Tennessee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609-2000

July 25, 2003

10 CFR 50.55a(a)(3)(i)

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop: OWFN P1-35
Washington, D.C. 20555-0001

Gentlemen:

In the Matter of	)	Docket Nos. 50-260
Tennessee Valley Authority	)	50-296

BROWNS FERRY NUCLEAR PLANT (BFN) - UNITS 2, AND 3 - AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) SECTION XI, INSERVICE INSPECTION (ISI) PROGRAM - REQUESTS FOR RELIEF 2-ISI-22, AND 3-ISI-18 FOR EXAMINATION OF REACTOR PRESSURE VESSEL (RPV) NOZZLE-TO-VESSEL SHELL WELDS AND NOZZLE BLEND RADII

In accordance with 10 CFR 50.55a(a)(3)(i), TVA is requesting relief from certain inservice inspection (ISI) requirements in Section XI of the ASME Section XI Code, for the volumetric examination of Class 1, reactor pressure vessel (RPV) nozzle-to-vessel welds and nozzle inner radius sections. The enclosure to this letter contains BFN Units 2 and 3 requests for relief 2-ISI-22, and 3-ISI-18 for NRC review and approval.

The justification for TVA's requests for relief is the technical basis described in the Boiling Water Reactor Vessel Internals Project (BWRVIP) technical report BWRVIP-108, "BWR Vessel and Internals Project, Technical Basis for the Reduction of Inspection Requirements for the Boiling Water Reactor Nozzle-To-Vessel Shell Welds and Nozzle Blend Radii." The BWRVIP-108 report concludes that nondestructive examination frequency for RPV nozzle-to-shell welds and nozzle blend radii may be reduced

A047

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from 100 percent each 10-year inspection interval to 25 percent of the nozzles for each nozzle type (e.g., 1 of 4 main steam nozzles, each 10-year interval). It should be noted that the term "blend radii" is a generic term used in the BWRVIP-108 report which is synonymous with the RPV nozzle "inner radius."

The 25 percent examination sampling size was selected by the BWRVIP and justified by a probabilistic fracture mechanics evaluation (Section 5 of BWRVIP-108) considering the following criteria: (1) sample size large enough to effectively identify aging degradation, (2) sample size consistent with current industry requirements, and (3) examination sampling size reduction sufficient to result in significant cost savings and radiological dose reduction.

Enclosure 1 of this letter contains BFN Unit 2 request for relief 2-ISI-22 for NRC review and approval. BFN Unit 3 request for relief 3-ISI-18 is provided in Enclosure 2.

TVA requests approval of these requests for relief by January 16, 2004, to support resource planning for the Unit 3, Cycle 11 (Spring 2004) refueling outage.

There are no new regulatory commitments in this letter. If you have any questions, please contact me at (256) 729-2636.

Sincerely,

T. E. Abney
Manager of Licensing
and Industry Affairs

cc: See Page 3

Enclosures
cc (Enclosures):
(Via NRC Electronic Distribution)

Mr. Stephen J. Cahill, Branch Chief
U.S. Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW, Suite 23T85
Atlanta, Georgia 30303-8931

NRC Resident Inspector
Browns Ferry Nuclear Plant
10833 Shaw Road
Athens, Alabama 35611-6970

Mr. Kahtan N. Jabbour, Senior Project Manager
U.S. Nuclear Regulatory Commission
One White Flint, North
(MS 08G9)
11555 Rockville Pike
Rockville, Maryland 20852-2739

ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNIT 2
AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) SECTION XI,
INSERVICE INSPECTION (ISI) PROGRAM
(THIRD TEN-YEAR INSPECTION INTERVAL)

REQUEST FOR RELIEF 2-ISI-22

(See Attached)

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNIT 2
AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) SECTION XI, INSERVICE INSPECTION (ISI) PROGRAM
(THIRD TEN-YEAR INSPECTION INTERVAL)

REQUEST FOR RELIEF 2-ISI-22

Executive Summary: In accordance with 10 CFR 50.55a(a)(3)(i), TVA is requesting relief from inservice inspection requirements of the 1995 Edition, 1996 Addenda, Section XI of the ASME Boiler and Pressure Vessel Code for the volumetric examination of Class 1, reactor pressure vessel (RPV) nozzle-to-vessel welds and inner radius sections. The examination requirement is for a volumetric examination of 100 percent of the ASME Section XI, Examination Category B-D, "Full Penetration Welded Nozzles in Vessels," Item No. B3.90, "Reactor Vessel Nozzle to Vessel Welds, and Item No. B3.100, "Reactor Vessel Nozzle Inner Radius Section" each inspection interval.

This request for relief applies to the BFN Unit 2 Reactor Pressure Vessel and RPV Head nozzles, with the exception of the six (N4) feedwater nozzles. The six feedwater nozzle-to-vessel welds and inner radius sections will continue to be examined with ultrasonic examination (UT) techniques in accordance with ASME Code, Section XI, Appendix VIII and the Performance Demonstration Initiative (PDI) Program.

TVA proposes to utilize the technical basis contained in the Boiling Water Reactor Vessel Internals Project (BWRVIP) Report, BWRVIP-108, "BWR Vessel and Internals Project Technical Basis for the Reduction of Inspection Requirements for the Boiling Water Reactor Nozzle-to-Vessel Shell Welds and Nozzle Blend Radii." This report provides the technical basis for the reduction of the nozzle-to-shell welds and nozzle blend radii from 100 percent to 25 percent of the nozzles each 10-year interval.

The 25 percent coverage refers to 25 percent of the nozzles for each nozzle type (e.g., 1 of 4 main steam nozzles would be inspected).

TVA is also proposing an alternate examination for the nozzle blend radii (i.e., inner radius). For the reactor pressure vessel nozzles inner radius section, TVA will perform an enhanced remote visual (VT-1) examination, capable of a 1-mil wire resolution, and on the RPV head nozzles perform an enhanced direct visual (VT-1) examination, capable of a 1-mil wire resolution, in accordance with ASME Section XI, VT-1 requirements. This change from volumetric (UT) to enhanced visual (VT-1) was submitted as two separate requests for relief, 2-ISI-16 and 2-ISI-17 to NRC by letters dated April 23, and September 5, 2002, and approved by NRC letter dated October 7, 2002.

TVA is requesting that the reduction from 100 percent to 25 percent of the nozzles each 10-year inspection interval in this request for relief apply to the above aforementioned requests for relief, for the enhanced remote or direct visual (VT-1) examination, capable of a 1-mil wire resolution, in accordance with ASME Section XI, VT-1 requirements.

TVA considers the above proposed alternative examinations will provide an acceptable level of quality and safety. The proposed alternatives will also provide a significant savings in examination resources and radiation exposure.

The examinations will be performed with personnel, procedures, and equipment qualified in accordance with the ASME Section XI Code, 1995 Edition, 1996 Addenda, Appendix VIII and the Performance Demonstration Initiative (PDI) Program requirements.

Unit: Two (2)

ISI Interval: ASME Section XI, Third Ten-Year ISI Interval (May 25, 2001 to May 24, 2011)

System(s) Components: Reactor Pressure Vessel (RPV), Nozzle-to-Vessel Welds and RPV Nozzle Inner Radius Sections:

Reactor Recirculation Outlet Nozzles, N1A and N1B (Total of 2 nozzles)

Reactor Recirculation Inlet Nozzles, N2A, N2B, N2C, N2D, N2E, N2F, N2G, N2H, N2J, and N2K (Total of 10 nozzles)

Main Steam Nozzles, N3A, N3B, N3C, and N3D (Total of 4 nozzles)

Core Spray Nozzles, N5A and N5B (Total of 2 nozzles)

Reactor Pressure Vessel(RPV)Head Nozzles, N6A, N6B, and N7 (Total of 3 nozzles)

Jet Pump Instrumentation Nozzles, N8A and N8B (Total of 2 nozzles)

Control Rod Drive Return Line Nozzle, (capped) N9 (Total of 1 nozzle)

Standby Liquid Control Nozzle, N10 (Total of 1 nozzle)

ASME Code Class: ASME Code Class 1

ASME Section XI Code Edition: 1995 Edition, 1996 Addenda

Code Table: IWB-2500-1

Examination Category: B-D, "Full Penetration Welded Nozzles In Vessels"

Examination Item Number(s): B3.90, "Nozzle-To-Vessel Welds", and B3.100, "Nozzle Inner Radius Sections,"

Code Requirement: The 1995 Edition, 1996 Addenda, ASME Section XI, Table IWB-2500-1, Examination Category B-D, Item No. B3.90 and Item No. B3.100, requires a volumetric examination of 100 percent of the reactor pressure vessel (RPV) nozzle-to-shell welds and nozzle inner radius section each inspection interval.

Code Requirements From Which Relief Is Requested:

The 1995 Edition, 1996 Addenda, ASME Section XI, Table IWB-2500-1, Examination Category B-D, Item No. B3.90 and Item No. B3.100, requires a volumetric examination of 100 percent each inspection interval of the reactor pressure vessel (RPV) nozzle-to-shell welds and nozzle inner radius section.

Relief is requested from the requirement to perform a volumetric examination of 100 percent of the reactor pressure vessel (RPV) nozzle-to-shell welds and nozzle inner radius section each inspection interval.

List Of Items Associated With The Relief Request:

Reactor Pressure Vessel Nozzles, N1A, N1B, N2A, N2B, N2C, N2D, N2E, N2F, N2G, N2H, N2J, N2K, N3A, N3B, N3C, N3D, N5A, N5B, N6A, N6B, N7, N8A, N8B, N9 (capped), and N10 (Total of 25 nozzles)

Note: The six feedwater nozzle-to-vessel welds and inner radius sections will continue to be examined with ultrasonic examination (UT) techniques in accordance with ASME Code, Section XI, Appendix VIII and the Performance Demonstration Initiative (PDI) Program.

Basis For Relief Request:

Pursuant to 10 CFR 50.55a(a)(3)(i) TVA is requesting relief from ASME Section XI requirements to perform the volumetric examination described above.

TVA proposes to utilize the technical basis contained in the Boiling Water Reactor Vessel Internals Project (BWRVIP) Report, BWRVIP-108, "BWR Vessel and Internals Project Technical Basis for the Reduction of Inspection Requirements for the Boiling Water Reactor Nozzle-to-Vessel Shell Welds and Nozzle Blend Radii." This report provides the technical basis for the reduction of the nozzle-to-shell welds and nozzle blend radii from 100 percent to 25 percent of the nozzles each 10-year inspection interval. The 25 percent coverage

refers to 25 percent of the nozzles for each nozzle type (e.g., 1 of 4 main steam nozzles would be inspected). This report was submitted by the Boiling Water Reactor Vessel Internals Project (BWRVIP) Committee to the NRC by letter dated November 25, 2002.

As stated in the above report, the 25 percent inspection sampling level was selected, in part, because it was considered to be sufficient to effectively identify aging degradation in the nozzle-to-shell welds and nozzle blend radii. It is consistent with current industry and regulatory sampling practice, and there is significant dose reduction and cost savings.

The determination of whether the 25 percent inspection sampling is sufficient is the object of the Probabilistic Failure Mechanics (PFM) evaluation. The PFM evaluation shows very low probability of failure, and the 25 percent inspection sampling is considered sufficient to identify aging degradation.

The 25 percent sampling level is similar to industry practice and, in some cases, exceeds current practice. For example:

- The ASME Code Section XI, IWB-2500 requires 25 percent of Category B-J (Item No. B9.11) circumferential welds be inspected each inspection interval.

- The ASME Code Case N-560, (Risk Informed Inspection) requires inspection of 10 percent of higher risk Class I Category B-J piping welds.

- The ASME Code Case N-578, (Risk Informed Inspection) requires inspection of at least 25 percent of the highest risk, (Risk Category 1, 2, and 3) and at least

- 10 percent of the next highest risk, (Risk Category 4 or 5) Class I piping welds.

- The ASME Code Section XI, IWC-2500 (Class II piping) Category C-F-1 and C-F-2 requires inspection of 7.5 percent of welds.

- Generic Letter 88-01 requires 25 percent inspection of Category A piping welds.

The 25 percent sampling also provides a significant cost savings and reduces worker dose exposure. Several utilities have estimated that the proposed reduction of inspection requirements would result in a savings of up to $750,000 per 10-year inspection interval, not including exposure considerations. The dose savings for BFN Unit 2 would be approximately 6.5 to 7 REM over a ten-year interval.

For the reactor pressure vessel nozzles inner radius section, TVA will perform an enhanced remote visual (VT-1) examination, capable of a 1-mil wire resolution, and on the RPV head nozzles perform an enhanced direct visual (VT-1) examination, capable of a 1-mil wire resolution, in accordance with ASME Section XI, VT-1 requirements. The change from volumetric (UT) to enhanced visual (VT-1) was submitted as two separate requests for relief, 2-ISI-16 and 2-ISI-17 to NRC by letters April 23, and September 5, 2002, and approved by NRC letter dated October 7, 2002.

TVA considers the above proposed alternative examinations will provide an acceptable level of quality and safety. The proposed alternatives will also provide a significant savings in examination resources and radiation exposure.

In the first Unit 2 inspection interval 30 reactor pressure vessel nozzle-to-shell welds and inner radius sections received a volumetric examination. In the second Unit 2 inspection interval, 31 of the 31 reactor pressure vessel nozzle-to-shell welds and 30 inner radius sections received a volumetric examination. The results were acceptable. In the third Unit 2 inspection interval,

6 of the 31 reactor pressure vessel nozzle-to-shell welds and inner radius sections have received a volumetric examination. The examination results were all acceptable.

Also, in the third Unit 2 inspection interval, seven (7) of the 31 reactor pressure vessel nozzle-to-shell welds received a volumetric examination. The inner radius sections of these nozzles received an enhanced visual (EVT-1) examination from the vessel ID. The examination results were acceptable.

Alternate Examination:

In accordance with 10 CFR 50.55a(a)(3)(i) TVA will perform the following alternate examinations:

TVA will perform the following. TVA proposes to utilize the technical basis contained in the Boiling Water Reactor Vessel Internals Project (BWRVIP) Report, BWRVIP-108, "BWR Vessel and Internals Project Technical Basis for the Reduction of Inspection Requirements for the Boiling Water Reactor Nozzle-to-Vessel Shell Welds and Nozzle Blend Radii." This report provides the technical basis for the reduction of the nozzle-to-shell welds and nozzle blend radii from 100 percent to 25 percent of the nozzles each 10-year inspection interval. The 25 percent coverage refers to 25 percent of the nozzles for each nozzle type (e.g., 1 of 4 main steam nozzles would be inspected).

For the reactor pressure vessel nozzles inner radius section, TVA will perform an enhanced remote visual (VT-1) examination, capable of a 1-mil wire resolution, and on the RPV head nozzles perform an enhanced direct visual (VT-1) examination, capable of a 1-mil wire resolution, in accordance with ASME Section XI, VT-1 requirements. This was submitted as two separate requests for relief, 2-ISI-16 and 2-ISI-17 to NRC by letters dated April 23, and September 5, 2002, and approved by NRC letter dated October 07, 2002.

In summary, TVA's proposed alternative examinations are as follows. Perform examination of 25 percent each inspection interval in lieu of 100 percent, of the ASME Section XI, Examination Category B-D, "Full Penetration Welded Nozzles in Vessels," Item No. B3.90, "Reactor Vessel Nozzle to Vessel Welds and an enhanced remote or direct visual (VT-1) examination capable of a 1-mil wire resolution in accordance with ASME Section XI, VT-1 of Item No. B3.100, "Reactor Vessel Nozzle Inner Radius Section." (Reference request for relief 2-ISI-16 and 2-ISI-17)

The following nozzles will be examined: N1 (1), N2 (3), N3 (1), N5 (1), N6 (1), N7 (1), N8 (1), N9 (1), and N10 (1) (Total of 11 nozzles in ten years).

The examinations will be performed with personnel, procedures, and equipment qualified in accordance with the ASME Section XI Code, 1995 Edition, 1996 Addenda, Appendix VIII and the Performance Demonstration Initiative (PDI) Program requirements.

Justification For The Granting Of Relief:

The BFN Unit 2 RPV nozzles were nondestructively examined during fabrication and have previously been examined using inservice ultrasonic techniques specific to the nozzle configuration.

No indication of fabrication defects or service related cracking has been detected by these examinations. See Attachment B for RPV nozzle and inner radius section listing and UT examinations and coverage for Unit 2 first, second, and third ISI inspection interval.

In the first Unit 2 inspection interval 30 reactor pressure vessel nozzle-to-shell welds and inner radius sections received a volumetric examination. In the second Unit 2 inspection interval, 31 of 31 reactor pressure vessel nozzle-to-shell welds and 30 inner radius sections received a volumetric examination. The examination results were acceptable.

In the third Unit 2 inspection interval, 6 of the 31 reactor pressure vessel nozzle-to-shell welds and inner radius sections received a volumetric examination. The results of all examinations were acceptable.

Also, in the third Unit 2 inspection interval Seven (7) of the 31 reactor pressure vessel nozzle-to-shell welds received a volumetric examination. The inner radius sections of these nozzles received an enhanced visual (EVT-1) examination from the vessel ID. The examination results were acceptable.

As presented in the BWRVIP-108 report, a significant number of examinations have been performed on units in the BWR fleet that have been operational, for periods up to 30 years, using modern examination techniques capable of detecting significant cracking if it were present. No degradation or failure mechanism has been identified in nozzle-to-vessel or blend radius areas, other than feedwater and CRDM nozzles. An evaluation of reactor pressure vessel reliability was performed. The nozzles considered were the core spray, main steam, recirculation inlet, and outlet nozzles. The analyses were performed using the worst weld chemistry from the BWR vessel fleet. Stresses were conservatively selected. Any cracks were assumed to occur at the highest stressed locations around the nozzle. Both stress corrosion and fatigue crack growth were included in the evaluation.

In summary, based on the selection criteria used in the BWRVIP-108 report, TVA has concluded that the RPV nozzles considered in the BWRVIP-108 analysis are representative of the BFN Units 2 and 3 RPV nozzles. Further, based on the conservatisms used in the analysis: (1) poor water chemistry, (2) stresses selected from limiting azimuth in the nozzle, (3) cracks assumed to occur at the highest stressed locations around the nozzle azimuth and (4) both stress corrosion and fatigue crack growth were included in the evaluation, TVA has determined that the conclusions reached in the BWRVIP-108 report apply to the BFN Units 2 and 3 RPV nozzles. Therefore, TVA requests a reduction in RPV nozzle and nozzle inner radius section

examinations from 100 percent to 25 percent (of each nozzle type) each 10-year inspection interval. The 25 percent examination frequency, as stated in the BWRVIP-108 report, is sufficient to identify any aging degradation of the nozzles.

Implementation Schedule:

This request for relief is applicable to the BFN Unit 2, Third Ten-Year ASME Section XI Inservice Inspection Interval (May 25, 2001 to May 24, 2011).

Attachments:

Attachment A - (8 sketches)

Sketch SK-B2001, Reactor Pressure Vessel Assembly

Sketch SK-B2017, N1, Recirculation Outlet Nozzles

Sketch SK-B2018, N2, Recirculation Inlet Nozzles, N3, Main Steam Nozzles, and N5, Core Spray Nozzles

Sketch SK-B2016, N6, Reactor Head Spray/Instrumentation Nozzle

Sketch SK-B2015, N7, Reactor Head Vent Nozzle

Sketch SK-B2019, N8, Jet Pump Instrumentation Nozzle

Sketch SK-B2020, N9, Control Rod Drive Return Line Nozzle (capped)

Sketch SK-B2022, N10, Differential pressure and Liquid Volume Control Nozzle

Attachment B - Unit 2 RPV Nozzle and Inner Radius Section Examinations

Attachment A

2-ISI-22

EIGHT (8) Sketches

Sketch SK-B2001, Reactor Pressure Vessel Assembly

Sketch SK-B2017, N1, Recirculation Outlet Nozzles

Sketch SK-B2018, N2, Recirculation Inlet Nozzles, N3, Main Steam Nozzles, and N5, Core Spray Nozzles

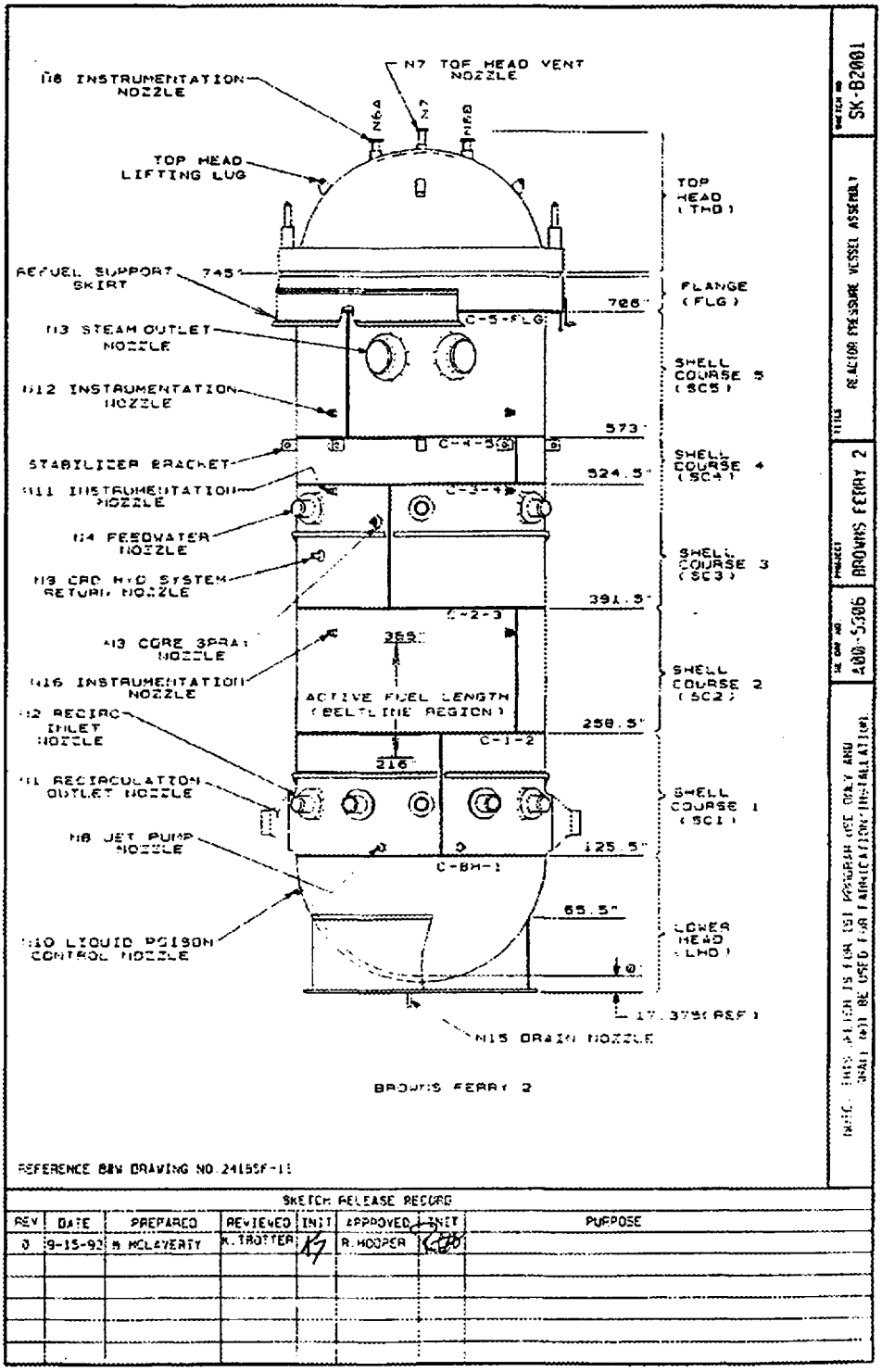
Sketch SK-B2016, N6, Reactor Head Spray/Instrumentation Nozzle

Sketch SK-B2015, N7, Reactor Head Vent Nozzle

Sketch SK-B2019, N8, Jet Pump Instrumentation Nozzle

Sketch SK-B2020, N9, Control Rod Drive Return Line Nozzle (capped)

Sketch SK-B2022, N10, Differential pressure and Liquid Volume Control Nozzle



SKETCH RELEASE RECORD

REV	DATE	PREPARED	REVIEWED	INIT	APPROVED	INIT	PURPOSE
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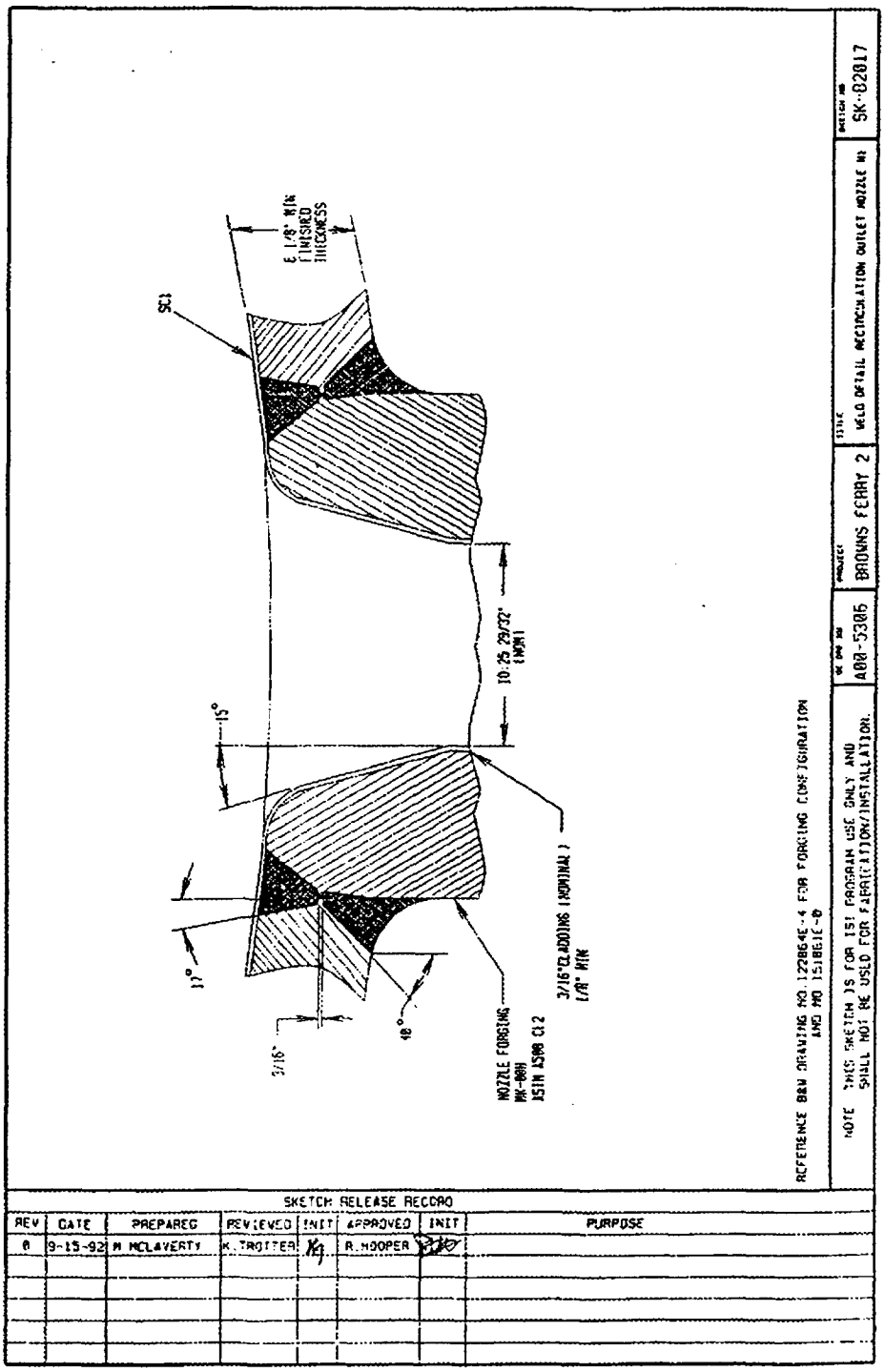
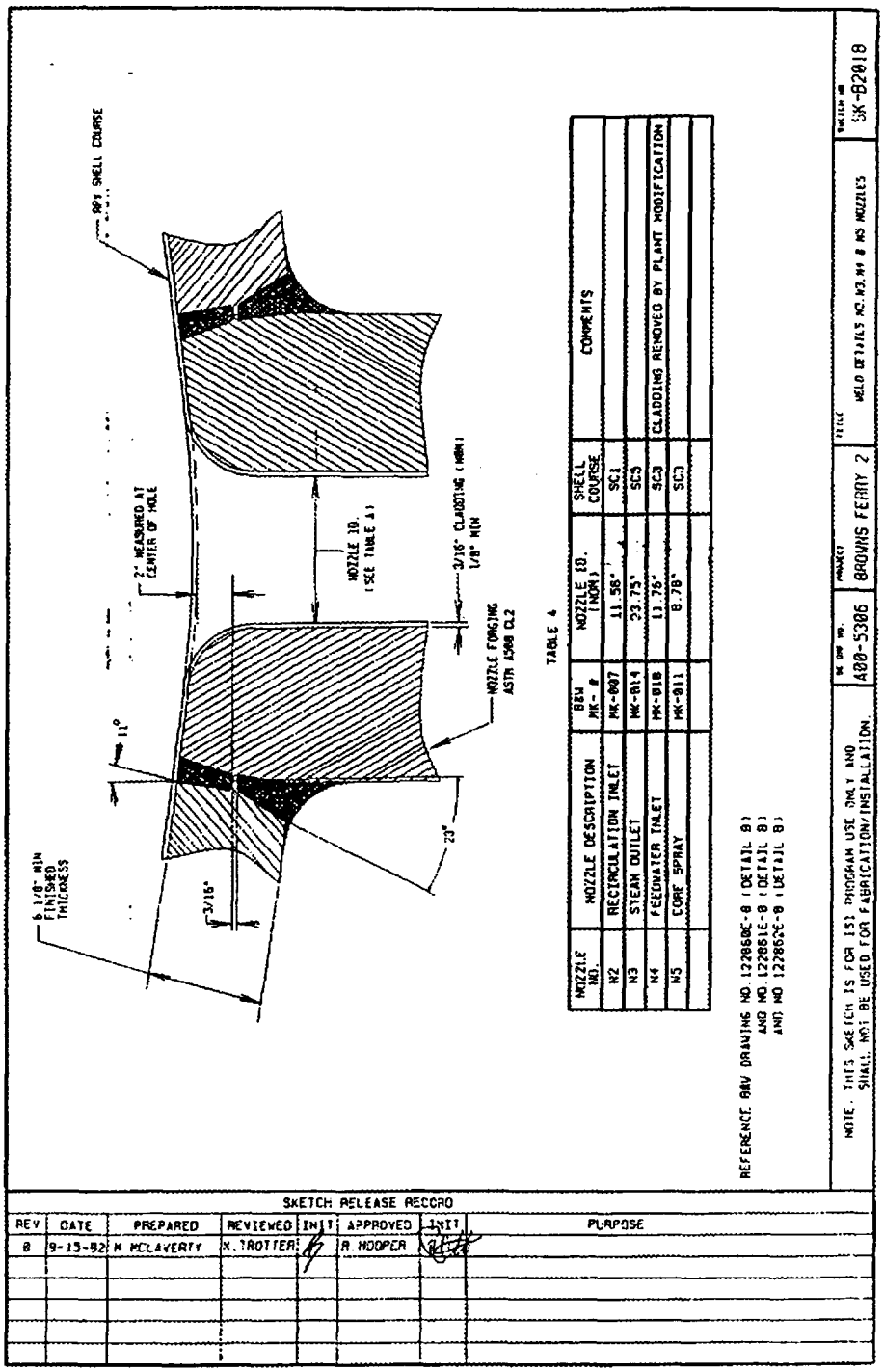
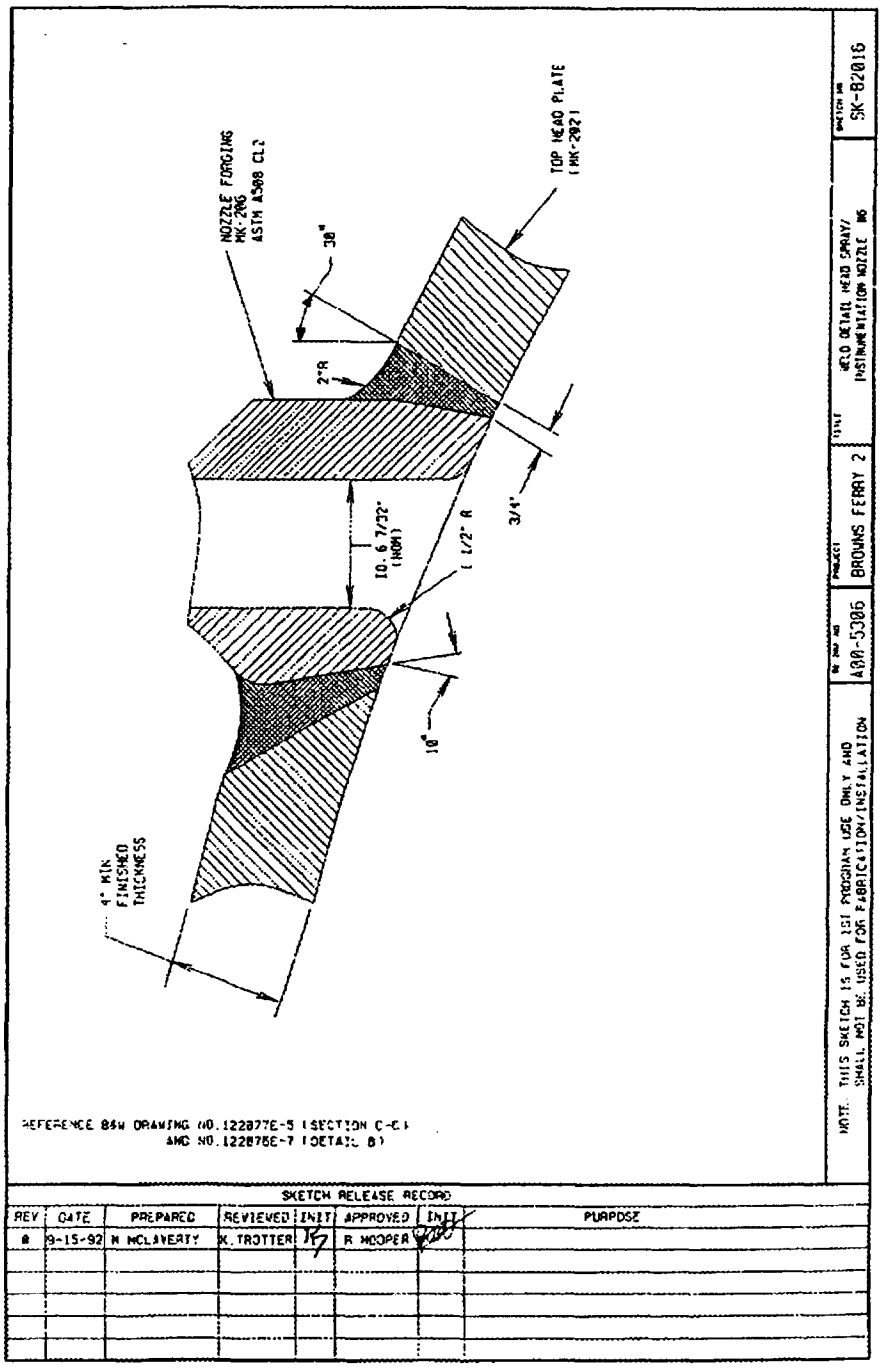
SK-B2001


SK1
E 1/8" MIN FINISHED THICKNESS
15°
17°
3/16"
10°
10:25 29/32" (NOM)
NOZZLE FORGING MK-0000 ASTM A508 CL2
3/16"CLADDING (NOMINAL) 1/8" MIN
REFERENCE B&W DRAWING NO.122864E-4 FOR FORGING CONFIGURATION AND NO 151861E-0
NOTE THIS SKETCH IS FOR ISI PROGRAM USE ONLY AND SHALL NOT BE USED FOR FABRICATION/INSTALLATION.
A00-5305
BROWNS FERRY 2
WELD DETAIL RECIRCULATION OUTLET NOZZLE N1
SK-B2017
SKETCH RELEASE RECORD
REV | DATE | PREPARED | REVIEWED | INIT | APPROVED | INIT | PURPOSE
0 | 9-15-92 | M MCLAVERTY | K.TROTTER | | R.HOOPER | |

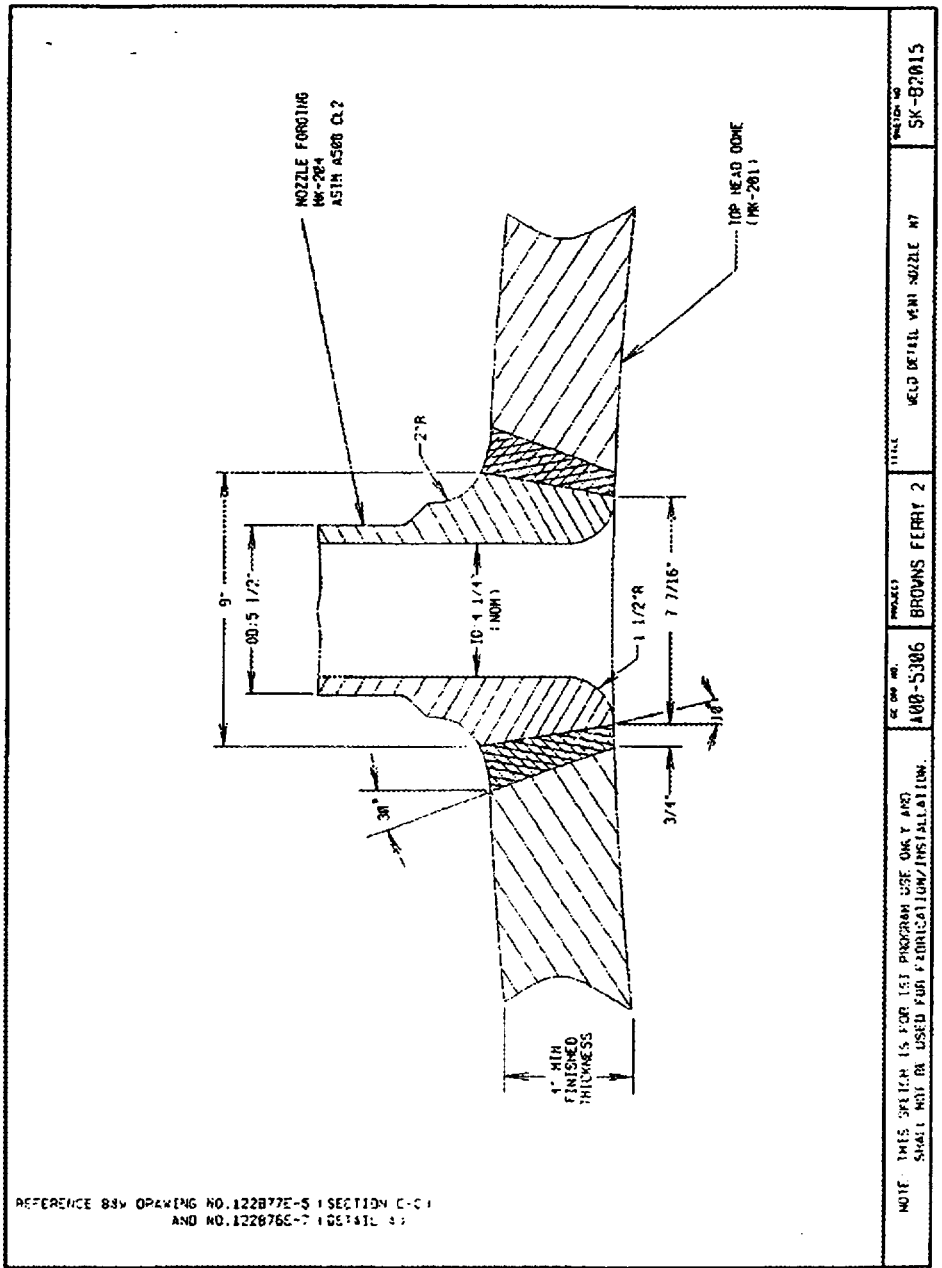
SK-B2017


RPV SHELL COURSE
2" MEASURED AT CENTER OF HOLE
NOZZLE ID. (SEE TABLE 4)
3/16" CLADDING (NOM) 1/8" MIN
NOZZLE FORGING ASTM A508 CL2
11°
23°
3/16"
6 1/8" MIN FINISHED THICKNESS
TABLE 4
NOZZLE NO. | NOZZLE DESCRIPTION | BEW MK- # | NOZZLE ID. (NOM) | SHELL COURSE | COMMENTS
N2 | RECIRCULATION INLET | MK-807 | 11.56" | SC1 |
N3 | STEAM OUTLET | MK-814 | 23.75" | SC3 |
N4 | FEEDWATER INLET | MK-818 | 13.76" | SC3 | CLADDING REMOVED BY PLANT MODIFICATION
N5 | CORE SPRAY | MK-811 | 8.78" | SC3 |
REFERENCE BAV DRAWING NO 122868C-8 (DETAIL 8)
AND NO 122861E-8 (DETAIL 8)
AND NO 122862C-8 (DETAIL 8)
NOTE. THIS SKETCH IS FOR ISI PROGRAM USE ONLY AND SHALL NOT BE USED FOR FABRICATION/INSTALLATION.
A00-5306
BROWNS FERRY 2
WELD DETAILS NZ, N3, N4 & N5 NOZZLES
SK-B2018
SKETCH RELEASE RECORD
REV | DATE | PREPARED | REVIEWED | INIT | APPROVED | INIT | PURPOSE
0 | 9-13-92 | H MCCLAVERTY | K. TROTTER | | R. HOOPER |

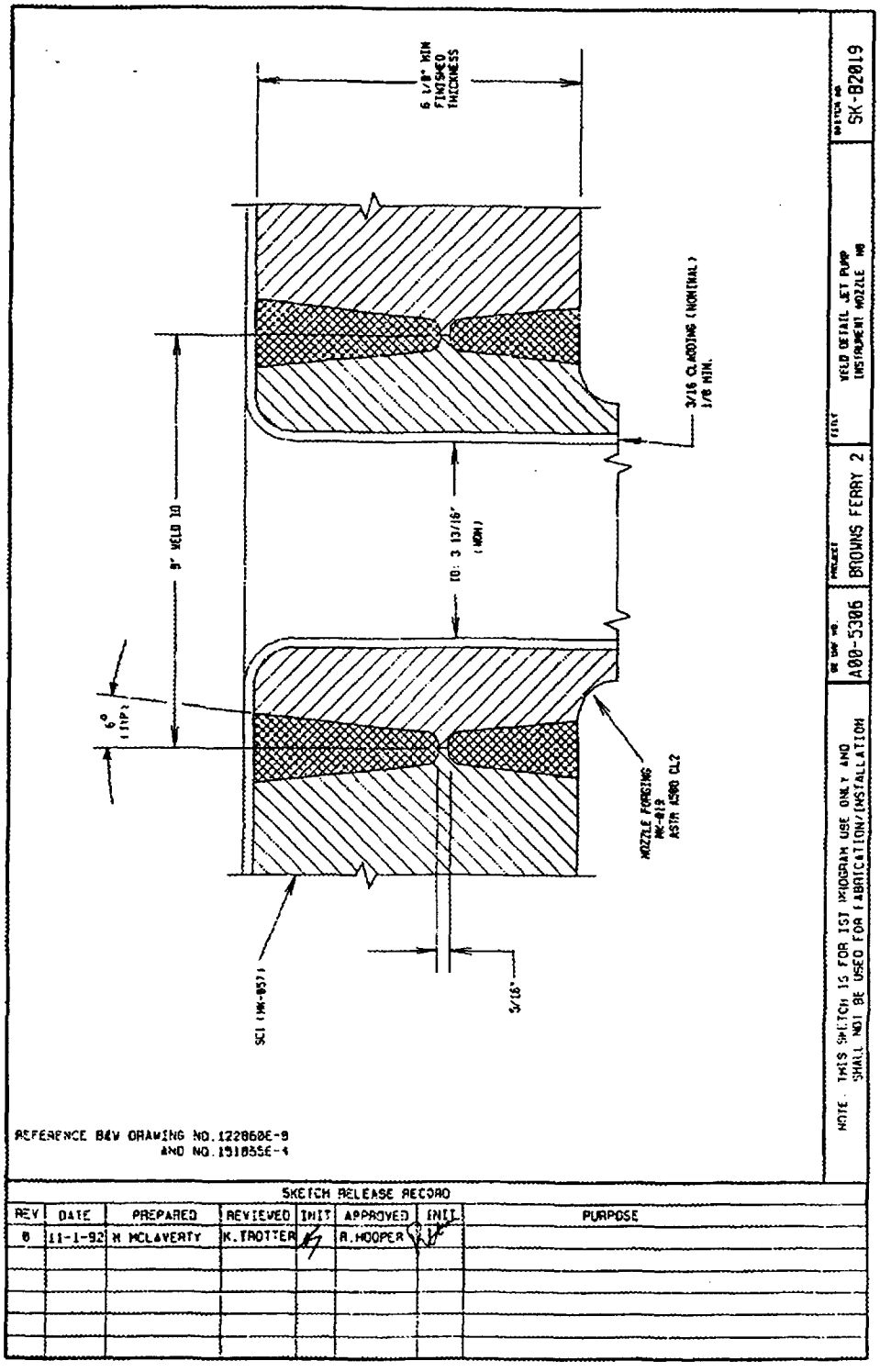
SK-B2018


NOZZLE FORGING
MK-2086
ASTM A508 CL2
TOP HEAD PLATE
(MK-2082)
30°
2"R
3/4"
10.6 7/32"
(NOM)
1 1/2" R
10°
4" MIN
FINISHED
THICKNESS
REFERENCE B&W DRAWING NO.122877E-5 (SECTION C-C)
AND NO.122875E-7 (DETAIL B)
NOTE: THIS SKETCH IS FOR 1ST PROGRAM USE ONLY AND
SHALL NOT BE USED FOR FABRICATION/INSTALLATION
A00-5306
BROWNS FERRY 2
WELD DETAIL HEAD SPRAY/
INSTRUMENTATION NOZZLE
SK-B2016
SKETCH RELEASE RECORD
REV
DATE
PREPARED
REVIEWED
INIT
APPROVED
INIT
PURPOSE
0
9-15-92
M MCLAVERTY
K. TROTTER
R HOOPER

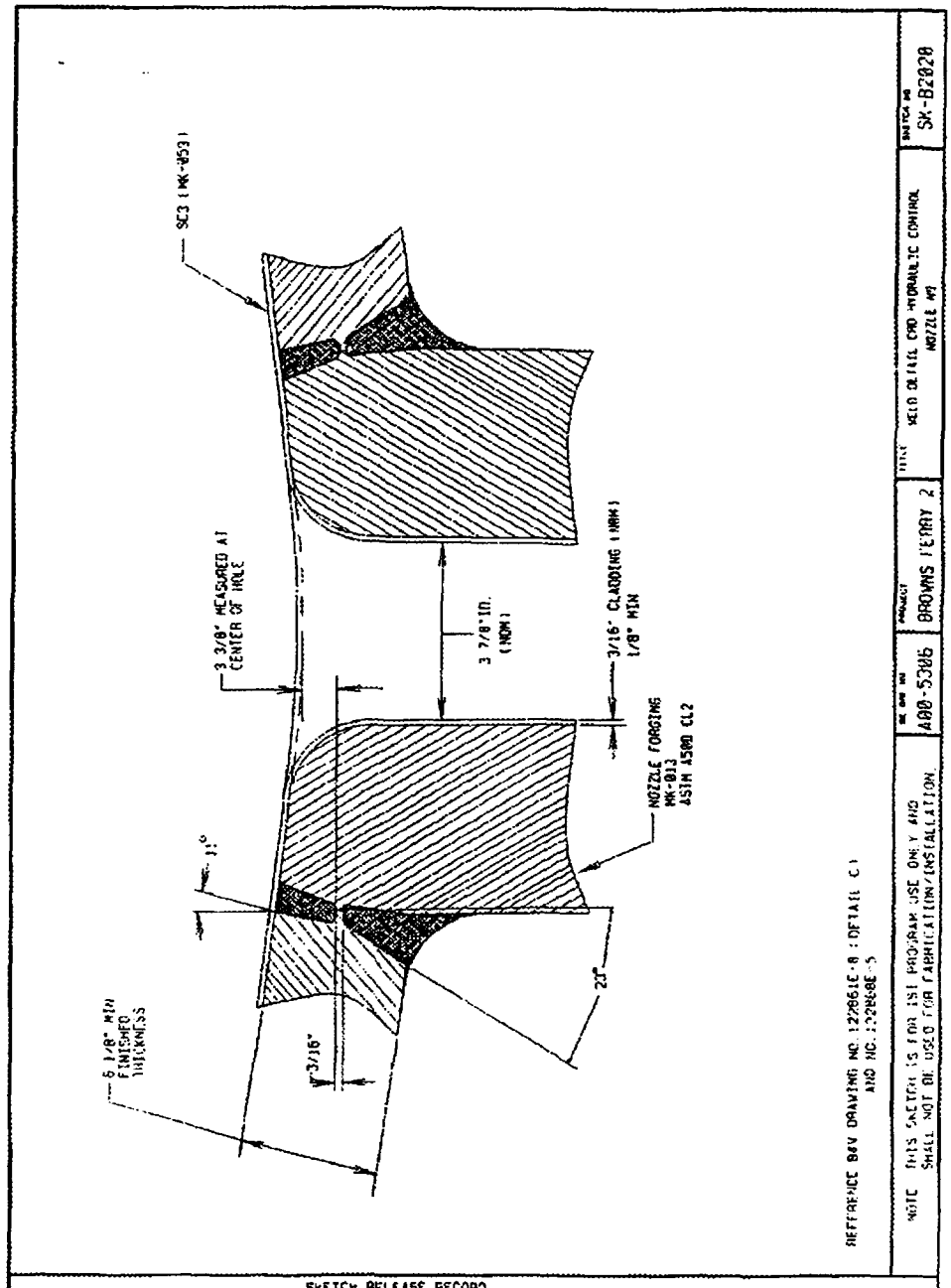
SK-B2016


NOZZLE FORGING
MK-204
ASTM A508 Cl 2
TOP HEAD DOME
(MK-201)
2"R
9"
OD: 5 1/2"
ID: 4 1/4"
(NOM)
1 1/2"R
7 7/16"
10°
30°
3/4"
1" MIN
FINISHED
THICKNESS
REFERENCE B&W DRAWING NO.122877E-5 (SECTION C-C)
AND NO.122876E-7 (DETAIL A)
NOTE: THIS SKETCH IS FOR 1ST PROGRAM USE ONLY AND
SHALL NOT BE USED FOR FABRICATION/INSTALLATION.
GE DWG NO.
A00-5306
PROJECT
BROWNS FERRY 2
TITLE
WELD DETAIL VENT NOZZLE N7
SKETCH NO
SK-B2015
SKETCH RELEASE RECORD
REV
DATE
PREPARED
REVIEWED
INIT
APPROVED
INIT
PURPOSE
0
9-15-92
K MCLAVERTY
K.TROTTER
R.HOOPER

SK-B2015


6 1/8" MIN FINISHED THICKNESS
3/16 CLADDING (NOMINAL) 1/8 MIN.
8" WELD ID
ID: 3 13/16" (NOM)
9° (TYP)
NOZZLE FORGING MK-419 ASTM A508 CL2
SCI (MK-857)
5/16"
REFERENCE B&W DRAWING NO. 122860E-8
AND NO. 151855E-4
SKETCH NO. SK-B2019
TITLE WELD DETAIL JET PUMP INSTRUMENT NOZZLE MB
PROJECT BROWNS FERRY 2
B&W NO. A08-5306
NOTE: THIS SKETCH IS FOR ISI DIAGRAM USE ONLY AND SHALL NOT BE USED FOR FABRICATION/INSTALLATION
SKETCH RELEASE RECORD
REV | DATE | PREPARED | REVIEWED | INIT | APPROVED | INIT. | PURPOSE
0 | 11-1-92 | H MCLAVERTY | K. TROTTER | | R. HOOPER | | |

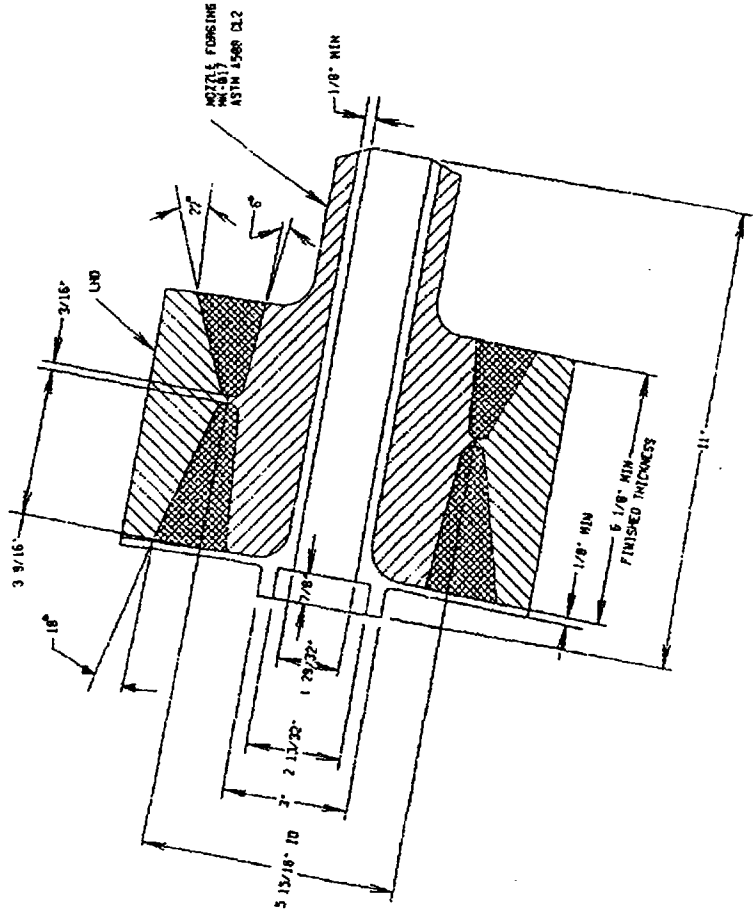
SK-B2019



SKETCH RELEASE RECORD

REV	DATE	PREPARED	REVIEWED	INIT	APPROVED	INIT	PURPOSE
0	9-15-92	M MCLAVERTY	K TROTTER		R. HOOPER		

SK-B2020



REFERENCE B&W DRAWING NO 122858E-8 (DETAIL B)
AND NO.151863E-8

NOTE: THIS SKETCH IS FOR 131 PROGRAM USE ONLY AND SHALL NOT BE USED FOR FABRICATION/INSTALLATION.

B&W DWG NO. 408-5306

PROJECT BROWNS FERRY 2

TITLE WELD DETAIL DIFFERENTIAL PRESSURE AND LIQUID CONTROL NOZZLE N18

SKETCH NO SK-B2022

SKETCH RELEASE RECORD

REV	DATE	PREPARED	REVIEWED	INIT	APPROVED	INIT	PURPOSE
0	9-15-92	M MCLAVERTY	K. TROTTER		R.HOOPER		

SK-B2022

Attachment B

2-ISI-22

UNIT 2 RPV NOZZLE EXAMINATIONS SUMMARY

REQUEST FOR RELIEF 2-ISI-22

UNIT 2 RPV NOZZLE EXAMINATIONS SUMMARY

COMPONENT	CYCLE		DATE		REPORT #		RESULTS		COVERAGE	
									* Note 1	
N1A	3	7	9/24/80	10/11/94	R-065, R-067, R-070	R-1001	A	A	*Note 1	60%
N1A-IR	5B	7	7/20/90	10/6/94	R-1400	R-1002	A	A	*Note 1	100%
N1B	4	9	9/28/82	10/15/97	R-181, R-178, R-195	R-207	A	A	*Note 1	72%
N1B-IR	5B	9	7/20/90	11/3/97	R-1399	R-207A	A	A	*Note 1	100%
*Note 1 N2A	4	9	9/28/82	10/15/97	R-171, R-183, R-199	R-208	A	A	*Note 1	77%
N2A-IR	4	9	9/28/82	11/21/97	R-202	R-208A	A	A	*Note 1	100%
N2B	1/3	7	5/17/78 9/23/80	10/23/94	R-048, R-063	R-1021	A	A	*Note 1	52%
N2B-IR	1	7	5/20/78	10/6/94	R-046	R-1022	A	A	*Note 1	100%
N2C	4	9	9/28/82	10/15/97	R-172, R-182, R-196	R-209	A	A	*Note 1	77%
N2C-IR	4	9	9/28/82	11/21/97	R-200	R-209A	A	A	*Note 1	100%
N2D	5B	11	9/20/86 10/22/87	4/6/01	R-137, R-829, R-832	R-126	A	A	*Note 1	67%
N2D-IR	5B	11	9/25/86	4/6/01	R-193	R-126A	A	A	*Note 1	100%
N2E	5B	11	9/20/86 10/22/87	4/7/01	R-136, R-828, R-833	R-127	A	A	*Note 1	67%
N2E-IR	5B	11	9/25/86	4/7/01	R-192	R-127A	A	A	*Note 1	100%
N2F	4A	7	6/6/81	10/22/94	R-006, R-011, R-013	R-1023	A	A	*Note 1	55%
N2F-IR	4A	7	6/7/81	10/6/94	R-020	R-1024	A	A	*Note 1	100%
N2G	4	9	9/28/82	10/15/97	R-179, R-180, R-198	R-210	A	A	*Note 1	77%
N2G-IR	4	9	9/28/82	11/21/97	R-206	R-210A	A	A	*Note 1	100%
N2H	4	9	9/28/82	10/15/97	R-173, R-184, R-197	R-211	A	A	*Note 1	77%
N2H-IR	4	9	9/29/82	11/21/97	R-207	R-11A	A	A	*Note 1	100%
N2J	4A	7	6/6/81	10/22/94	R-007, R-014, R-015	R-1025	A	A	*Note 1	55%
N2J-IR	4A	7	6/7/81	10/6/94	R-019	R-1026	A	A	*Note 1	100%
N2K	5B	11	9/16/86 10/22/87	10/7/01	R-138, R-830, R-834	R-128	A	A	*Note 1	67%
N2K-IR	5B	11	9/25/86	10/7/01	R-194	R-128A	A	A	*Note 1	100%
N3A	5B	11	9/27/86 10/21/87	3/31/01	R-198, R-201, R-893	R-129	A	A	*Note 1	61%
N3A-IR	5B	11	9/28/86	3/31/01	R-255	R-129A	A	A	*Note 1	100%
N3B	4	9	9/26/82	10/15/97	R-067, R-074, R-075	R-212	A	A	*Note 1	75%
N3B-IR	4	9	9/21/82	11/21/97	R-142	R-212A	A	A	*Note 1	100%

COMPONENT	CYCLE		DATE		REPORT #		RESULTS		COVERAGE	
N3C	5B	11	9/27/86 12/21/86	3/31/01	R-196, R-199, R-892	R-130	A	A	*Note 1	61%
N3C-IR	5B	11	9/28/86	3/31/01	R-254	R-130A	A	A	*Note 1	100%
N3D	1	7	5/17/78	10/13/94	R-047	R-1003	A	A	*Note 1	57%
N3D-IR	1	7	5/20/78	10/6/94	R-045	R-1004	A	A	*Note 1	100%
N4A	3	7	10/9/80	10/7/94	R-107, R-109, R-122	R-1009	A	A	*Note 1	59%
N4A-IR	3	7	10/7/80	10/17/94	R-105	R-1009	A	A	*Note 1	100%
N4B	4	9	9/12/82	10/15/97	R-089, R-091, R-094	R0213	A	A	*Note 1	67%
N4B-IR	4	9	9/21/82	11/21/97	R-140	R-213A	A	A	*Note 1	100%
N4C	4	9	9/12/82	10/15/97	R-088, R-090, R-095, R-103	R-214	A	A	*Note 1	67%
N4C-IR	4	9	9/21/82	11/21/97	R-141	R-214A	A	A	*Note 1	100%
N4D	5B	11	9/20/86 12/22/87	4/5/01	R-128, R-134, R-897	R-131	A	A	*Note 1	69%
N4D-IR	5B	11	9/25/86	4/5/01	R-190	R-131A	A	A	*Note 1	100%
N4E	5B	11	9/20/86 10/22/87	4/5/01	R-126, R-133, R-895	R-132	A	A	*Note 1	69%
N4E-IR	5B	11	9/25/86	4/3/01	R-189	R-132A	A	A	*Note 1	100%
N4F	3	7	10/9/80	10/17/94	R-108, R-110, R-121	R-1005	A	A	*Note 1	54%
N4F-IR	3	7	10/7/80	10/17/94	R-104, R-008, R-010, R-012	R-1007	A	A	*Note 1	100%
N5A	1/4A	7	5/19/78 6/6/81	10/21/94	R-051	R-1027	A	A	*Note 1	53%
N5A-IR	3	7	10/8/80	10/20/94	R-114	R-1028	A	A	*Note 1	100%
N5B	4	9	9/24/82	10/15/97	R-089, R-105, R-106	R-215	A	A	*Note 1	65%
N5B-IR	4	9	9/21/82	11/21/97	R-138	R-215A	A	A	*Note 1	100%
N6A	3	6	9/18/80	2/13/93	R-050, R-051, R-052	R-064	A	A	*Note 1	100%
N6A-IR	3/5B	6	10/3/80 11/4/88	2/13/93	R-087, R-1111	R-063	A	A	*Note 1	100%
N6B	5B	10	11/16/87	4/25/90	R-859, R-862, R-865	R-353	A	A	*Note 1	100%
N6B-IR	5B	10	11/4/88	4/25/90	R-1110	R-331	A	A	*Note 1	100%
N7	5B	10	11/16/87	4/23/90	R-854, R-857, R-860	R-352	A	A	*Note 1	100%
N7-IR	5B	10	11/4/88	4/25/90	R-1112	R-335	A	A	*Note 1	100%
N8A	3	7	9/24/80	10/17/94	R-061, R-062, R-069	R-1008	A	A	*Note 1	68%
N8A-IR	3	7	10/6/80	10/18/94	R-101	R-1011	A	A	*Note 1	73%
N8B	5B	11	9/20/86 11/16/87	4/3/01	R-139, R-831, R-835	R-133	A	A	*Note 1	72%
N8B-IR	5B	11	9/25/86	4/4/01	R-191	R-133A	A	A	*Note 1	100%
N9	4	9	9/24/82	10/15/97	R-098, R-104, R-161	R-216	A	A	*Note 1	75%
N9-IR	4	9	9/21/82	11/21/97	R-139	R-216A	A	A	*Note 1	100%
N10	-	11	-	4/3/01	-	R-134	-	A		56%

UNIT 2 RPV NOZZLE EXAMINATIONS
THIRD INTERVAL, FIRST PERIOD ONLY

COMPONENT	CYCLE	DATE	REPORT #	RESULTS	COVERAGE
N1A	12	3/4/03	R-160	A	48.8%
N1A-IR	12	3/7/03	R-169	A	100%
N2B	12	3/3/03	R-161	A	51.5%
N2B-IR	12	3/7/03	R-167	A	60%
N2F	12	3/3/03	R-162	A	51.5%
N2F-IR	12	3/7/03	R-169	A	60%
N2J	12	3/3/03	R-163	A	51.5%
N2J-IR	12	3/7/03	R-169	A	60%
N3D	12	3/1/03	R-164	A	47.3%
N3D-IR	12	3/3/03	R-169	A	100%
N4A	12	3/2/03	R-141	A	45.4%
N4A-IR	12	3/2/03	R-141	A	100%
N4B	12	3/4/03	R-142	A	45.4%
N4B-IR	12	3/4/03	R-142	A	100%
N4C	12	3/1/03	R-143	A	45.4%
N4C-IR	12	3/1/03	R-143	A	100%
N4D	12	3/4/03	R-144	A	45.4%
N4D-IR	12	3/4/03	R-144	A	100%
N4E	12	3/2/03	R-145	A	45.45
N4E-IR	12	3/2/03	R-145	A	100%
N4F	12	3/4/03	R-146	A	45.4%
N4F-IR	12	3/4/03	R-146	A	100%
N6A	12	2/28/03	R-110	A	90.5%
N6A-IR	12	3/1/03	R-106	A	100%
N8A	12	3/5/03	R-165	A	89.5%
N8A-IR	12	3/7/03	R-169	A	60%

Note 1: The examination method (UT) and techniques utilized in the First Ten-Year ISI Interval were basically the same as used in the Second Ten-Year ISI Interval, therefore the percentage of examination coverage are essentially the same for the RPV Nozzle-To-Vessel Shell Welds and Inner Radius Sections.

ENCLOSURE 2

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNIT 3
AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) SECTION XI,
INSERVICE INSPECTION (ISI) PROGRAM
(SECOND TEN-YEAR INSPECTION INTERVAL)

REQUEST FOR RELIEF 3-ISI-18

(See Attached)

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT (BFN)
UNIT 3
AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) SECTION XI,
INSERVICE INSPECTION (ISI) PROGRAM
(SECOND TEN-YEAR INSPECTION INTERVAL)

REQUEST FOR RELIEF 3-ISI-18

Executive Summary: In accordance with 10 CFR 50.55a(a)(3)(i), TVA is requesting relief from inservice inspection requirements of the 1989 Edition, no Addenda, Section XI of the ASME Boiler and Pressure Vessel Code for the volumetric examination of Class 1, reactor pressure vessel (RPV) nozzle-to-vessel welds and inner radius sections. The examination requirement is for a volumetric examination of 100 percent of the ASME Section XI, Examination Category B-D, "Full Penetration Welded Nozzles in Vessels," Item No. B3.90, "Reactor Vessel Nozzle to Vessel Welds and Item No. B3.100, "Reactor Vessel Nozzle Inner Radius Section" each inspection interval.

This request for relief applies to the BFN Unit 3 Reactor Pressure Vessel and RPV Head nozzles, with the exception of the six (N4) feedwater nozzles. The six feedwater nozzle-to-vessel welds and inner radius sections will continue to be examined with ultrasonic examination (UT) techniques in accordance with ASME Code, Section XI, Appendix VIII and the Performance Demonstration Initiative (PDI) Program.

TVA proposes to utilize the technical basis contained in the Boiling Water Reactor Vessel Internals Project (BWRVIP) Report, BWRVIP-108, "BWR Vessel and Internals Project Technical Basis for the Reduction of Inspection Requirements for the Boiling Water Reactor Nozzle-to-Vessel Shell Welds and Nozzle Blend Radii." This report provides the technical basis for the reduction of the nozzle-to-shell welds and nozzle blend radii from 100 percent to 25 percent of the nozzles each 10-year

inspection interval. The 25 percent coverage refers to 25 percent of the nozzles for each nozzle type (e.g., 1 of 4 main steam nozzles would be inspected).

TVA is also proposing an alternate examination of the nozzle blend radii (i.e., inner radius). For the reactor pressure vessel nozzles inner radius section, TVA will perform an enhanced remote visual (VT-1) examination, capable of a 1-mil wire resolution, and on the RPV head nozzles perform an enhanced direct visual (VT-1) examination, capable of a 1-mil wire resolution, in accordance with ASME Section XI, VT-1 requirements. The change from volumetric (UT) to enhanced visual (VT-1) has been submitted as two separate requests for relief, 3-ISI-14 and 3-ISI-15, by TVA letter dated May 9, 2003, and is pending NRC approval. A request for relief, 3-ISI-11, for the RPV Head Nozzles was submitted to NRC by TVA letters dated August 13, 2001, January 9 and February 5, 2002 and approved by NRC letter dated March 13, 2002, also applies.

TVA is requesting that the reduction from 100 percent to 25 percent of the nozzles every 10-year inspection interval in this request for relief apply to the above aforementioned requests for relief, for the enhanced remote or direct visual (VT-1) examination, capable of a 1-mil wire resolution, in accordance with ASME Section XI, VT-1 requirements.

TVA considers the above proposed alternative examinations will provide an acceptable level of quality and safety. The proposed alternatives will also provide a significant savings in examination resources and radiation exposure.

The examinations will be performed with personnel, procedures, and equipment qualified in accordance with the ASME Section XI Code, 1995 Edition, 1996 Addenda, Appendix VIII and the Performance Demonstration Initiative (PDI) Program requirements.

Unit: Three (3)

ISI Interval: ASME Section XI, Second Ten-Year ISI Interval (November 19, 1996 to November 18, 2005)

System(s):
Components: Reactor Pressure Vessel (RPV), Nozzle-to-Shell Welds and Inner Radius Sections:

Reactor Recirculation Outlet Nozzles, N1A and N1B (Total of 2 nozzles)

Reactor Recirculation Inlet Nozzles, N2A, N2B, N2C, N2D, N2E, N2F, N2G, N2H, N2J, and N2K (Total of 10 nozzles)

Main Steam Nozzles, N3A, N3B, N3C, and N3D (Total of 4 nozzles)

Core Spray Nozzles, N5A and N5B (Total of 2 nozzles)

Reactor Pressure Vessel(RPV)Head Nozzles, N6A, N6B, and N7 (Total of 3 nozzles)

Jet Pump Instrumentation Nozzles, N8A and N8B (Total of 2 nozzles)

Control Rod Drive Return Line Nozzle, (capped) N9 (Total of 1 nozzle)

Standby Liquid Control Nozzle, N10 (Total of 1 nozzle)

ASME Code Class: ASME Code Class 1

ASME Section XI Code Edition: 1989 Edition with no Addenda

Note: The Code of Record for the BFN Unit 3 Second Ten-Year ISI Interval is the 1989 Edition, with no Addenda. However, TVA has adopted the 1995 Edition with the 1996 addenda (all TVA nuclear sites) for performance of nondestructive examinations.

Code Table: IWB-2500-1

Examination Category: B-D, "Full Penetration Welded Nozzles In Vessels"

Examination Item Number(s): B3.90, "Nozzle-To-Vessel Welds", and B3.100, "Nozzle Inner Radius Sections,"

Code Requirement: The 1989 Edition with no Addenda, ASME Section XI, Table IWB-2500-1, Examination Category B-D, Item No. B3.90 and Item No. B3.100, requires a volumetric examination of 100 percent of the reactor pressure vessel (RPV) nozzle-to-shell welds and nozzle inner radius section each inspection interval.

Code Requirements From Which Relief Is Requested: The 1989 Edition with no Addenda, ASME Section XI, Table IWB-2500-1, Examination Category B-D, Item No. B3.90 and Item No. B3.100, requires a volumetric examination of 100 percent each inspection interval of the reactor pressure vessel (RPV) nozzle-to-shell welds and nozzle inner radius section.

Relief is requested from the requirement to perform a volumetric examination of 100 percent of the reactor pressure vessel (RPV) nozzle-to-shell welds and nozzle inner radius section each inspection interval.

List Of Items Associated With The Relief Request: Reactor Pressure Vessel Nozzles, N1A, N1B, N2A, N2B, N2C, N2D, N2E, N2F, N2G, N2H, N2J, N2K, N3A, N3B, N3C, N3D, N5A, N5B, N6A, N6B, N7, N8A, N8B, N9 (capped), and N10 (Total of 25 nozzles)

Note: The six feedwater nozzle-to-vessel welds and inner radius sections will continue to be examined with ultrasonic examination (UT) techniques in accordance with ASME Code, Section XI, Appendix VIII and the Performance Demonstration Initiative (PDI) Program.

Basis For Relief Request: Pursuant to 10 CFR 50.55a(a)(3)(i) TVA is requesting relief from ASME Section XI requirements to perform the alternate examination described above.

TVA proposes to utilize the technical basis contained in the Boiling Water Reactor Vessel Internals Project (BWRVIP) Report, BWRVIP-108, "BWR Vessel and Internals Project Technical Basis for the Reduction of Inspection Requirements for the Boiling Water Reactor Nozzle-to-Vessel Shell Welds and Nozzle Blend Radii." This report provides the technical basis for the reduction of the nozzle-to-shell welds and nozzle blend radii (i.e., inner radius section) from 100 percent to 25 percent of the nozzles each 10-year inspection interval. The 25 percent coverage refers to 25 percent of the nozzles for each nozzle type (e.g., 1 of 4 main steam nozzles would be inspected). This report was submitted by the Boiling Water Reactor Vessel Internals Project (BWRVIP) Committee to the NRC by letter dated November 25, 2002, for staff review.

As stated in the above report, the 25 percent inspection sampling level was selected, in part, because it was considered to be sufficient to effectively identify aging degradation in the nozzle-to-shell welds and nozzle blend radii. It is consistent with current industry and regulatory sampling practice, and there is significant dose reduction and examination cost savings.

The determination of whether the 25 percent inspection sampling is sufficient is the object of the Probabilistic Failure Mechanics (PFM) evaluation.

The PFM evaluation shows very low probability of failure, and the 25 percent inspection sampling is considered sufficient to identify aging degradation.

The 25 percent sampling level is similar to industry practice and, in some cases, exceeds current practice. For example:

- ASME Code Section XI, IWB-2500 requires 25 percent of Category B-J (Item No. B9.11) circumferential welds be inspected each inspection interval.

- ASME Code Case N-560, (Risk Informed Inspection) requires inspection of 10 percent of higher risk Class I Category B-J piping welds.

- ASME Code Case N-578, (Risk Informed Inspection) requires inspection of at least 25 percent of the highest risk, (Risk Category 1, 2, and 3) and at least 10 percent of the next highest risk, (Risk Category 4 or 5) Class I piping welds.

- ASME Code Section XI, IWC-2500 (Class II piping) Category C-F-1 and C-F-2 requires inspection of 7.5 percent of welds.

- Generic Letter 88-01 requires 25 percent inspection of Category A piping welds.

The 25 percent sampling alternative also provides a significant cost savings and reduces worker dose exposure. Several utilities have estimated that the proposed reduction of inspection requirements would result in a savings of up to $750,000 per 10-year interval not including exposure considerations. The dose savings at BFN Unit 3 would be approximately 6.5 to 7 REM over a ten-year interval.

For the reactor pressure vessel nozzles inner radius section, TVA will perform an enhanced remote visual (VT-1) examination, capable of a 1-mil wire resolution, and on the RPV head nozzles perform an enhanced direct visual (VT-1) examination, capable of a 1-mil wire resolution, in accordance with ASME Section XI, VT-1 requirements. The change from volumetric (UT) to enhanced visual (VT-1) has been submitted as two separate requests for relief, 3-ISI-14 and 3-ISI-15, by TVA letter dated May 9, 2003, and is pending NRC approval.

A request for relief 3-ISI-11 for the RPV Head Nozzles, submitted to NRC by TVA letters dated August 13, 2001, January 9 and February 5, 2002, and approved by NRC letter

dated March 13, 2002, also applies. TVA is requesting that the reduction from 100 percent to 25 percent of the nozzles each 10-year inspection interval in this request for relief will apply to the above aforementioned requests for relief, for the enhanced remote or direct visual (VT-1) examination, capable of a 1-mil wire resolution, in accordance with ASME Section XI, VT-1 requirements.

TVA considers the above proposed alternative examinations will provide an acceptable level of quality and safety. The proposed alternatives will also provide a significant savings in examination resources and radiation exposure.

In the first Unit 3 inspection interval, 30 reactor pressure vessel nozzle-to-shell welds and inner radius sections received a volumetric examination. In the second Unit 3 inspection interval, 20 of the 31 reactor pressure vessel nozzle-to-shell welds and 19 inner radius sections have received a volumetric examination. The examination results were acceptable. One (1) inner radius section received an enhanced visual (EVT-1) examination from the vessel ID. The examination results were acceptable.

Alternate Examination:

In accordance with 10 CFR 50.55a(a)(3)(i) TVA will perform the following alternate examinations:

TVA proposes to utilize the technical basis contained in the Boiling Water Reactor Vessel Internals Project (BWRVIP) Report, BWRVIP-108, "BWR Vessel and Internals Project Technical Basis for the Reduction of Inspection Requirements for the Boiling Water Reactor Nozzle-to-Vessel Shell Welds and Nozzle Blend Radii."

This report provides the technical basis for the reduction of the nozzle-to-shell welds and nozzle blend radii from 100 percent to 25 percent of the nozzles each 10-year inspection interval. The 25 percent coverage

refers to 25 percent of the nozzles for each nozzle type (e.g., 1 of 4 main steam nozzles would be inspected).

For the reactor pressure vessel nozzles inner radius section, TVA will perform an enhanced remote visual (VT-1) examination, capable of a 1-mil wire resolution, and on the RPV head nozzles perform an enhanced direct visual (VT-1) examination, capable of a 1-mil wire resolution, in accordance with ASME Section XI, VT-1 requirements. The change from volumetric (UT) to enhanced visual (VT-1) has been submitted as two separate requests for relief, 3-ISI-14 and 3-ISI-15, by TVA letter dated May 9, 2003, and is pending NRC approval. A request for relief 3-ISI-11 for the RPV Head Nozzles submitted to NRC by TVA letters dated August 13, 2001, January 9 and February 5, 2002, and approved by NRC letter dated March 13, 2002, also applies. TVA is requesting that the reduction from 100 percent to 25 percent of the nozzles each 10-year inspection interval in this request for relief will apply to the above aforementioned requests for relief, for the enhanced remote or direct visual (VT-1) examination, capable of a 1-mil wire resolution, in accordance with ASME Section XI, VT-1 examination requirements.

In summary, TVA's proposed alternative examinations are as follows. Perform volumetric examination of 25 percent each inspection interval in lieu of 100 percent, of the ASME Section XI, Examination Category B-D, "Full Penetration Welded Nozzles in Vessels," Item No. B3.90, "Reactor Vessel Nozzle to Vessel Welds and an enhanced remote or direct visual (VT-1) examination, capable of a 1-mil wire resolution, in accordance with ASME Section XI, VT-1, of Item No. B3.100, "Reactor Vessel Nozzle Inner Radius Section." (Reference request for relief 3-ISI-14 and 3-ISI-15)

The following nozzles will be examined: N1 (1), N2 (3), N3 (1), N5 (1), N6 (1), N7 (1), N8 (1), N9 (1), and N10 (1) (Total of 11 nozzles in ten years).

The examinations will be performed with personnel, procedures, and equipment qualified in accordance with the ASME Section XI Code, 1995 Edition, 1996 Addenda, Appendix VIII and the Performance Demonstration Initiative (PDI) Program requirements.

Justification For The Granting Of Relief:

The RPV nozzles were nondestructively examined during fabrication and have previously been examined using inservice ultrasonic techniques specific to the nozzle configuration. No indication of fabrication defects or service related cracking has been detected by these examinations. See Attachment B for RPV nozzle and inner radius section listing and UT examinations and coverage for the Unit 3 first and second 10-year ISI inspection interval.

In the first Unit 3 inspection interval, 30 reactor pressure vessel nozzle-to-shell welds and inner radius sections received a volumetric examination. The examination results were acceptable.

In the second Unit 3 inspection interval, 20 of 31 reactor pressure vessel nozzle-to-shell welds and 19 inner radius sections have received a volumetric examination, the results were acceptable. One (1) inner radius section received an enhanced visual (EVT-1) examination from the vessel ID. The results were acceptable. (Reference request for relief 3-ISI-11)

As presented in the BWRVIP-108 report, a significant number of examinations have been performed on units in the BWR fleet that have been operational, for periods up to 30 years, using modern examination techniques capable of detecting significant cracking if it were present. No degradation or failure mechanism has been identified in nozzle-to-vessel or blend radius areas, other than feedwater and CRDM nozzles. An evaluation of reactor pressure vessel reliability was performed. The nozzles considered were the core spray, main steam, recirculation inlet and outlet

nozzles. The analyses were performed using the worst weld chemistry from the BWR vessel fleet. Stresses were conservatively selected. Any cracks were assumed to occur at the highest stressed locations around the nozzle. Both stress corrosion and fatigue crack growth were included in the evaluation.

In summary, based on the selection criteria used in the BWRVIP-108 report, TVA has concluded that the RPV nozzles considered in the BWRVIP-108 analysis are representative of the BFN Units 2 and 3 RPV nozzles. Further, based on the conservatisms used in the analysis: (1) poor water chemistry, (2) stresses selected from limiting azimuth in the nozzle, (3) cracks assumed to occur at the highest stressed locations around the nozzle azimuth and (4) both stress corrosion and fatigue crack growth were included in the evaluation, TVA has determined that the conclusions reached in the BWRVIP-108 report apply to the BFN Units 2 and 3 RPV nozzles. Therefore, TVA requests a reduction in RPV nozzle and nozzle inner radius section examinations from 100 percent to 25 percent (of each nozzle type) each 10-year inspection interval. The 25 percent examination frequency, as stated in the BWRVIP-108 report, is sufficient to identify any aging degradation of the nozzles.

Implementation Schedule:

This request for relief is applicable to the BFN Unit 3, Second Ten-Year ASME Section XI Inservice Inspection Interval, (November 19,1996 to November 18, 2005).

Attachments:

Attachment A - (8 sketches)

Sketch SK-B3001, Reactor Pressure Vessel Assembly

Sketch SK-B3017, N1, Recirculation Outlet Nozzle

Sketch SK-B3018, N2, Recirculation Inlet Nozzles, N3, Main Steam Nozzles, and N5, Core Spray Nozzles

Sketch SK-B3016, N6, Reactor Head Spray/Instrumentation Nozzle

Sketch SK-B3015, N7, Reactor Head Vent Nozzle

Sketch SK-B3019, N8, Jet Pump Instrumentation Nozzle

Sketch SK-B3020, N9, Control Rod Drive Return Line Nozzle (capped)

Sketch SK-B3022, N10, Differential pressure and Liquid Volume Control Nozzle

Attachment B

Unit 3 RPV Nozzle and Inner Radius Section Examinations

Attachment A

3-ISI-18

EIGHT (8) Sketches

Sketch SK-B3001, Reactor Pressure Vessel Assembly

Sketch SK-B3017, N1, Recirculation Outlet Nozzles

Sketch SK-B3018, N2, Recirculation Inlet Nozzles, N3, Main Steam Nozzles, and N5, Core Spray Nozzles

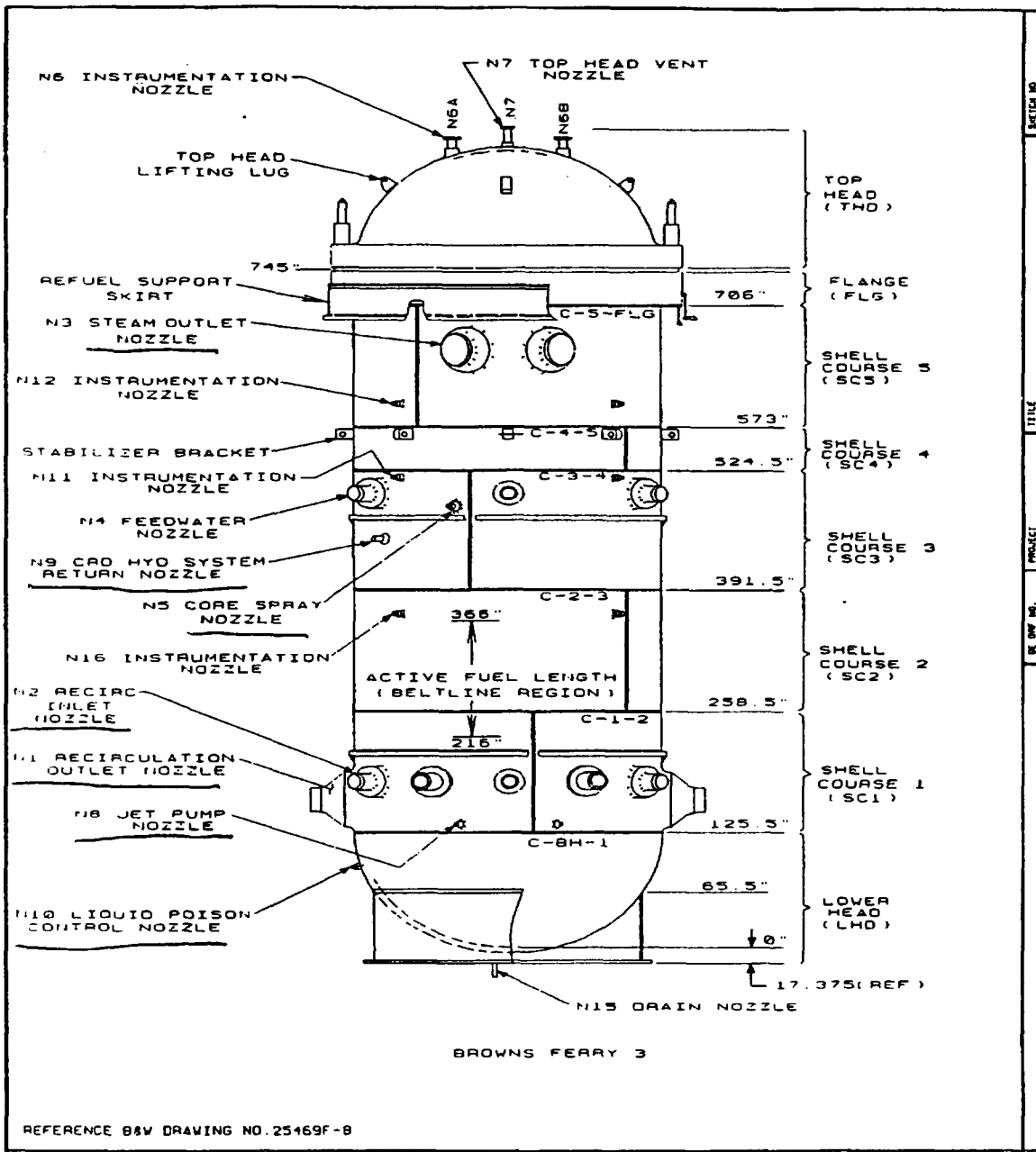
Sketch SK-B3016, N6, Reactor Head Spray/Instrumentation Nozzles

Sketch SK-B3015, N7, Reactor Head Vent Nozzle

Sketch SK-B3019, N8, Jet Pump Instrumentation Nozzles

Sketch SK-B3020, N9, Control Rod Drive Return Line Nozzle (capped)

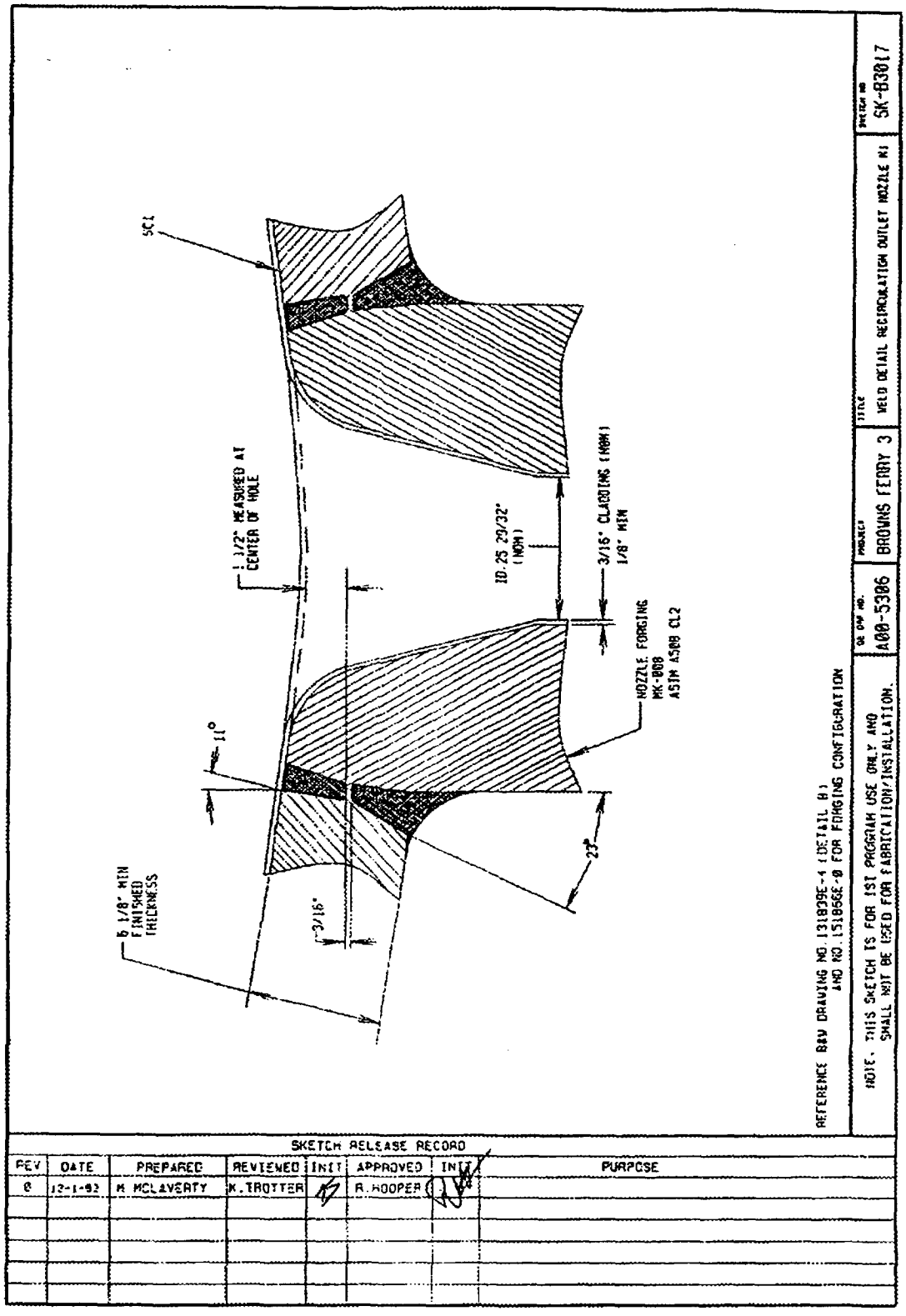
Sketch SK-B3022, N10, Differential pressure and Liquid Volume Control Nozzle



SKETCH RELEASE RECORD

REV	DATE	PREPARED	REVIEWED	INIT	APPROVED	INIT	PURPOSE
0	11-30-92	M MCLAVERTY	K. TROTTER	KT	R. HOOPER	RH	

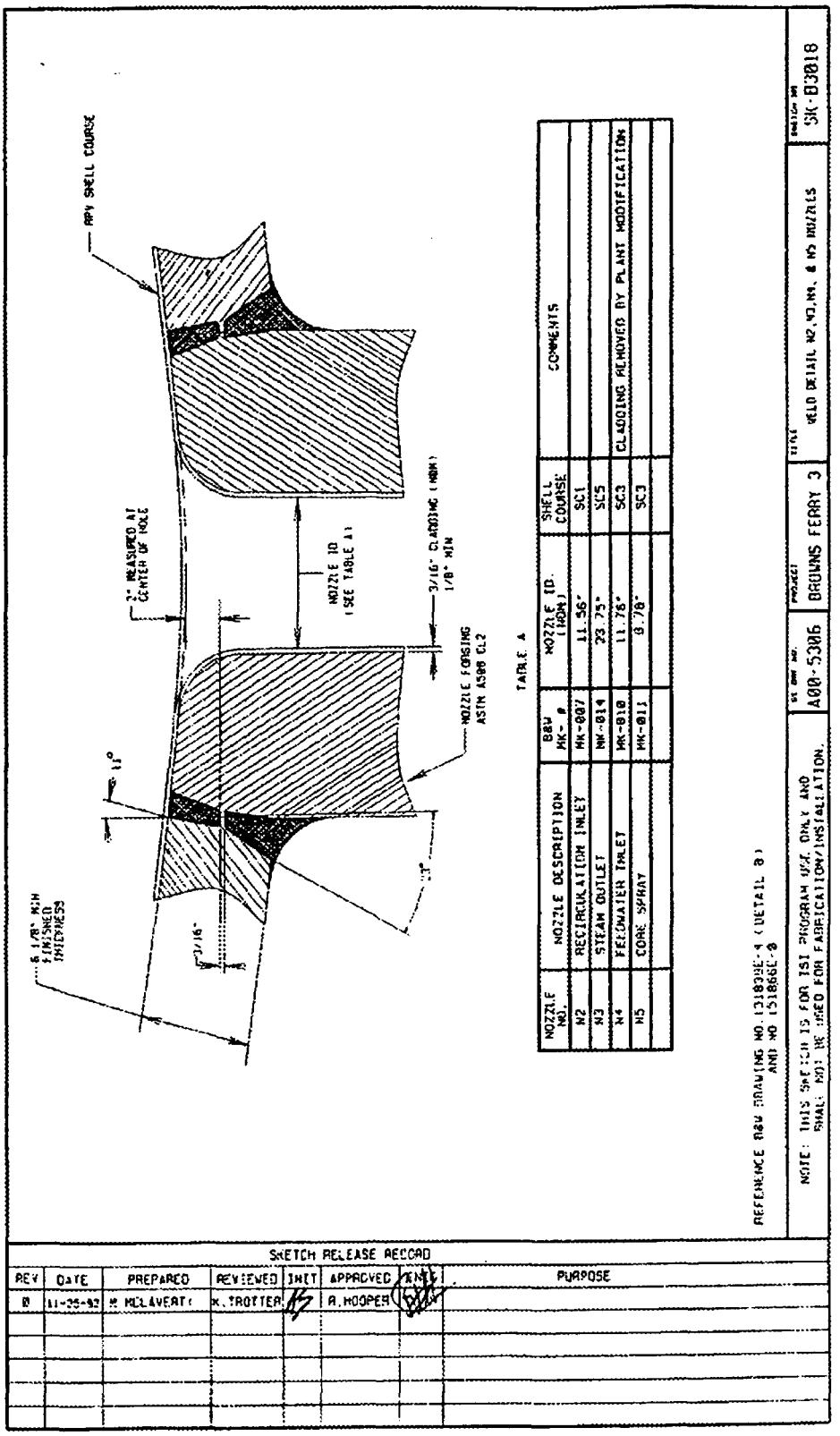
SK-B3001



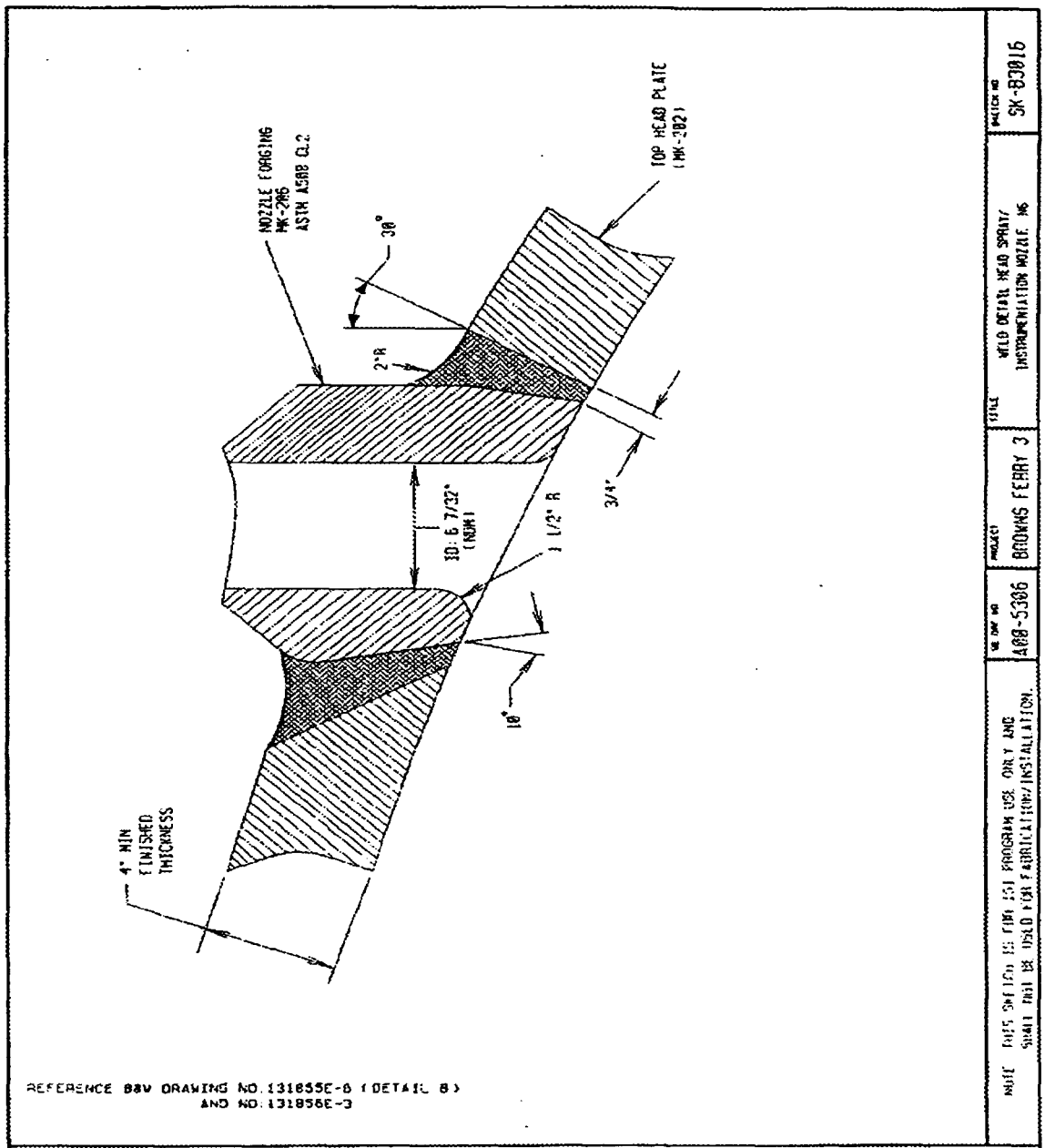
SKETCH RELEASE RECORD

REV	DATE	PREPARED	REVIEWED	INIT	APPROVED	INIT	PURPOSE
0	12-1-92	M MCLAVERTY	K.TROTTER		R.HOOPER		

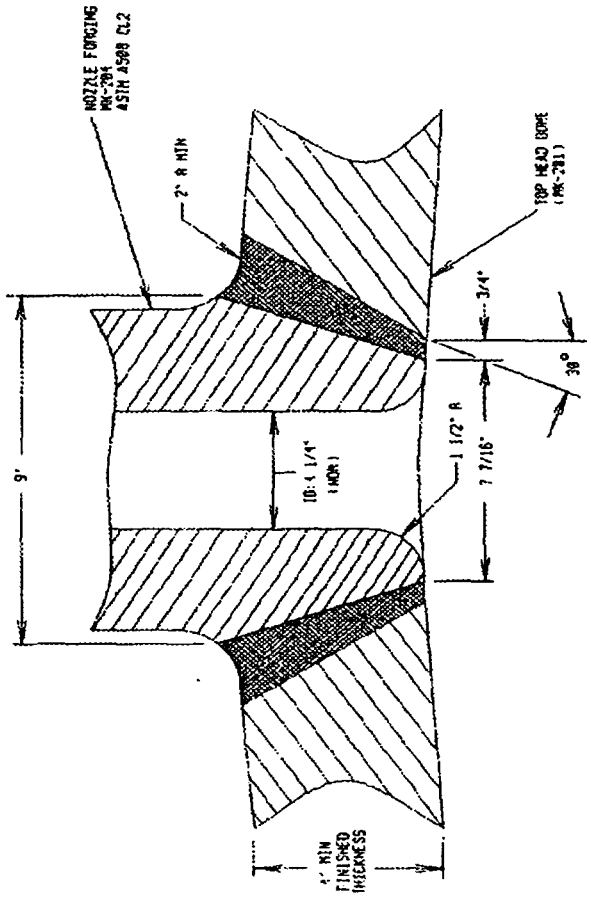
SK-B3017


RPV SHELL COURSE
2" MEASURED AT CENTER OF HOLE
NOZZLE ID (SEE TABLE A)
3/16" CLADDING (NOM) 1/8" MIN
NOZZLE FORGING ASTM A508 CL2
1°
3/16"
6 1/8" MIN FINISHED THICKNESS
TABLE A
NOZZLE NO. | NOZZLE DESCRIPTION | B&W MK- # | NOZZLE ID (NOM) | SHELL COURSE | COMMENTS
N2 | RECIRCULATION INLET | MK-007 | 11.56" | SC1 |
N3 | STEAM OUTLET | MK-014 | 23.75" | SC5 |
N4 | FEEDWATER INLET | MK-010 | 11.76" | SC3 | CLADDING REMOVED BY PLANT MODIFICATION
N5 | CORE SPRAY | MK-011 | 8.76" | SC3 |
REFERENCE B&W DRAWING NO. 131893E-4 (DETAIL B) AND NO. 151866E-8
NOTE: THIS SPECIMEN IS FOR IST PROGRAM USE ONLY AND SHALL NOT BE USED FOR FABRICATION/INSTALLATION.
A00-5306
PROJECT: BROWNS FERRY 3
TITLE: WELD DETAIL N2,N3,N4, & N5 NOZZLES
SK-B3018
SKETCH RELEASE RECORD
REV | DATE | PREPARED | REVIEWED | INIT | APPROVED | INIT | PURPOSE
0 | 11-25-92 | M. MCLAVERTY | K. TROTTER | | A. HOOPER | |

SK-B3018


NOZZLE FORGING
MK-286
ASTM A508 CL.2
TOP HEAD PLATE
(MK-302)
30°
2"R
3/4"
ID: 6 7/32"
(NOM)
1 1/2" R
10°
4" MIN
FINISHED
THICKNESS
REFERENCE B&W DRAWING NO.131855E-8 (DETAIL B)
AND NO.131856E-3
SKETCH RELEASE RECORD
REV
DATE
PREPARED
REVIEWED
INIT
APPROVED
INIT
PURPOSE
0
11-24-92
M MCLAVERTY
K.TROTTER
R.HOOPER
SK-B3016
WELD DETAIL HEAD SPRAY/
INSTRUMENTATION NOZZLE MK
BROWNS FERRY 3
408-5306
NOTE: THIS SKETCH IS FOR ISI PROGRAM USE ONLY AND
SHALL NOT BE USED FOR FABRICATION/INSTALLATION.

SK-B3016



REFERENCE B&W DRAWING NO. 131855E-6 (DETAIL A)

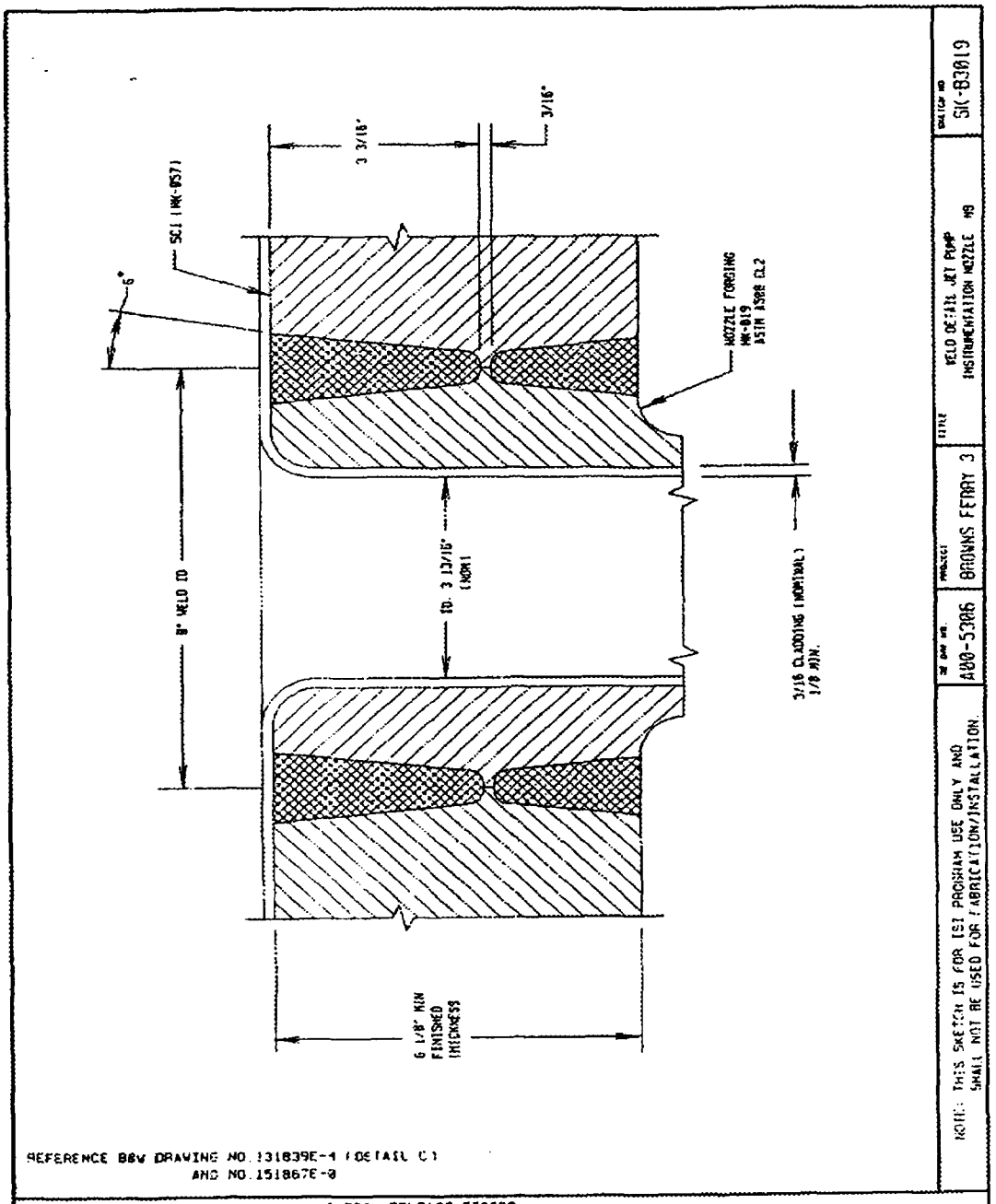
NOTE: THIS SKETCH IS FOR ISI PROGRAM USE ONLY AND SHALL NOT BE USED FOR FABRICATION/INSTALLATION.

B&W CAV NO.	A00-5306
PROJECT	BROWNS FERRY 3
TITLE	WELD DETAIL VENT NOZZLE N7
SKETCH NO	SK-B3015

SKETCH RELEASE RECORD

REV	DATE	PREPARED	REVIEWED	INIT	APPROVED	INIT	PURPOSE
0	11-24-92	M MCLAVERTY	K. TROTTER	KT	R. HOOPER	RH	

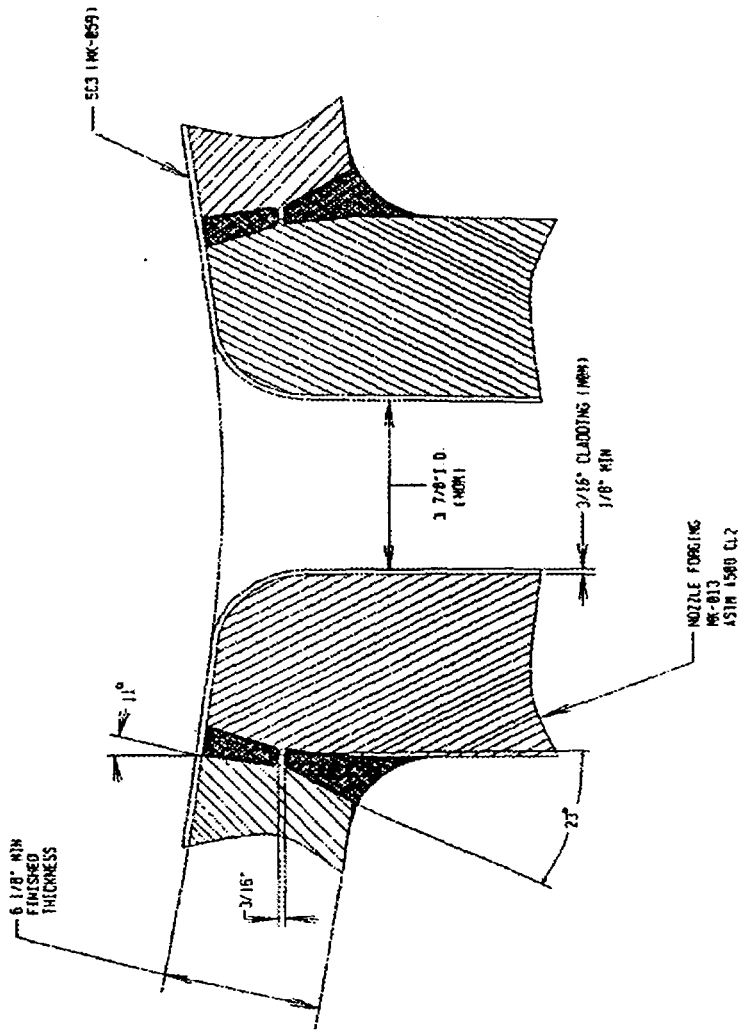
SK-B3015



SKETCH RELEASE RECORD

REV	DATE	PREPARED	REVIEWED	INIT	APPROVED	INIT	PURPOSE
0	11-25-92	M MCLAVERTY	K. TROTTER	KT	R. HOOPER	[illegible]	

SK-B3019



REFERENCE B&W DRAWING NO.131840E-5 (DETAIL C)
AND NO.131847E-4

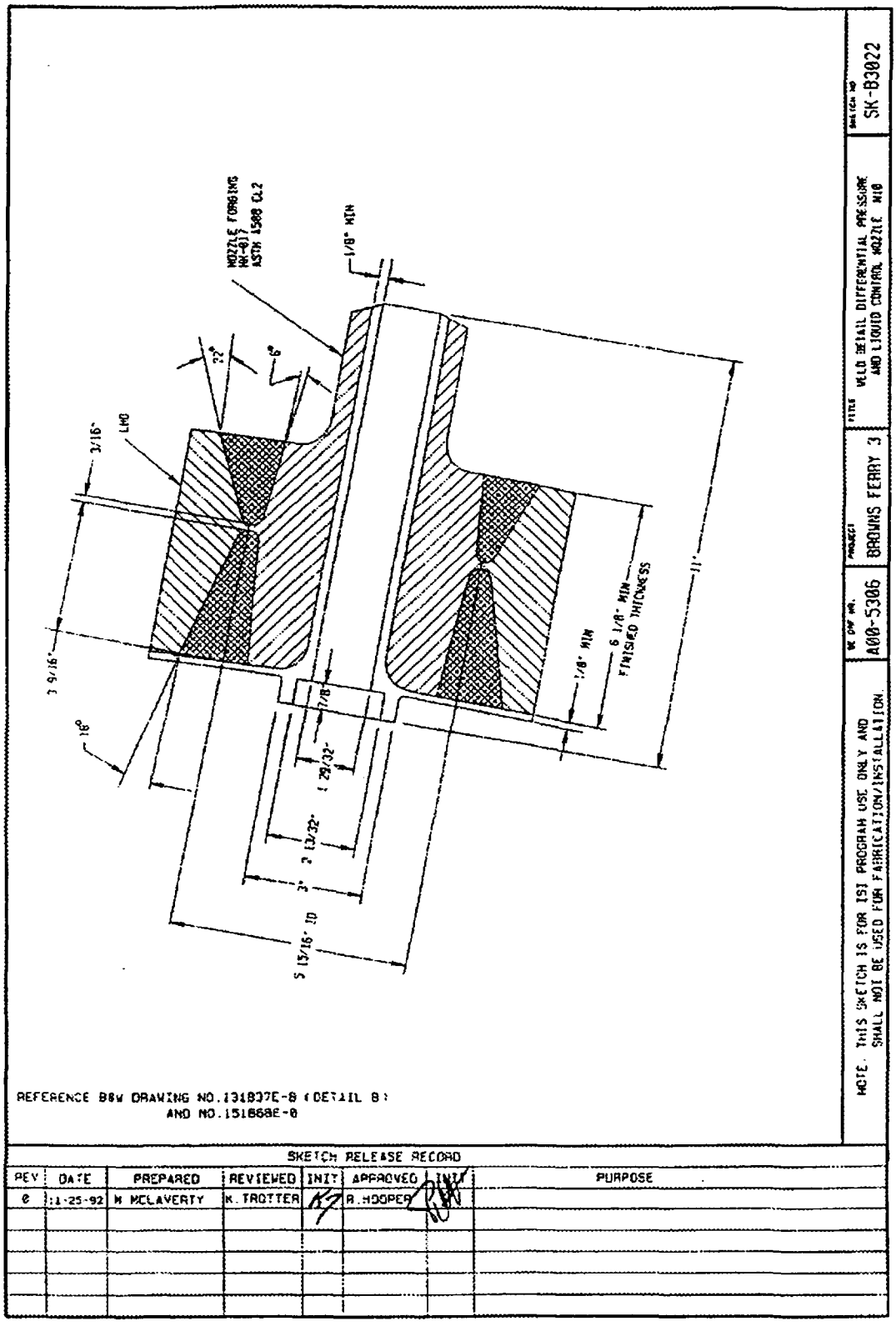
NOTE: THIS SKETCH IS FOR 1ST PROGRAM USE ONLY AND SHALL NOT BE USED FOR FABRICATION/INSTALLATION.

DE DWF NO.	408-5306
PROJECT	BROWNS FERRY 3
TITLE	WELD DETAIL CRD HYDRAULIC CONTROL NOZZLE MS
SKETCH NO	SK-B3020

SKETCH RELEASE RECORD

REV	DATE	PREPARED	REVIEWED	INIT	APPROVED	INIT	PURPOSE
0	11-25-92	M MCLAVERTY	K.TROTTER	KT	R.HOOPER	RH	

SK-B3020



SKETCH RELEASE RECORD

REV	DATE	PREPARED	REVIEWED	INIT	APPROVED	INIT	PURPOSE
0	11-25-92	M MCLAVERTY	K. TROTTER	KT	R.HOOPER	RH	

SK-B3022

Attachment B

3-ISI-18

UNIT 3 RPV NOZZLE EXAMINATIONS SUMMARY

REQUEST FOR RELIEF 3-ISI-18

UNIT 3 RPV NOZZLE EXAMINATIONS SUMMARY

COMPONENT	CYCLE		DATE		REPORT #		RESULTS		COVERAGE	
N1A	2	8	10/18/79	10/8/98	R-256/R-272	R-205	A	A	25%	72%
N1A-IR	5B	8	11/16/93	10/8/98	R-1172	R-205A	A	A	100%	100%
N1B	4	10	12/8/81	3/29/02	R-112, R-149, R-157	R-156	A	A	20%	77%
N1B-IR	5B	10	11/16/93	3/29/02	R-1173	R-157	A	A	100%	100%
N2A	4	10	12/7/81	4/1/02	R-109, R-127, R-152	R-158	A	A	20%	77%
N2A-IR	4	10	12/9/81	4/1/02	R-161	R-159	A	A	100%	100%
N2B	2	8	10/19/79	10/8/98	R-238, R-258, R-265	R-206	A	A	25%	77%
N2B-IR	2	8	1016/79	10/8/98	R-233	R-206A	A	A	100%	100%
N2C	4	10	12/7/81	4/1/02	R-111, R-119, R-153	R-160	A	A	20%	77%
N2C-IR	4	10	12/9/81	4/1/02	R-162	R-161	A	A	100%	100%
N2D	2	8	10/16/79	10/8/98	R-235, R-260, R-266	R-207	A	A	25%	77%
N2D-IR	2	8	10/16/79	10/8/98	R-229	R-207A	A	A	100%	100%
N2E	4	10	12/7/81	4/1/02	R-110, R-150, R-154	R-162	A	A	20%	77%
N2E-IR	4	10	12/9/81	4/1/02	R-163	R-163	A	A	100%	100%
N2F	2	8	10/19/79	10/8/98	R-237, R-261, R-269	R-208	A	A	25%	77%
N2F-IR	2	8	10/16/79	10/8/98	R-231	R-208A	A	A	100%	100%
N2G	4	*11	12/8/81		R-113, R-148, R-158		A		20%	
N2G-IR	4	*11	12/8/81		R-165		A		100%	
N2H	5B	*11	11/13/93		R-1174		A		42%	
N2H-IR	5B	*11	11/12/93		R-1204		A		100%	
N2J	5B	*11	11/15/93		R-1175		A		42%	
N2J-IR	5B	*11	11/14/93		R-1205		A		100%	
N2K	5B	*11	11/15/93		R-1176		A		42%	
N2K-IR	5B	*11	11/15/93		R-1206		A		100%	
N3A	4	10	11/20/93	3/31/02	R-045, R-047, R-049, R-051, R-052	R-164	A	A	20%	77%
N3A-IR	4	10	11/22/93	3/10/02	R-061	R-165	A	A	100%	100%
N3B	2	8	10/23/79	10/8/98	R-273, R-293, R-253	R-209	A	A	25%	75%
N3B-IR	2	8	10/16/79	10/8/98	R-226	R-209A	A	A	100%	100%
N3C	5B	*11	11/10/93		R-1177		A		28%	
N3C-IR	5B	*11	11/17/93		R-1207		A		100%	
N3D	5B	*11	11/10/93		R-1178		A		28%	
N3D-IR	5B	*11	11/11/93		R-1178		A		100%	

COMPONENT	CYCLE		DATE		REPORT #		RESULTS		COVERAGE	
N4A	4	10	11/30/81	3/20/02	R-083, R-084, R-085	R-166	A	A	20%	77%
N4A-IR	4	10	11/23/81	3/20/02	R-067	R-167	A	A	100%	100%
N4B	2	8	10/22/79	10/14/98	R-251, R-270, R-281	R-211	A	A	25%	68%
N4B-IR	2	8	10/15/79	10/9/98	R-221	R-211A	A	A	100%	100%
N4C	2	8	10/22/79	10/14/98	R-250, R-268, R-282	R-212	A	A	25%	68%
N4C-IR	2	8	10/16/79	10/9/98	R-232	R-212A	A	A	100%	100%
N4D	5B	*11	11/16/93		R-1182		A		44%	
N4D-IR	5B	*11	11/9/93		R-1208		A		100%	
N4E	5B	*11	11/16/93		R-1183		A		43%	
N4E-IR	5B	*11	11/12/93		R-1209		A		100%	
N4F	4	10	11/20/81	3/20/02	R-054, R-057, R-068	R-168	A	A	20%	77%
N4F-IR	4	10	11/23/81	3/20/02	R-068	R-169	A	A	100%	100%
N5A	2	8	10/22/79	10/8/98	R-249, R-267, R-284	R-216	A	A	20%	64%
N5A-IR	2	8	10/16/79	10/8/98	R-228	R-216A	A	A	75%	100%
N5B	4	10	12/3/81	4/2/02	R-093, R-101, R-105	R-170	A	A	20%	71%
N5B-IR	4	10	11/24/81	3/31/02	R-081	R-171	A	A	83%	100%
N6A	5B	7	8/1795 9/27/91	3/1/97	R-591, R-591A	R-247	A	A	100%	100%
N6A-IR	5B	7	9/28/91	3/1/97	R-598	R-243	A	A	100%	100%
N6B	5B	*11	8/1795 9/27/91		R-592, R-592A		A		100%	
N6B-IR	5B	*11	9/28/91		R-597		A		100%	
N7	5B	10	8/1795 9/27/91	3/29/02	R-590, R-590A	R-125	A	A	100%	70%
N7-IR	5B	10	9/28/91	3/30/02	R-599	R-115	A	A	100%	100%
N8A	2	8	10/19/79	10/9/98	R-247, R-259, R-271	R-217	A	A	68%	71%
N8A-IR	2	8	10/16/79	10/9/98	R-230	R-217A	A	A	100%	100%
N8B	5B	*11	11/6/93		R-1185		A		68%	
N8B-IR	5B	*11	11/7/93		R-1185		A		100%	
N9	4	10	12/3/81	4/1/02	R-092, R-103, R-099	R-172	A	A	25%	74%
N9-IR	4	10	1124/81	4/1/02	R-079	R-173	A	A	100%	100%
N10		*11								

*Note: Scheduled for examination in Unit 3 Cycle 11 Refueling Outage.