Entergy

River Bend Station
5485 U.S. Highway 61N
St. Francisville, LA 70775
Tel 225-381-4157

David N. Lorfing
Manager, Licensing

RBG-46978

November 30, 2009

U. S. Nuclear Regulatory Commission
Attn.: Document Control Desk
Washington, DC 20555-0001

SUBJECT: Request for Alternative RBS-ISI-014
Proposed Alternative to 10 CFR 50.55a Examination Requirements for Reactor Pressure Vessel Weld Inspections
River Bend Station – Unit 1
Docket No. 50-458
License No. NPF-47

REFERENCES:
1. William H. Bateman, Letter from NRC to Carl Terry, BWRVIP Chairman, Final Safety Evaluation of the "BWRVIP Vessel and Internals Project, BWRVIP Vessel and Internals Project ,Technical Basis for Revisions to Generic Letter 88-01 Inspection Schedules (BWRVIP-75)," EPRI Report TR-113932, October 1999 (TAC NO. MA5012), May 14, 2002
2. BWRVIP-75-A: BWRVIP Vessel and Internals Project ,Technical Basis for Revisions to Generic Letter 88-01 Inspection Schedules, Final Report, October 2005

Dear Sir or Madam:

In accordance with 10 CFR 50.55a, "Codes and Standards," paragraph (a)(3)(i), Entergy hereby requests NRC approval of the proposed alternative to American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, Sub Article IWB-2500 to implement the requirements of BWRVIP-75A, in lieu of the ASME Code, Section XI requirements and other augmented requirements, for the examination of Category B-F, Item Number B5.10 Nozzle-to-Safe End Butt Welds. This alternative is requested for the third 10-year interval of the River Bend Station (RBS) Inservice Inspection Program.

The NRC provided a Safety Evaluation (Reference 1) approving, with certain stipulations, the generic technical basis and acceptability criteria for application of BWRVIP-75, "BWR Vessel and Internals Project Technical Basis for Revisions to Generic Letter 88-01 Inspection Schedules," on May 14, 2002. Entergy utilized the revised version, BWRVIP-75A (Reference 2), which incorporated the NRC stipulations, in the development of this request for alternative.

A047
NRR

The details of the 10 CFR 50.55a proposed alternative are enclosed as Attachment 1. The components affected by this request are tabulated in Attachment 2. Attachment 3 provides a tabulation of the materials used in the fabrication and assembly of the components which comprise the subject nozzle-to-safe end weld joints. Attachment 4 addresses the specific measures RBS has previously taken and continues to implement to control and mitigate intergranular stress corrosion cracking (IGSCC).

Entergy requests approval of this alternative by December 31, 2010, to support planning for the sixteenth refueling outage (RF-16) at RBS, scheduled for early 2011.

This letter contains no new regulatory commitments.

If you have any questions concerning this letter, please contact me at 225-381-4157.

Respectfully,

Manager, Licensing
River Bend Station / Unit 1

DNL/bmb

Attachments:
1. Request for Alternative - RBS-ISI-014
2. Table of Affected Components
3. Table of Materials and Associated Drawings
4. Discussion of RBS-Specific IGSCC Control and Mitigation Measures

cc: Regional Administrator
U. S. Nuclear Regulatory Commission
Region IV
612 E. Lamar Blvd., Suite 400
Arlington, TX 76011-4125

NRC Senior Resident Inspector
P. O. Box 1050
St. Francisville, LA 70775

U. S. Nuclear Regulatory Commission
Attn: Mr. Alan B. Wang
MS O-7 D1
Washington, DC 20555-0001

Mr. Jeffrey P. Meyers
Louisiana Department of Environmental Quality
Office of Environmental Compliance
Attn. OEC - ERSD
P. O. Box 4312
Baton Rouge, LA 70821-4312

ATTACHMENT 1 TO

RBG-46978

RIVER BEND STATION – UNIT 1
THIRD 10 YEAR INTERVAL INSERVICE INSPECTION PROGRAM

REQUEST FOR ALTERNATIVE

RBS-ISI-014

RIVER BEND STATION – UNIT 1
THIRD 10 YEAR INTERVAL INSERVICE INSPECTION PROGRAM
REQUEST FOR ALTERNATIVE RBS-ISI-014

Component(s) Affected	See Attachment 2
Code Class:	ASME Code Class 1
References:	ASME Section XI 2001 Edition, 2003 Addenda, Table IWB-2500-1
Examination Category:	B-F, Pressure Retaining Dissimilar Metal Welds in Vessel Nozzles
Item Number:	B5.10, Nozzle –to-Safe End Butt Welds – NPS 4 or Larger
Unit / Inspection Interval Applicability:	River Bend Station (RBS), Third (3rd)10-year interval

I. Applicable Code Requirement(s)

ASME Code, Section XI, Subsection IWB-2412 requires an applicable percentage of the subject examinations to be completed in accordance with Table IWB-2412-1, except for those examinations that may be deferred until the end of the inspection interval. Table IWB-2412-1 defines the minimum and maximum percentage of examinations that may be completed each inspection period.

ASME Code, Section XI, Subsection IWB-2500 requires examinations be performed as specified in Table IWB-2500-1. The *Extent and Frequency of Examination* portion of the table requires that all Category B-F welds be examined over the 10-year ISI Interval.

Item B5.10 requires volumetric and surface examination of all Nozzle-to-Safe End Butt Welds. These welds are also covered by augmented examination requirements of NUREG-0313 (Reference 1) and Generic Letter 88-01, including Supplement 1 (references 2 and 3).

II. Relief Requested

Attachment 2 tabulates the specific B-F welds subjected to the inspection schedule and requirements of Table IWB-2500-1 and Generic Letter (GL) 88-01, including Supplement 1. Entergy proposes the alternative of using the schedules and frequencies specified in the BWRVIP-75-A (Reference 5) in lieu of the above listed ASME Code requirements. BWRVIP-75-A provides the technical basis for revisions to GL 88-01 Inspection Schedules, which supports reducing the number of welds examined in some categories, or increasing the interval between examinations in other categories.

III. Proposed Alternative and Basis for Use

Proposed Alternative

In lieu of the requirements of ASME Code, Section XI, 2001 Edition, 2003 Addenda, and as augmented by the requirements of NRC Generic Letter GL 88-01, including Supplement 1, Entergy requests to use the proposed alternative inspection guidance of BWRVIP-75-A. The Examination Method specified in Table IWB-2500-1 is not affected by this request.

Basis for Use

By letter dated May 14, 2002 (Reference 4), the NRC issued their Final Safety Evaluation (SE) for BWRVIP-75. In the SE, the NRC concluded that "licensee implementation of the guidelines of the BWRVIP-75 report, as modified, will provide an acceptable level of quality for inspection of safety-related components." The NRC further concluded that "the revised BWRVIP-75 guidance is acceptable for licensee referencing as the technical relief from, or as an alternative to, the ASME Code and 10 CFR 50.55a, in order to use the sample schedules and frequencies specified in the revised BWRVIP-75 report that are less than those required by the ASME Code."

BWRVIP-75-A is the updated (revised) version of the report that incorporated changes proposed by the BWRVIP in response to recommendations in the NRC Safety Evaluation, and other revisions as necessary identified since the publication of BWRVIP-75.

In conclusion, the proposed alternative use of BWRVIP-75-A, as defined in the NRC Final Safety Evaluation, in lieu of the above specified ASME Section XI Code requirements, will provide an acceptable level of quality and safety. Therefore, approval is requested pursuant to 10 CFR 50.55a(a)(3)(i).

IV. Duration of Proposed Alternative

Entergy proposes to use the alternative for the remainder of the Third Inservice Inspection (ISI) Interval for RBS, which began June 1, 2008 and ends May 31, 2018.

V. Precedents

The NRC Staff has approved similar Requests for Alternative for the following plants:

1. Edwin I. Hatch Nuclear Plant – Units 1 & 2, for their third Inservice ISI Interval as RR-39 TAC MC2383/2384, NRC SE dated January 7, 2005.
2. Vermont Yankee Nuclear Power Station for their fourth ISI Interval as RR-ISI-013, TAC MD0287, NRC SE dated November 15, 2006.

VI. References

1. W.S. Hazelton and W.H. Koo, "Technical Report on Material Selection and Processing Guidelines for BWR Coolant Pressure Boundary Piping," NUREG-0313, Rev. 2, USNRC, January 1988
2. USNRC Generic Letter 88-01, " NRC Position on IGSCC in BWR Austenitic Stainless Steel," January 25, 1988
3. USNRC Generic Letter 88-01, Supplement 1," NRC Position on Intergranular Stress Corrosion Cracking (IGSCC) in BWR Austenitic Stainless Steel," February 4, 1992
4. William H. Bateman, Letter from NRC to Carl Terry, BWRVIP Chairman, Final Safety Evaluation of the "BWRVIP Vessel and Internals Project, BWRVIP Vessel and Internals Project ,Technical Basis for Revisions to Generic Letter 88-01 Inspection Schedules (BWRVIP-75)," EPRI Report TR-113932, October 1999 (TAC NO. MA5012), May 14, 2002
5. BWRVIP-75-A: BWRVIP Vessel and Internals Project ,Technical Basis for Revisions to Generic Letter 88-01 Inspection Schedules, Final Report, October 2005

ATTACHMENT 2 TO

RBG-46978

TABLE OF AFFECTED COMPONENTS

RIVER BEND STATION – UNIT 1
THIRD 10 YEAR INTERVAL INSERVICE INSPECTION PROGRAM
REQUEST FOR ALTERNATIVE RBS-ISI-014

TABLE OF AFFECTED COMPONENTS

COMPONENT NO	CATEGORY	ITEM NUMBER	DESCRIPTION
B13-D001-N01A-2 B13-D001-N01B-2	B-F	B5.10	20.00" Reactor Recirculation Outlet Nozzle-to-Safe End Butt Weld
B13-D001-N02A-2 B13-D001-N02B-2 B13-D001-N02C-2 B13-D001-N02D-2 B13-D001-N02E-2 B13-D001-N02F-2 B13-D001-N02G-2 B13-D001-N02H-2 B13-D001-N02J-2 B13-D001-N02K-2	B-F	B5.10	10.00" Reactor Recirculation Inlet Nozzle-to-Safe End Butt Weld
B13-D001-N04B-2 B13-D001-N04C-2 B13-D001-N04D-2	B-F	B5.10	12.00" Feedwater Nozzle-to-Safe End Butt Weld (Note: B13-D001-N04A-2 safe end was removed during a previous outage, therefore is not included in this table)
B13-D001-N05A-2 B13-D001-N05B-2	B-F	B5.10	12.00" Core Spray Nozzle-to-Safe End Butt Weld
B13-D001-N06A-2 B13-D001-N06B-2 B13-D001-N06C-2	B-F	B5.10	10.00" Low Pressure Core Injection Nozzle-to-Safe End Butt Weld
B13-D001-N09A-2 B13-D001-N09B-2	B-F	B5.10	4.00" Jet Pump Instrumentation Nozzle-to-Safe End Butt Weld

ATTACHMENT 3 TO

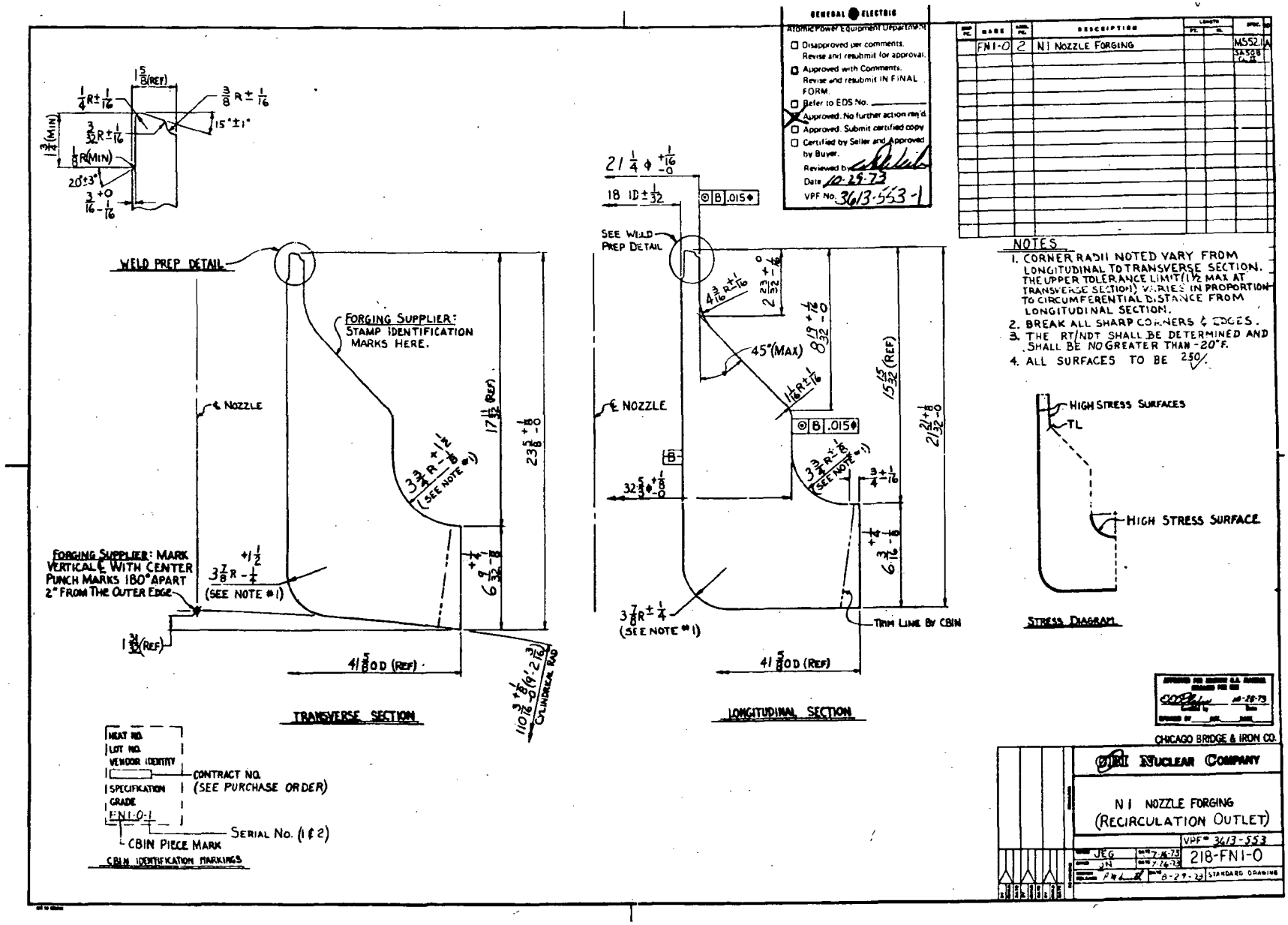
RBG-46978

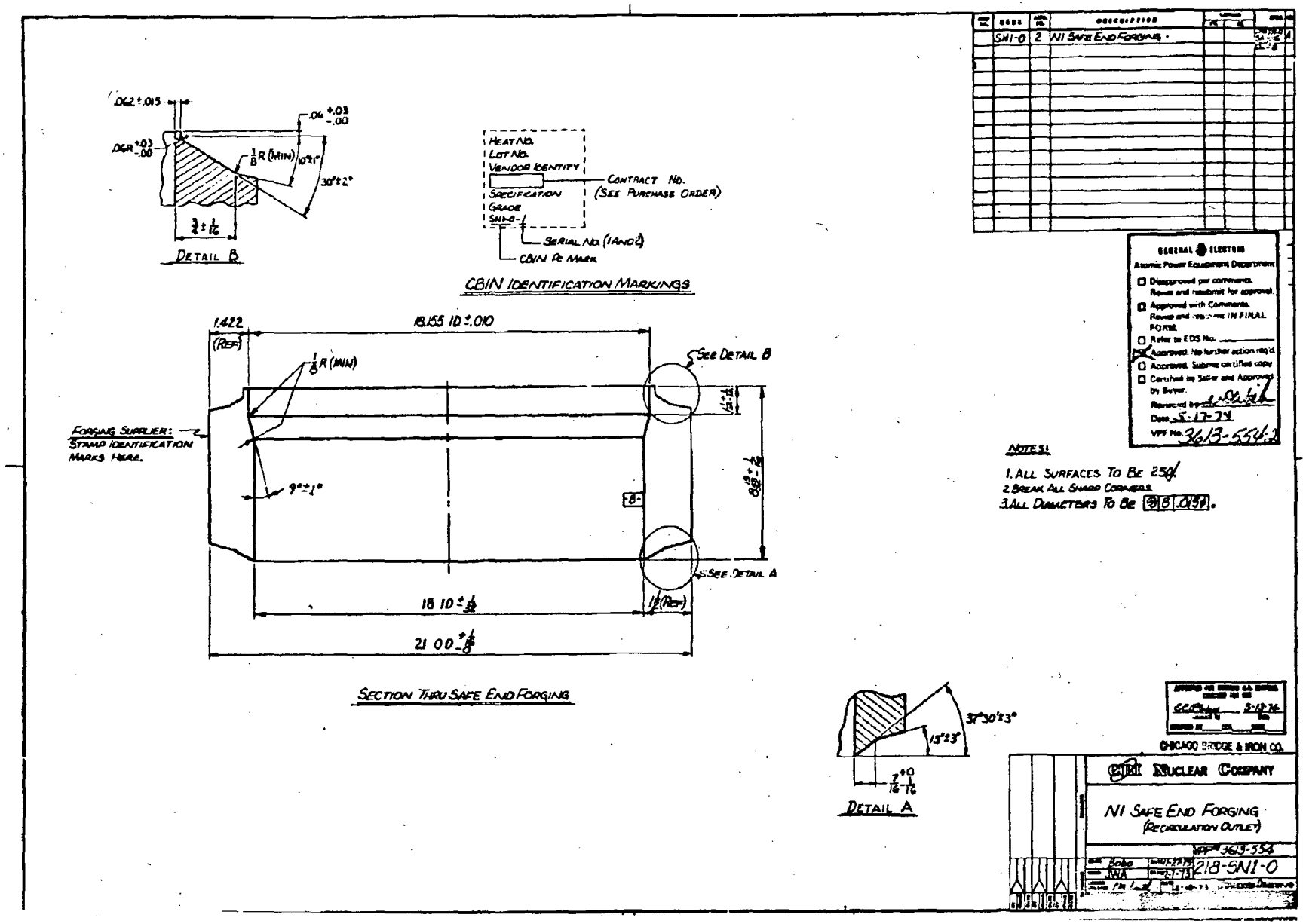
TABLE OF MATERIALS AND ASSOCIATED DRAWINGS

RIVER BEND STATION – UNIT 1
THIRD 10 YEAR INTERVAL INSERVICE INSPECTION PROGRAM
REQUEST FOR ALTERNATIVE RBS-ISI-014

TABLE OF MATERIALS AND ASSOCIATED DRAWINGS

COMPONENT NO	NOZZLE MATERIAL	SAFE END MATERIAL	WELD METAL MATERIAL	WELD BUILDUP MATERIAL	DRAWINGS (VPF#)
B13-D001-N01A-2 B13-D001-N01B-2	SA 508 CL 2	SA 336 CL F8	Inconel 182	Inconel 82	Nozzle: CBI 3613-553 Safe End: CBI 3613-554 Assembly: CBI 3614-487
B13-D001-N02A-2 B13-D001-N02B-2 B13-D001-N02C-2 B13-D001-N02D-2 B13-D001-N02E-2 B13-D001-N02F-2 B13-D001-N02G-2 B13-D001-N02H-2 B13-D001-N02J-2 B13-D001-N02K-2	SA 508 CL 2	WAS: SB 166 IS: SA 182 F316L	Inconel 182	Inconel 182	Nozzle: CBI 3613-555 Safe End (WAS): CBI 3613-556 Safe End (IS): GE 112D2847, CBI 6147-001 Assembly (WAS): CBI 3614-488 Assembly (IS): GE 22A6643AY
B13-D001-N04B-2 B13-D001-N04C-2 B13-D001-N04D-2	SA 508 CL 2	WAS: SB166 IS: SA 508 CL 1	Inconel 182	Inconel 82	Nozzle: CBI 3613-562 Safe End (WAS): CBI 3613-563 Safe End (IS): CBI 6071-700 Machining Detail: CBI 6159-1 Assembly (WAS): CBI 3614-490 Assembly (IS): GE 22A5536AS
B13-D001-N05A-2 B13-D001-N05B-2	SA 508 CL 2	SB 166	Inconel 182	Inconel 82	Nozzle: CBI 3613-567 Safe End: CBI 3613-568 Assembly: CBI 3614-491
B13-D001-N06A-2 B13-D001-N06B-2 B13-D001-N06C-2	SA 508 CL 2	SB 166	Inconel 182	Inconel 82	Nozzle: CBI 3613-572 Safe End: CBI 3613-573 Assembly: CBI 3614-492
B13-D001-N09A-2 B13-D001-N09B-2	SA 508 CL 2	SA 336 CL F8	Inconel 182	Inconel 82	Nozzle: CBI 3613-579 Safe End: CBI 3613-580 Assembly: CBI 3614-495

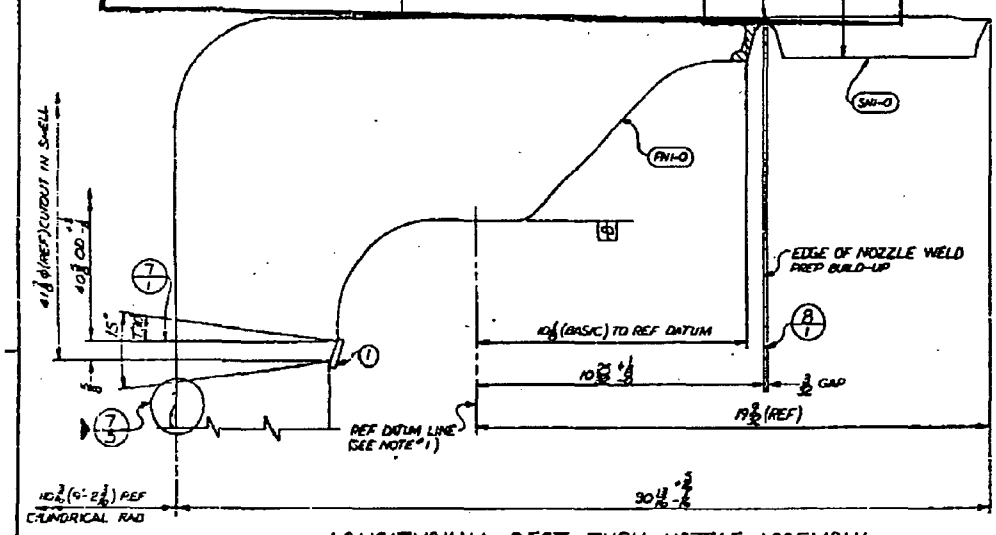

GENERAL ELECTRIC
Atomic Power Equipment Department
Disapproved per comments. Revise and resubmit for approval.
Approved with Comments. Revise and resubmit IN FINAL FORM.
Refer to EDS No.
Approved. No further action req'd.
Approved. Submit certified copy
Certified by Seller and Approved by Buyer.
Reviewed by
Date 10-29-73
VPF No. 3613-553-1
FN1-0 2 N1 NOZZLE FORGING MS52.1A
NOTES
1. CORNER RADII NOTED VARY FROM LONGITUDINAL TO TRANSVERSE SECTION. THE UPPER TOLERANCE LIMIT (1½ MAX AT TRANSVERSE SECTION) VARIES IN PROPORTION TO CIRCUMFERENTIAL DISTANCE FROM LONGITUDINAL SECTION.
2. BREAK ALL SHARP CORNERS & EDGES.
3. THE RT/NDT SHALL BE DETERMINED AND SHALL BE NO GREATER THAN -20°F.
4. ALL SURFACES TO BE 250
WELD PREP DETAIL
FORGING SUPPLIER: STAMP IDENTIFICATION MARKS HERE.
℄ NOZZLE
FORGING SUPPLIER: MARK VERTICAL ℄ WITH CENTER PUNCH MARKS 180° APART 2" FROM THE OUTER EDGE
(SEE NOTE #1)
41 5/8 OD (REF)
TRANSVERSE SECTION
SEE WELD PREP DETAIL
45° (MAX)
TRIM LINE BY CBIN
LONGITUDINAL SECTION
HIGH STRESS SURFACES
TL
HIGH STRESS SURFACE
STRESS DIAGRAM
HEAT NO.
LOT NO.
VENDOR IDENTITY
CONTRACT NO. (SEE PURCHASE ORDER)
SPECIFICATION GRADE
FN1-0-1
SERIAL No. (1 & 2)
CBIN PIECE MARK
CBIN IDENTIFICATION MARKINGS
CHICAGO BRIDGE & IRON CO.
CBI NUCLEAR COMPANY
N1 NOZZLE FORGING
(RECIRCULATION OUTLET)
VPF# 3613-553
218-FN1-0
STANDARD DRAWING


SN1-0 2 N1 SAFE END FORGING
.062 ± .015
.06 +.03 -.00
.06R +.03 -.00
1/8 R (MIN)
10°±1°
30°±2°
3/4 ± 1/16
DETAIL B
HEAT NO.
LOT NO.
VENDOR IDENTITY
SPECIFICATION
GRADE
SN1-0-1
CONTRACT NO.
(SEE PURCHASE ORDER)
SERIAL NO. (1 AND 2)
CBIN PC MARK
CBIN IDENTIFICATION MARKINGS
1.422 (REF)
18.155 ID ± .010
1/8 R (MIN)
SEE DETAIL B
FORGING SUPPLIER: STAMP IDENTIFICATION MARKS HERE.
9°±1°
-B-
SEE DETAIL A
18 ID ± 1/32
1 1/2 (REF)
21 OD +1/8 -1/8
SECTION THRU SAFE END FORGING
37°30'±3°
15°±3°
7/16 +0 -1/16
DETAIL A
GENERAL ELECTRIC
Atomic Power Equipment Department
Disapproved per comments. Revise and resubmit for approval.
Approved with Comments. Revise and resubmit IN FINAL FORM.
Refer to EDS No.
Approved. No further action req'd
Approved. Submit certified copy
Certified by Seller and Approved by Buyer.
Date 5-17-74
VPF No. 3613-554-2
NOTES:
1. ALL SURFACES TO BE 250
2. BREAK ALL SHARP CORNERS.
3. ALL DIAMETERS TO BE .015
CHICAGO BRIDGE & IRON CO.
NUCLEAR COMPANY
N1 SAFE END FORGING
(RECIRCULATION OUTLET)
3613-554
218-SN1-0

REVIEW RECORD	REVIEWED BY	DATE
T. B. MADDEN	TBM	1/7/77
M. L. BOOTHBY	MLB	1-14-77
J. E. CONWAY	J E Conway	1/21/77

2 copies

MARK	QTY	DESCRIPTION				
FNI-0	2	NI NOZZLE FORGING				
		(BILLED/DETAILED ON DWG "2B-FNI-0)				
SNI-0	2	NI SAFE END FORGING				
		(BILLED/DETAILED ON DWG "2B-SNI-0)				
3B-1	2	BU BAR 1" x 3/16" x SPACIN ON OUTS 11				
		(7/16 BAR 13-1/4)				
3B-2	2	3/32 V-TYPE "WELDING" GROOVE				
		INSERT OR APPD EQ FOR 18 ID				
		TUBING				

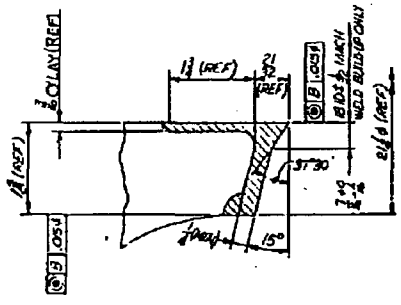


LONGITUDINAL SECT THRU NOZZLE ASSEMBLY

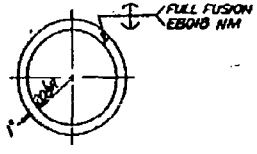
NOTES:
1. SCRIBE REF DATUM LINE ON OUTSIDE OF NOZZLE BEFORE INCONEL BUILD-UP IS APPLIED.
2. APPLY INCONEL BUILD-UP / MACHINE NOZZLE WELD PREP USING THE DIMENSIONS FROM REFERENCE DATUM LINE AS THE CONTROLLING DIMENSIONS.
3. ATTACH SAFE END AFTER FINAL PWHT.

GENERAL ELECTRIC
NUCLEAR ENERGY DIVISION
☐ Disapproved per comments
Revise and resubmit for approval
☐ Approved with Comments.
Revise and resubmit in FINAL FORM.
☐ Refer to EDS No.
☒ Approved. No further action req'd
☐ Approved. Submit certified copy
☐ Certified by Seller and Approved by Buyer.
Reviewed by
Date 3-11-74
VFF No.

RIVERBEND 1&2
MPL # B13-D003



DETAIL OF NOZZLE WELD PREP



DETAIL ①

2B-SNI-0	NI SAFE END FORGING
2B-FNI-0	NI NOZZLE FORGING
21	"I SHELL & NS
8	SEAM DETAILS (SEE 1/3)
7	SEAM DETAILS (NOZZLE)
4	GEN NOTES & TOL
SFD-1-0	TOLERANCE SYM

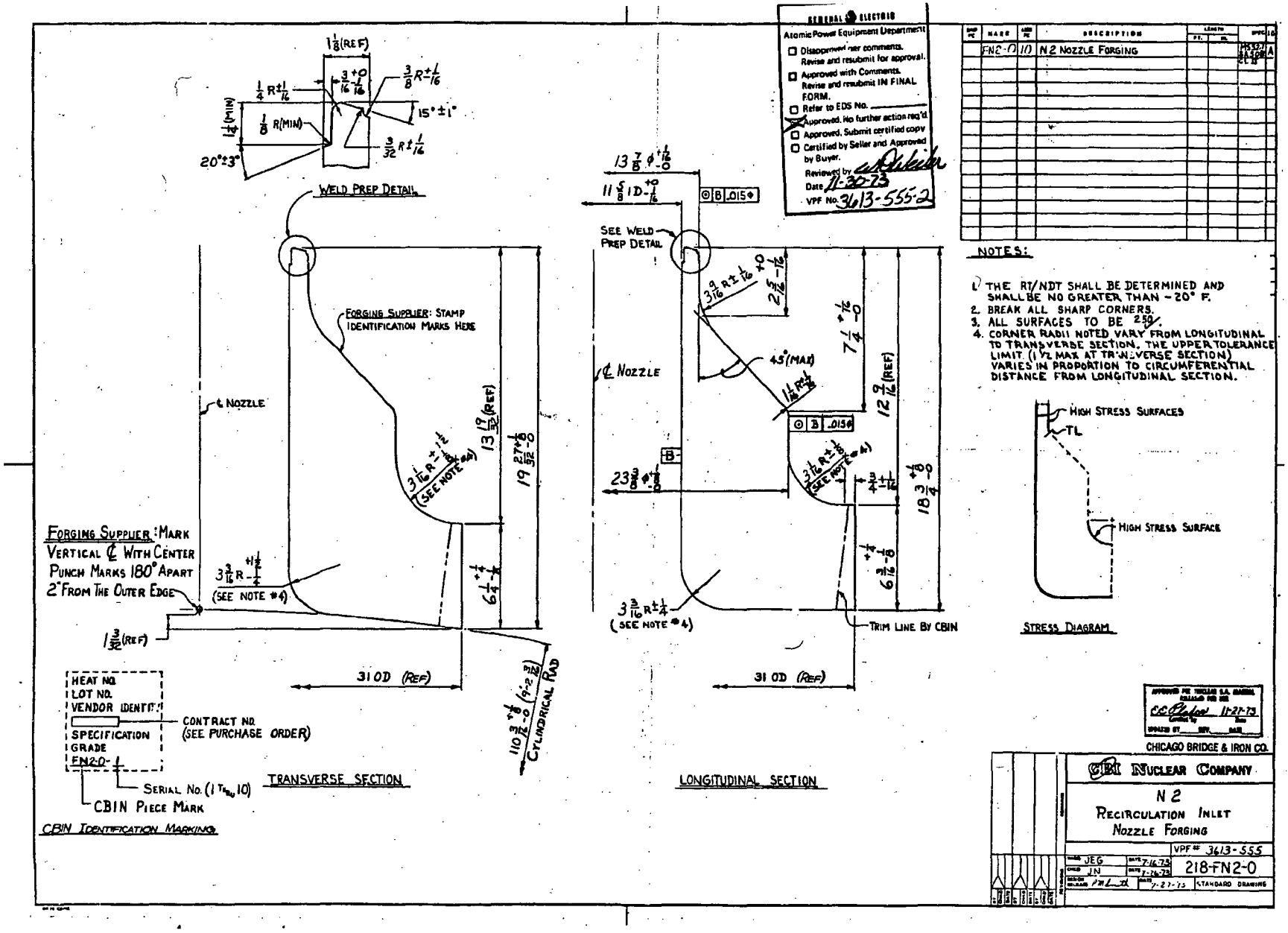
CHICAGO BRIDGE & IRON CO

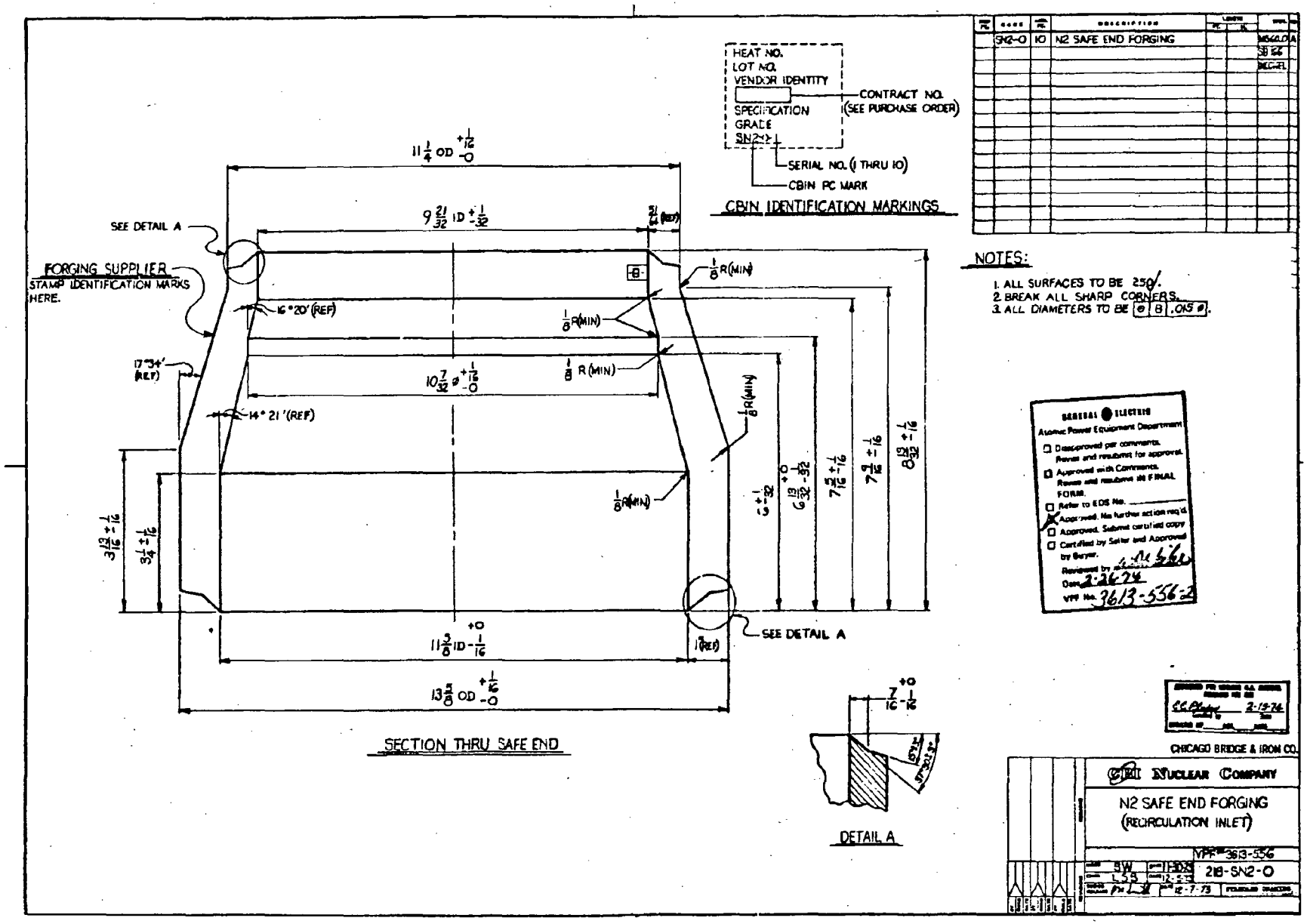
GE NUCLEAR COMPANY

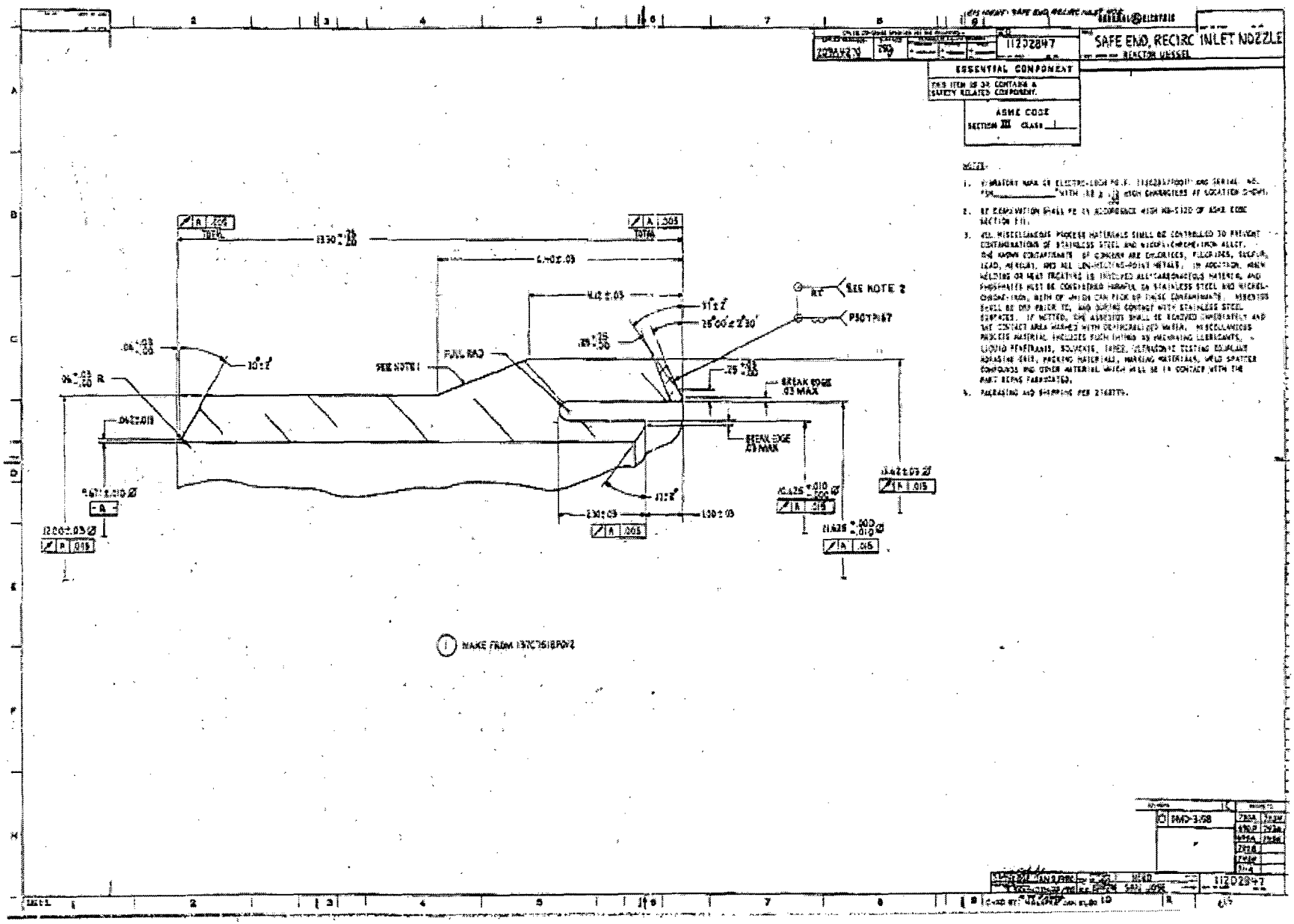
NI NOZZLE ASSEMBLY
(RECIRCULATION OUTLET)

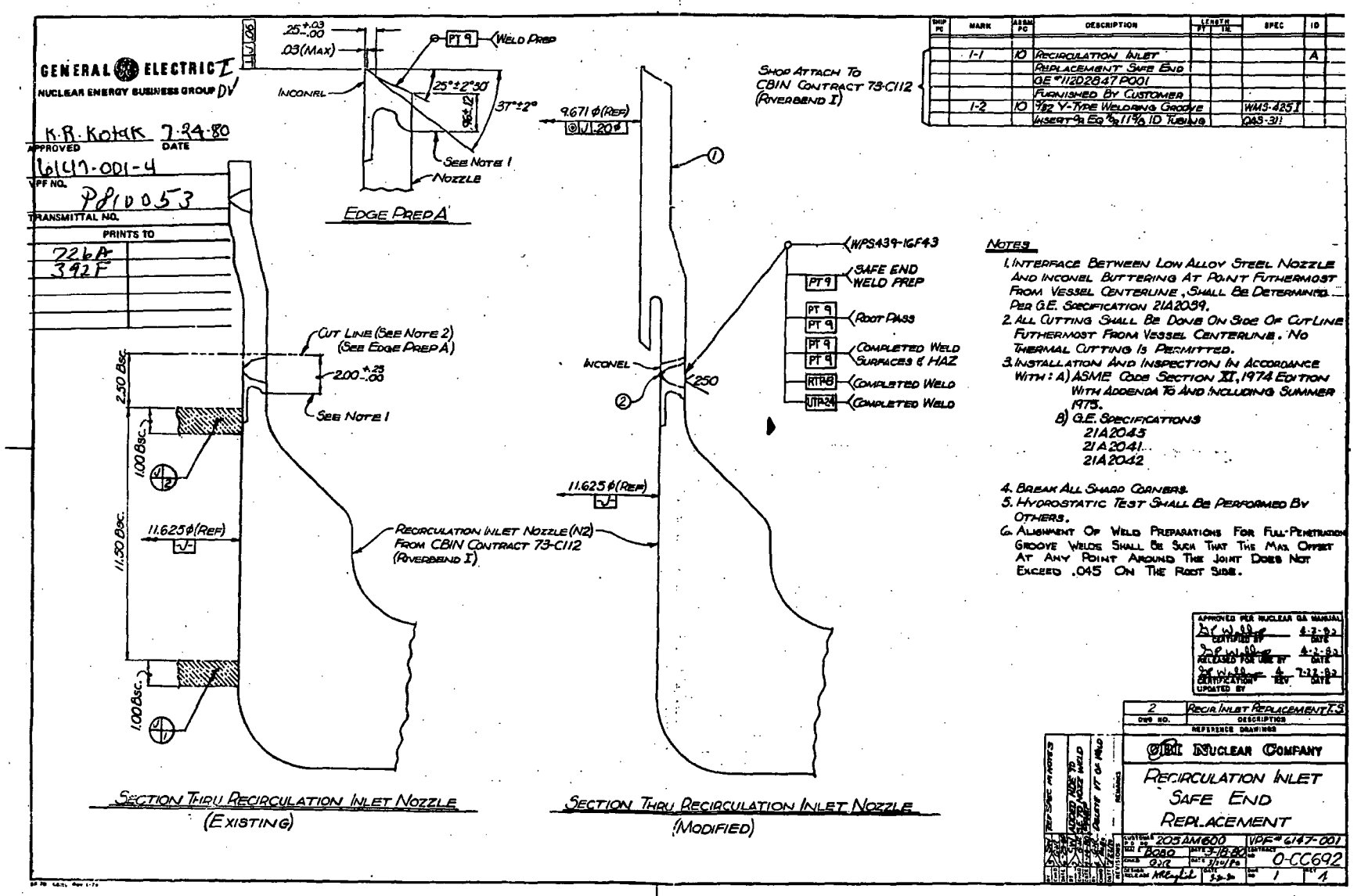
205 HB968 | APF 3614-487
RPS | 73-C112
JFG
1-3-74 | 38 | 2

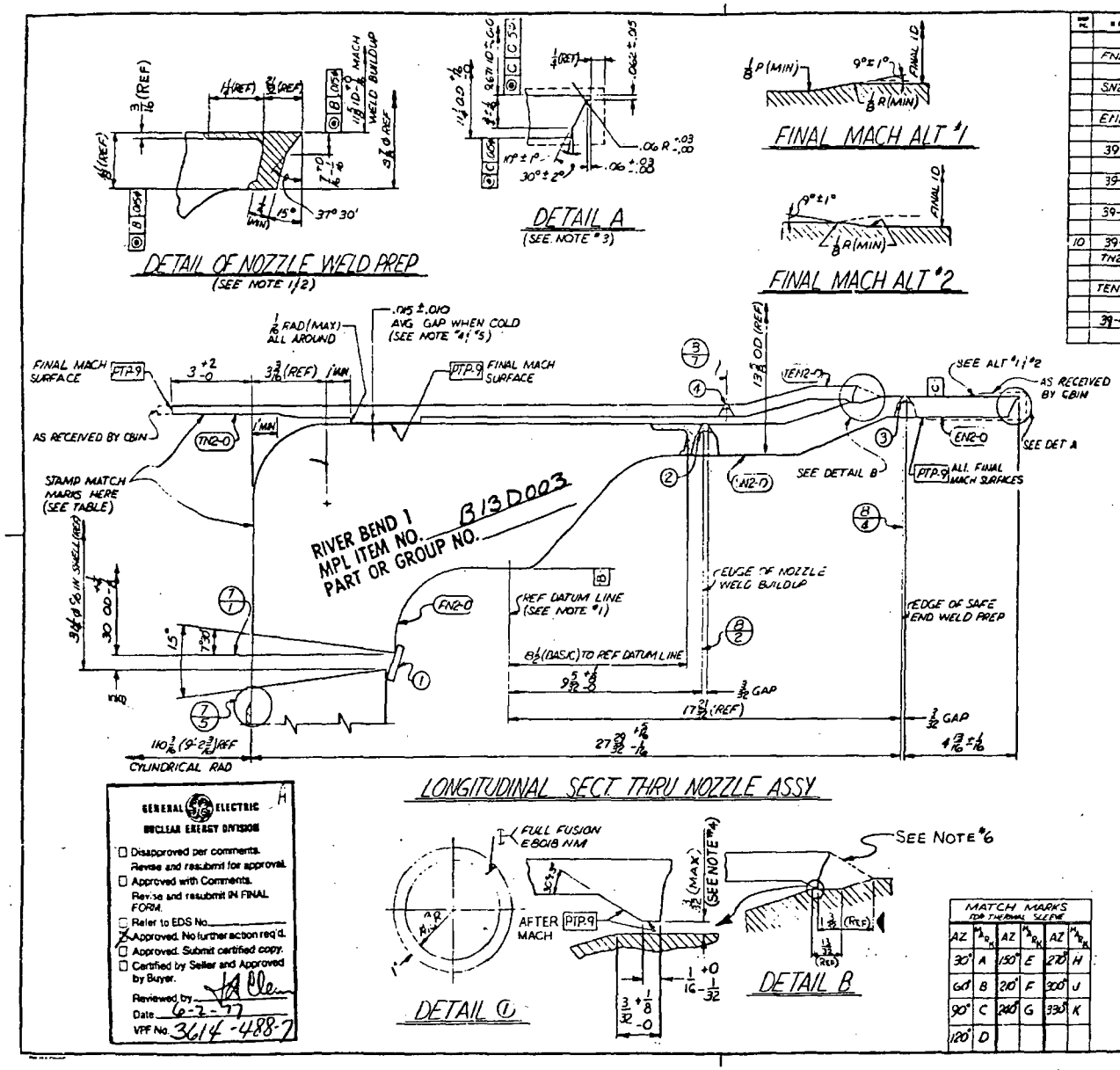
3614-487-3


WELD PREP DETAIL
FORGING SUPPLIER: STAMP IDENTIFICATION MARKS HERE
℄ NOZZLE
FORGING SUPPLIER: MARK VERTICAL ℄ WITH CENTER PUNCH MARKS 180° APART 2" FROM THE OUTER EDGE
(SEE NOTE #4)
31 OD (REF)
CYLINDRICAL ROD
HEAT NO.
LOT NO.
VENDOR IDENTIF.
SPECIFICATION GRADE
FN2-0-
CONTRACT NO. (SEE PURCHASE ORDER)
SERIAL NO.
CBIN PIECE MARK
CBIN IDENTIFICATION MARKING
TRANSVERSE SECTION
SEE WELD PREP DETAIL
45°(MAX)
TRIM LINE BY CBIN
LONGITUDINAL SECTION
HIGH STRESS SURFACES
TL
HIGH STRESS SURFACE
STRESS DIAGRAM
GENERAL ELECTRIC
Atomic Power Equipment Department
Approved. No further action req'd.
Approved. Submit certified copy
Reviewed by
Date 11-30-73
VPF No. 3613-555-2
NOTES:
1. THE RT/NDT SHALL BE DETERMINED AND SHALL BE NO GREATER THAN -20° F.
2. BREAK ALL SHARP CORNERS.
3. ALL SURFACES TO BE 250
4. CORNER RADII NOTED VARY FROM LONGITUDINAL TO TRANSVERSE SECTION. THE UPPER TOLERANCE LIMIT (1 1/2 MAX AT TRANSVERSE SECTION) VARIES IN PROPORTION TO CIRCUMFERENTIAL DISTANCE FROM LONGITUDINAL SECTION.
CHICAGO BRIDGE & IRON CO.
CBI NUCLEAR COMPANY
N2
RECIRCULATION INLET NOZZLE FORGING
VPF # 3613-555
218-FN2-0
STANDARD DRAWING


SN2-0 10 N2 SAFE END FORGING
HEAT NO.
LOT NO.
VENDOR IDENTITY
SPECIFICATION
GRADE
SN2-0
CONTRACT NO. (SEE PURCHASE ORDER)
SERIAL NO. (1 THRU 10)
CBIN PC MARK
CBIN IDENTIFICATION MARKINGS
NOTES:
1. ALL SURFACES TO BE 250.
2. BREAK ALL SHARP CORNERS.
3. ALL DIAMETERS TO BE ⌀ B .015 ⌀.
SEE DETAIL A
FORGING SUPPLIER
STAMP IDENTIFICATION MARKS HERE.
16°20' (REF)
17°34' (REF)
14°21' (REF)
SEE DETAIL A
SECTION THRU SAFE END
DETAIL A
GENERAL ELECTRIC
Atomic Power Equipment Department
Disapproved per comments. Revise and resubmit for approval.
Approved with Comments. Revise and resubmit in FINAL FORM.
Refer to EDS No.
Approved. No further action req'd.
Approved. Submit certified copy
Certified by Seller and Approved by Buyer.
Reviewed by
Date 2-26-74
VPF No. 3613-556-2
CHICAGO BRIDGE & IRON CO.
CBI NUCLEAR COMPANY
N2 SAFE END FORGING
(RECIRCULATION INLET)
VPF 3613-556
218-SN2-0
12-7-73


SAFE END, RECIRC INLET NOZZLE
REACTOR VESSEL
11202847
ESSENTIAL COMPONENT
ASME CODE
SECTION III CLASS 1
SEE NOTE 2
SEE NOTE 1
FULL RAD
BREAK EDGE .03 MAX
MAKE FROM 137C7618P012
11202847


GENERAL ELECTRIC
NUCLEAR ENERGY BUSINESS GROUP
K.R. Kotak 7-24-80
APPROVED DATE
6147-001-4
VPF NO.
P810053
TRANSMITTAL NO.
PRINTS TO
726A
392F
.25 +.03 -.00
.03 (MAX)
PT 9
WELD PREP
INCONEL
25°±2°30'
37°±2°
SEE NOTE 1
NOZZLE
EDGE PREP A
9.671 ϕ (REF)
.20ϕ
SHOP ATTACH TO CBIN CONTRACT 73-C112 (RIVERBEND I)
WPS439-16F43
SAFE END WELD PREP
ROOT PASS
COMPLETED WELD SURFACES & HAZ
COMPLETED WELD
COMPLETED WELD
CUT LINE (SEE NOTE 2) (SEE EDGE PREP A)
2.00 +.25 -.00
SEE NOTE 1
2.50 BSC.
1.00 BSC.
11.50 BSC.
11.625 ϕ (REF)
RECIRCULATION INLET NOZZLE (N2) FROM CBIN CONTRACT 73-C112 (RIVERBEND I)
INCONEL
.250
11.625 ϕ (REF)
SECTION THRU RECIRCULATION INLET NOZZLE (EXISTING)
SECTION THRU RECIRCULATION INLET NOZZLE (MODIFIED)
NOTES
1. INTERFACE BETWEEN LOW ALLOY STEEL NOZZLE AND INCONEL BUTTERING AT POINT FUTHERMOST FROM VESSEL CENTERLINE, SHALL BE DETERMINED PER G.E. SPECIFICATION 21A2039.
2. ALL CUTTING SHALL BE DONE ON SIDE OF CUTLINE FUTHERMOST FROM VESSEL CENTERLINE. NO THERMAL CUTTING IS PERMITTED.
3. INSTALLATION AND INSPECTION IN ACCORDANCE WITH: A) ASME CODE SECTION XI, 1974 EDITION WITH ADDENDA TO AND INCLUDING SUMMER 1975.
B) G.E. SPECIFICATIONS 21A2043 21A2041 21A2042
4. BREAK ALL SHARP CORNERS.
5. HYDROSTATIC TEST SHALL BE PERFORMED BY OTHERS.
6. ALIGNMENT OF WELD PREPARATIONS FOR FULL-PENETRATION GROOVE WELDS SHALL BE SUCH THAT THE MAX OFFSET AT ANY POINT AROUND THE JOINT DOES NOT EXCEED .045 ON THE ROOT SIDE.
APPROVED PER NUCLEAR QA MANUAL
CERTIFIED BY 4-2-82 DATE
RELEASED FOR USE BY 4-2-82 DATE
CERTIFICATION UPDATED BY 4 REV 7-22-82 DATE
2 RECIR. INLET REPLACEMENT T.S.
DWG NO. DESCRIPTION
REFERENCE DRAWINGS
GEI NUCLEAR COMPANY
RECIRCULATION INLET SAFE END REPLACEMENT
205AM600 VPF# 6147-001
B080 3-18-80 0-CC692
1 1



REF PC.	NAME	ITEM PC.	DESCRIPTION	LENGTH FT.	LENGTH IN.	SPEC.	LB.	
	FN2-0	10	N2 NOZZLE FORGING			SA 508 CL 2		18
			(BILLED & DETAILED ON DWG 218-FN2-0)					
	SN2-0	10	N2 SAFE END FORGING			SB166		18
			(BILLED & DETAILED ON DWG 218-SN2-0)					
	EN2-0	10	N2 SAFE END EXTENSION FORGING			SA 336 CL 2		19
			(BILLED & DETAILED ON DWG 218-EN2-0)					
	39-1	10	B.J. BAR 1 1/2 x 5/8 x 5/8 FINISH ON OUTSIDE	8	3 11/32	SA 533 CL 2	0	18
			(1/2 BAR 10 - 4 5/8)					
	39-2	10	5/32 Y-TYPE "WELDRING" GROOVE			INCONEL		19
			INSERT 3/8 APPD EQ FOR 11 5/8 ID TUBING			B2		
	39-3	10	5/32 Y-TYPE WELDRING GROOVE INSERT			INCONEL		19
			3/8 APPD EQ FOR 9 11/16 ID TUBING			B2		
10	39-8		N2 THERMAL SLEEVE ASSY					
	TN2-0	10	N2 THERMAL SLEEVE FORGING			SA 336 CL 2		74
			(BILLED & DETAILED ON DWG 218-TN2-0)					
	TEN2-0	10	N2 THERMAL SLEEVE EXTENSION			SB166		74
			(BILLED & DETAILED ON DWG 218-TEN2-0)					
	39-4	10	5/32 Y-TYPE "WELDRING" GROOVE INSERT			INCONEL		74
			3/8 APPD EQ FOR 10 1/8 ID TUBING			B2		

NOTES:

1. SCRIBE REFERENCE DATUM LINE ON OUTSIDE OF NOZZLE BEFORE INCONEL BUILD-UP IS APPLIED.
2. APPLY INCONEL BUILD-UP & MACHINE NOZZLE WELD PREP USING THE DIMENSION FROM THE REF DATUM LINE AS THE CONTROLLING DIMENSION.
3. ATTACH SAFE END & EXTENSION AFTER FINAL PWHT. RESTAMP CBIN IDENTIFICATION MARKS AFTER MACHINING.
4. MACHINE THERMAL SLEEVE AS REQUIRED TO MAINTAIN GAP & PROJECTION, THEN MATCH MARK THERMAL SLEEVE AS SHOWN IN TABLE.
5. ORIENT THERMAL SLEEVE WITH ONE PAD TOWARD TOP OF VESSEL.
6. INCONEL WELD BY OTHERS TO FILL GROOVE AND FORM SMOOTH TRANSITION FROM SAFE END TO THERMAL SLEEVE.

218-TEN2-0	N2 THERMAL SLEEVE EXT
218-TN2-0	N2 THERMAL SLEEVE
218-EN2-0	N2 SAFE END EXT
218-SN2-0	N2 SAFE END
218-FN2-0	N2 NOZZLE FORGING
21	#1 SHELL RING
8	SEAM DETAILS (S.E. & T.S.)
7	SEAM DETAILS NOZZLE
4	GENERAL NOTES & TOL
STD-1-0	TOLERANCE SYMBOLS

MATCH MARKS FOR THERMAL SLEEVE

AZ	MARK	AZ	MARK	AZ	MARK
30°	A	150°	E	270°	H
60°	B	210°	F	300°	J
90°	C	240°	G	330°	K
120°	D				

APPROVED FOR NUCLEAR U.S. MARINE RELEASED FOR USE
5-13-74
CHICAGO BRIDGE & IRON CO.

CBI NUCLEAR COMPANY

N2 NOZZLE ASSEMBLY
(RECIRCULATION INLET)

205H8968 VPF 3614-488
RPS
73-C112
39 6

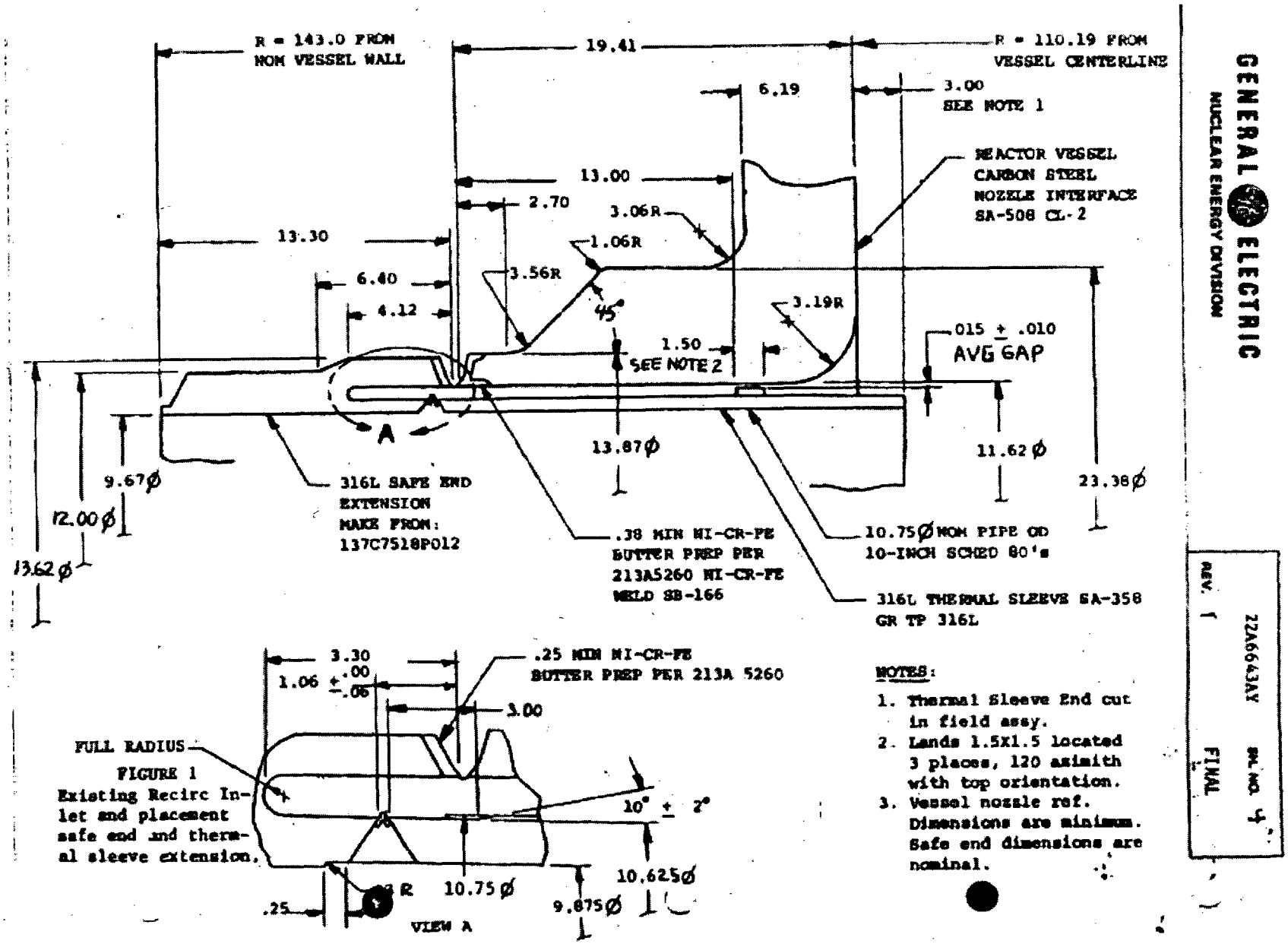
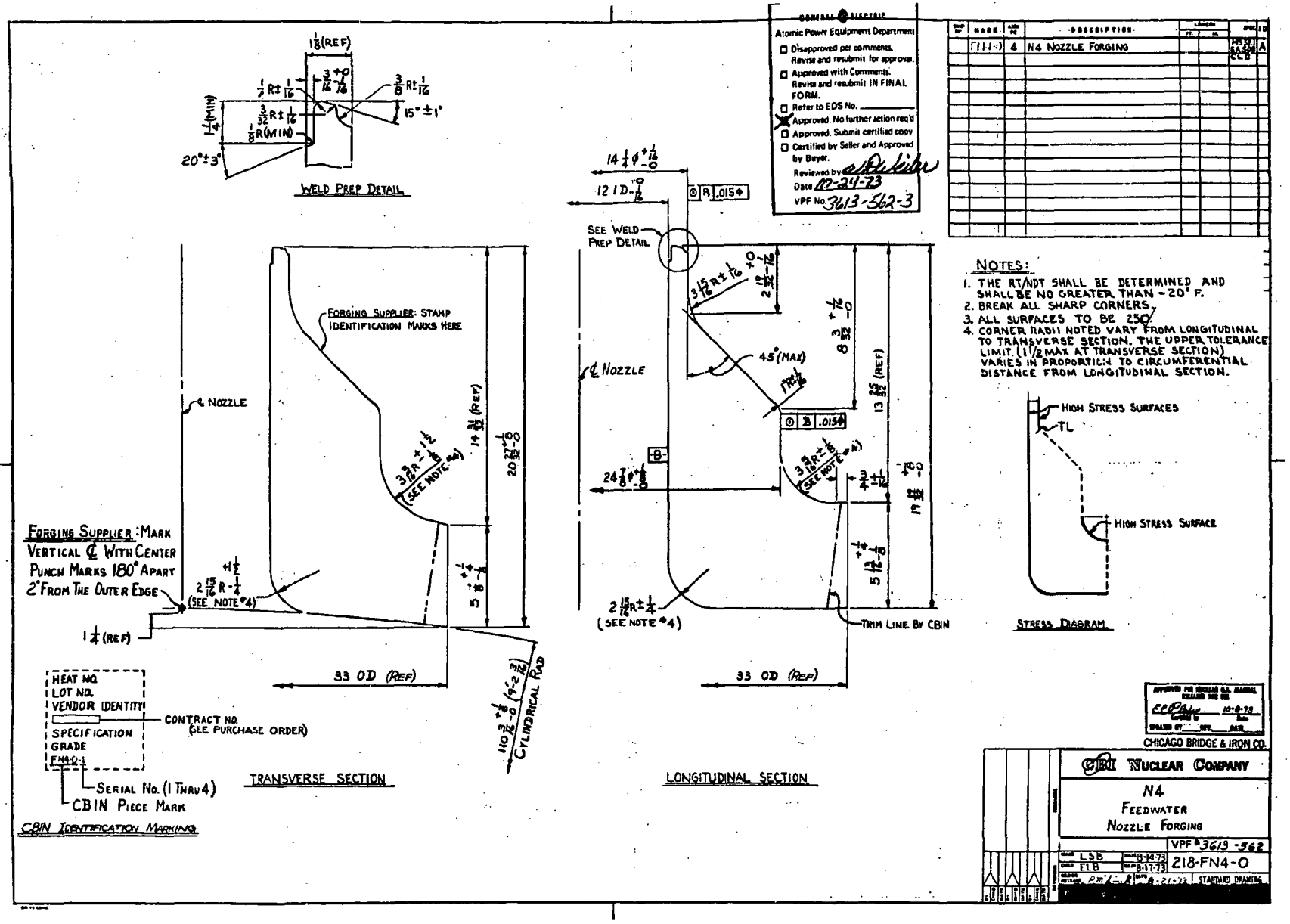
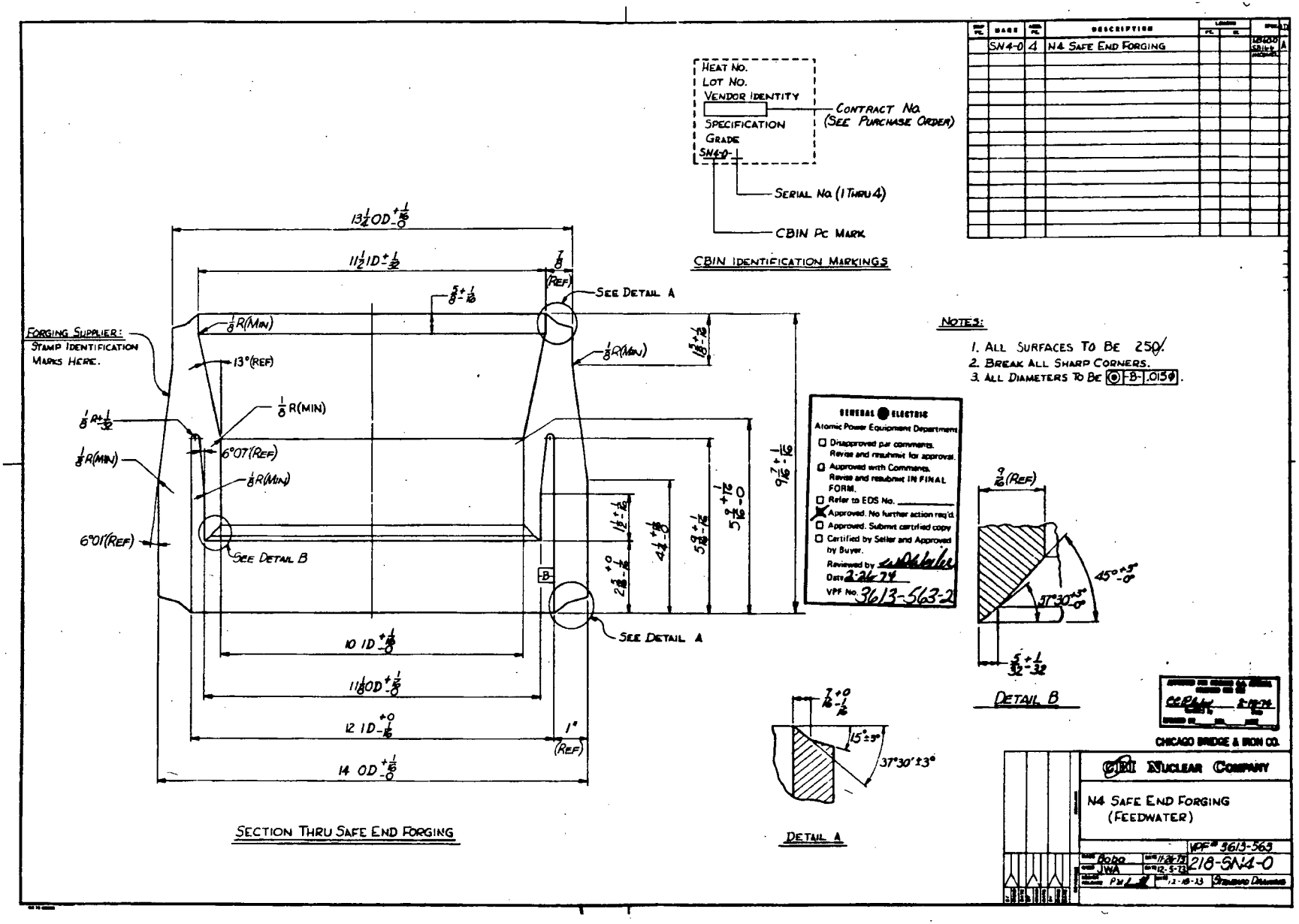


FIGURE 1
Existing Recirc Inlet and placement safe end and thermal sleeve extension.

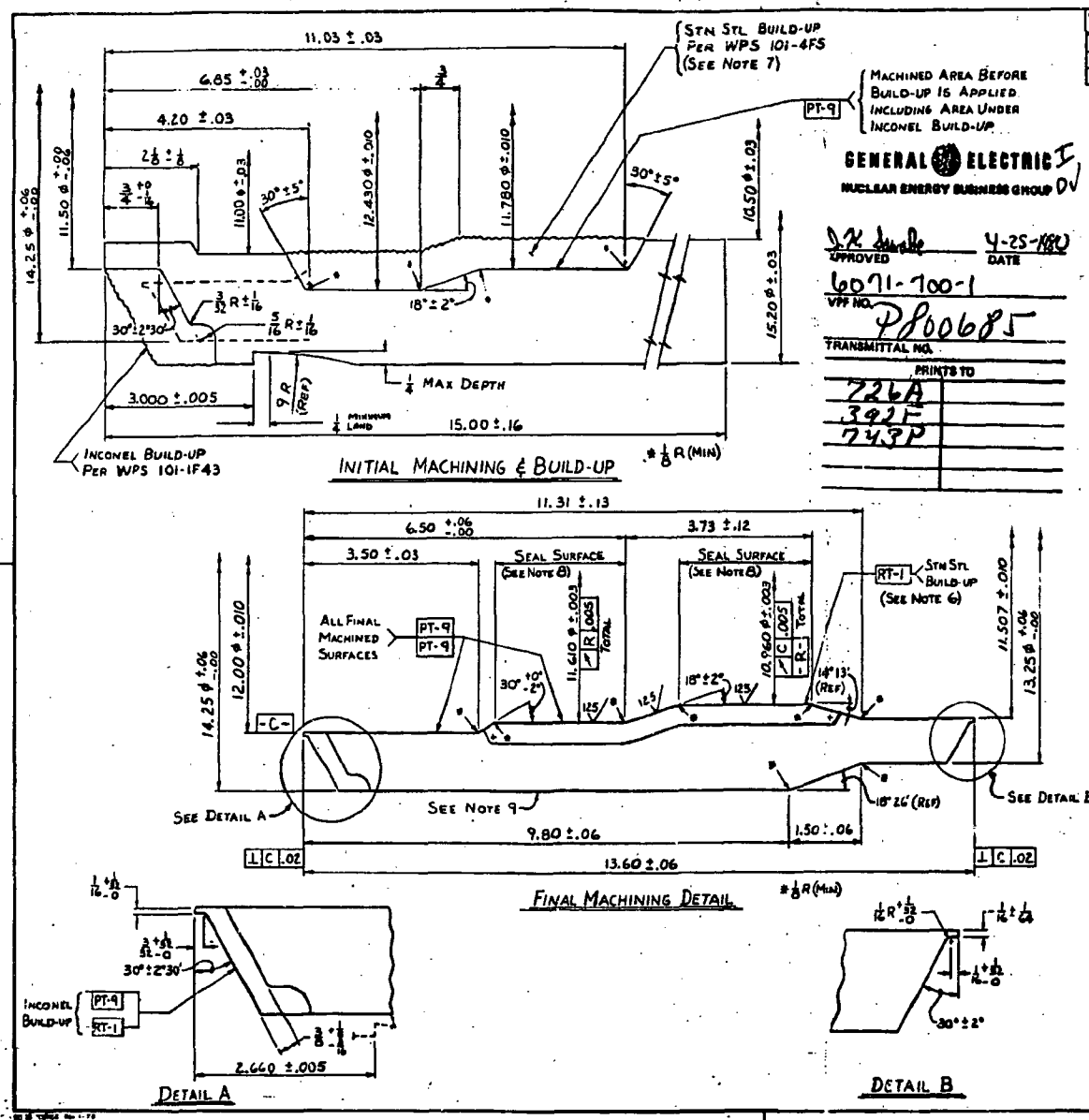
NOTES:

1. Thermal Sleeve End cut in field assy.
2. Lands 1.5X1.5 located 3 places, 120 azimith with top orientation.
3. Vessel nozzle ref. Dimensions are minimum. Safe end dimensions are nominal.


WELD PREP DETAIL
TRANSVERSE SECTION
LONGITUDINAL SECTION
STRESS DIAGRAM
HIGH STRESS SURFACES
HIGH STRESS SURFACE
FORGING SUPPLIER: STAMP IDENTIFICATION MARKS HERE
FORGING SUPPLIER: MARK VERTICAL ℄ WITH CENTER PUNCH MARKS 180° APART 2" FROM THE OUTER EDGE
℄ NOZZLE
SEE WELD PREP DETAIL
SEE NOTE #4
TRIM LINE BY CBIN
33 OD (REF)
CYLINDRICAL RAD
HEAT NO.
LOT NO.
VENDOR IDENTITY
CONTRACT NO. (SEE PURCHASE ORDER)
SPECIFICATION
GRADE
SERIAL NO. (1 THRU 4)
CBIN PIECE MARK
CBIN IDENTIFICATION MARKING
Atomic Power Equipment Department
Approved. No further action req'd
VPF No. 3613-562-3
N4 NOZZLE FORGING
NOTES:
1. THE RT/NDT SHALL BE DETERMINED AND SHALL BE NO GREATER THAN -20° F.
2. BREAK ALL SHARP CORNERS.
3. ALL SURFACES TO BE 250.
4. CORNER RADII NOTED VARY FROM LONGITUDINAL TO TRANSVERSE SECTION. THE UPPER TOLERANCE LIMIT (1 1/2 MAX AT TRANSVERSE SECTION) VARIES IN PROPORTION TO CIRCUMFERENTIAL DISTANCE FROM LONGITUDINAL SECTION.
CHICAGO BRIDGE & IRON CO.
CBI NUCLEAR COMPANY
N4
FEEDWATER
NOZZLE FORGING
VPF # 3613-562
218-FN4-0
STANDARD DRAWING


HEAT NO.
LOT NO.
VENDOR IDENTITY
SPECIFICATION
GRADE
SN4-0-
CONTRACT NO. (SEE PURCHASE ORDER)
SERIAL NO. (1 THRU 4)
CBIN PC MARK
CBIN IDENTIFICATION MARKINGS
FORGING SUPPLIER: STAMP IDENTIFICATION MARKS HERE.
SEE DETAIL A
SEE DETAIL B
SECTION THRU SAFE END FORGING
DETAIL A
DETAIL B
NOTES:
1. ALL SURFACES TO BE 250
2. BREAK ALL SHARP CORNERS.
3. ALL DIAMETERS TO BE ⊙-B-.015Ø.
GENERAL ELECTRIC
Atomic Power Equipment Department
Approved. No further action req'd.
VPF No. 3613-563-2
SN4-0
4
N4 SAFE END FORGING
CHICAGO BRIDGE & IRON CO.
CBI NUCLEAR COMPANY
N4 SAFE END FORGING
(FEEDWATER)
VPF # 3613-563
218-SN4-0

SHEET PT	MARK	ALSO	DESCRIPTION	LENGTH FT	LENGTH IN	SPEC	ID	
4	1-1		SAFE END FORGING			MS 53.0	A	2
			(M/E FORGING 15.20 OD X			SA 508 CL1		
			10.50 ID X 15.00 LONG)			QAS 51.1		



GENERAL ELECTRIC I
NUCLEAR ENERGY BUSINESS GROUP DV

APPROVED — DATE 4-25-1980

6071-700-1
VPF NO.

P800685
TRANSMITTAL NO.

PRINTS TO
726A
392F
743P

NOTES:

1. FABRICATION AND INSPECTION IN ACCORDANCE WITH:
   (A) G.E. DESIGN SPEC 22A5538
   (B) G.E. DESIGN SPEC DATA SHEET 22A5538AS
   (C) ASME CODE SECTIONS II & III, 1974 EDITION WITH ADDENDA TO AND INCLUDING SUMMER 1976 AND CODE CASES 1332-6.
2. ALL DIAMETERS, UNLESS OTHERWISE NOTED TO BE
   ⊥ C .015 TOTAL ~ FOR FINAL MACHINING
3. ALL SURFACES TO BE 250 √ UNLESS SHOWN OTHERWISE.
4. BREAK ALL SHARP CORNERS.
5. SHOP CAUTION: CARBON STEEL SAFE END SHALL NOT BE POST WELD HEAT TREATED ANY TIME AFTER STAINLESS BUTTERING HAS BEEN APPLIED.
6. ACCEPTANCE CRITERIA AND PERIMETER SELECTION WILL BE BASED ON FINAL MACHINED THICKNESS OF PART.
7. THE FERRITE CONTENT AT A CLADDING THICKNESS OF 0.25 IN. AND THE FINAL CLAD SURFACE SHALL BE A MINIMUM OF 5.0 (FERRITE NO.). IF THE FERRITE CONTENT ON THE 0.25 IN. THK SURFACE IS BELOW 5.0, THE FERRITE CONTENT OF THE NEXT DEPOSITED WELD LAYER SHALL BE A MINIMUM OF 5.0. A MINIMUM OF SIX (6) FERRITE READINGS SHALL BE TAKEN, EQUALLY SPACED ON THE SURFACE AND SHALL BE AVERAGED TO A SINGLE FERRITE NO. THE FERRITE NOS. SHALL BE DETERMINED USING A FERRITESCOPE OR MAGNE GAGE PER FT-1.
8. BLENDED CHAMFERS ON THE FINAL MACHINED CLAD SURFACE UP TO 0.10 IN. IN DEPTH BEYOND THE MAXIMUM DIAMETER ARE PERMITTED. PROVIDED THERE IS A TAPER OF AT LEAST 3:1 INTO THE SURROUNDING SURFACE. EXCEPT SEAL SURFACES MUST REMAIN WITHIN TOLERANCE SHOWN AFTER CHAMFERS.
9. SHOP "VIBRO-ETCH" INFORMATION SHOWN BELOW IN DESIGNATED AREA WITH 1/8 INCH NORMAL HIGH CHARACTERS.

B PT 1	FABRICATED BY: CBI NUCLEAR CO. MEMPHIS, TN.
	CBIN CONTRACT NO: 8-CN231
	CBIN PC NO: 1-1-
	YEAR BUILT: 1980 — SERIAL NO. 1 THRU 4
	G.E. IDENT: 11201716 P9

10. SHOP TO ASSURE THAT A STAINLESS STEEL CLAD THICKNESS ON SAFE END I.D. OF 0.31 INCH MINIMUM IS MET AFTER FINAL MACHINING.

APPROVED PER NUCLEAR QA MANUAL
CERTIFIED BY — DATE 4/21 80
RELEASED FOR USE BY — DATE 4/21 80
CERTIFICATION UPDATED BY — REV — DATE

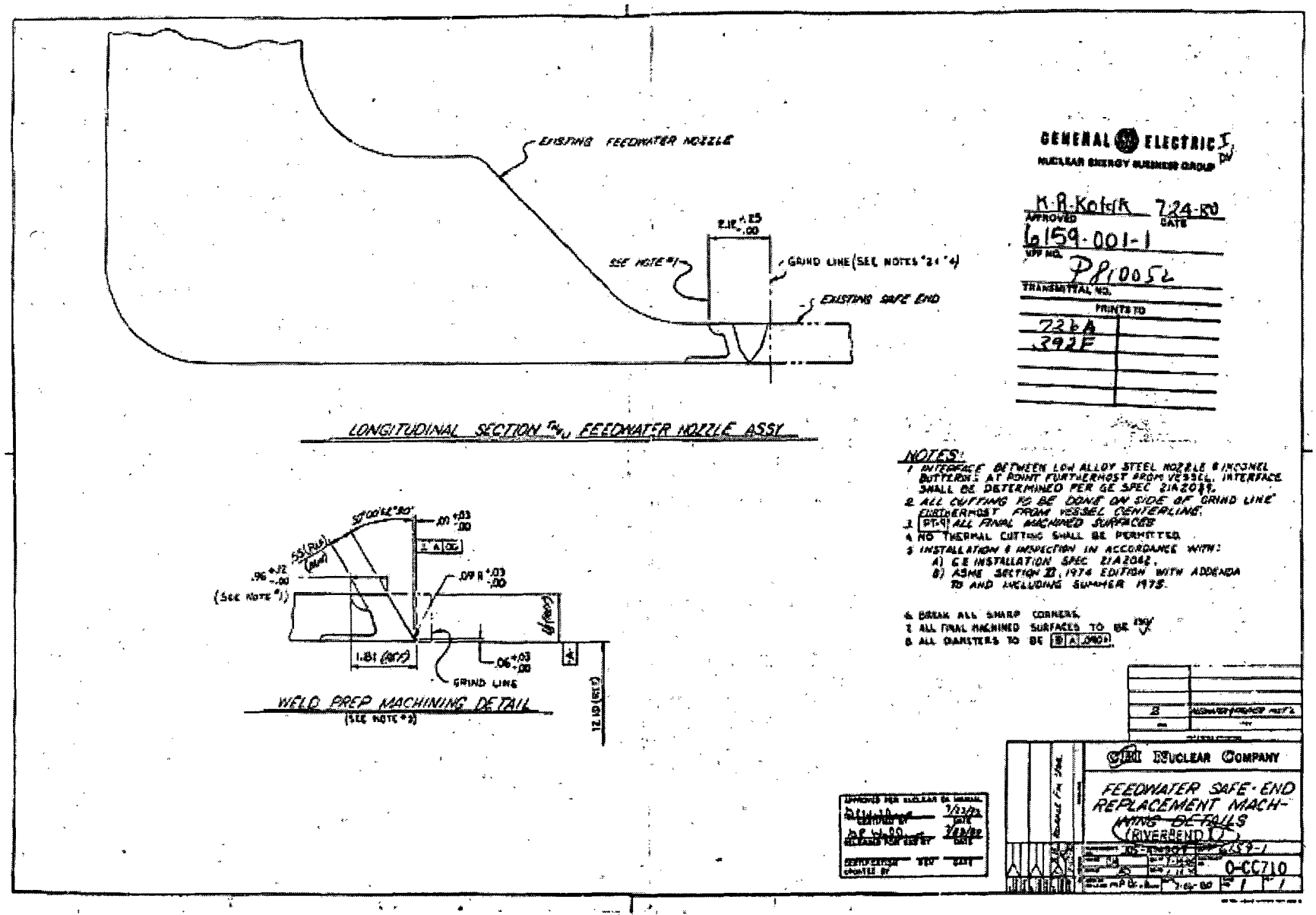
DWG NO.	DESCRIPTION
REFERENCE DRAWINGS	

CBI NUCLEAR COMPANY

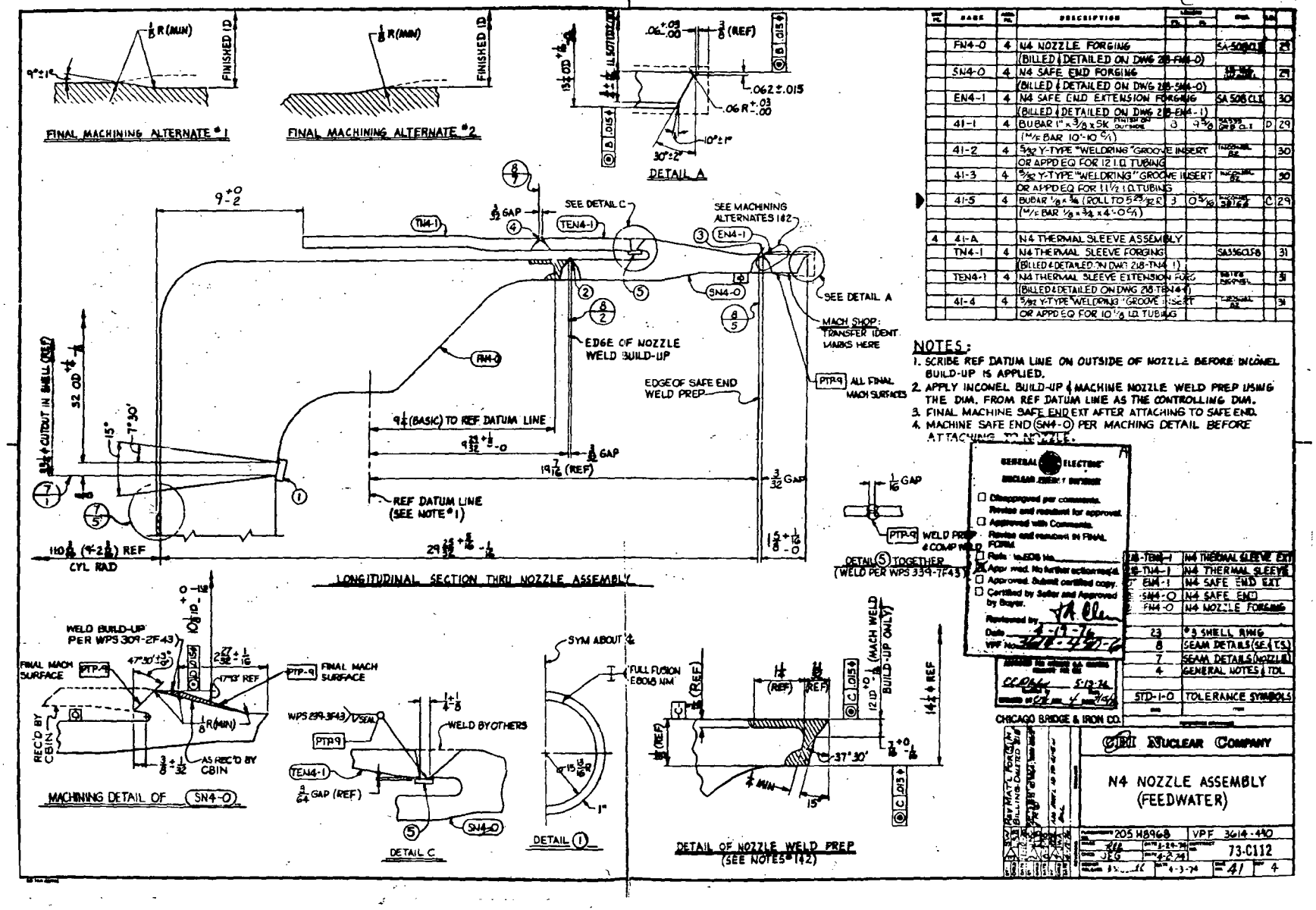
FEEDWATER SAFE ENDS FOR RIVER BEND I

RELEASED FOR USE

J. NO 205-AM304		VPF 6071-700	
DESIGN EKW	DATE 4-11-80	CONTRACT NO 8-CN231	
CHECK JD	DATE 4-15-80		
TITLE APPROVAL MPB/rcb	DATE 4-15-80	SHEET 1	REV 1


EXISTING FEEDWATER NOZZLE
SEE NOTE #1
GRIND LINE (SEE NOTES #2 & #4)
EXISTING SAFE END
LONGITUDINAL SECTION FEEDWATER NOZZLE ASSY
WELD PREP MACHINING DETAIL
(SEE NOTE #2)
GRIND LINE
GENERAL ELECTRIC
NUCLEAR ENERGY BUSINESS GROUP
K.A. Kotik 7-24-80
APPROVED DATE
6159-001-1
MFF NO.
P810052
TRANSMITTAL NO.
PRINTS TO
726A
392F
NOTES:
1 INTERFACE BETWEEN LOW ALLOY STEEL NOZZLE & INCONEL BUTTERING AT POINT FURTHERMOST FROM VESSEL. INTERFACE SHALL BE DETERMINED PER GE SPEC 21A2039.
2 ALL CUTTING TO BE DONE ON SIDE OF GRIND LINE FURTHERMOST FROM VESSEL CENTERLINE.
3 PT-9 ALL FINAL MACHINED SURFACES
4 NO THERMAL CUTTING SHALL BE PERMITTED.
5 INSTALLATION & INSPECTION IN ACCORDANCE WITH:
A) GE INSTALLATION SPEC 21A2042.
B) ASME SECTION II, 1974 EDITION WITH ADDENDA TO AND INCLUDING SUMMER 1975.
6 BREAK ALL SHARP CORNERS.
7 ALL FINAL MACHINED SURFACES TO BE 250
8 ALL DIAMETERS TO BE
CMI NUCLEAR COMPANY
FEEDWATER SAFE-END REPLACEMENT MACHINING DETAILS
(RIVERBEND I)
0-CC710

2 of 2


FINAL MACHINING ALTERNATE #1
FINAL MACHINING ALTERNATE #2
DETAIL A
LONGITUDINAL SECTION THRU NOZZLE ASSEMBLY
SEE DETAIL C
SEE MACHINING ALTERNATES 1&2
SEE DETAIL A
EDGE OF NOZZLE WELD BUILD-UP
EDGE OF SAFE END WELD PREP
MACH SHOP: TRANSFER IDENT. MARKS HERE
ALL FINAL MACH SURFACES
REF DATUM LINE (SEE NOTE #1)
CYL RAD
DETAIL (5) TOGETHER (WELD PER WPS 334-7F43)
MACHINING DETAIL OF (SN4-0)
DETAIL C
DETAIL (1)
DETAIL OF NOZZLE WELD PREP (SEE NOTES #1&2)
NOTES:
1. SCRIBE REF DATUM LINE ON OUTSIDE OF NOZZLE BEFORE INCONEL BUILD-UP IS APPLIED.
2. APPLY INCONEL BUILD-UP & MACHINE NOZZLE WELD PREP USING THE DIM. FROM REF DATUM LINE AS THE CONTROLLING DIM.
3. FINAL MACHINE SAFE END EXT AFTER ATTACHING TO SAFE END.
4. MACHINE SAFE END (SN4-0) PER MACHING DETAIL BEFORE ATTACHING TO NOZZLE.
CHICAGO BRIDGE & IRON CO.
GE NUCLEAR COMPANY
N4 NOZZLE ASSEMBLY (FEEDWATER)
VPF 3614-440
73-C112

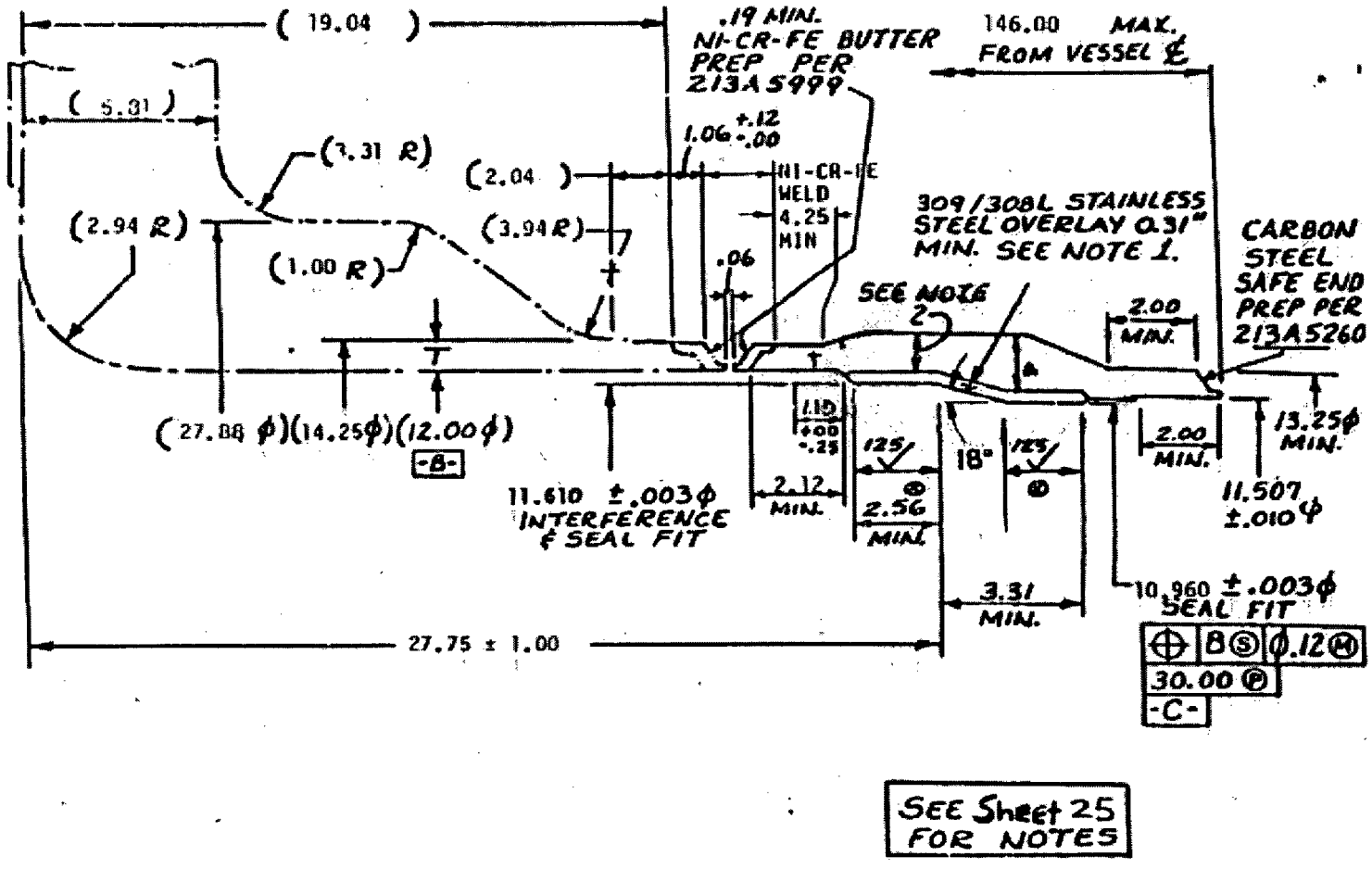
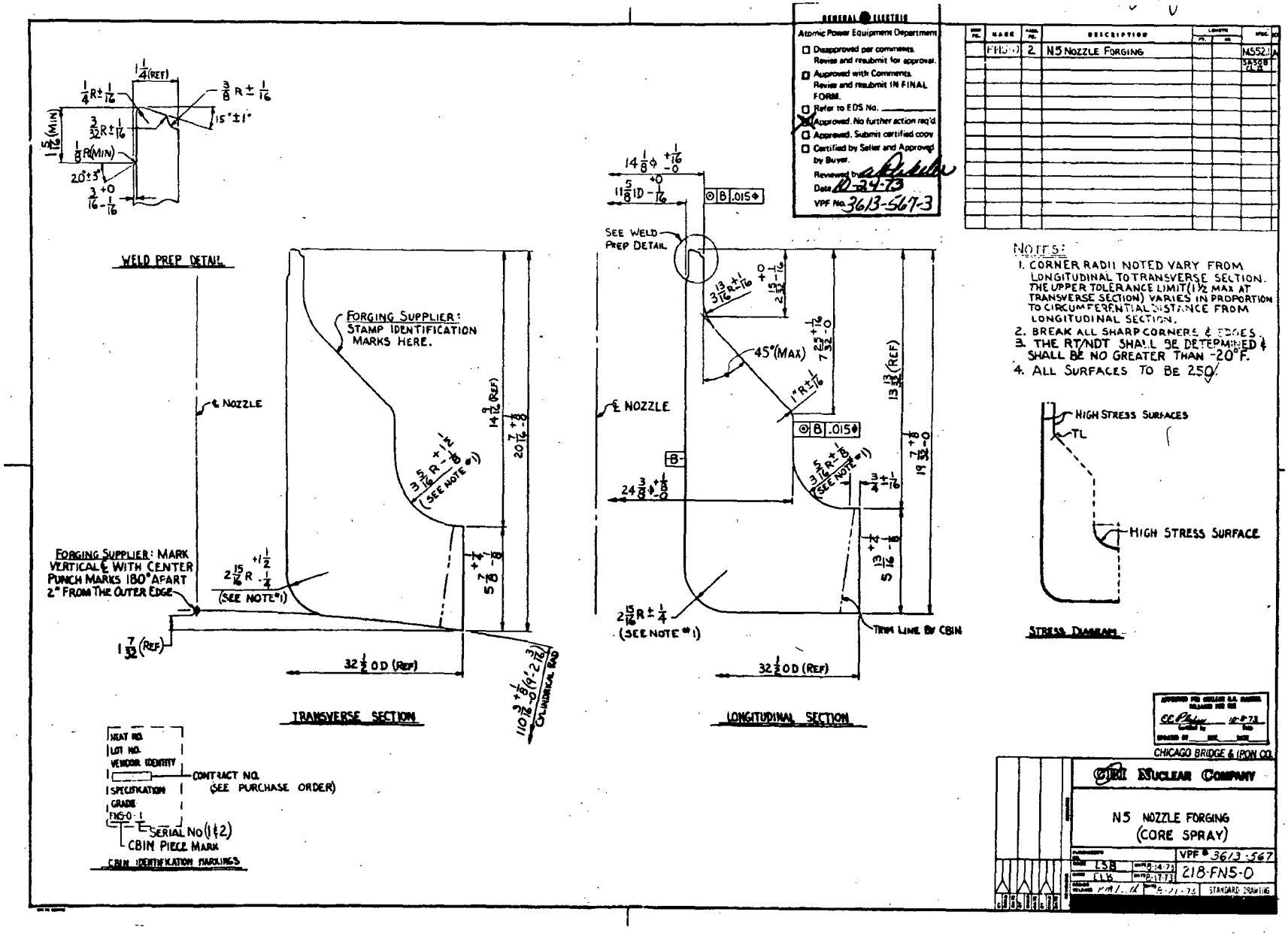


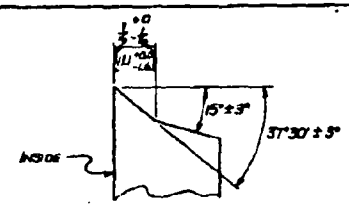
FIGURE 2 EXISTING FEEDWATER AND REPLACEMENT SAFE END DETAILS

GENERAL ELECTRIC
NUCLEAR ENERGY DIVISION

22A5536AS SH. NO. 24
REV. 1


GENERAL ELECTRIC
Atomic Power Equipment Department
Disapproved per comments. Revise and resubmit for approval.
Approved with Comments. Revise and resubmit IN FINAL FORM.
Refer to EDS No.
Approved. No further action req'd.
Approved. Submit certified copy
Certified by Seller and Approved by Buyer.
Reviewed by
Date 10-24-73
VPF No. 3613-567-3
FN5-0 2 N5 NOZZLE FORGING
WELD PREP DETAIL
FORGING SUPPLIER: STAMP IDENTIFICATION MARKS HERE.
℄ NOZZLE
FORGING SUPPLIER: MARK VERTICAL ℄ WITH CENTER PUNCH MARKS 180° APART 2" FROM THE OUTER EDGE
(SEE NOTE #1)
32 1/2 OD (REF)
TRANSVERSE SECTION
SEE WELD PREP DETAIL
45° (MAX)
TRIM LINE BY CBIN
LONGITUDINAL SECTION
NOTES:
1. CORNER RADII NOTED VARY FROM LONGITUDINAL TO TRANSVERSE SECTION. THE UPPER TOLERANCE LIMIT (1½ MAX AT TRANSVERSE SECTION) VARIES IN PROPORTION TO CIRCUMFERENTIAL DISTANCE FROM LONGITUDINAL SECTION.
2. BREAK ALL SHARP CORNERS & EDGES.
3. THE RT/NDT SHALL BE DETERMINED & SHALL BE NO GREATER THAN -20°F.
4. ALL SURFACES TO BE 250
HIGH STRESS SURFACES
TL
HIGH STRESS SURFACE
STRESS DIAGRAM
HEAT NO.
LOT NO.
VENDOR IDENTITY
CONTRACT NO. (SEE PURCHASE ORDER)
SPECIFICATION
GRADE
FN5-0-1
SERIAL NO (1 & 2)
CBIN PIECE MARK
CBIN IDENTIFICATION MARKINGS
CHICAGO BRIDGE & IRON CO.
CBI NUCLEAR COMPANY
N5 NOZZLE FORGING
(CORE SPRAY)
VPF # 3613-567
218-FN5-0
STANDARD DRAWING

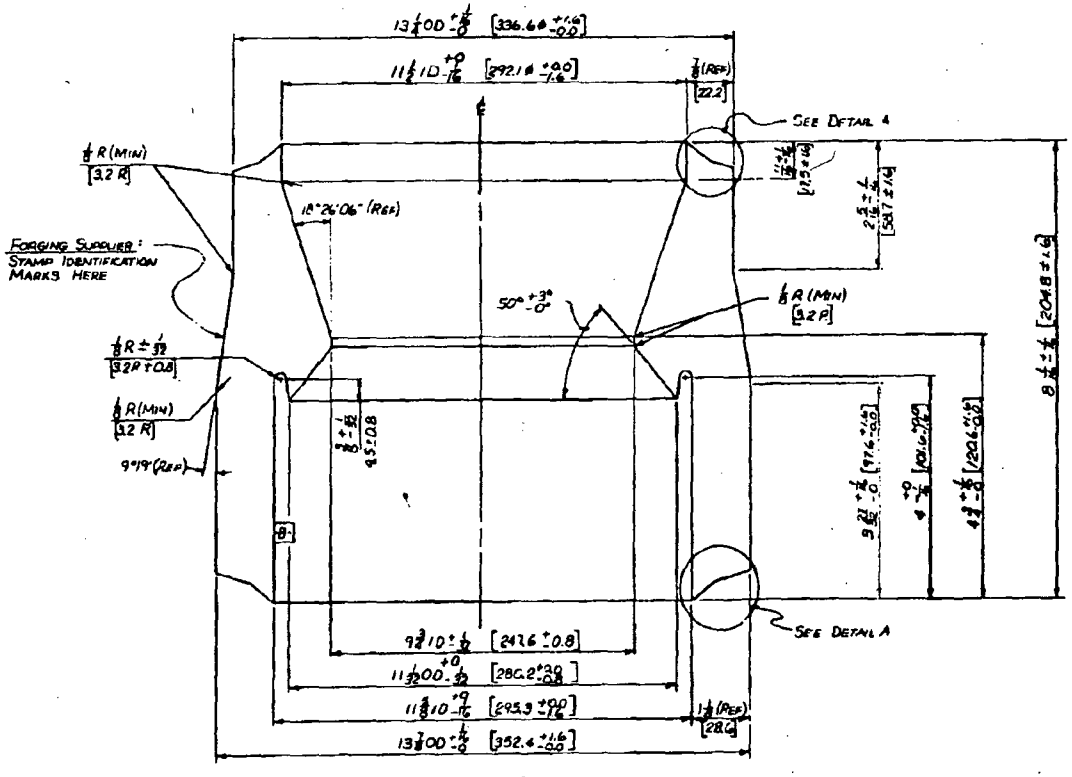
ITEM NO.	GRADE	NO. REQ'D	DESCRIPTION	LOCATION FR.	LOCATION TO	MATL.	LA.
	SN5-1	2	N5 SAFE END FORGING			ASTM A350 LF2 TRACEABLE	A



DETAIL A

NOTES:

1. ALL DIMENSIONS IN BRACKETS [ ] ARE MILLIMETERS.
2. INCH DIMENSIONS TO HAVE PRECEDENCE OVER METRIC DIMENSIONS.
3. ALL MACHINED SURFACES TO BE 250 UNLESS OTHERWISE SPECIFIED.
4. BREAK ALL SHARP CORNERS.
5. ALL DIAMETERS TO BE [S] ⌀ .005 Ⓜ .5 Ⓐ



SECTION THRU SAFE END

HEAT NO.
LOT NO.
VENDOR IDENTITY
SPECIFICATION
GRADE
SN5-1-1

CONTRACT NO. (SEE PURCHASE ORDER)
SERIAL NO. (1 AND 2)
CBIN PIECE MARK

CBIN IDENTIFICATION MARKING

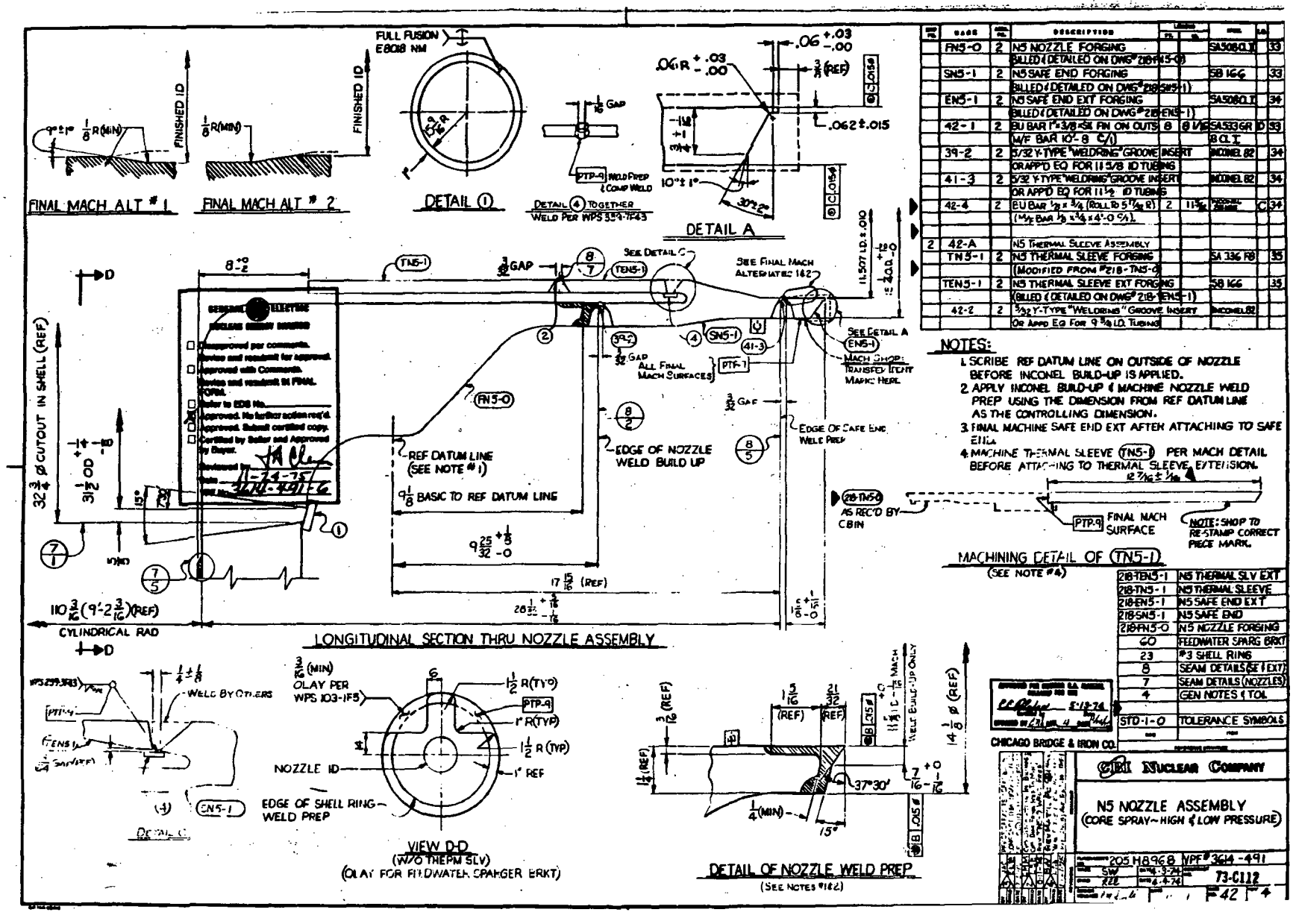
GENERAL ELECTRIC
Atomic Power Equipment Department
☐ Disapproved per comments. Revise and resubmit for approval.
☐ Approved with Comments. Revise and resubmit IN FINAL FORM.
☐ Refer to E OB No. _____
☒ Approved. No further action req'd.
☐ Approved. Submit certified copy
☐ Certified by Seller and Approved by Buyer:
Reviewed by _____
Date 9-3-75
VPF No. 3613-5683

APPROVED FOR ISSUE AS NOTED
8/29/75
CHICAGO BRIDGE & IRON CO.

CBI NUCLEAR COMPANY

N5 SAFE END FORGING
(CORE SPRAY)

VPF 3613-568
218-SN5-1
STANDARD DRAWING

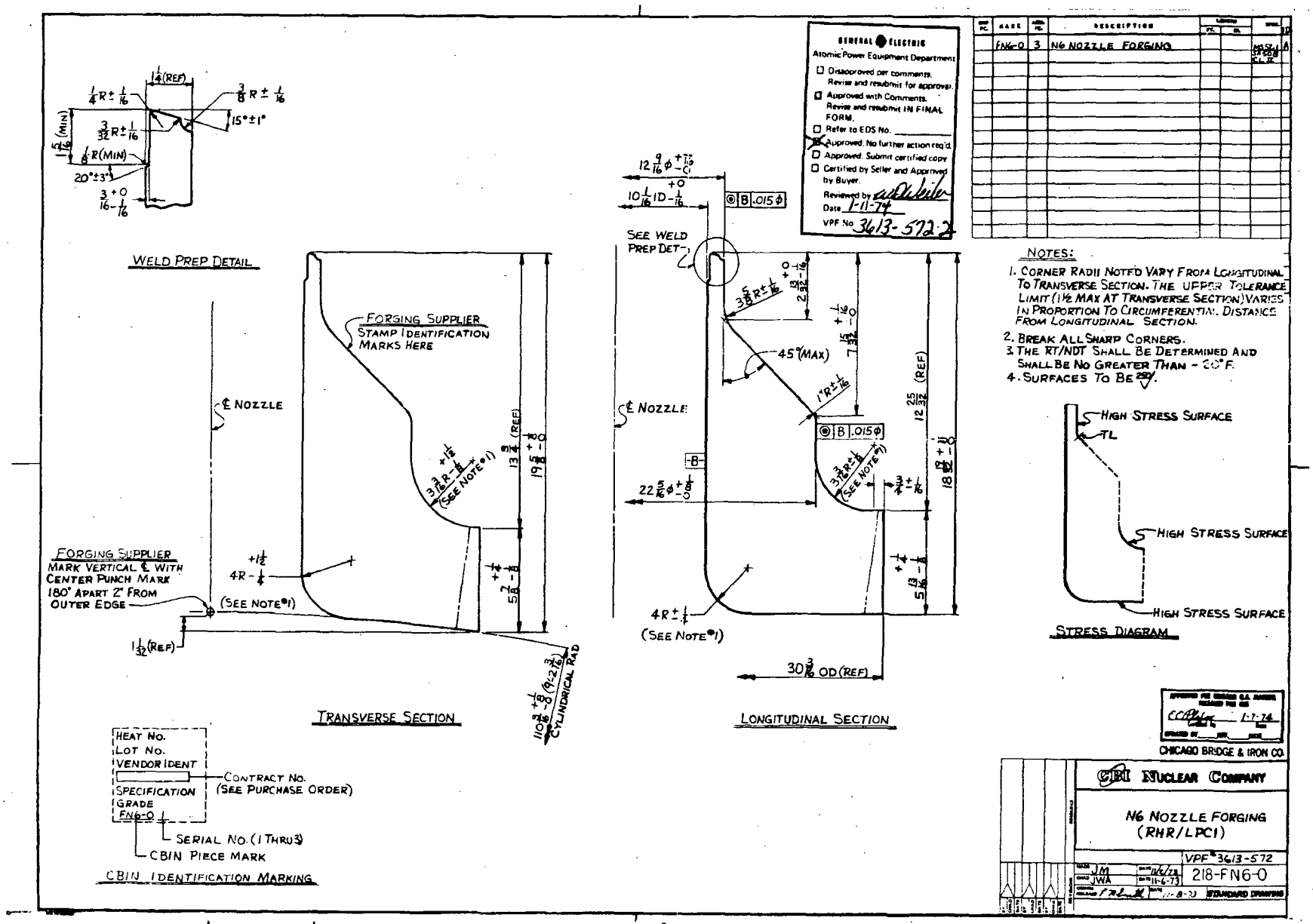


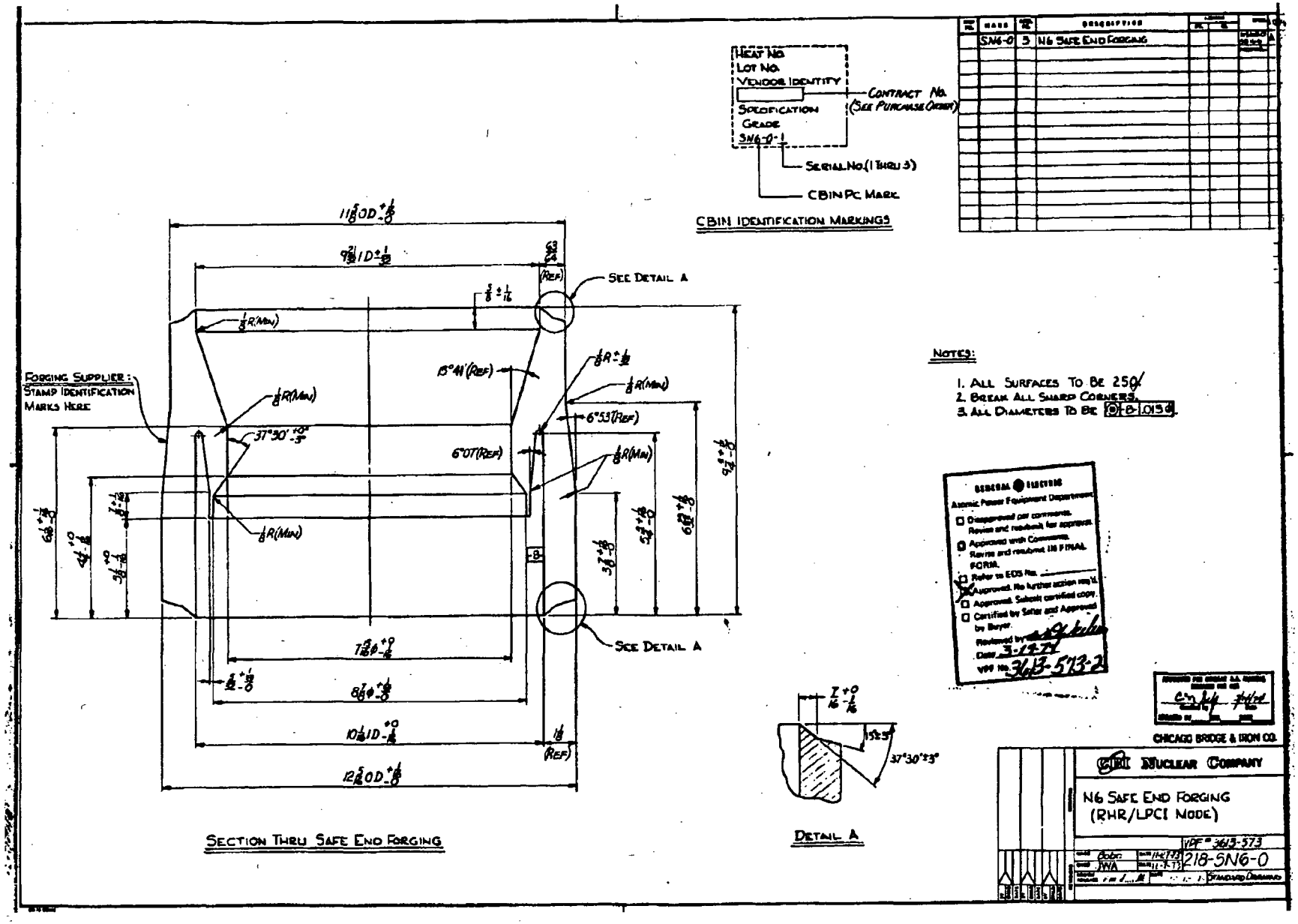
	MARK		DESCRIPTION					
	FN5-0	2	N5 NOZZLE FORGING			SA508CL I		33
			BILLED & DETAILED ON DWG# 218-FN5-0					
	SN5-1	2	N5 SAFE END FORGING			SB 166		33
			BILLED & DETAILED ON DWG# 218-SN5-1					
	EN5-1	2	N5 SAFE END EXT FORGING			SA508CL I		34
			BILLED & DETAILED ON DWG# 218-EN5-1					
	42-1	2	BU BAR 1"×3/8×SK FIN ON OUTS	8	8 1/16	SA533GR	D	33
			(M/F BAR 10'-8 C/L)			B CL I		
	39-2	2	5/32 Y-TYPE "WELDRING" GROOVE INSERT			INCONEL 82		34
			OR APP'D EQ FOR 11 5/8 ID TUBING					
	41-3	2	5/32 Y-TYPE "WELDRING" GROOVE INSERT			INCONEL 82		34
			OR APP'D EQ FOR 11 1/2 ID TUBING					
	42-4	2	BU BAR 1/8 × 3/4 (ROLL TO 5 7/32 R)	2	11 5/16	INCONEL 82	C	34
			(M/F BAR 1/8 × 3/4 × 4'-0 C/L)					
2	42-A		N5 THERMAL SLEEVE ASSEMBLY					
	TN5-1	2	N5 THERMAL SLEEVE FORGING			SA 336 F8		35
			(MODIFIED FROM #218-TN5-0)					
	TEN5-1	2	N5 THERMAL SLEEVE EXT FORGING			SB 166		35
			(BILLED & DETAILED ON DWG# 218-TEN5-1)					
	42-2	2	5/32 Y-TYPE "WELDRING" GROOVE INSERT			INCONEL 82		
			OR APP'D EQ FOR 9 3/4 I.D. TUBING					

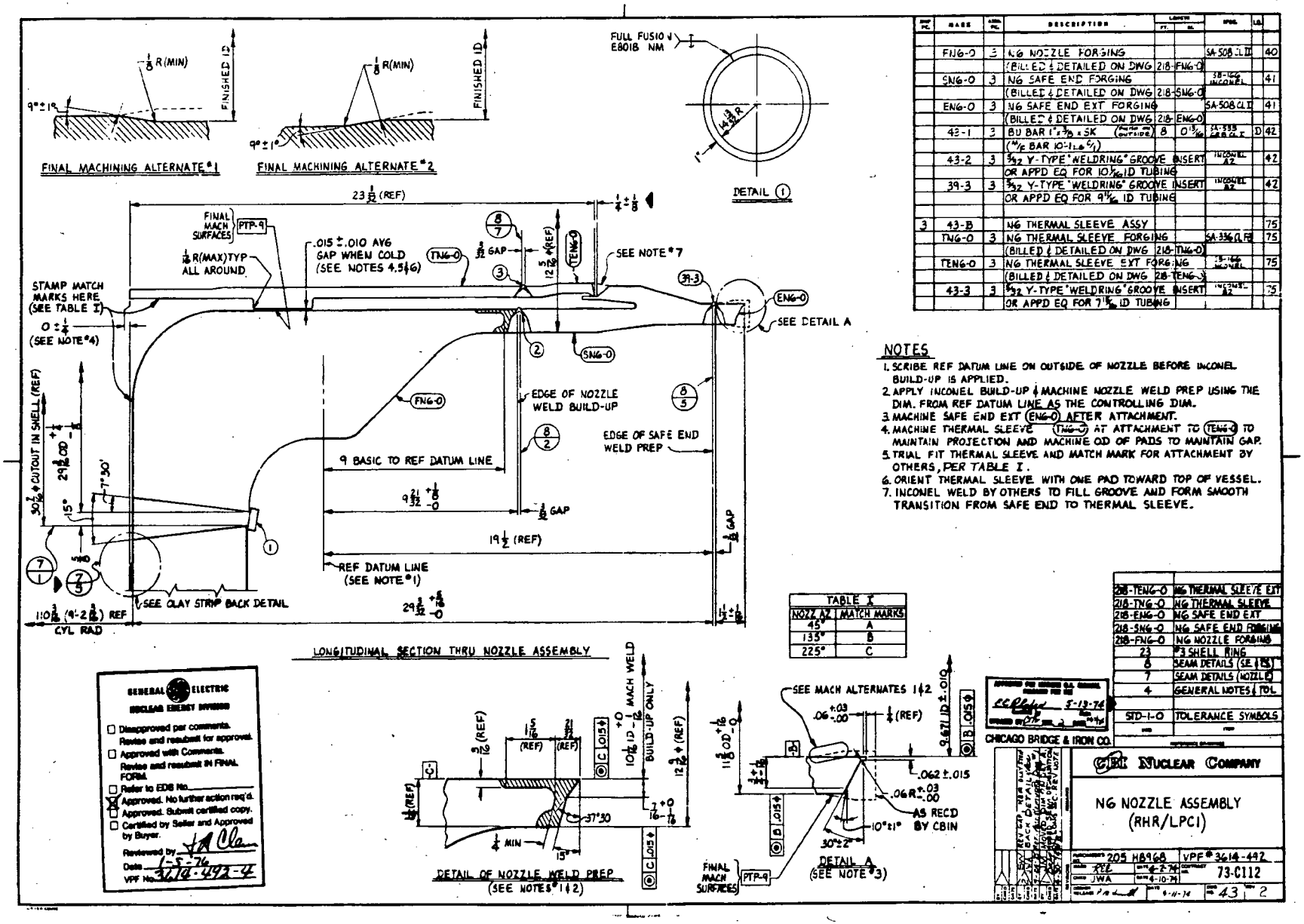
NOTES:

1. SCRIBE REF DATUM LINE ON OUTSIDE OF NOZZLE BEFORE INCONEL BUILD-UP IS APPLIED.
2. APPLY INCONEL BUILD-UP & MACHINE NOZZLE WELD PREP USING THE DIMENSION FROM REF DATUM LINE AS THE CONTROLLING DIMENSION.
3. FINAL MACHINE SAFE END EXT AFTER ATTACHING TO SAFE END.
4. MACHINE THERMAL SLEEVE (TN5-1) PER MACH DETAIL BEFORE ATTACHING TO THERMAL SLEEVE EXTENSION.

218-TEN5-1	N5 THERMAL SLV EXT
218-TN5-1	N5 THERMAL SLEEVE
218-EN5-1	N5 SAFE END EXT
218-SN5-1	N5 SAFE END
218-FN5-0	N5 NOZZLE FORGING
60	FEEDWATER SPARG BRKT
23	#3 SHELL RING
8	SEAM DETAILS (SE & EXT)
7	SEAM DETAILS (NOZZLES)
4	GEN NOTES & TOL
STD-1-0	TOLERANCE SYMBOLS


WELD PREP DETAIL
TRANSVERSE SECTION
LONGITUDINAL SECTION
STRESS DIAGRAM
FORGING SUPPLIER STAMP IDENTIFICATION MARKS HERE
FORGING SUPPLIER MARK VERTICAL ℄ WITH CENTER PUNCH MARK 180° APART 2" FROM OUTER EDGE
℄ NOZZLE
SEE WELD PREP DET
45°(MAX)
(SEE NOTE #1)
CYLINDRICAL RAD
30 3/16 OD (REF)
HIGH STRESS SURFACE
TL
HEAT NO.
LOT NO.
VENDOR IDENT
SPECIFICATION
GRADE FN6-0
CONTRACT NO. (SEE PURCHASE ORDER)
SERIAL NO. (1 THRU 3)
CBIN PIECE MARK
CBIN IDENTIFICATION MARKING
GENERAL ELECTRIC
Atomic Power Equipment Department
Disapproved per comments. Revise and resubmit for approval.
Approved with Comments. Revise and resubmit IN FINAL FORM.
Refer to EDS No.
Approved. No further action req'd.
Approved. Submit certified copy
Certified by Seller and Approved by Buyer.
Reviewed by
Date 1-11-74
VPF No. 3613-572-2
FN6-0 3 N6 NOZZLE FORGING
NOTES:
1. CORNER RADII NOTED VARY FROM LONGITUDINAL TO TRANSVERSE SECTION. THE UPPER TOLERANCE LIMIT (1½ MAX AT TRANSVERSE SECTION) VARIES IN PROPORTION TO CIRCUMFERENTIAL DISTANCE FROM LONGITUDINAL SECTION.
2. BREAK ALL SHARP CORNERS.
3. THE RT/NDT SHALL BE DETERMINED AND SHALL BE NO GREATER THAN -20°F.
4. SURFACES TO BE 250.
CHICAGO BRIDGE & IRON CO.
CBI NUCLEAR COMPANY
N6 NOZZLE FORGING (RHR/LPCI)
VPF 3613-572
218-FN6-0
JM
JWA
11-6-73
STANDARD DRAWING


HEAT NO.
LOT NO.
VENDOR IDENTITY
SPECIFICATION
GRADE
SN6-0-1
CONTRACT NO. (SEE PURCHASE ORDER)
SERIAL NO. (1 THRU 3)
CBIN PC MARK
CBIN IDENTIFICATION MARKINGS
SN6-0
3
N6 SAFE END FORGING
SEE DETAIL A
FORGING SUPPLIER: STAMP IDENTIFICATION MARKS HERE
NOTES:
1. ALL SURFACES TO BE 250
2. BREAK ALL SHARP CORNERS.
3. ALL DIAMETERS TO BE
GENERAL ELECTRIC
Atomic Power Equipment Department
Approved. No further action req'd.
Reviewed by
Date 3-14-74
VDF No. 3613-573-2
CHICAGO BRIDGE & IRON CO.
CBI NUCLEAR COMPANY
N6 SAFE END FORGING
(RHR/LPCI NODE)
VDF # 3613-573
218-SN6-0
STANDARD DRAWING
SECTION THRU SAFE END FORGING
DETAIL A



PART NO.	MARK	ASSY NO.	DESCRIPTION	LENGTH FT.	LENGTH IN.	MTRL	LB.
	FNG-0	3	NG NOZZLE FORGING			SA-508 CL II	40
			(BILLED & DETAILED ON DWG	218-	FNG-0)		
	SNG-0	3	NG SAFE END FORGING			18-16G INCONEL	41
			(BILLED & DETAILED ON DWG	218-	SNG-0)		
	ENG-0	3	NG SAFE END EXT FORGING			SA-508 CL II	41
			(BILLED & DETAILED ON DWG	218-	ENG-0)		
	43-1	3	BU BAR 1" x 3/8 x SK (FINISH ON OUTSIDE)	8	0 15/16	SA-533 GR B CL 1	D 42
			(15/16 BAR 10-1 LB 5/1)				
	43-2	3	5/32 Y-TYPE "WELDRING" GROOVE	INSERT		INCONEL 82	42
			OR APPD EQ FOR 10 1/16 ID TUBING				
	39-3	3	5/32 Y-TYPE "WELDRING" GROOVE	INSERT		INCONEL 82	42
			OR APPD EQ FOR 9 11/16 ID TUBING				
3	43-B		NG THERMAL SLEEVE ASSY				75
	TNG-0	3	NG THERMAL SLEEVE FORGING			SA-336 CL F8	75
			(BILLED & DETAILED ON DWG	218-	TNG-0)		
	TENG-0	3	NG THERMAL SLEEVE EXT FORGING			18-16G INCONEL	75
			(BILLED & DETAILED ON DWG	218-	TENG-0)		
	43-3	3	5/32 Y-TYPE "WELDRING" GROOVE	INSERT		INCONEL 82	75
			OR APPD EQ FOR 7 11/16 ID TUBING				

NOTES

1. SCRIBE REF DATUM LINE ON OUTSIDE OF NOZZLE BEFORE INCONEL BUILD-UP IS APPLIED.
2. APPLY INCONEL BUILD-UP & MACHINE NOZZLE WELD PREP USING THE DIM. FROM REF DATUM LINE AS THE CONTROLLING DIM.
3. MACHINE SAFE END EXT (ENG-0) AFTER ATTACHMENT.
4. MACHINE THERMAL SLEEVE (TNG-0) AT ATTACHMENT TO (TENG-0) TO MAINTAIN PROJECTION AND MACHINE OD OF PADS TO MAINTAIN GAP.
5. TRIAL FIT THERMAL SLEEVE AND MATCH MARK FOR ATTACHMENT BY OTHERS, PER TABLE I.
6. ORIENT THERMAL SLEEVE WITH ONE PAD TOWARD TOP OF VESSEL.
7. INCONEL WELD BY OTHERS TO FILL GROOVE AND FORM SMOOTH TRANSITION FROM SAFE END TO THERMAL SLEEVE.

TABLE I

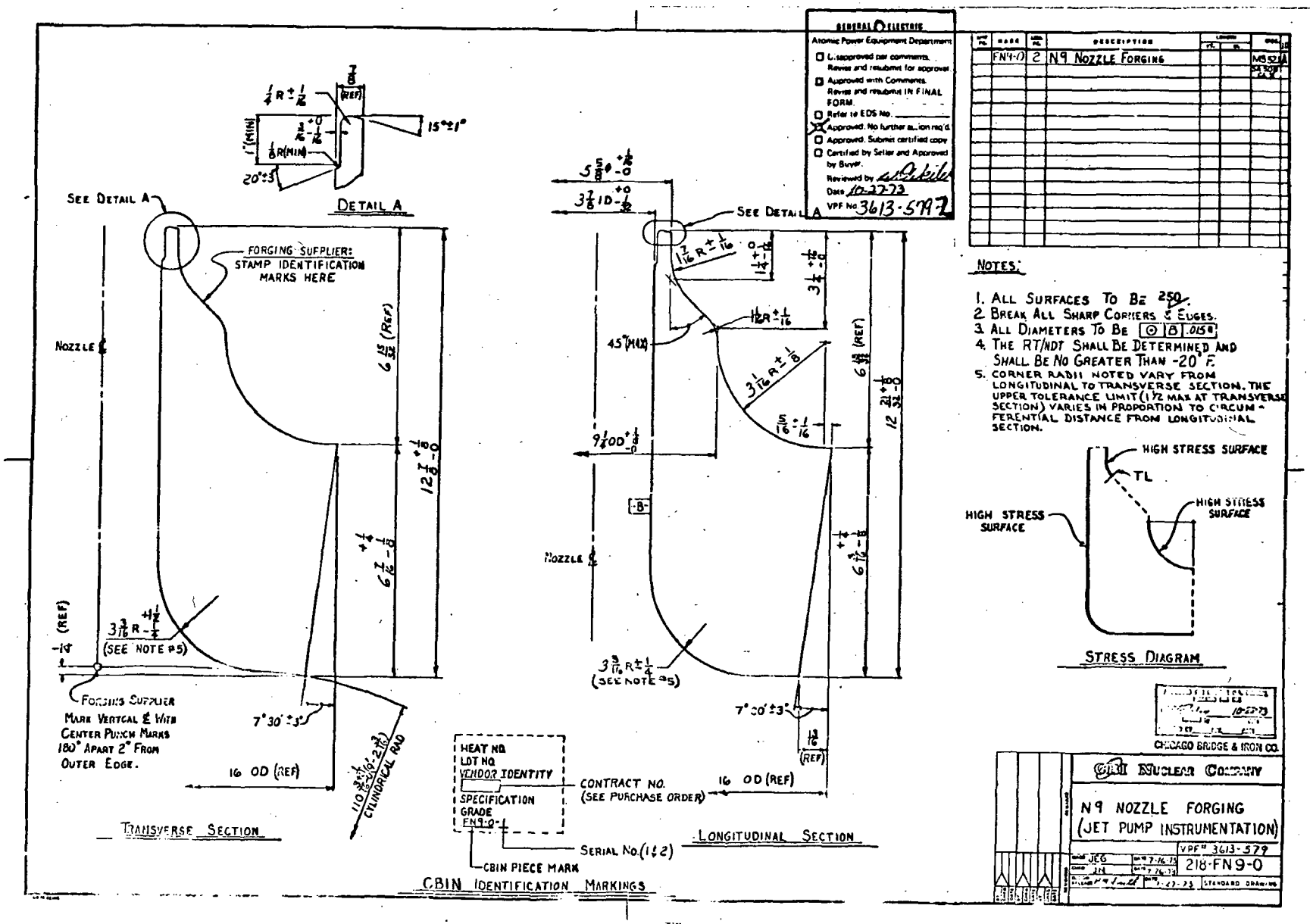
NOZZ AZ	MATCH MARKS
45°	A
135°	B
225°	C

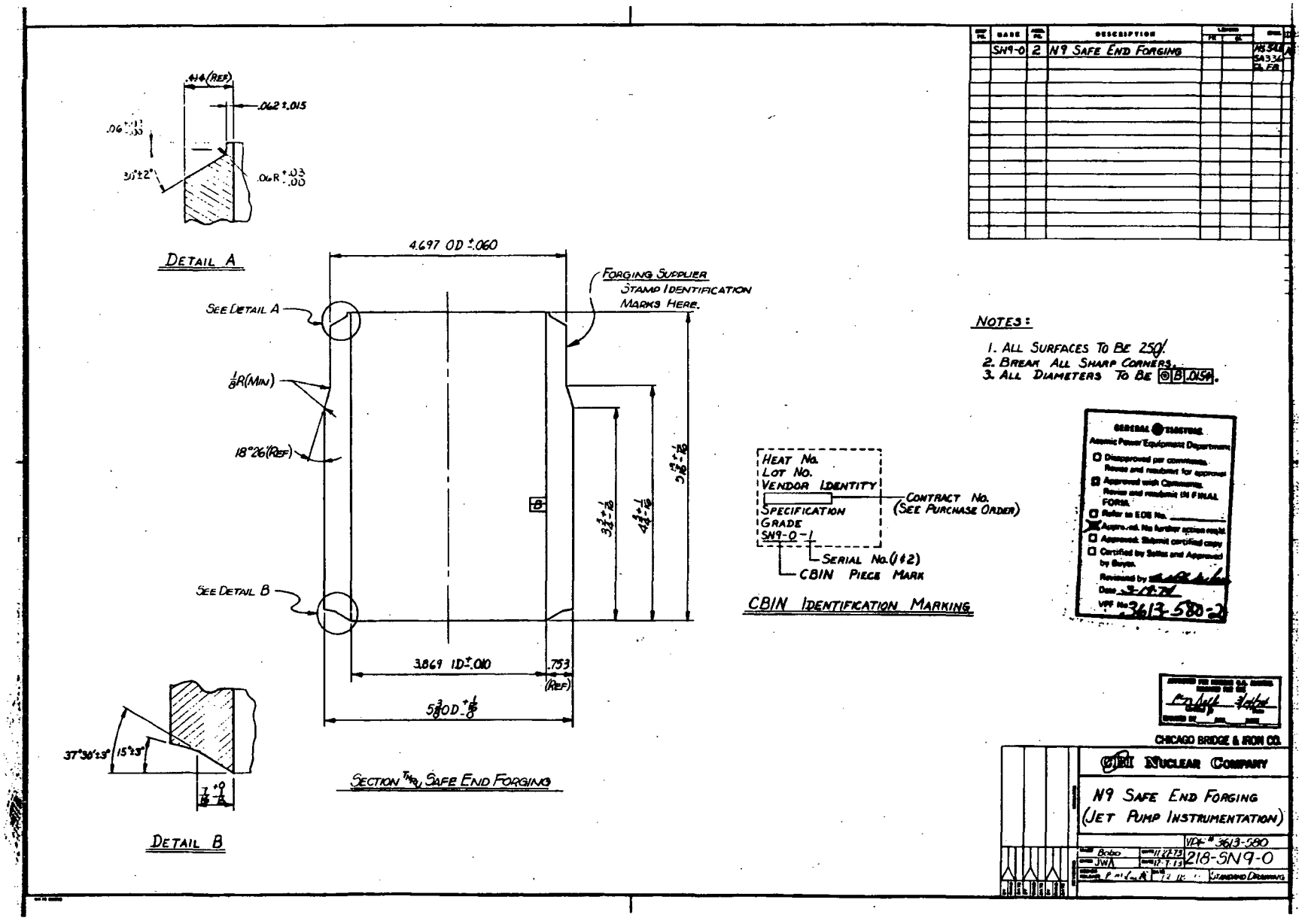
218-TENG-0	NG THERMAL SLEEVE EXT
218-TNG-0	NG THERMAL SLEEVE
218-ENG-0	NG SAFE END EXT
218-SNG-0	NG SAFE END FORGING
218-FNG-0	NG NOZZLE FORGING
23	#3 SHELL RING
8	SEAM DETAILS (SE & RS)
7	SEAM DETAILS (NOZZLE)
4	GENERAL NOTES & TOL
STD-1-0	TOLERANCE SYMBOLS

GENERAL ELECTRIC
NUCLEAR ENERGY DIVISION

- ☐ Disapproved per comments. Revise and resubmit for approval.
- ☐ Approved with Comments. Revise and resubmit IN FINAL FORM.
- ☐ Refer to EDB No.
- ☒ Approved. No further action req'd.
- ☐ Approved. Submit certified copy.
- ☐ Certified by Seller and Approved by Buyer.

Reviewed by
Date 1-5-76
VPF No. 3614-492-4

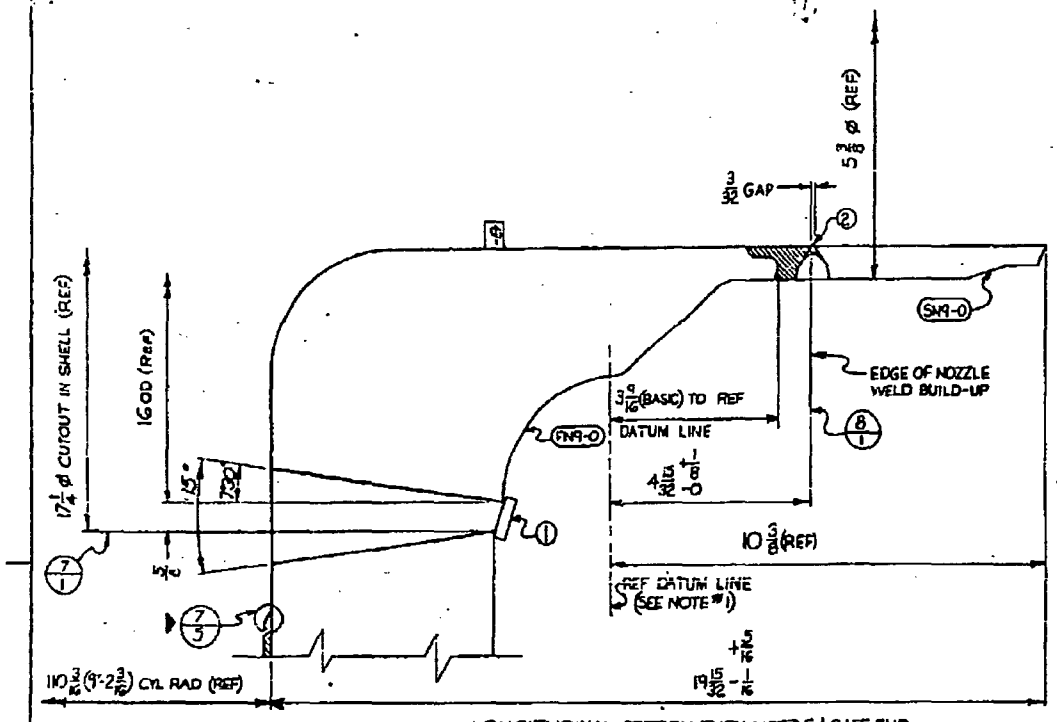

GENERAL ELECTRIC
Atomic Power Equipment Department
Disapproved per comments. Revise and resubmit for approval.
Approved with Comments. Revise and resubmit IN FINAL FORM.
Refer to EDS No.
Approved. No further action req'd.
Approved. Submit certified copy
Certified by Seller and Approved by Buyer.
Reviewed by
Date 10-27-73
VPF No. 3613-579Z
FN9-0 2 N9 NOZZLE FORGING
NOTES:
1. ALL SURFACES TO BE 250.
2. BREAK ALL SHARP CORNERS & EDGES.
3. ALL DIAMETERS TO BE ⊙ B .015
4. THE RT/NDT SHALL BE DETERMINED AND SHALL BE NO GREATER THAN -20° F.
5. CORNER RADII NOTED VARY FROM LONGITUDINAL TO TRANSVERSE SECTION. THE UPPER TOLERANCE LIMIT (1 1/2 MAX AT TRANSVERSE SECTION) VARIES IN PROPORTION TO CIRCUMFERENTIAL DISTANCE FROM LONGITUDINAL SECTION.
HIGH STRESS SURFACE
TL
HIGH STRESS SURFACE
HIGH STRESS SURFACE
STRESS DIAGRAM
DETAIL A
SEE DETAIL A
FORGING SUPPLIER: STAMP IDENTIFICATION MARKS HERE
NOZZLE ℄
FORGING SUPPLIER MARK VERTICAL ℄ WITH CENTER PUNCH MARKS 180° APART 2" FROM OUTER EDGE.
(SEE NOTE #5)
7°30' ±3°
16 OD (REF)
CYLINDRICAL RAD
TRANSVERSE SECTION
HEAT NO.
LOT NO.
VENDOR IDENTITY
SPECIFICATION
GRADE
FN9-0
CONTRACT NO. (SEE PURCHASE ORDER)
SERIAL NO. (1 & 2)
CBIN PIECE MARK
CBIN IDENTIFICATION MARKINGS
LONGITUDINAL SECTION
CHICAGO BRIDGE & IRON CO.
CBI NUCLEAR COMPANY
N9 NOZZLE FORGING
(JET PUMP INSTRUMENTATION)
VPF# 3613-579
218-FN9-0
STANDARD DRAWING


SN9-0 2 N9 SAFE END FORGING
DETAIL A
.414 (REF)
.062 ±.015
30°±2°
.06R +.03 -.00
4.697 OD ±.060
FORGING SUPPLIER STAMP IDENTIFICATION MARKS HERE.
SEE DETAIL A
1/8R (MIN)
18°26' (REF)
SEE DETAIL B
3.869 ID ±.010
.753 (REF)
5 3/8 OD +1/8 -
SECTION THRU SAFE END FORGING
DETAIL B
37°30'±3°
15°±3°
NOTES:
1. ALL SURFACES TO BE 250.
2. BREAK ALL SHARP CORNERS.
3. ALL DIAMETERS TO BE B .015.
HEAT No.
LOT No.
VENDOR IDENTITY
SPECIFICATION
GRADE
SN9-0-1
CONTRACT No. (SEE PURCHASE ORDER)
SERIAL No. (1 & 2)
CBIN PIECE MARK
CBIN IDENTIFICATION MARKING
GENERAL ELECTRIC
Atomic Power Equipment Department
Disapproved per comments. Revise and resubmit for approval
Approved with Comments. Revise and resubmit IN FINAL FORM.
Refer to EOS No.
Approved. No further action reqd.
Approved. Submit certified copy
Certified by Sellas and Approved by Buyer.
Reviewed by
Date 3-19-74
VPF No. 3613-580-2
CHICAGO BRIDGE & IRON CO.
CBI NUCLEAR COMPANY
N9 SAFE END FORGING
(JET PUMP INSTRUMENTATION)
VPF # 3613-580
218-SN9-0
STANDARD DRAWING

FN9-0	2	N9 NOZZLE FORGING (BILLED & DETAILED ON DWG # 218-FN9-0)		SA508 CL II		20
SN9-0	2	N9 SAFE END FORGING (BILLED & DETAILED ON DWG # 218-SN9-0)		SA336 CL 1B		21
46-1	2	BU BAR (7 7/8 x SR (FIN ON OTS))	4	7 3/8	SA333 GR 1	10 21
		M/F BAR (4-8 SH)			BCL I	
46-2	2	5/32 Y-TYPE "WELD RING" GROOVE INSERT OR APPD EQ FOR 3 7/8 ID TUBING.			INCONEL 82	20

NOTES

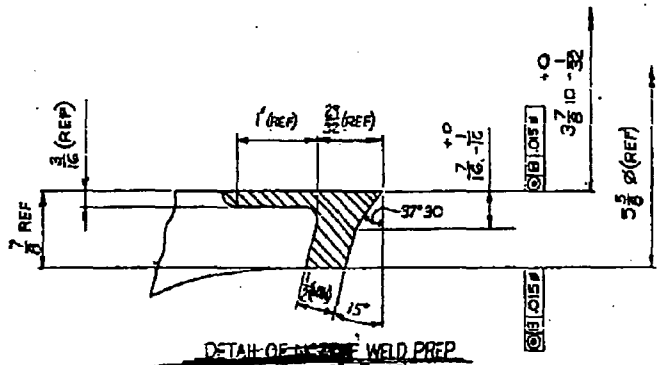
1. SCRIBE REF DATUM LINE ON OUTSIDE OF NOZZLE BEFORE INCONEL BUILD-UP IS APPLIED.
2. APPLY INCONEL BUILD-UP & MACHINE NOZZLE WELD PREP USING THE DIMENSION FROM THE REFERENCE DATUM LINE AS THE CONTROLLING DIMENSION.
3. ATTACH SAFE END AFTER FINAL PWHT.



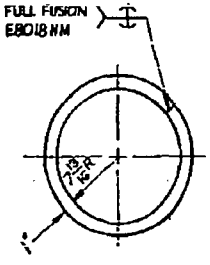
LONGITUDINAL SECTION THRU NOZZLE & SAFE END

RIVERBEND 1&2
MPL # B13-D003

GENERAL ELECTRIC
NUCLEAR ENERGY DIVISION
☐ Disapproved per comments
Revise and resubmit for approval
☐ Approved with Comments
Revise and resubmit IN FINAL FORM
☐ Refer to EDS No.
☒ Approved. No further action req'd
☐ Approved. Submit corrected copy
☐ Certified by Seller and Approved by Buyer.
Reviewed by
Date 1-5-76
VPF No. 3614-495-3



DETAIL OF NOZZLE WELD PREP (SEE NOTE #1 & 2)



DETAIL ①

218-SN9-0	N9 SAFE END FORGING
218-FN9-0	N9 NOZZLE FORGING
21	9" SHELL RING
6	SEAM DETAILS (SEE EFF)
7	SEAM DETAILS (SEE EFF)
4	GEN. NOTES (TOLERANCE)
STD-1-0	TOLERANCE SYMBOLS

CHICAGO BRIDGE & IRON CO.

GE NUCLEAR COMPANY

N9 NOZZLE ASSEMBLY
(JET PUMP INSTRUMENTATION)

7051189968 VPF 3614-495
SW 4-3-74
JEG 4-5-74
73-C112
1-5-76 46 2

DATE

ATTACHMENT 4 TO

RBG-46978

DISCUSSION OF RBS-SPECIFIC IGSCC CONTROL AND MITIGATION MEASURES

RIVER BEND STATION – UNIT 1
THIRD 10 YEAR INTERVAL INSERVICE INSPECTION PROGRAM
REQUEST FOR ALTERNATIVE RBS-ISI-014

DISCUSSION OF RBS-SPECIFIC IGSCC CONTROL AND MITIGATION MEASURES

I. Replace Susceptible Materials

The IGSCC susceptible safe-end materials were replaced with less-susceptible materials on the following nozzles prior to vessel installation:

a. N2A, N2B, N2C, N2D, N2E, N2F, N2G, N2H, N2J, N2K
b. N4B, N4C, N4D (Note: N4A safe end was removed during a previous outage, therefore it is not included in this list)

II. Perform Mechanical Stress Improvement (MSIP)

Mechanical Stress Improvement Process was performed on the following nozzles in RF-05 (1994):

a. N1 A, N1B
b. N2A, N2B, N2C, N2D, N2E, N2F, N2G, N2H, N2J, N2K
c. N4B, N4C, N4D
d. N5A, N5B
e. N6A, N6B, N6C
f. N9A, N9B

III. Inspect Subject Welds

All subject nozzle-to-safe end welds were inspected in accordance with Appendix VIII, Supplement 10 requirements during the Second ISI Interval. No recordable indications noted.

IV. Implement Strict Reactor Coolant Water Chemistry Control Measures

The following reactor coolant water chemistry control measures have been implemented:

a. BWRVIP Guidelines – Implemented BWRVIP-190 guidelines since 2009. Previous controls were in accordance with BWRVIP-130.
b. Condensate Full Flow Filtration (CFFF) – in service since 2003.
c. Hydrogen Water Chemistry (HWC) – Hydrogen injection implemented since 2003