outage (A1R12). The attached report is also being submitted in accordance with the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, 1989 Edition, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," Article IWA-6000, "Records and Reports," and Article IV-7000, "Report of Examination," of Mandatory Appendix IV, "Eddy Current Examination of Non-Ferromagnetic Steam Generator Heat Exchanger Tubing."

If there are any questions regarding this submittal, please contact Mr. Dale Ambler, Regulatory Assurance Manager, at (815) 417-2800.

Respectfully,

Keith J. Polson
Site Vice President
Braidwood Station

Attachment: Exelon Braidwood Station, Unit 1 Twelfth Refueling Outage Steam Generator Inservice Inspection Summary Report

Exelon Nuclear
BRAIDWOOD STATION UNIT 1
35100 South Rte. 53, Suite 84
Braceville, IL 60407

COMMERCIAL OPERATION: July 29, 1988

STEAM GENERATOR EDDY CURRENT INSPECTION REPORT

TWELFTH REFUELING OUTAGE (A1R12)

April 2006

Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

Document Completion Date: June 15, 2006

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1.0 INTRODUCTION

Braidwood Station, Unit 1 operates with four Babcock & Wilcox Replacement Steam Generators (SGs) in the four loop pressurized water reactor system. The SGs each contain 6633 thermally treated Inconel-690 U-tubes that have a nominal diameter of 0.6875 inches and a nominal thickness of 0.040 inches. The tubes are supported by stainless steel lattice grid structures and fan bars. The tubes are hydraulically expanded into the full depth of the tubesheet. Main Feedwater enters the SGs above the tube bundle through a feedring and J-tubes. The SG configuration is shown in Figures A.1 and A.2. The replacement SGs were installed at the end of Cycle 7, in Fall 1998.

In compliance with Braidwood Station Technical Specification (TS) 5.5.9, "Steam Generator Tube Surveillance Program," and American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code Section XI 1989 Edition, IWB 2500-1, Examination Category B-Q, Item B16.20, SG eddy current examinations were performed during the Braidwood Station Unit 1 twelfth refueling outage (A1R12). The inspections were performed consistent with the Electric Power Research Institute (EPRI) "PWR Steam Generator Examination Guidelines," Revision 6, and Nuclear Energy Institute NEI 97-06, "Steam Generator Program Guidelines," Revision 2. The inspections were conducted from April 19, 2006 through April 26, 2006 by the Westinghouse Electric Company (Westinghouse). The following inspections were performed during this outage.

- 100% full length bobbin coil eddy current in all four SGs
- 20% hot leg top of tubesheet (+/- 3 inches) +Point™ eddy current in all four SGs
- 20% hot leg dents and dings $\geq$ 2.0 volts +Point™
- Diagnostic +Point™ eddy current based on bobbin coil eddy current results
- 100% Visual Inspection of Previously Installed Tube Plugs
- 100% Visual Inspection of Newly Installed Tube Plugs

2.0 SUMMARY

The requirements of Revision 6 of the EPRI PWR Steam Generator Examination Guidelines (i.e., EPRI Guidelines) along with Interim Guidance as provided by EPRI, were implemented during this inspection. A degradation assessment was performed prior to the inspection to ensure the proper EPRI Guidelines Appendix H, "Performance Demonstration for Eddy Current Examination," qualified inspection techniques were used to detect any existing and potential modes of degradation. Each technique was evaluated to ensure that the detection and sizing capabilities are applicable to the Braidwood Station Unit 1 site-specific condition in accordance with the EPRI Guidelines. All data analysts were qualified to Appendix G, "Qualification of Nondestructive Examination Personnel for Analysis of NDE Data," of the EPRI Guidelines (i.e., Qualified Data Analyst (QDA)). All data analyst and acquisition personnel satisfactorily completed site-specific training and testing prior to beginning examinations. An independent QDA process control review was employed to randomly sample the data to ensure that the analysis resolution process was properly performed and that the field calls were properly reported. An analysis feedback process was implemented that required the data analysts to review their missed calls and overcalls on a daily basis.

The modes of tube degradation found during A1R12 were fan bar wear, lattice grid wear and foreign object wear.

As a result of the eddy current inspection of the SGs, a total of 28 tubes were removed from service by mechanical tube plugging. The 28 tubes were removed from service due to either having wear associated with secondary side foreign objects or were required to be removed from service in order to bound high flow locations where secondary side foreign objects could not be retrieved.

One tube in the 1A SG had tube wear greater than the TS plugging limit of $\geq$ 40%. Pursuant to TS 5.5.9.c, "Inspection Results Classification," the 1A SG was classified as inspection category C-2. No additional scope expansion was required since 100% full-length bobbin eddy current inspection was already being performed in the 1A SG.

One tube in the 1B SG had tube wear greater than the TS plugging limit of $\geq$ 40%. Pursuant to TS 5.5.9.c, "Inspection Results Classification," the 1B SG was classified as inspection category C-2. No additional scope expansion was required since 100% full-length eddy current inspection was already being performed in the 1B SG.

There were no tubes containing wear greater than the TS plugging limit of $\geq$ 40% in the 1C and 1D SGs. Pursuant to TS 5.5.9.c, "Inspection Results Classification," the 1C and 1D SGs were classified as inspection category C-1.

There were no scanning limitations during the eddy current examinations. Table 2.1, "Equivalent Tube Plugging Level," provides the total tube plugging history and equivalent plugging levels to-date for the Braidwood Station, Unit 1 SGs:

Table 2.1
Equivalent Tube Plugging Level

	SG A	SG B	SG C	SG D	Total
Tubes Plugged at Factory	1	2	0	0	3
Tubes Plugged in A1R08	1	0	0	0	1
Tubes Plugged in A1R10	8	10	3	0	21
Tubes Plugged in A1R11	0	2	2	1	5
Tubes Plugged in A1R12	11	17	0	0	28
Total Tubes Plugged	21	31	5	1	58
Total Tubes Plugged (%)	0.32%	0.92%	0.08%	0.02%	0.22%

Note: Steam Generator Inspections Were Not Performed During A1R09.

3.0 CERTIFICATIONS

3.1 Procedures/Examinations/Equipment

3.1.1 The examination and evaluation procedures used during the SG eddy current inspection were approved by personnel qualified to Level III in accordance with the 1984 Edition of SNT-TC-1A, "Personnel Qualification and Certification in Nondestructive Testing." Exelon Generation Company, LLC (i.e., Exelon) Procedure ER-AP-335-039, "Multifrequency Eddy Current Data Acquisition of Steam Generator Tubing," Revision 3 and Exelon Procedure ER-AP-335-040, "Evaluation of Eddy Current Data for Steam Generator Tubing," Revision 2, were used for data acquisition and analysis.

3.1.2 The examinations, equipment and personnel were in compliance with the requirements of Exelon and Westinghouse Quality Assurance Programs for Inservice Inspection; Braidwood Station TS 5.5.9; 1989 Edition of ASME Boiler and Pressure Vessel Code Sections XI, "Rules for Inservice Inspection of Nuclear power Plant Components," and Section V, "Nondestructive Examination"; EPRI PWR SG Examination Guidelines, Revision 6; and NEI 97-06, "Steam Generator Program Guidelines," Revision 2.

3.1.3 Certification packages for examiners, data analysts, and equipment are available at Braidwood Station. Tables A.1 and A.2 of Attachment A lists all personnel who performed, supervised, or evaluated the data during this SG inservice inspection.

3.1.4 R/D Tech Incorporated TC6700 Remote Data Acquisition Units (RDAUs) with Westinghouse ANSER computer software was used to acquire the eddy current data. Analysis was performed with Westinghouse ANSER 8.4.3 Rev 198 computer software. Secondary analysis was performed with CoreStar Eddyvision 32, Release 5.7.1 computer software.

3.1.5 The bobbin coil examinations of the SGs were performed with Westinghouse 0.560 inch diameter probes. For low row U-Bend tubing, a 0.540 inch diameter probe was utilized to achieve the complete full tube examination in tubes where there was difficulty using the 0.560 inch diameter probe.

3.1.6 The rotating coil examinations were performed with Zetec 0.560 inch diameter three coil +Point™ probes for straight section tubing. The coils within this probes were a 0.115 inch diameter pancake coil, a shielded 0.080 inch diameter pancake coil and a standard +Point™ coil. For diagnostic evaluation of indications within the U-Bend tubing, a 0.520 inch diameter probe was used with a single standard +Point™ coil.

3.2 Personnel

3.2.1 The personnel who performed the SG eddy current inspections were qualified to Level I and Level II certification in accordance with the 1984 Edition of SNT-TC-1A. The Level I personnel performed the inspections under the direct supervision of Level II or Level III personnel. A list of the certified eddy current personnel who performed data acquisition for the examination is contained in Table A.1 of Attachment A.

3.2.2 The personnel who performed the SG eddy current data analysis were qualified to a minimum of Level II, with special analysis training (i.e., Level IIA) in accordance with the 1984 Edition of SNT-TC-1A and Article IV-2000 of ASME Section XI, 1989 Edition. A list of the certified eddy current personnel who performed data analysis for the examination is contained in Table A.2 of Attachment A.

3.2.3 All eddy current data analysts were qualified in accordance with EPRI Appendix G for Qualified Data Analysts (QDAs). In addition, all data analysts were trained and tested in accordance with a site specific performance demonstration program in both the bobbin coil and +Point™ inspection data analysis. Resolution analysts were also trained and tested specifically for the performance of data resolution. All analysts were required to achieve a minimum score of 80% probability of detection with a 90% confidence level on the practical examination, and a minimum score of 80% on the written examination prior to analyzing data.

3.2.4 All SG eddy current data acquisition personnel were trained and tested in accordance with a site specific performance demonstration program. The data acquisition operators were required to achieve a written test score of 80% or greater prior to acquiring data.

3.2.5 The SG eddy current analysis was subject to two independent analyses. Primary and secondary analysis was performed by an automated data screening analysis system as described in the EPRI Guidelines, Revision 6. The analysis systems were operated in the manual interactive mode. Each system successfully passed the EPRI Automated Analysis Performance Demonstration Database (AAPDD). Each system also was required to successfully pass the site specific performance demonstration practical examination prior to analyzing field data. Discrepancies between the two parties required Level III concurrence between both parties for final resolution.

3.2.6 Two independent SG eddy current Level III QDA's were employed to serve as a process control reviewers, in accordance with EPRI Guidelines, to randomly sample the data to ensure the resolution process was properly performed and that the field calls were properly reported. The Independent Level III QDA's also provided data acquisition oversight to ensure that the data collection process was in compliance with appropriate procedures, that all essential variables were set in accordance with the applicable Examination Technique Specification Sheet (ETSS) and to provide a data quality check of acquired data. The Independent Level III QDA's reported directly to the Exelon Level III inspector.

4.0 EXAMINATION TECHNIQUES AND EXAMINATION SCOPE

All SG eddy current examination techniques used were qualified in accordance with Appendix H of the EPRI Guidelines. Each examination technique was evaluated to be applicable to the tubing and conditions of the Braidwood Station Unit 1 SGs.

4.1 Examination Techniques

4.1.1 The bobbin coil examinations were performed with a 0.560 inch diameter probe as described in Section 3.1.5 of this report. For low row U-Bend regions where there was difficulty using the 0.560 inch diameter probe, a 0.540 inch diameter probe was utilized to achieve the full tube inspection. Nominal probe inspection speed was 40 inches per second for tubes in row 10 and higher and 24 inches per second for low row tubes. Sufficient sampling rates were used to maintain a minimum digitizing rate of 30 samples per inch. The bobbin probes were operated in both the differential and absolute modes at frequencies of 650 kHz, 320 kHz, 160 kHz, and 35 kHz. The following suppression mixes were used to enhance the inspection: 650/160 kHz differential mix, 320/160 kHz absolute mix, 650/320 kHz differential mix and a 650/320/160 kHz differential mix.

4.1.2 Inspections at the hot leg top of tubesheet region along with diagnostic examinations of non-quantifiable indications and hot leg dents/dings greater than or to 2.0 volts as detected by the bobbin coil examination, were performed utilizing +Point™ probes as described in Section 3.1.6. Maximum axial probe inspection speed was 0.6 inches per second for straight tubing, 0.35 inches per second for U-bend region of the tubing and 0.15 inches per second at dents and dings. Sample rates and rotation speeds were used to maintain a minimum digitizing rate of 30 samples per inch (i.e., 25 samples per inch for the axial direction and 30 samples per inch for the circumferential direction). The rotating probes for straight section tubing and dents/ding inspections were operated in the absolute test mode at frequencies of 300 kHz, 200 kHz, 100 kHz and 20 kHz. The rotating probes for U-bend section inspections were operated in the absolute test mode at frequencies of 400 kHz, 300 kHz, 100 kHz and 20 kHz. In addition to the four base frequencies, three process channels were used to display axial indications in the positive trace.

4.1.3 The eddy current calibration standards used for the bobbin coil and +Point™ inspections met the requirements of the EPRI Guidelines, Revision 6, and Sections V and XI of the ASME Code, 1989 Edition.

4.1.4 The SG eddy current examination techniques used during this inspection were equivalent to the EPRI Guidelines Appendix H techniques listed in Table 4.1. Each ETSS was evaluated and determined to be applicable to site conditions.

Table 4.1
EPRI Appendix H Techniques

EPRI Technique ETSS	Probe	Description
96004.3 Rev. 9	Bobbin	Fan Bar/Lattice Grid/Foreign Object Wear and Free Span Flaws
96910.1 Rev. 9	+Point™	Foreign Object Wear/Free Span Flaws (Wear Like Flaws)
21998.1 Rev. 3	+Point™	Foreign Object Wear (Volumetric Like Flaws)
96703.1 Rev. 16	+Point™	Dents/Dings – Primary Water Stress Corrosion Cracking (PWSCC)
21409.1 Rev. 4	+Point™	Outer Diameter Stress Corrosion Cracking (Axial ODSCC)
21410.1 Rev. 4	+Point™	Outer Diameter Stress Corrosion Cracking (Circumferential ODSCC)
20511.1 Rev. 7	+Point™	Inside Diameter Stress Corrosion Cracking (Axial PWSCC)
20510.1 Rev. 5	+Point™	Inside Diameter Stress Corrosion Cracking (Circumferential PWSCC)
96010.1 Rev. 6	Bobbin	Manufacturing Burnish Marks
22401.1 Rev. 3	+Point™	Dents/Dings – Outer Diameter Stress Corrosion Cracking (Axial ODSCC)
96008.1 Rev. 13	Bobbin	Tube Support Plate / Sludge Pile – Outer Diameter Stress Corrosion Cracking (Axial ODSCC)

PWSCC – Primary Water Stress Corrosion Cracking
ODSCC – Outside Diameter Stress Corrosion Cracking

4.2 Steam Generator Inspection Scope

4.2.1 100% of the tubes in all SGs were inspected full-length with a bobbin probe as described in Section 4.1.1.

4.2.2 20% of the tubes in all SGs were inspected at the hot leg top of tubesheet expansion transition region (+/- 3 inches) with a +Point™ as described in Section 4.1.2.

4.2.3 Diagnostic examinations were performed on all non-quantifiable indications, locations of foreign object wear, and hot leg dents/dings greater than or equal to 2.0 volts that were detected by the bobbin coil examination. Diagnostic examinations were also conducted in the vicinity of potential foreign objects to determine the extent of tubes potentially affected by the objects. These special examinations were performed with the three coil +Point™ probe described in Section 4.1.2 above. See Section 5.1 and Attachment B.3 for further detail.

4.2.4 See Attachment B for tubesheet maps detailing the inspection scope for each SG.

4.3 Recording of Examination Data

Results of the SG eddy current data analysis were recorded on optical disks. The data was then loaded into a Westinghouse Eddy Current Data Management System, "STMax" version, 1.17.01. The system was used to track the completion of the examinations and was used to generate the final SG eddy current report summaries.

4.4 Witness and Verification of Examination

SG eddy current inspections were witnessed and/or verified by the Authorized Nuclear Inservice Inspectors, Mr. L. Malabanan of the Hartford Steam Boiler Inspection and Insurance Company of Hartford Connecticut, Chicago Branch, 2443 Warrenville Road, Suite 500, Lisle, Illinois 60532-9871.

5.0 EXAMINATION RESULTS

5.1 Eddy Current Inspection

Full-length bobbin coil examination of all inservice tubes, and 20% of the hot leg top of tubesheet transition region (+/- 3 inches) examination was performed in all SGs. Only one tube was identified with a hot leg region dent / ding greater than or equal to 2.0 volts in the hot leg region. This tube was inspected with +Point™ and showed no degradation.

5.1.1 Fan Bar Wear – A total of 22 indications of tube wear at the Fan Bar intersections were identified during A1R12. The largest indication of Fan Bar wear was 17% Through Wall (TW). The EPRI Appendix H bobbin coil technique 96004.3 Revision 9 was utilized in this inspection for depth sizing of all Fan Bar wear. Refer to Attachment B.5 for detailed locations and sizing for all Fan Bar wear.

5.1.2 Lattice Grid Wear – A total of six indications of tube wear at the Lattice Grid intersections were identified during A1R12. The largest indication of Lattice Grid wear was 9% TW. The EPRI Appendix H bobbin coil technique 96004.3 Revision 9 was utilized in this inspection for depth sizing of all Lattice Grid wear. Refer to Attachment B.6 for detailed locations and sizing for all Lattice Grid wear.

5.1.3 Foreign Object Wear – A total of eight indications of secondary side foreign object wear in six tubes were identified during A1R12. The EPRI Appendix H +Point™ technique 21988.1 Revision 3 was utilized in this inspection for depth sizing of all foreign object wear.

Of the eight indications, four were associated with relatively small amounts of tube wear (16% TW, 16% TW, 17% TW and 23%TW). These tubes were allowed to remain in service since they were below the TS plugging criteria of greater than or equal to 40% TW, coupled with secondary side visual inspection confirming that the objects that caused the tube wear were no longer present.

In the 1A SG tube Row 102 Column 61 had two indications of secondary side foreign object wear slightly above the hot leg top of tubesheet intersection. The two indications were sized at 88% TW and 59% TW. Structural and leakage integrity of these two indications within this tube was demonstrated through In-Situ pressure testing as described in Section 5.2.2. Secondary side visual inspection of this region identified that the object that caused the tube wear was still present and could not be retrieved. The object is best described as a piece of metallic gasket material approximately 1.75 inches in length. Tube Row 102 Column 61 was plugged and stabilized in the region of the foreign object wear. The surrounding six tubes were also preventively plugged and stabilized in the region of the foreign object in order to preclude further tube damage. This tube was last inspected two cycles ago (A1R10) and showed no evidence of tube wear or a secondary side foreign object.

Additionally in the 1A SG, 4 tubes were preventatively plugged and stabilized in the cold leg top of tubesheet region due to visual inspection identifying a piece of metallic gasket material approximately 0.75 inches in length. Since this object was in a high flow area and could not be successfully retrieved, the tubes were preventively plugged even though they showed no signs of degradation based on eddy current or visual inspection.

In the 1B SG tube Row 53 Column 90 had two indications of secondary side foreign object wear at the 8th Lattice Grid in the hot leg side. The two indications were sized at 56% TW and 37% TW. Structural and leakage integrity of these two indications within this tube was demonstrated through In-Situ pressure testing as described in Section 5.2.2. Secondary side visual inspection of this region was not possible due to its location at the 8th Lattice Grid. Tube Row 53 Column 90 was plugged and stabilized in the region of the foreign object wear. The surrounding nine tubes were also preventively plugged and stabilized in the region of the foreign object in order to preclude further tube damage. This tube was last inspected one cycle ago (A1R11) and showed no evidence of tube wear or a secondary side foreign object.

Additionally in the 1B SG, seven tubes were preventatively plugged and stabilized in the hot leg top of tubesheet region due to visual inspection identifying a piece of metallic gasket material approximately 2.0 inches in length. Since this object was in a high flow area and could not be successfully retrieved, the tubes were preventively plugged even though they showed no signs of degradation based on eddy current or visual inspection.

Table 5.1.3 below provides a summary of the foreign object wear found during this SG inspection. Refer to Attachment B.4 for additional details.

Table 5.1.3
Foreign Object Wear Summary

SG	Row	Col	Elevation	+Point™ Call	%TW	Plug	Stabilize
A	102	61	TSH	SVI*	59	Y	Y
A	102	61	TSH	SVI*	88	Y	Y
A	96	107	TSH	VOL**	17	N	N
A	98	107	TSH	VOL**	16	N	N
A	97	108	TSH	VOL**	16	N	N
B	98	47	TSH	VOL**	23	N	N
B	53	90	8H	SVI*	37	Y	Y
B	53	90	8H	SVI*	56	Y	Y

*SVI = Single Volumetric Indication
**VOL = Volumetric Indication Visually Verified Foreign Object No Longer Present

5.1.4 Tube to Tube Proximity – The condition of tube to tube being in close proximity was monitored as part of the 100% full length bobbin coil inspection of all SGs during A1R12. The inspection results, including historical data related to tube to tube proximity is provided in Table 5.1.4 below. No tube degradation was identified associated with tube to tube proximity. This condition will continue to be monitored during future scheduled SG inspections.

Table 5.1.4
Tube to Tube Proximity Summary

	Tubes Identified In-Proximity During Pre-Service Inspection	Tubes Identified In-Proximity A1R08 (Spring 2000)	Tubes Identified In-Proximity A1R10 (Spring 2003) Note 1	Tubes Identified In-Proximity A1R11 (Fall 2004) Note 2	Tubes Identified In-Proximity A1R12 (Spring 2006)
Total	508	85	132	39	188

Note 1: During A1R10 the 1A SG received 100% full-length eddy current inspection and the 1B, 1C and 1D SGs received 54% full-length inspection.
Note 2: Only the 1B SG received 100% full-length inspection through the area of interest during A1R11.

5.1.5 Attachment B contains tube lists with axial elevations of all imperfections that contain measurable through wall depth that were found during the A1R12 eddy current inspection.

5.2 Other Inspection Results

5.2.1 Visual Inspection of Installed Tube Plugs – All previously installed tube plugs were visually inspected for signs of degradation and leakage. In addition, all plugs installed during this outage were also visually inspected and the installation parameters were reviewed for acceptable installation. No anomalies were found.

5.2.2 In-Situ Pressure Testing – In the 1A SG tube Row 102 Column 61 had two indications of secondary side foreign object wear slightly above the hot leg top of tubesheet intersection. The two indications were sized at 88% TW and 59% TW. In the 1B SG tube Row 53 Column 90 had two indications of secondary side foreign object wear at the 8th Lattice Grid in the hot leg side. The two indications were sized at 56% TW and 37% TW. Structural and leakage integrity of these indications was demonstrated through in-situ pressure testing during A1R12.

The indications described above were in-situ pressure tested by Westinghouse using localized testing techniques.

Westinghouse performed a local in-situ pressuring testing of the above tubes per the requirements of Revision 2 of the EPRI In-Situ Pressure Test Guidelines and applicable interim guidance. Leakage tests were performed at multiples of differential pressures associated with normal operation and main steam line break. No leakage was noted during these tests. Proof testing was performed at various pressures up to differential pressures associated with three times the normal operating differential pressure (3XNOdP) conditions. The in-situ pressure tests were performed at approximately 1600 psig, 2000 psig, 2550 psig, 2950 psig, 3550 psig, 4050 psig and 4600 psig. No leakage was noted during these tests.

Based on the results of the leak and proof in-situ pressure testing, accident leakage and structural integrity performance criteria were demonstrated for the tubes described above. The tubes met all performance criteria as required by NEI 97-06, Revision 2. The tubes were plugged and stabilized following the in-situ testing.

6.0 REPAIR SUMMARY

Repairs were conducted in accordance with ASME Section XI, 1989 Edition. All repairs were performed using Inconel-690 mechanical tube plugs. All repairs were performed in accordance with Westinghouse approved procedures. Table 6.0 summarizes the repairs performed during A1R12. No tube sleeving was performed.

Table 6.0
Summary of A1R12 Tube Plugging

REPAIRS PERFORMED	SG 1A	SG 1B	SG 1C	SG 1D	TOTAL
Tubes Plugged	11	17	0	0	28
Tubes Stabilized	11	17	0	0	28

7.0 DOCUMENTATION

All original data is stored on optical disks that have been provided to Exelon and are maintained at Braidwood Station. The final data sheets and pertinent tube sheet plots are contained in the Westinghouse Outage Report for Braidwood Unit 1, Twelfth Refueling Outage, and are also maintained at Braidwood Station.

NOTE: The ASME Section XI NIS-1 Form,"Owner's Report for Inservice Inspections," for steam generator inspections performed during the Braidwood Unit 1 Twelfth Refueling Outage is contained in a separate transmittal: the "Braidwood Station, Unit 1 Inservice Inspection Summary Report."

8.0 FIGURES/TABLES/ATTACHMENTS

Attachment A Contents

Attachment B Contents

Attachment A

Personnel Certifications

TABLE A.1
A1R12
Data Acquisition Personnel Certifications

No.	Name	Company	Level	QDA (Y/N)
1	Brown, W.	Hudson	II	No
2	Kintigh, B.	Hudson	I	No
3	Mantich, S.	Hudson	I	No
4	Dillard, W.	Westinghouse	II	No
5	Evering, D.	Westinghouse	II	No
6	Fore, S.	Westinghouse	II	No
7	Gault, W.	Westinghouse	II	No
8	Greenawalt, L.	Westinghouse	I	No
9	Groh, T.	Westinghouse	II	No
~~10~~	~~Guiterrez, E.~~	~~Westinghouse~~	~~I~~	~~No~~
11	Hazlett, W.	Westinghouse	II	No
12	Hill, W.	Westinghouse	I	No
13	Hopper, J.	Westinghouse	II	No
14	Mardell, D.	Westinghouse	II	No
15	Miller, G.	Westinghouse	II	No
16	Scott, A.	Westinghouse	II	No
17	Shipley, E.	Westinghouse	II	No
18	Tedrick, J.	Westinghouse	I	No
19	Vernon, D.	Westinghouse	II	No
20	Walsh, M.	Westinghouse	II	No

TABLE A.2
A1R12
Data Analysis Personnel Certifications

No.	Name	Company	Level	QDA (Y/N)
1	Bowler, S.	Anatec	IIA	Yes
2	Griffith, T.	Anatec	IIA	Yes
3	Hufford, C.	Anatec	IIA	Yes
4	Johnson, G.	Anatec	IIA	Yes
5	Jones, D.	Anatec	IIA	Yes
7	Leach, K.	Anatec	IIA	Yes
8	Moore, T.	Anatec	IIA	Yes
9	Obazenu, D.	Anatec	III	Yes
10	Owens, S.	Anatec	IIA	Yes
11	Prentice, R.	Anatec	IIA	Yes
12	Rogers, G.	Anatec	III	Yes
13	Wieber, J.	Anatec	IIA	Yes
14	Ives, D.	CoreStar	III	Yes
15	Martin, A.	CoreStar	IIA	Yes
16	Spake, C.	CoreStar	III	Yes
17	Marijanovic, S.	HRID	IIA	Yes
18	Nadinic, B.	HRID	III	Yes
19	Postruzin, Z.	HRID	IIA	Yes
20	Todev, I.	HRID	IIA	Yes
21	Tsankov, M.	HRID	IIA	Yes
22	Zerovnik, V.	HRID	IIA	Yes
23	Dlabik, A.	Master-Lee	III	Yes
24	Kajari, I.	Master-Lee	IIA	Yes
25	Lynn, V.	Master-Lee	III	Yes
26	Padgett, L.	Master-Lee	IIA	Yes
27	Rehak, R.	Master-Lee	IIA	Yes
28	Tarr, G.	Master-Lee	IIA	Yes
29	Toman, J.	Master-Lee	III	Yes
30	Chambers, D.	MoreTech	III	Yes
31	Gortemiller, M.	MoreTech	III	Yes
32	Mitchell, J.	MoreTech	III	Yes
33	Sordini, J.	MoreTech	IIA	Yes
34	Webb, M.	MoreTech	IIA	Yes
35	Anderson, D.	NDE Tech	IIA	Yes
36	*Brown, M.	NDE Tech	III	Yes
37	Case, J.	NDE Tech	III	Yes
38	Causby, G.	NDE Tech	III	Yes
39	Drumm, R.	NDE Tech	III	Yes
40	Haynes, W.	NDE Tech	III	Yes
41	Johnson, J.	NDE Tech	IIA	Yes

TABLE A.2
A1R12
Data Analysis Personnel Certifications
(Continued)

No.	Name	Company	Level	QDA (Y/N)
42	Lohner, E.	NDE Tech	III	Yes
43	Richmond, M.	NDE Tech	III	Yes
44	Schmitz, K.	NDE Tech	III	Yes
45	Sheldon, J.	NDE Tech	III	Yes
46	Skirpan, J.	NDE Tech	IIA	Yes
47	Zevchak, J.	NDE Tech	IIA	Yes
48	Montes, E.	Tencnatom	IIA	Yes
49	Salvador, C.	Tencnatom	III	Yes
50	Beehner, S.	Westinghouse	III	Yes
51	*Bowser, C.	Westinghouse	III	Yes
52	Pocratsky, R.	Westinghouse	III	Yes
53	Popovich, R.	Westinghouse	III	Yes
54	Yaklich, D.	Westinghouse	III	Yes

* Independent Qualified Data Analyst

FIGURE A.1
Babcock & Wilcox Replacement Steam Generator
Braidwood Unit 1 Configuration

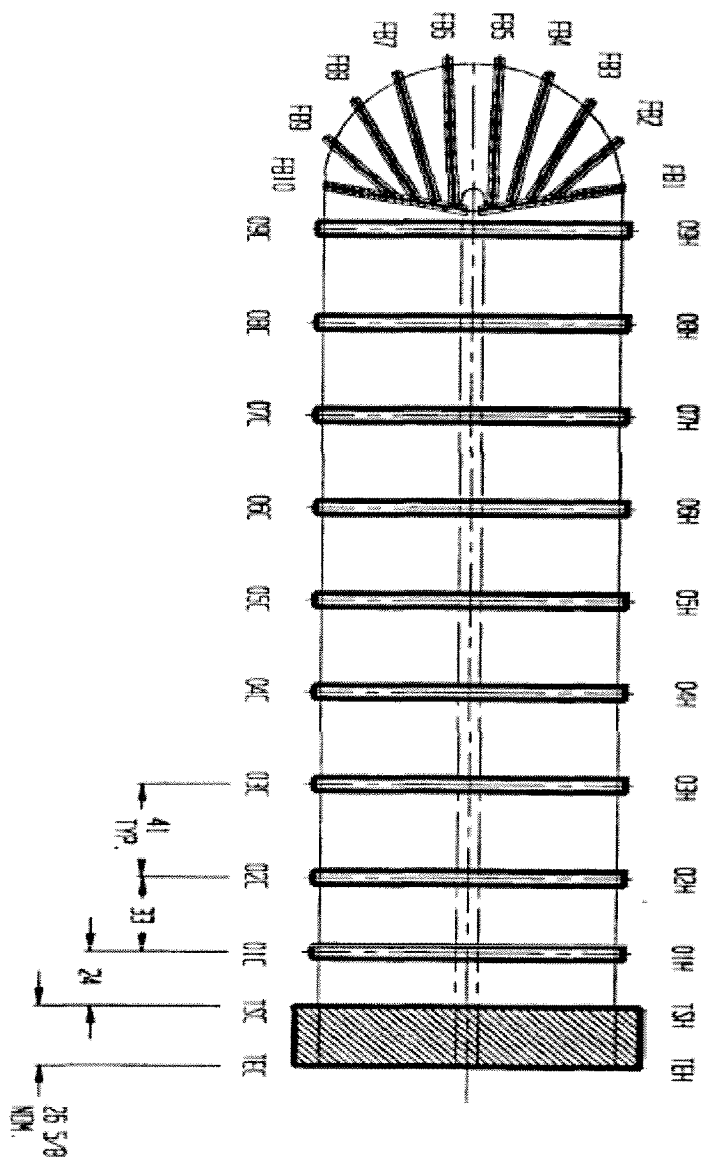
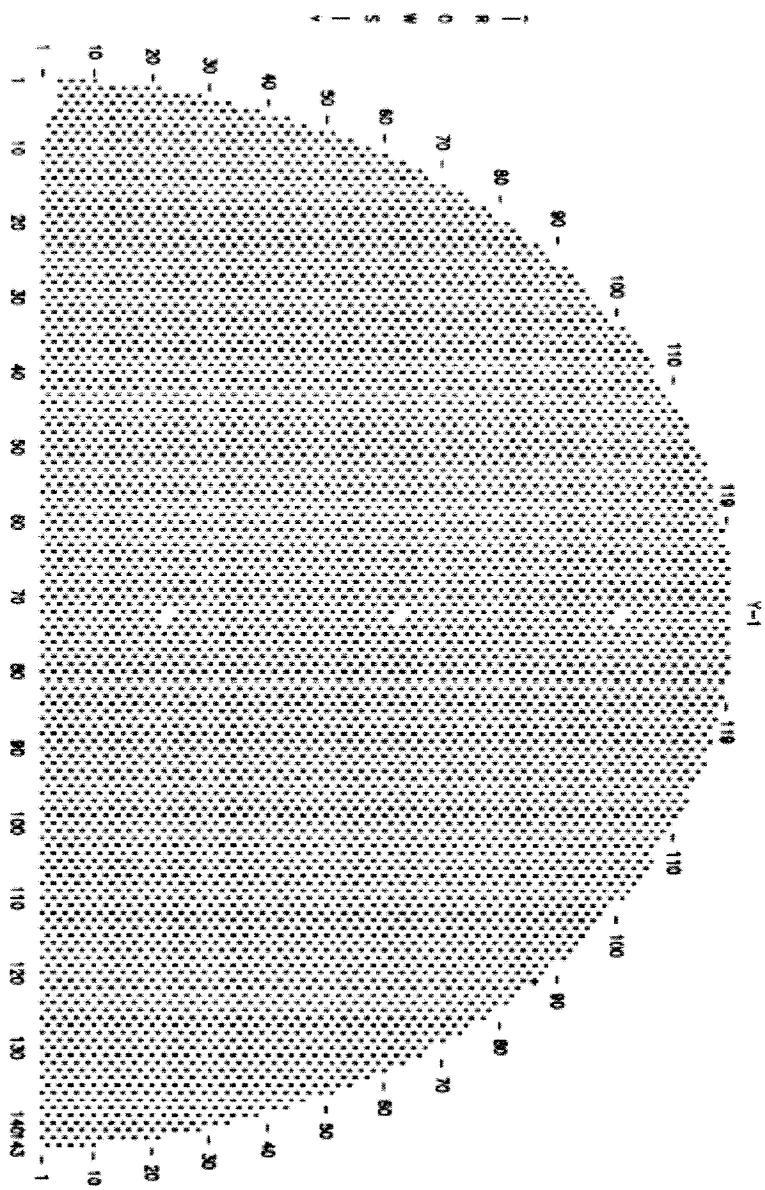


FIGURE A.2
Babcock & Wilcox Replacement Steam Generator
Braidwood Unit 1 Tubesheet Configuration



Attachment B

Inspection Scope / Results
A1R12

Attachment B.1

As-tested Bobbin Inspection Maps
A1R12

SG-1A BOBBIN INSPECTION PROGRAM

AS TESTED FROM THE COLD LEG

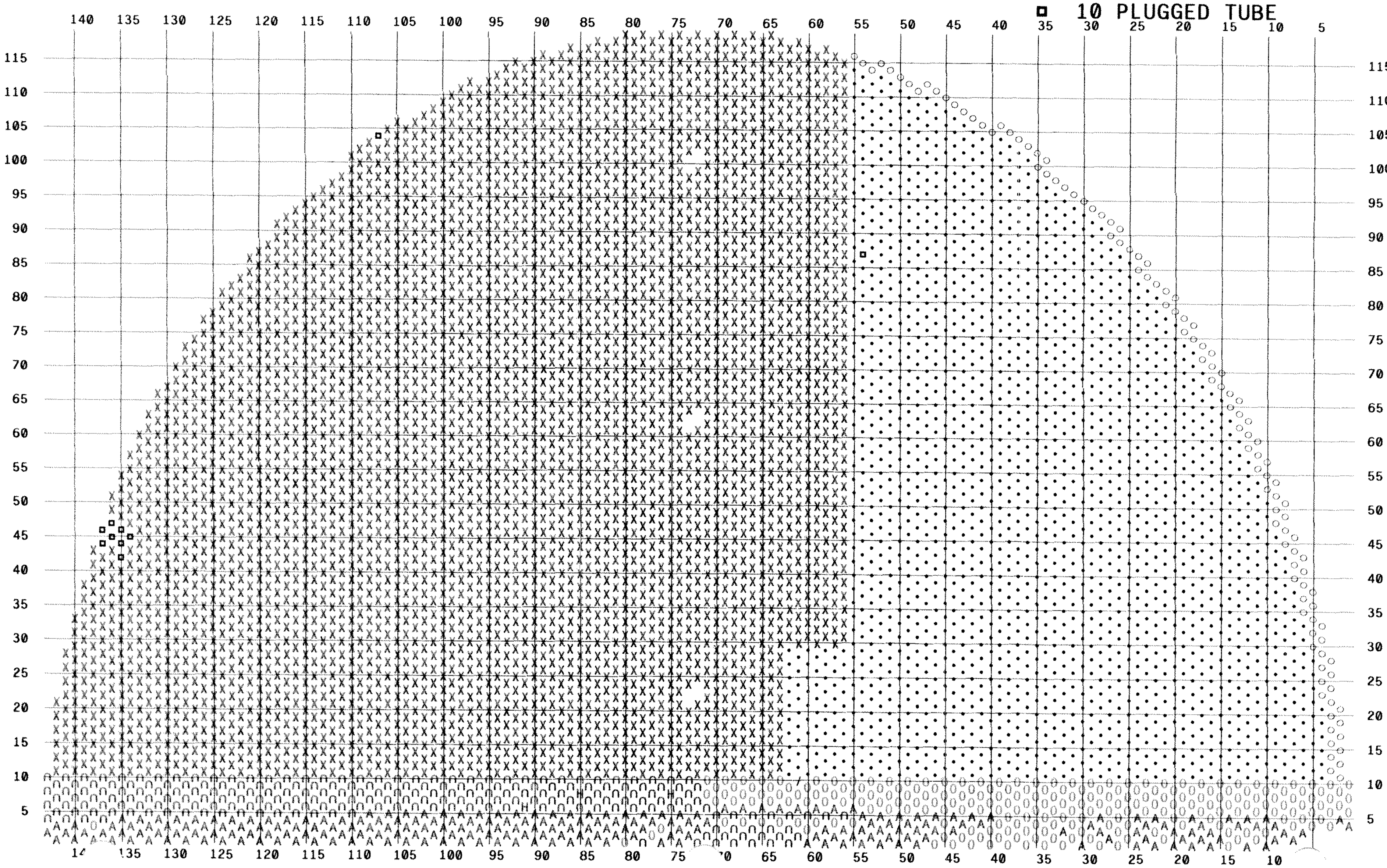
Braidwood A1R12 CCE 7720

X 3777 TESTED TEH THROUGH TEC ∩ 225 TESTED 09H THROUGH TEC

O 240 TESTED F10 THROUGH TEC H 3 TESTED 08H THROUGH TEC

A 237 TESTED F01 THROUGH TEC / 1 TESTED 09C THROUGH TEC

▫ 10 PLUGGED TUBE



SG-1A BOBBIN INSPECTION PROGRAM

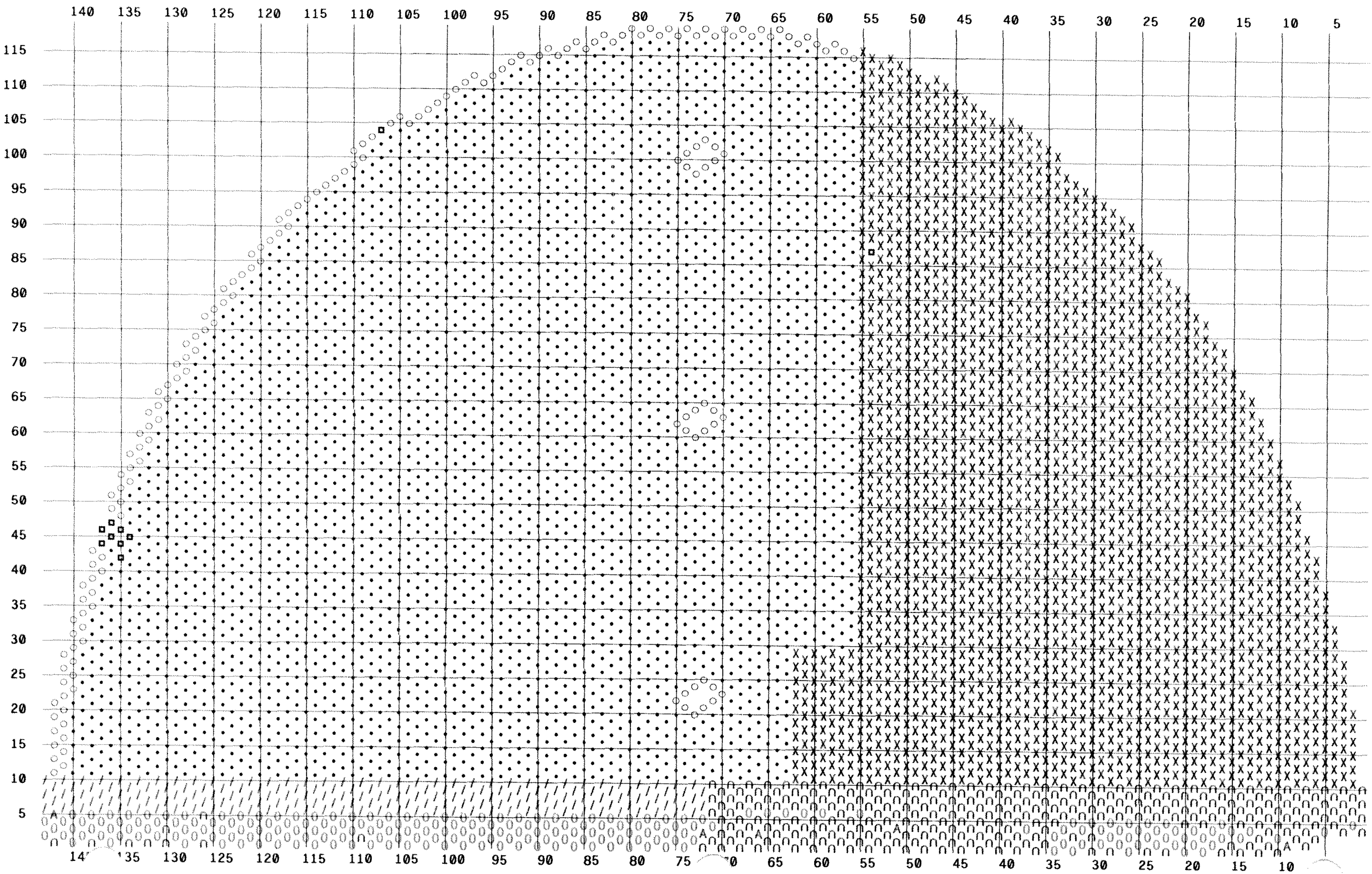
AS TESTED FROM THE HOT LEG

Braidwood A1R12 CCE 7720

X 2140 TESTED TEC THROUGH TEH / 180 TESTED 09H THROUGH TEH

∩ 301 TESTED 09C THROUGH TEH A 5 TESTED F01 THROUGH TEH

0 220 TESTED F10 THROUGH TEH ◘ 10 PLUGGED TUBE



SG - 1B BOBBIN INSPECTION PROGRAM

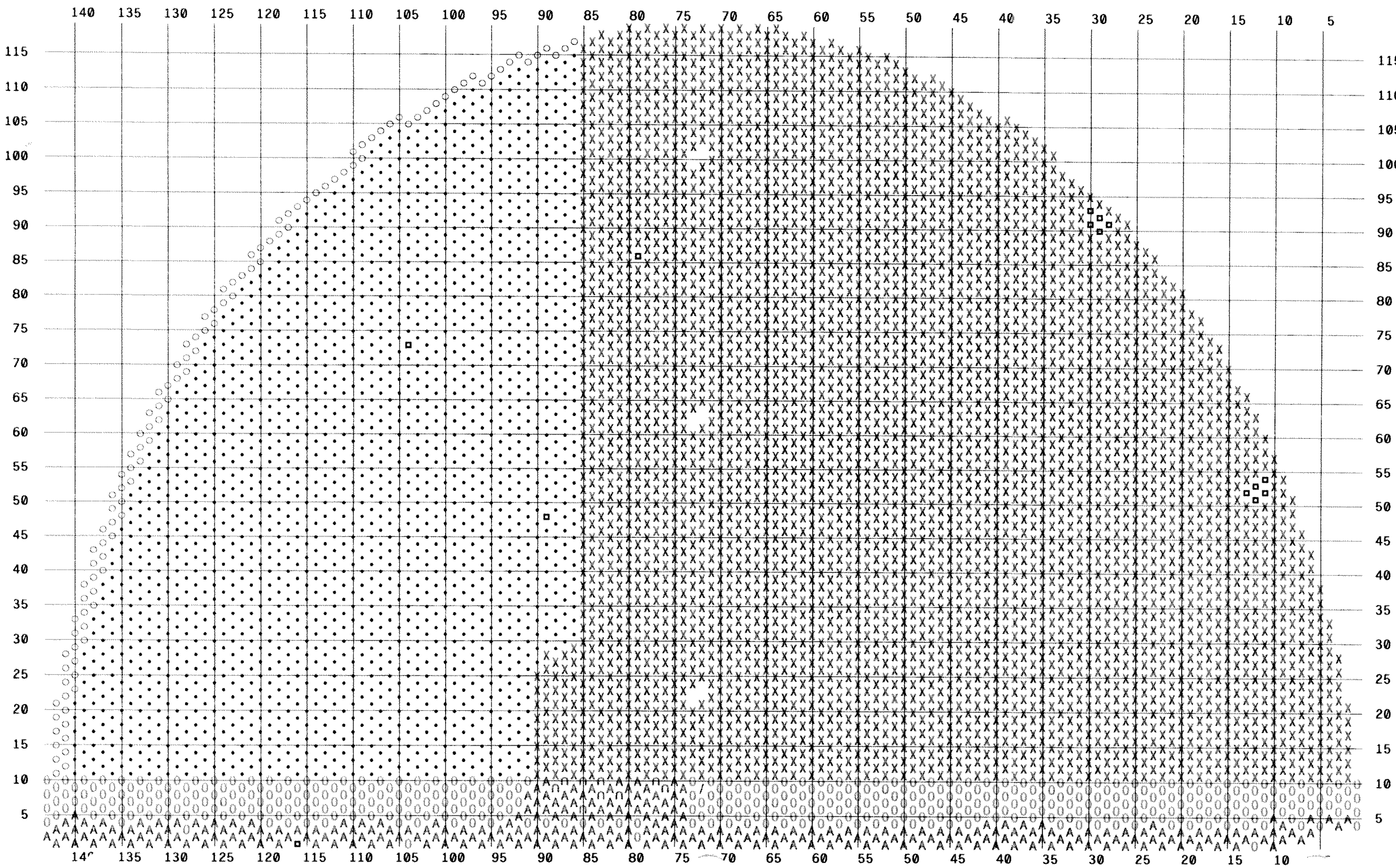
AS TESTED FROM THE COLD LEG

Braidwood A1R12 CCE 7720

X 3727 TESTED TEH THROUGH TEC ∩ 9 TESTED 09H THROUGH TEC

O 421 TESTED F10 THROUGH TEC / 1 TESTED 09C THROUGH TEC

A 274 TESTED F01 THROUGH TEC ▫ 14 PLUGGED TUBE



SG - 1B BOBBIN INSPECTION PROGRAM

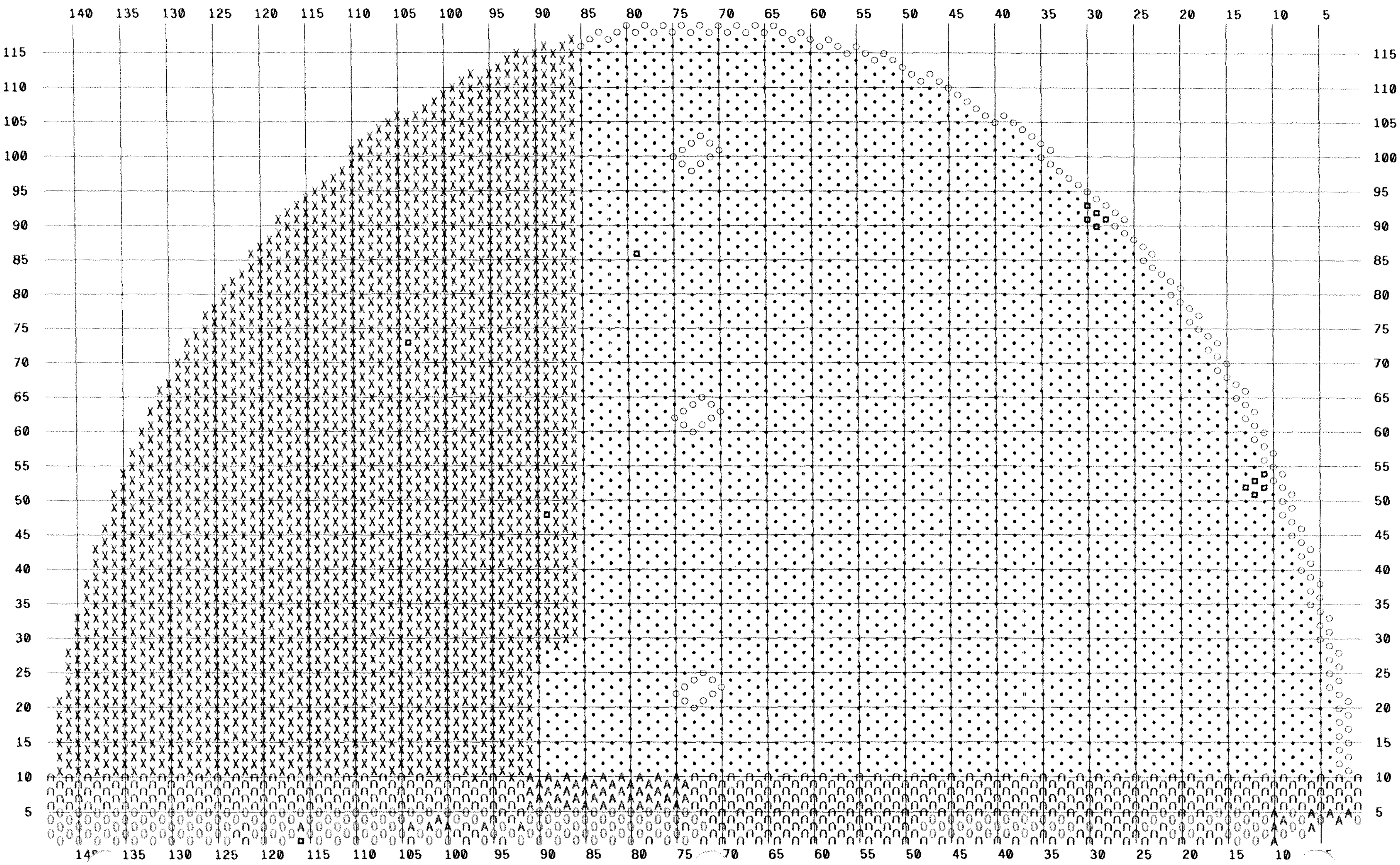
AS TESTED FROM THE HOT LEG

Braidwood A1R12 CCE 7720

X 2190 TESTED TEC THROUGH TEH   A 61 TESTED F01 THROUGH TEH

∩ 433 TESTED 09C THROUGH TEH   ◘ 14 PLUGGED TUBE

O 208 TESTED F10 THROUGH TEH



Westinghouse Electric Company LLC - ST Max 04/28/2006 11:19:32

SG-1C BOBBIN INSPECTION PROGRAM

AS TESTED FROM THE COLD LEG

Braidwood A1R12 CCE 7720

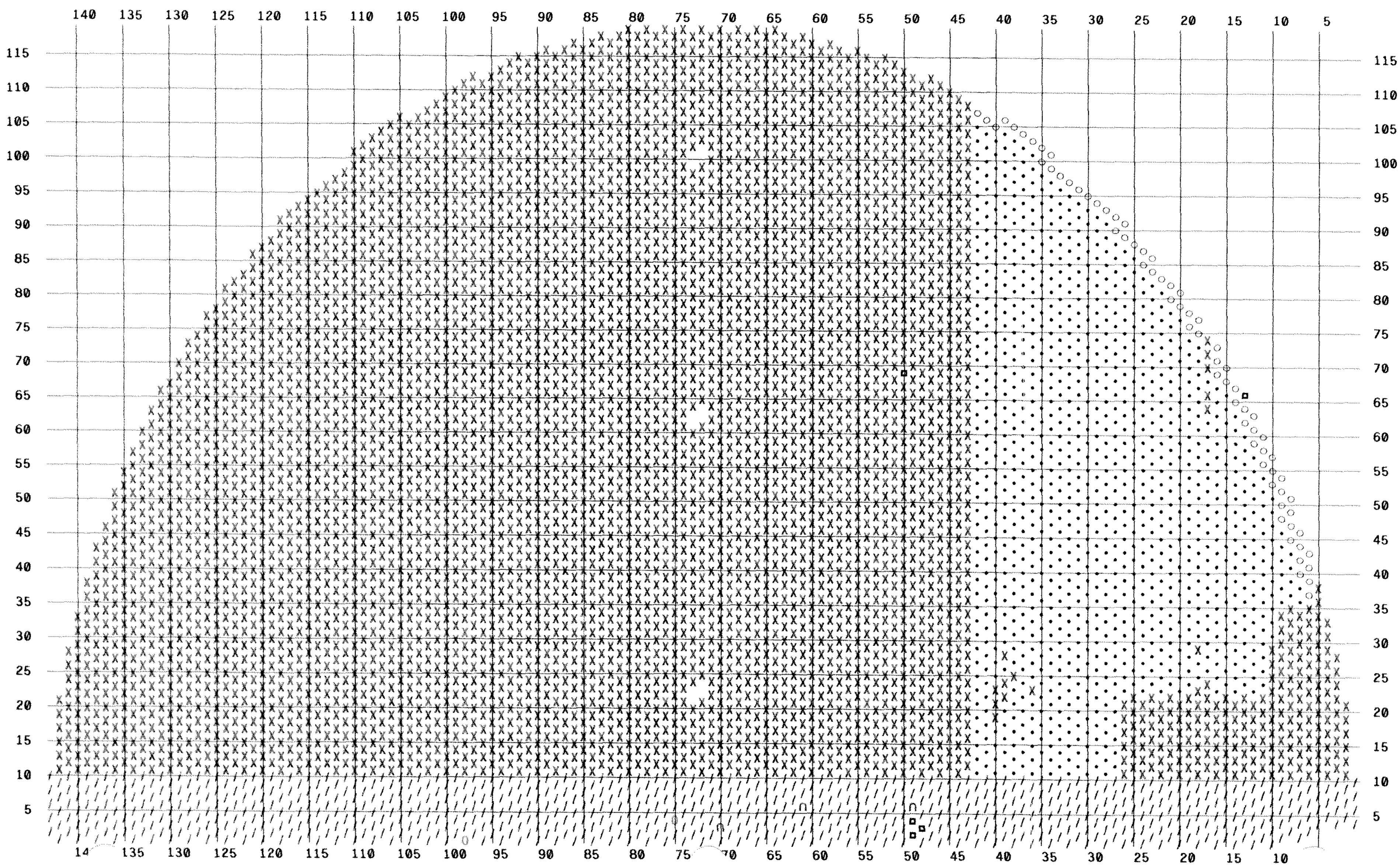
X 4733 TESTED TEH THROUGH TEC

O 2 TESTED F10 THROUGH TEC

/ 698 TESTED 09C THROUGH TEC

▫ 5 PLUGGED TUBE

∩ 3 TESTED 09H THROUGH TEC

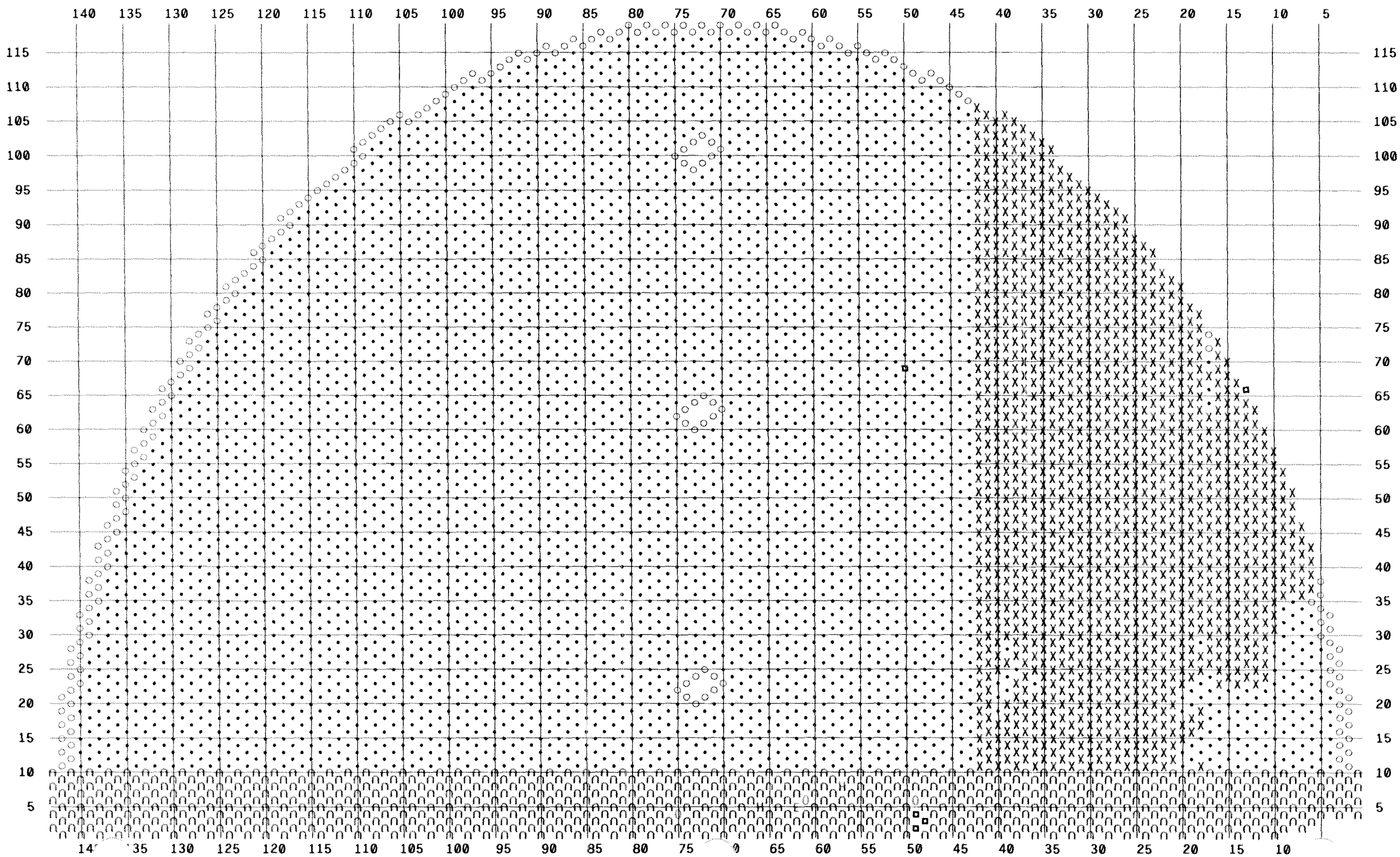


SG-1C BOBBIN INSPECTION PROGRAM

AS TESTED FROM THE HOT LEG

Braidwood A1R12 CCE 7720

X	1235 TESTED TEC THROUGH TEH		H	2 TESTED 08C THROUGH TEH
∩	697 TESTED 09C THROUGH TEH		E	1 TESTED 05C THROUGH TEH
O	3 TESTED F10 THROUGH TEH		◘	5 PLUGGED TUBE



Westinghouse Electric Company LLC - ST Max 04/27/2006 18:23:12

… BOBBIN INSPECTION PROGRAM

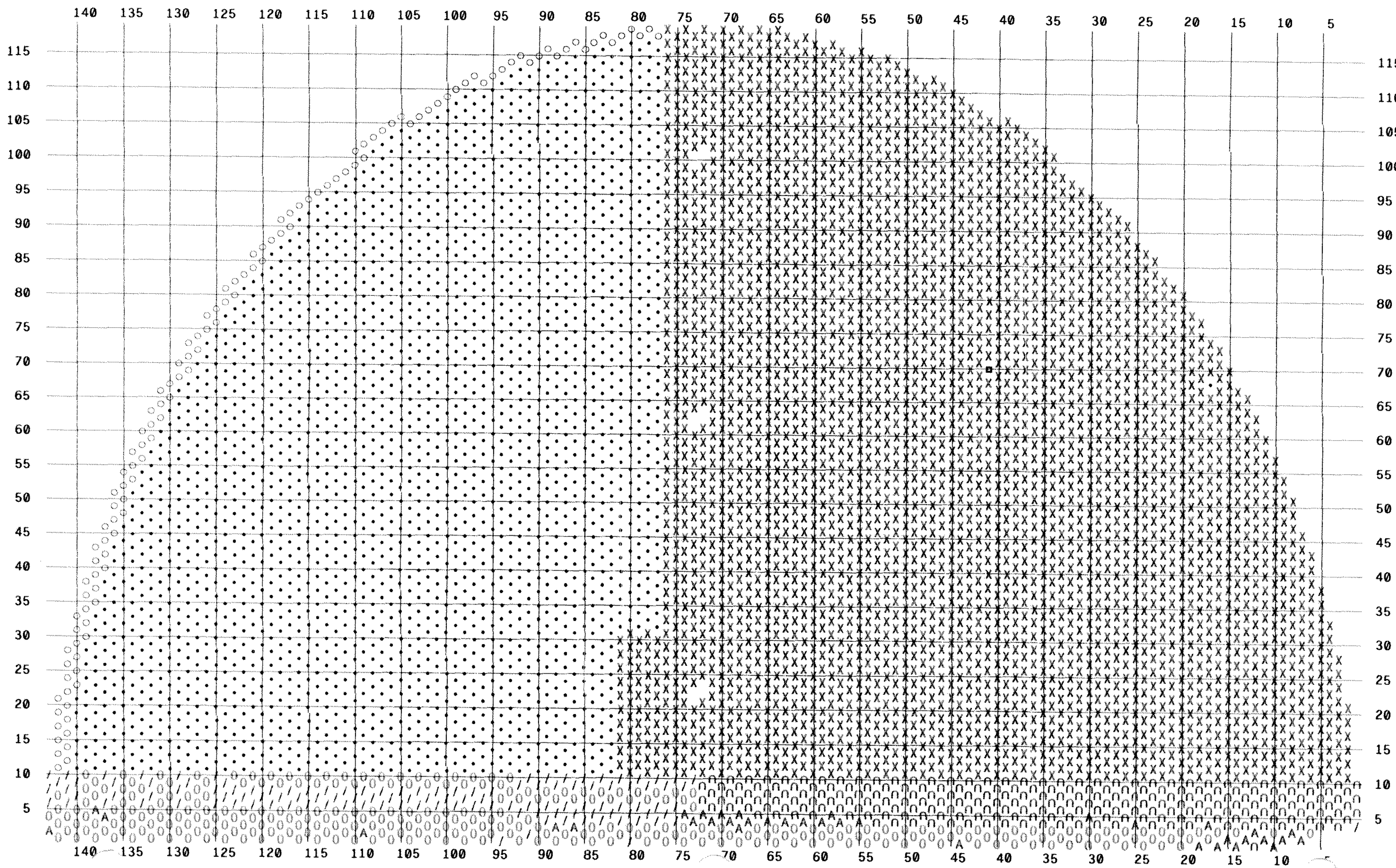
AS TESTED FROM THE COLD LEG

Braidwood A1R12 CCE 7720

X 3256 TESTED TEH THROUGH TEC / 121 TESTED 09C THROUGH TEC

O 312 TESTED F10 THROUGH TEC A 37 TESTED F01 THROUGH TEC

∩ 236 TESTED 09H THROUGH TEC ◘ 1 PLUGGED TUBE



Westinghouse Electric Company LLC - ST Max 04/28/2006 13:50:30

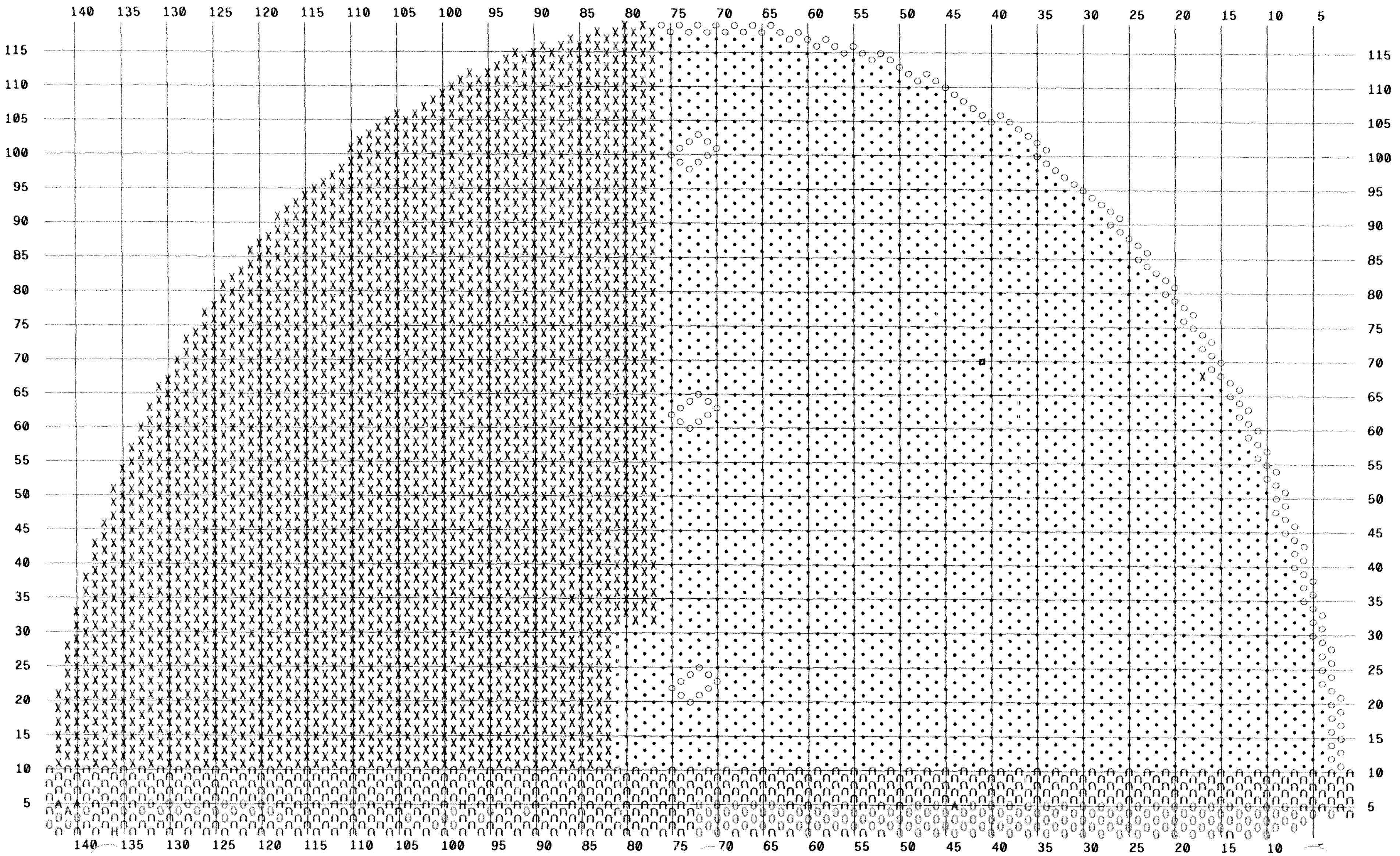
SG 1D BOBBIN INSPECTION PROGRAM

AS TESTED FROM THE HOT LEG
Braidwood A1R12 CCE 7720

X 2670 TESTED TEC THROUGH TEH   A 4 TESTED F01 THROUGH TEH

∩ 519 TESTED 09C THROUGH TEH   H 2 TESTED 08C THROUGH TEH

O 181 TESTED F10 THROUGH TEH   ◘ 1 PLUGGED TUBE



Attachment B.2

As-tested +Point™ Top of Tubesheet Inspection Maps
A1R12

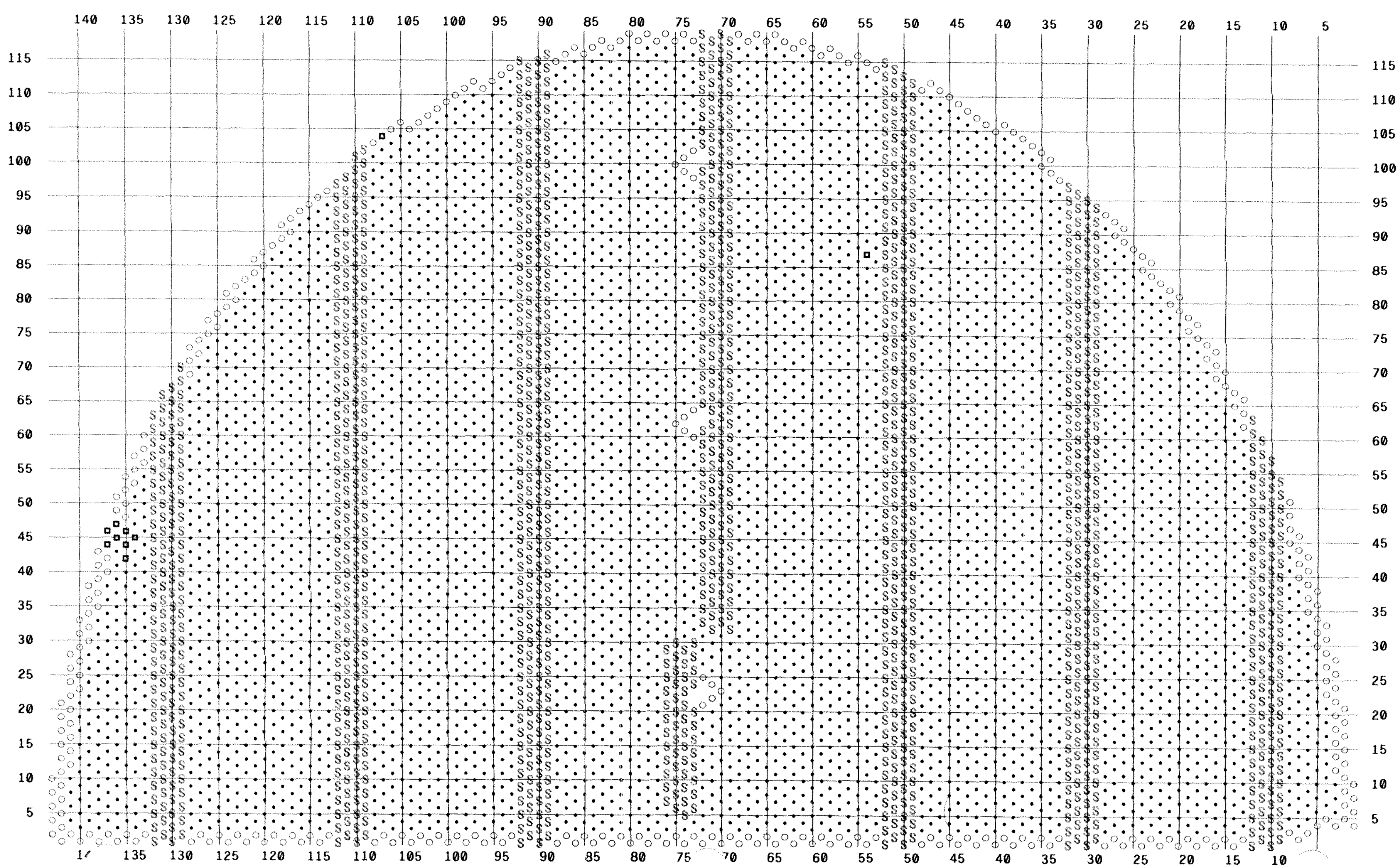
SG-1A HOT LEG TOP OF TUBESHEET +POINT INSPECTION PROGRAM

AS TESTED

Braidwood A1R12 CCE 7720

S 1327 TESTED TSH -/+ 3 INCHES

□ 10 PLUGGED TUBE



Westinghouse Electric Company LLC - ST Max 04/27/2006 18:19:40

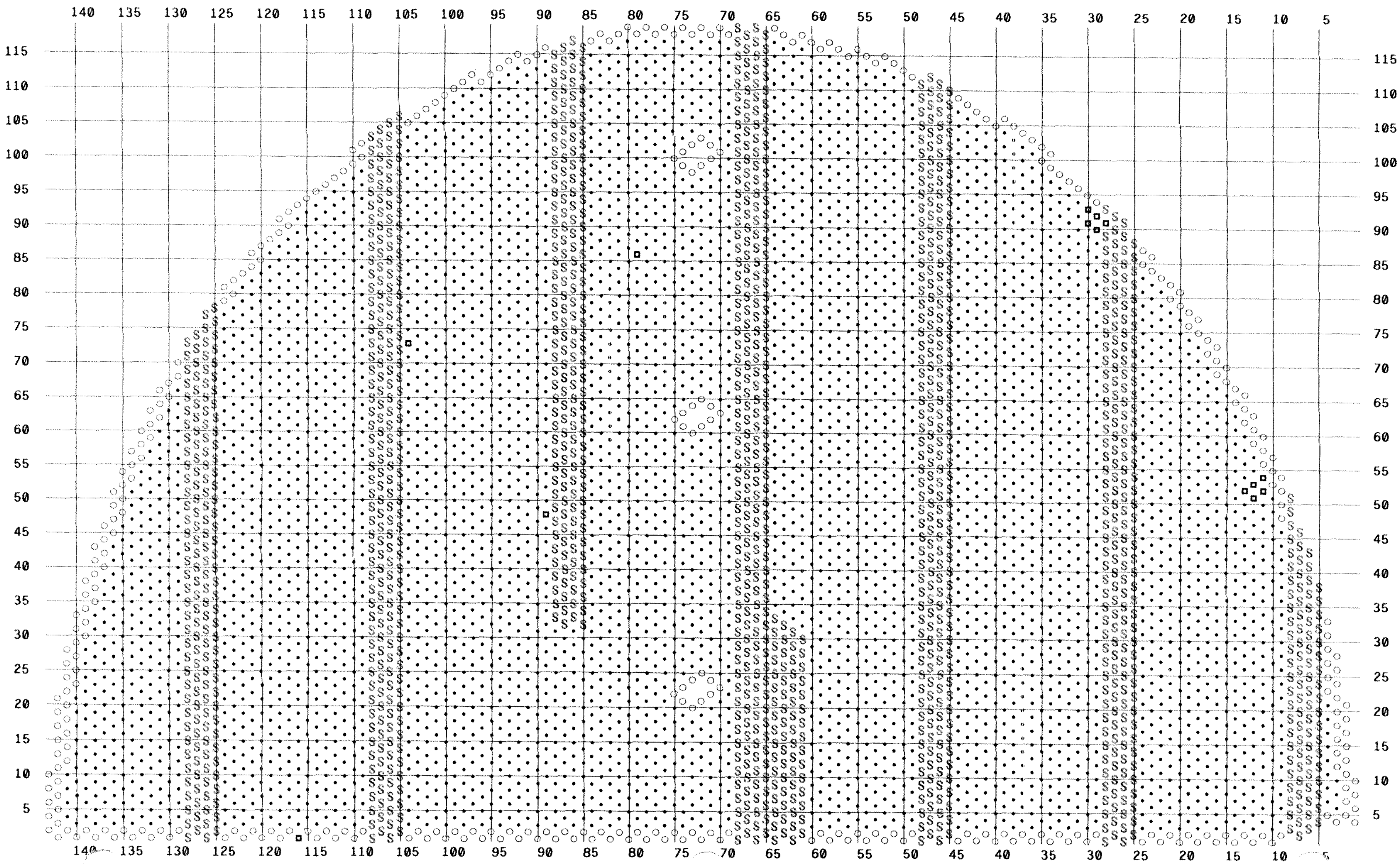
HOT LEG TOP OF TUBESHEET +POINT INSPECTION PROGRAM

AS TESTED

Braidwood A1R12 CCE 7720

S 1327 TESTED TSH -/+ 3 INCHES

▫ 14 PLUGGED TUBE



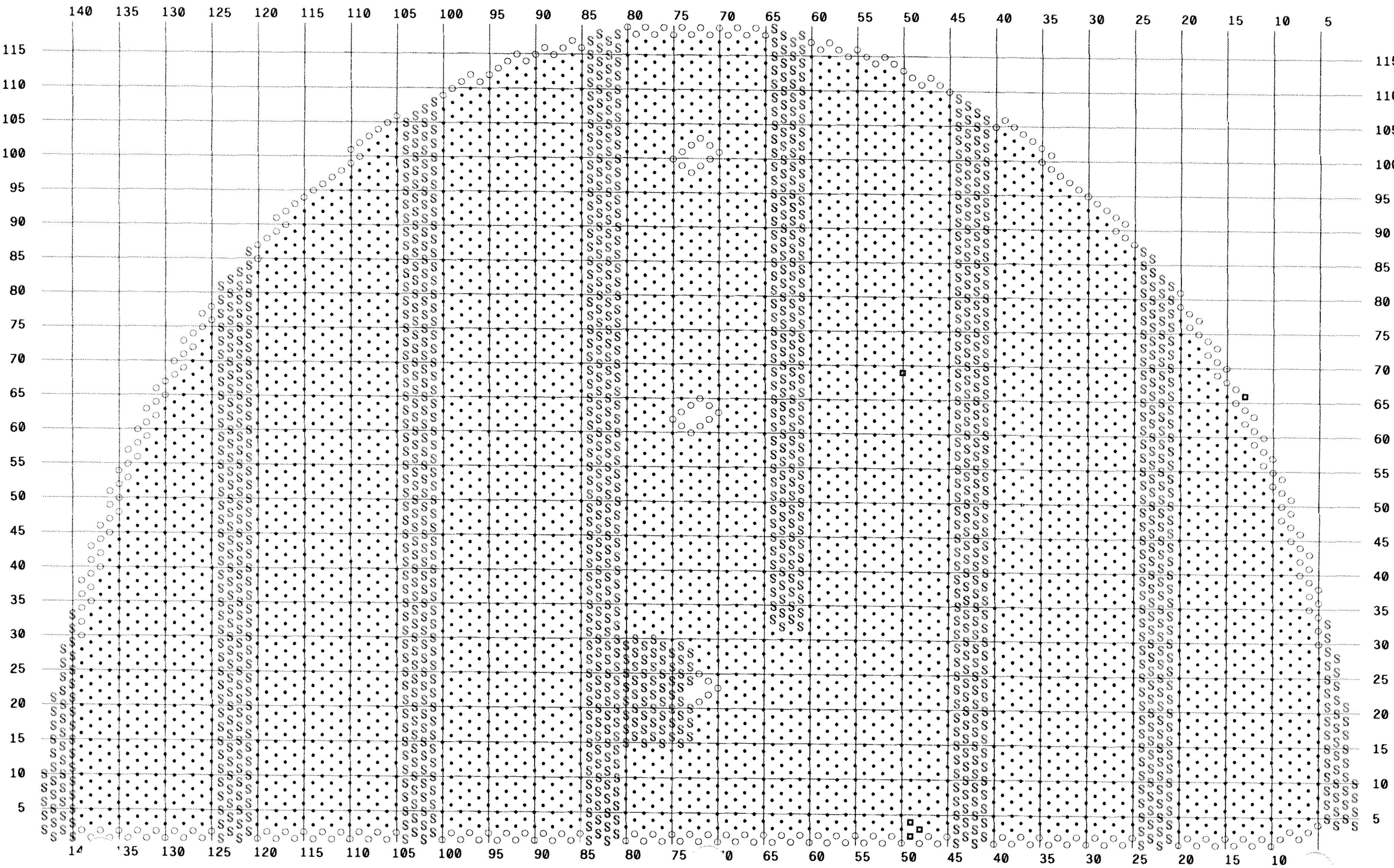
SG-1C HOT LEG TOP OF TUBESHEET +POINT INSPECTION PROGRAM

AS TESTED

Braidwood A1R12 CCE 7720

S 1327 TESTED TSH -/+ 3 INCHES

□ 5 PLUGGED TUBE



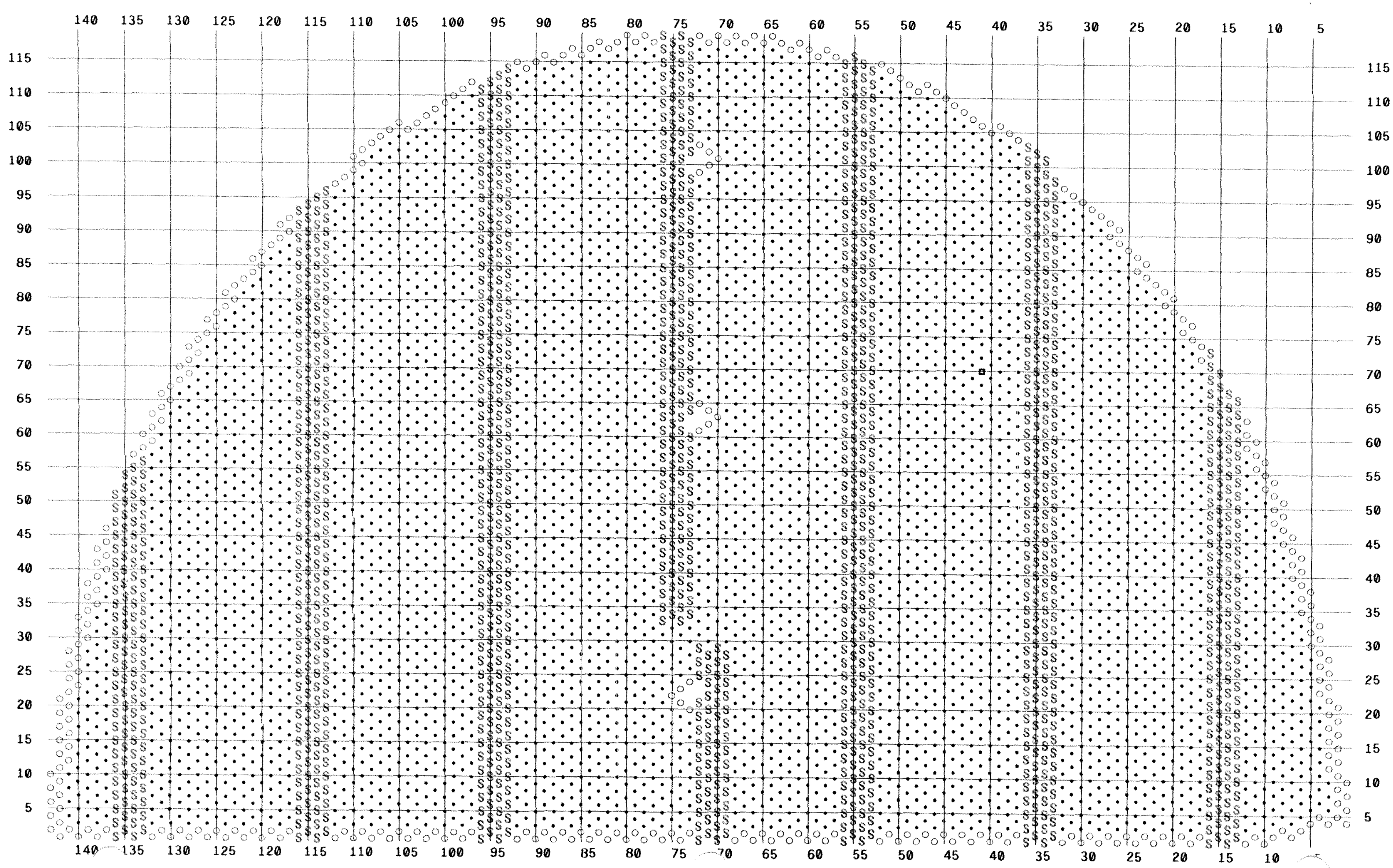
... HOT LEG TOP OF TUBESHEET +POINT INSPECTION PROGRAM

AS TESTED

Braidwood A1R12 CCE 7720

S 1327 TESTED TSH -/+ 3 INCHES

□ 1 PLUGGED TUBE



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