Duke Power
A Duke Energy Company

R. A. JONES
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May 15, 2003

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Subject: Duke Energy
Oconee Nuclear Station, Unit 1
Docket Nos. 50-269
Third Ten Year Inservice Inspection Interval
Requests for Relief No. 02-004 and 02-005

On July 29, 2002, Duke Energy Corporation (Duke) submitted Requests for Relief No. 02-004 and No. 02-005. These requests sought to address twenty (20) limited ultrasonic examinations on Reactor Vessel welds and seventeen (17) limited ultrasonic examinations on other welds specified in the request.

During examination of the subject Unit 1 welds, the ultrasonic examination coverage did not meet the 90% examination requirements of Code Case N-460. Duke personnel determined it was impractical to meet the volumetric requirements for ultrasonic examination of the specified welds due to piping/vessel geometry, interferences, and existing examination technology. Therefore, Duke Energy requested that the NRC grant relief as authorized under 10 CFR 50.55a(g)(6)(i).

Subsequently the staff requested additional information to facilitate their review of the requests. Accordingly, revised submittals are attached in order to clarify our requests and to provide additional information requested by the staff.

If there are any questions or further information is needed you may contact R. P. Todd at (864) 885-3418.

A047

Very truly yours,

Bruce Hamilton /for

R. A. Jones
Site Vice President

Attachments

xc w/att: L. A. Reyes, Regional Administrator
U.S. Nuclear Regulatory Commission, Region II
Atlanta Federal Center
61 Forsyth St., SWW, Suite 23T85
Atlanta, GA 30303

L. N. Olshan, Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

xc(w/o attch):

M. C. Shannon
Senior NRC Resident Inspector
Oconee Nuclear Station

Mr. Henry Porter
Division of Radioactive Waste Management
Bureau of Land and Waste Management
SC Dept. of Health & Environmental Control
2600 Bull St.
Columbia, SC 29201

Proposed Relief in Accordance with 10 CFR 50.55a(g)(5)(iii)
Inservice Inspection Impracticality

Duke Energy Corporation
Oconee Nuclear Station – Unit 1 (EOC-20)
Third 10-Year Interval – Inservice Inspection Plan
Interval Start Date = 7-15-1994 Interval End Date = 1-1-2004
ASME Section XI Code – 1989 Edition with No Addenda

	I.	II. & III.	IV.	V.	VI.	VII.
Limited Area/Weld I.D. Number	**System / Component for Which Relief is Requested:** Area or Weld to be Examined	**Code Requirement from Which Relief is Requested:** 100% Exam Volume Coverage Exam Category Item No. Fig. No. Limitation Percentage	**Basis for Relief**	**Alternate Examinations or Testing**	**Justification for Granting Relief**	**Implementation Schedule**
1-RPV-WR34	NC System Reactor Vessel Lower Shell to Lower Head Ring Circumferential Weld	Exam Category B-A Item No. B01.011.005 Fig. IWB-2500-1 36% Volume Coverage	See Paragraph "A"	See Paragraph "G"	See Paragraph "H"	See Paragraph "K"
1-RPV-WR35	NC System Reactor Vessel Lower Head Cap to Lower Head Ring Circumferential Weld	Exam Category B-A Item No. B01.021.003 Fig. IWB-2500-3 42% Volume Coverage	See Paragraph "A"	See Paragraph "G"	See Paragraph "H"	See Paragraph "K"
1-RPV-WR13	NC System Reactor Vessel Outlet Nozzle-to-Vessel Weld @ 90°	Exam Category B-D Item No. B03.090.001 Fig. IWB-2500-7(a) 82% Volume Coverage (UT from vessel I.D.)	See Paragraph "B"	See Paragraph "G"	See Paragraph "I"	See Paragraph "K"
1-RPV-WR13A	NC System Reactor Vessel Outlet Nozzle-to-Vessel Weld @ 270°	Exam Category B-D Item No. B03.090.002 Fig. IWB-2500-7(a) 82% Volume Coverage (UT from vessel I.D.)	See Paragraph "B"	See Paragraph "G"	See Paragraph "I"	See Paragraph "K"

	I.	II. & III.	IV.	V.	VI.	VII.
Limited Area/Weld I.D. Number	**System / Component for Which Relief is Requested:** Area or Weld to be Examined	**Code Requirement from Which Relief is Requested:** 100% Exam Volume Coverage Exam Category Item No. Fig. No. Limitation Percentage	**Basis for Relief**	**Alternate Examinations or Testing**	**Justification for Granting Relief**	**Implementation Schedule**
1-RPV-WR54	NC System Reactor Vessel Core Flood Nozzle-to-Vessel Weld @ 0°	Exam Category B-D Fig. IWB-2500-7(a) Item No. B03.090.007 (UT from vessel I.D.) 81% Volume Coverage Item No. B03.090.007A (UT from nozzle ID) 0% Volume Coverage (not able to scan)	See Paragraph "C"	See Paragraph "G"	See Paragraph "I"	See Paragraph "K"
1-RPV-WR54A	NC System Reactor Vessel Core Flood Nozzle-to-Vessel Weld @ 180°	Exam Category B-D Fig. IWB-2500-7(a) Item No. B03.090.008 (UT from vessel ID) 81% Volume Coverage Item No. B03.090.008A (UT from nozzle ID) 0% Volume Coverage (not able to scan)	See Paragraph "C"	See Paragraph "G"	See Paragraph "I"	See Paragraph "K"
1-RPV-WR54	NC System Reactor Vessel Core Flood Nozzle Inside Radius Section @ 0°	Exam Category B-D Item No. B03.100.007 Fig. IWB-2500-7(a) 52% Volume Coverage	See Paragraph "D"	See Paragraph "G"	See Paragraph "I"	See Paragraph "K"
1-RPV-WR54A	NC System Reactor Vessel Core Flood Nozzle Inside Radius Section @ 180°	Exam Category B-D Item No. B03.100.008 Fig. IWB-2500-7(a) 52% Volume Coverage	See Paragraph "D"	See Paragraph "G"	See Paragraph "I"	See Paragraph "K"

	I.	II. & III.	IV.	V.	VI.	VII.
Limited Area/Weld I.D. Number	**System / Component for Which Relief is Requested:** Area or Weld to be Examined	**Code Requirement from Which Relief is Requested:** 100% Exam Volume Coverage Exam Category Item No. Fig. No. Limitation Percentage	**Basis for Relief**	**Alternate Examinations or Testing**	**Justification for Granting Relief**	**Implementation Schedule**
1-RPV-WR53	NC System Reactor Vessel Core Flood Nozzle-to-Safe-End Butt Weld @ 0°	Exam Category B-F Item No. B05.010.001 Fig. IWB-2500-8(c) 86% Volume Coverage (UT from nozzle I.D. in lieu of PT from O.D.)	See Paragraph "E"	See Paragraph "G"	See Paragraph "I"	See Paragraph "K"
1-RPV-WR53	NC System Reactor Vessel Core Flood Nozzle-to-Safe-End Butt Weld @ 0°	Exam Category B-F Item No. B05.010.001A Fig. IWB-2500-8(c) 86% Volume Coverage (UT from nozzle side)	See Paragraph "E"	See Paragraph "G"	See Paragraph "I"	See Paragraph "K"
1-RPV-WR53	NC System Reactor Vessel Core Flood Nozzle-to-Safe-End Butt Weld @ 0°	Exam Category B-F Item No. B05.010.001B Fig. IWB-2500-8(c) 86% Volume Coverage (UT from safe-end side)	See Paragraph "E"	See Paragraph "G"	See Paragraph "I"	See Paragraph "K"
1-RPV-WR53A	NC System Reactor Vessel Core Flood Nozzle-to-Safe-End Butt Weld @ 180°	Exam Category B-F Item No. B05.010.002 Fig. IWB-2500-8(c) 81% Volume Coverage (UT from nozzle I.D. in lieu of PT from O.D.)	See Paragraph "E"	See Paragraph "G"	See Paragraph "I"	See Paragraph "K"
1-RPV-WR53A	NC System Reactor Vessel Core Flood Nozzle-to-Safe-End Butt Weld @ 180°	Exam Category B-F Item No. B05.010.002A Fig. IWB-2500-8(c) 81% Volume Coverage (UT from nozzle side)	See Paragraph "E"	See Paragraph "G"	See Paragraph "I"	See Paragraph "K"
1-RPV-WR53A	NC System Reactor Vessel Core Flood Nozzle-to-Safe-End	Exam Category B-F Item No. B05.010.002B Fig. IWB-2500-8(c) 81% Volume Coverage	See Paragraph "E"	See Paragraph "G"	See Paragraph "I"	See Paragraph "K"

	Butt Weld @ 180°	(UT from safe-end side)					
	I.	**II. & III.**	**IV.**	**V.**	**VI.**	**VII.**
Limited Area/Weld I.D. Number	**System / Component for Which Relief is Requested:** Area or Weld to be Examined	**Code Requirement from Which Relief is Requested:** 100% Exam Volume Coverage Exam Category Item No. Fig. No. Limitation Percentage	**Basis for Relief**	**Alternate Examinations or Testing**	**Justification for Granting Relief**	**Implementation Schedule**
1-53A-02-43L	NC System Reactor Vessel Core Flood Safe-End to Pipe Circumferential Weld @ 0°	Exam Category B-J Item No. B09.011.090 Fig. IWB-2500-8(c) 76% Volume Coverage	See Paragraph “F”	See Paragraph “G”	See Paragraph “I	See Paragraph “K”
1-53A-02-43L	NC System Reactor Vessel Core Flood Safe-End to Pipe Circumferential Weld @ 0°	Exam Category B-J Item No. B09.011.090A Fig. IWB-2500-8(c) 76% Volume Coverage (UT from nozzle I.D. in lieu of PT from O.D.)	See Paragraph “F”	See Paragraph “G”	See Paragraph “I”	See Paragraph “K”
1-53A-01-1L	NC System Reactor Vessel Core Flood Safe-End to Pipe Circumferential Weld @ 180°	Exam Category B-J Item No. B09.011.100 Fig. IWB-2500-8(c) 83% Volume Coverage	See Paragraph “F”	See Paragraph “G”	See Paragraph “I”	See Paragraph “K”
1-53A-01-1L	NC System Reactor Vessel Core Flood Safe-End to Pipe Circumferential Weld @ 180°	Exam Category B-J Item No. B09.011.100A Fig. IWB-2500-8(c) 83% Volume Coverage (UT from nozzle I.D. in lieu of PT from O.D.)	See Paragraph “F”	See Paragraph “G”	See Paragraph “I”	See Paragraph “K”

Items that are listed in the table above were inspected in April of 2002.

Note: See Attachment A for a drawing on all the welds listed above.

IV. <u>Basis for Relief</u> (See Attachment A for area/weld locations.)

Paragraph A:

During the ultrasonic examination of welds 1-RPV-WR34 and 1-RPV-WR35, 100% coverage of the required examination volume could not be obtained. The examination coverage was limited to 36% and 42% respectively. Limitations were caused by the core guide lugs & flow stabilizers for WR34 and incore nozzles & flow stabilizers for WR35 that restrict the scanning surface as shown on the Attachment A, B, and C drawings. The percentage of coverage reported represents the aggregate coverage from all scans. Some areas received no coverage at all while some areas were completely covered from four directions. 13.3% of the near surface (inner 15 % of wall thickness) volume of the weld and base material was covered in four scan directions using a 70° beam angle. 76.6% of the near surface volume of the weld and base material was covered with a 70° beam angle from one axial and circumferential direction. Only 10.1% of the near surface volume of the weld and base material received no coverage. There were no recordable indications found in the areas that were examined for either of these 2 welds. In order to achieve more coverage the core guide lugs, incore nozzles and flow stabilizers would have to be moved to allow greater access for scanning, which is impractical.

(See Attachment A for drawing on both welds)

(See Attachment B for drawings on Weld 1-RPV-WR34)

(See Attachment C for a drawing on Weld 1-RPV-WR35)

Paragraph B:

During the ultrasonic examination of welds 1-RPV-WR13 and 1-RPV-WR13A, 100% coverage of the required examination volume could not be obtained. The examination coverage was limited to 82%. Limitations were caused by the outlet nozzle boss that restricts the scanning surface both from the nozzle I.D. and the vessel I.D.. The percentage of coverage reported represents the aggregate coverage from all scans. The weld and adjacent base material received 100% coverage from the nozzle bore with 15° and 45° beam angles. Scans from the vessel shell side resulted in 42% coverage of the weld and base material with a 45° beam angle of the outer 85% of the vessel wall and coverage of the inner 15% with a 70° beam angle. There were no recordable indications found in the areas that were examined for item numbers B03.090.001 and B03.090.002. There were recordable indications found during examination of item numbers B03.090.001A and B03.090.002A. All of the indications were detected from the nozzle bore and were determined to be acceptable, sub-surface flaws. In order to achieve more coverage, the outlet nozzle boss would have to be moved to allow greater access for scanning, which is impractical.

(See Attachment E for drawing on both welds)

Paragraph C:

During the ultrasonic examination of welds 1-RPV-WR54 and 1-RPV-WR54A, 100% coverage of the required examination volume could not be obtained. The examination coverage was limited to 81% of the required volume. The Core Flood Nozzles of a B&W 177 plant have several obstructions which limit ultrasonic examination coverage. In order of significance these are:

- The flow restrictor which is welded to the inner bore of the nozzle.
- The Inlet nozzles located 30° on either side of each core flood nozzle.
- The taper above the core flood nozzles associated with the Core Support Ledge.

The percentage of exam volume coverage reported represents the aggregate coverage as follows:

- Weld and adjacent base material = 81% scanned parallel to the weld centerline in two directions and perpendicular to the weld centerline from one direction.

- Inner 15% from the vessel ID = 97%, in four orthogonal directions.

There were no recordable indications found in the areas that were examined for either of these 2 welds. In order to achieve more coverage, the inlet nozzles would have to be moved and the taper on the flange would have to be redesigned to allow greater access for scanning, which is impractical. In addition, because of the proximity of the flow restrictors no scanning was performed from the nozzle I.D. (0% examination coverage). In order to achieve more coverage, the flow restrictor would have to be moved to allow access for scanning, which is impractical.

(See Attachment D for a drawing on the core flood nozzle).

Paragraph D:

During the ultrasonic examination of inside radius sections 1-RPV-WR54 and 1-RPV-WR54A, 100% coverage of the required examination volume could not be obtained. The examination coverage was limited to 52%. Limitations were caused by the flow restrictor that prevents scanning from the nozzle bore surface. The percentage of coverage reported represents the aggregate coverage from all scans. There were no recordable indications found in the areas that were examined for either of these inside radius sections. In order to achieve more coverage, the flow restrictor would have to be moved to allow greater access for scanning, which is impractical.

(See Attachment D for a drawing on the core flood nozzle)

Paragraph E:

During the ultrasonic examination of welds 1-RPV-WR53 and 1-RPV-WR53A, 100% coverage of the required examination volume could not be obtained. The examination coverage was limited to 86% and 81%, respectively from two axial and two circumferential directions. Limitations were caused by air at the top of the nozzle that prevented the transducer from making contact for scanning the surface. The reactor vessel inspection services vendor made two attempts to evacuate the air with equipment made for the purpose but additional air was reintroduced from an unknown source. After the second attempt was unsuccessful and the source for the air could not be determined, a decision was made to perform the scan and obtain as much coverage as possible (the percentages shown above). The vendor noted that similar problems with eliminating trapped air have been experienced on other reactor vessels with small diameter piping.

The percentage of coverage reported represents the aggregate coverage from all scans. There were no recordable indications found in the volumes that were examined for either of these 2 welds. In order to achieve more coverage, the air would have to be eliminated which proved to be impractical during the subject inspection.

Alternatively, it is impractical to perform this exam from the outside nozzle surface due to the excessive personnel radiation exposure. Approximately 40 man-hours would be required to prepare each core flood nozzle-to-safe end weld for examination from the outside surface. The preparation involves removing the refueling canal seal plate, shielding bricks, shielding supports in the nozzle area and insulation. The radiation levels in this area are expected to be 0.51 R/hr. An alternative path would be to enter from the bottom of the reactor vessel and build scaffolding approximately 30 feet high to reach the core flood nozzles. This activity would require approximately 80 man-hours. 40 man-hours in a 0.51/hr radiation field and 40 man-hours in a 1-2 R/hr radiation field. Total estimated exposure would be 80-140 man-rem. Shielding in this area is impractical. Any remote inspection would require the same preparatory work.

Paragraph F:

During the ultrasonic examination of welds 1-53A-02-43L and 1-53A-01-1L, 100% coverage of the required examination volume could not be obtained. The examination coverage was limited to 76% and 83%, respectively from two axial and two circumferential directions. Limitations were caused by air at the top of nozzle that prevented the transducer from making contact for scanning the surface. The reactor vessel inspection services vendor made two attempts to evacuate the air with equipment made for the purpose but additional air was reintroduced from an unknown source. After the second attempt was unsuccessful and the source for the air could not be determined, a decision was made to perform the scan and obtain as much coverage as possible (the percentages shown above). The vendor noted that similar problems with eliminating trapped air have been experienced on other reactor vessels with small diameter piping.

The percentage of coverage reported represents the aggregate coverage. There were no recordable indications found in the volumes that were examined for either of these 2 welds. In order to achieve more coverage, the air would have to be eliminated which proved to be impractical during the subject inspection.

V. Alternate Examinations or Testing

Paragraph G:

The scheduled 10-year code examination was performed on the referenced area/weld and it resulted in the noted limited coverage of the required ultrasonic volume. No additional examinations are planned for the area/weld during the current inspection interval.

VI. Justification for Granting Relief

Paragraph H:

Ultrasonic examination of welds for item numbers B01.011 and B01.021 were conducted using personnel, equipment and procedures qualified in accordance with ASME Section XI, Appendix VIII, Supplements 4 and 6, 1995 Edition with the 1996 Addenda as administered through the Performance Demonstration Initiative (PDI) Program. Although 100% coverage of the examination volume could not be achieved, the amount of coverage obtained for these examinations along with the additional volumetric and visual examinations (listed in subsequent paragraph) provides an acceptable level of quality and integrity. (See Paragraph J for additional justification.)

In addition to the Category B-A welds that relief is being sought for, there were 5 circumferential and 6 longitudinal, Category B-A welds that were inspected and all obtained greater than 90 % coverage and there were no reportable indications found during the inspections. Visual examinations were also performed as part of the reactor vessel inspections (item number B13.010.001 and B13.050.001) and were found to be without any reportable indications.

Paragraph I:
Ultrasonic examination of areas/welds for item numbers B03.090, B03.100, B05.010 and B09.011 were conducted using personnel, equipment and procedures qualified in accordance with ASME Section XI, Appendix I, 1989 Edition with no Addenda Inspection of the B05.010 and B09.011 welds from the outside diameter is not a viable alternate due to the dose that would be received to prepare and perform the inspections. Relief Request ONS-001 and ONS-002 were written to perform UT from the ID surface in lieu of a surface exam from the OD surface of all reactor vessel nozzles to pipe welds due to the radiation exposure that is involved with performing inspections from the OD surface. Relief was granted for ONS-001 and ONS-002 on an SER dated 11-15-95. Although 100% coverage of the examination volume could not be achieved, the amount of coverage obtained for these examinations provides an acceptable level of quality and integrity. (See Paragraph J for additional justification.)

Paragraph J:
Duke Energy will use pressure testing and VT-2 visual examination to compliment the limited examination coverage. The Code requires (reference Table IWB-2500-1, item numbers B15.010 and B15.050) that a system leakage test be performed after each refueling outage for Class 1. Additionally a system hydrostatic test (reference Table IWB-

2500-1, item numbers B15.011 and B15.051) is required once during each 10-year inspection interval. These tests require a VT-2 visual examination for evidence of leakage. This testing provides adequate assurance of pressure boundary integrity.

Duke Energy will use VT-3 visual examination to compliment the limited examination coverage. The Code requires (reference Table IWB-2500-1, item number B13.010) that a VT-3 examination be performed after the first refueling outage and subsequent refueling outages at approximately 3 year periods. During the first and second periods of an interval a VT-3 examination is performed on areas above and below the reactor core that are made accessible for examination by removal of components during normal refueling outages. During the third period of an interval the VT-3 examination is performed on all of the reactor vessel interior surfaces at the same time that the automated UT exams are performed on the reactor vessel welds. This examination provides adequate assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric, pressure test, and VT-3), there are other activities which provide a high level of confidence that, in the unlikely case that leakage did occur through these welds, it would be detected and isolated. Specifically, leakage from these welds would be detected by monitoring of the Reactor Coolant System (RCS), which is performed once each shift under procedure PT/1,2,3/A/0600/10, "RCS Leakage". This RCS leakage monitoring is a requirement of Technical Specification 3.4.13, "Reactor Coolant System Leakage". Leakage is also evaluated in accordance with this Technical Specification. The leakage could also be detected through several other methods. One is the RCS mass balance calculation. A second is the Reactor Building air particulate monitor. This monitor is sensitive to low leak rates; the iodine monitor, gaseous monitor and area monitor are capable of detecting any fission products in the coolant and will be activated by coolant leakage. A third is the level indicator in the Reactor Building normal sump. A fourth is a loss of level in the Letdown Storage Tank.

Duke Energy has examined the welds/components referenced in this request to the maximum extent possible utilizing the latest in examination techniques and equipment. These welds were rigorously inspected by volumetric NDE methods during construction and verified to be free from unacceptable fabrication defects. Based on the portions and results of the required volumetric and visual examinations performed during this outage, it's our opinion that this combination of examinations provides a reasonable assurance of component integrity.

VII. Implementation Schedule

Paragraph K

The scheduled third 10-year interval plan code examination was performed on the referenced area/weld resulting in limited volumetric coverage. No additional examinations are planned for the area/weld during the current inspection interval. The same area/weld may be examined again as part of the next (fourth) 10-year interval plan, depending on the applicable code year edition and addenda requirements adopted in the future.

VIII. Other Information

The following individuals contributed to the development of this relief request:

James J. McArdle (Principal NDE Level III Inspector) provided Sections II through V and part of Section VI.

B. W. Carney, Jr. (Oconee Engineering) provided part of Section VI.

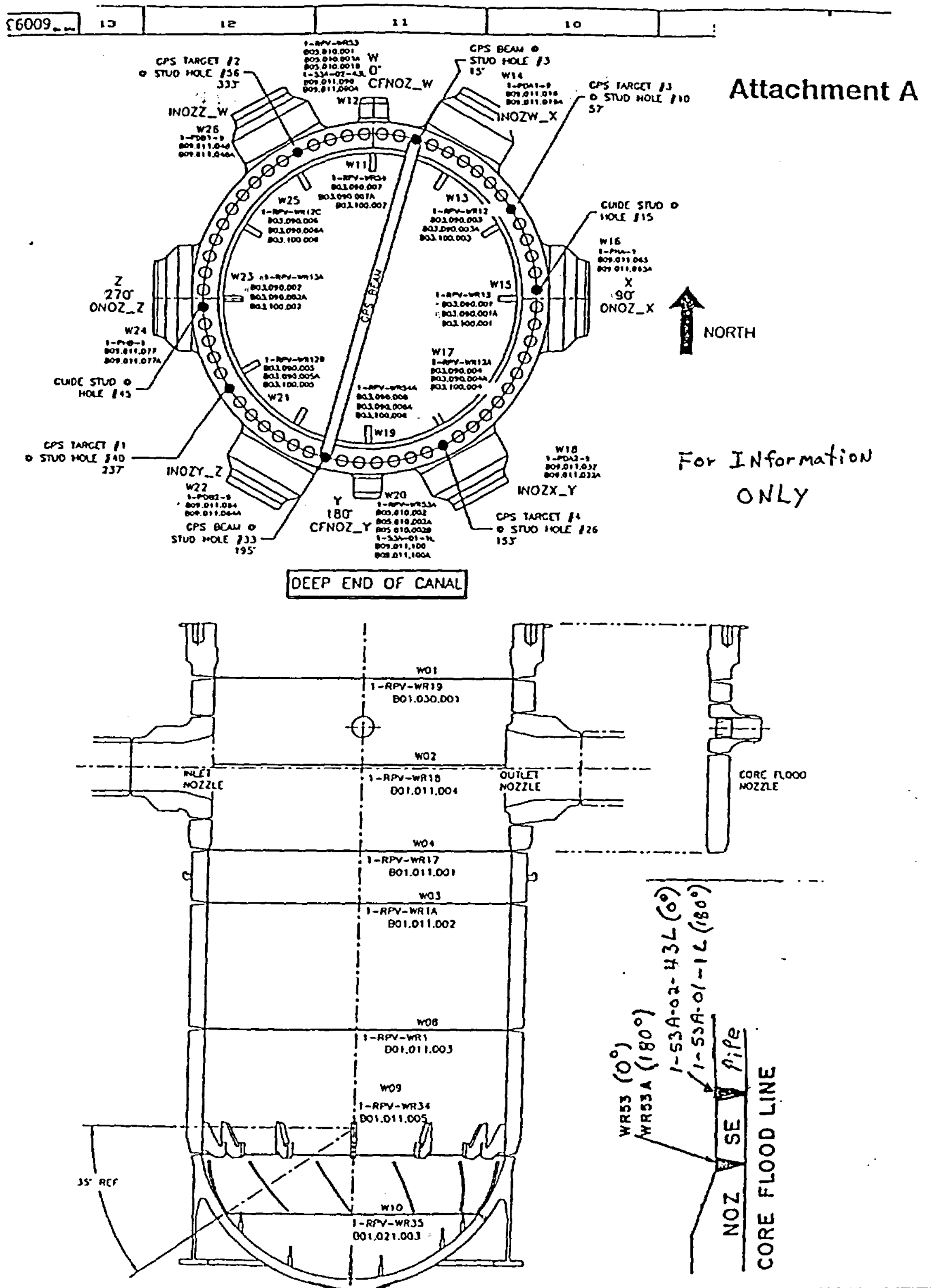
Larry C. Keith (Oconee ISI Plan Manager) compiled the remaining sections.

Sponsored By: Larry C. Keith **Date** 5/6/03

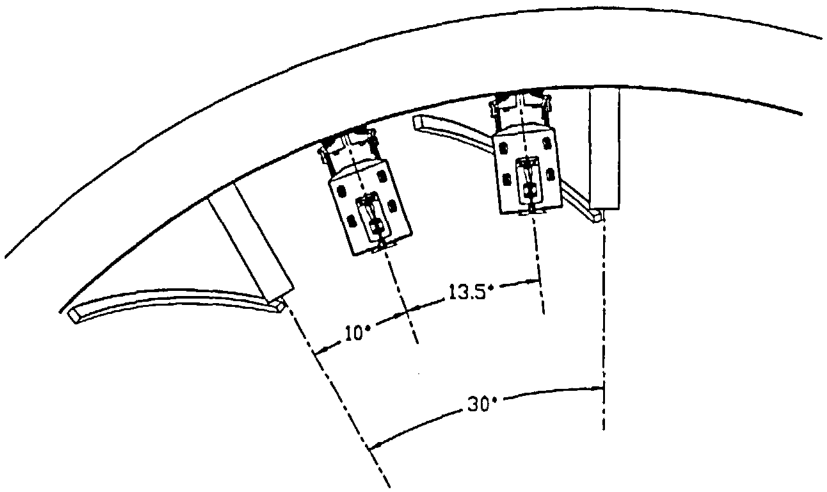
Approved By: R. Kevin Rhyne **Date** 5/6/03

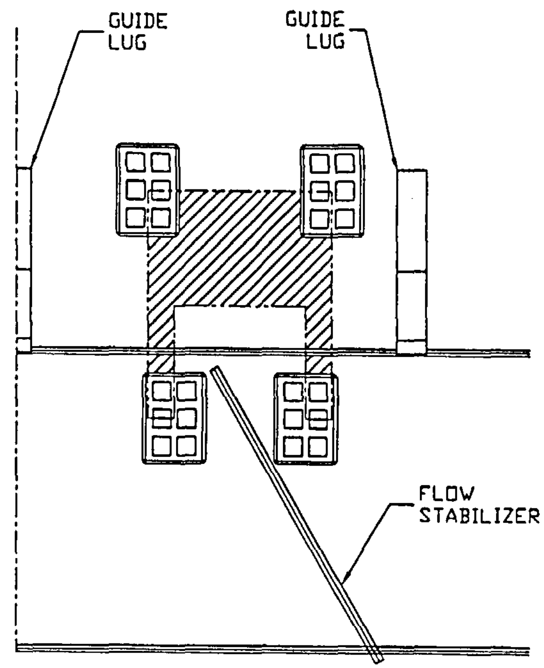
Attachment A	Drawing on Reactor Vessel Welds
Attachment B	Drawings on Weld 1-RPV-WR34
Attachment C	Drawings on Weld 1-RPV-WR35
Attachment D	Drawing on Weld 1-RPV-WR54 and 1-RPV-WR54A (core flood nozzle)
Attachment E	Drawing on Weld 1-RPV-WR13 and 1-RPV-WR13A

Attachment A



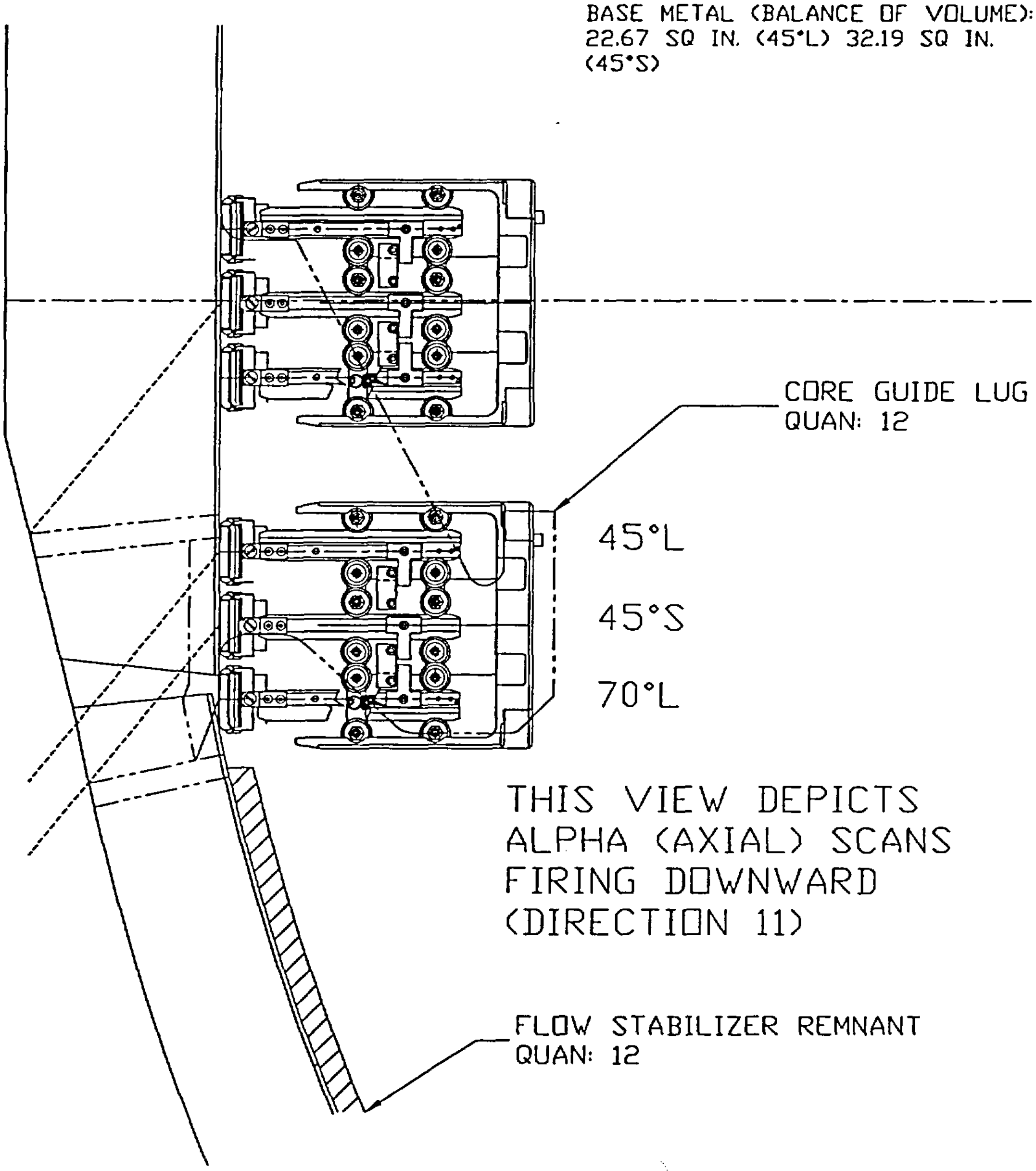
For Information ONLY





W09
OCONEE-1
1-RPV-WR34
B01.011.005

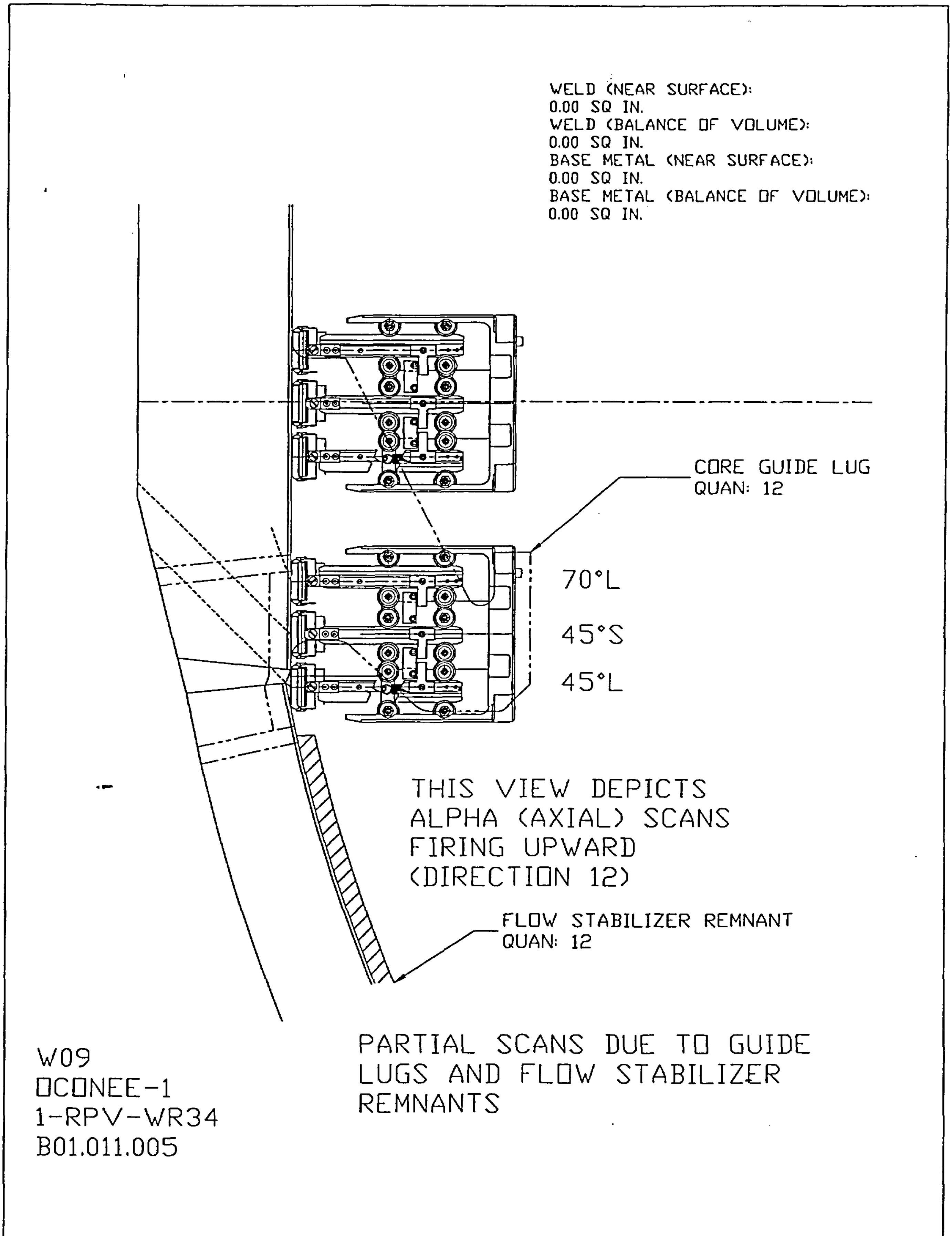
WELD (NEAR SURFACE):
4.12 SQ IN. (70°L)
WELD (BALANCE OF VOLUME):
3.03 SQ IN. (45°L) 6.42 SQ IN. (45°S)
BASE METAL (NEAR SURFACE):
7.31 SQ IN. (70°L)
BASE METAL (BALANCE OF VOLUME):
22.67 SQ IN. (45°L) 32.19 SQ IN. (45°S)



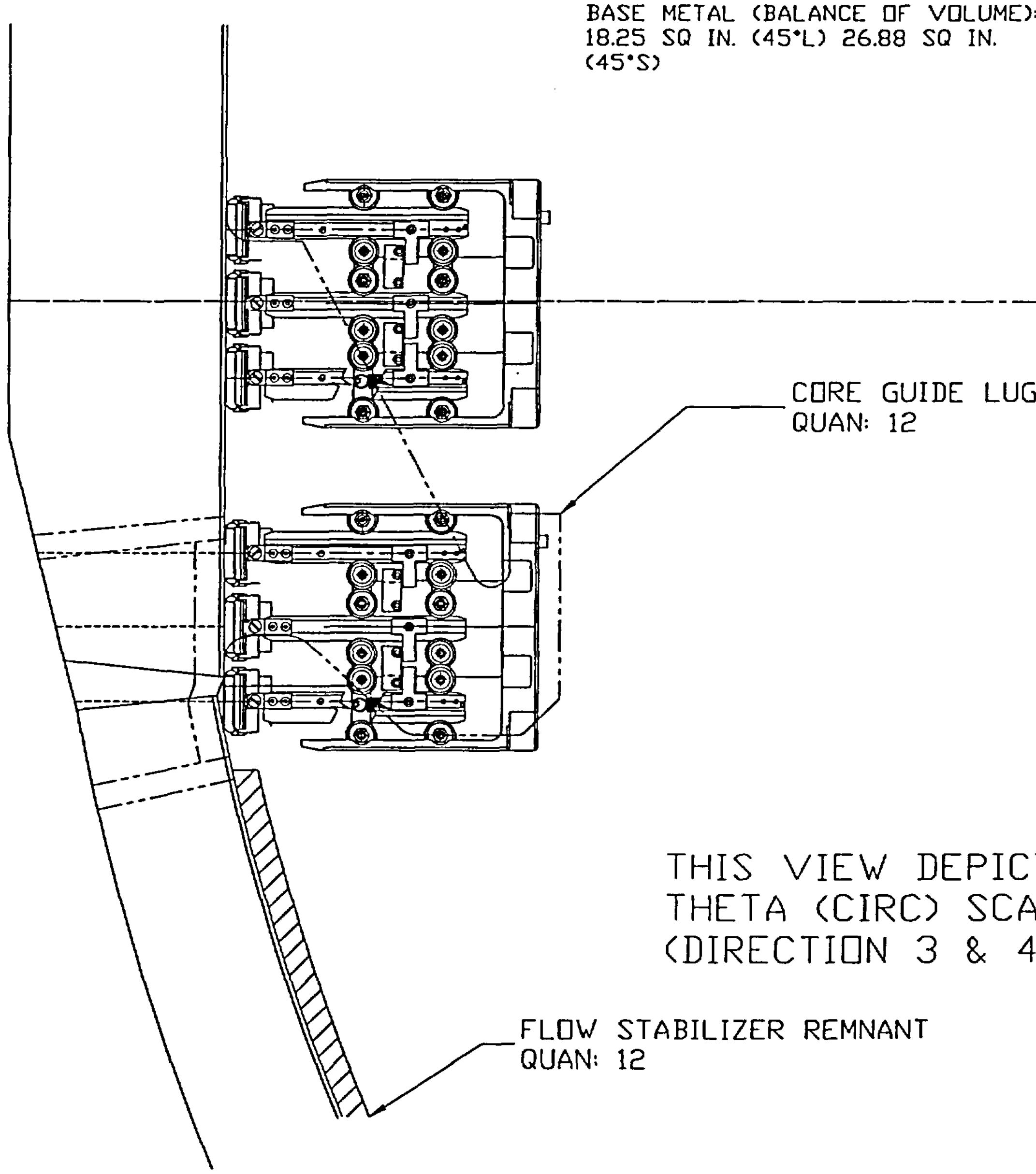
THIS VIEW DEPICTS ALPHA (AXIAL) SCANS FIRING DOWNWARD (DIRECTION 11)

PARTIAL SCANS DUE TO GUIDE LUGS AND FLOW STABILIZER REMNANTS

W09
OCONEE-1
1-RPV-WR34
B01.011.005


WELD (NEAR SURFACE):
0.00 SQ IN.
WELD (BALANCE OF VOLUME):
0.00 SQ IN.
BASE METAL (NEAR SURFACE):
0.00 SQ IN.
BASE METAL (BALANCE OF VOLUME):
0.00 SQ IN.
CORE GUIDE LUG
QUAN: 12
70°L
45°S
45°L
THIS VIEW DEPICTS
ALPHA (AXIAL) SCANS
FIRING UPWARD
(DIRECTION 12)
FLOW STABILIZER REMNANT
QUAN: 12
PARTIAL SCANS DUE TO GUIDE
LUGS AND FLOW STABILIZER
REMNANTS
W09
OCONEE-1
1-RPV-WR34
B01.011.005

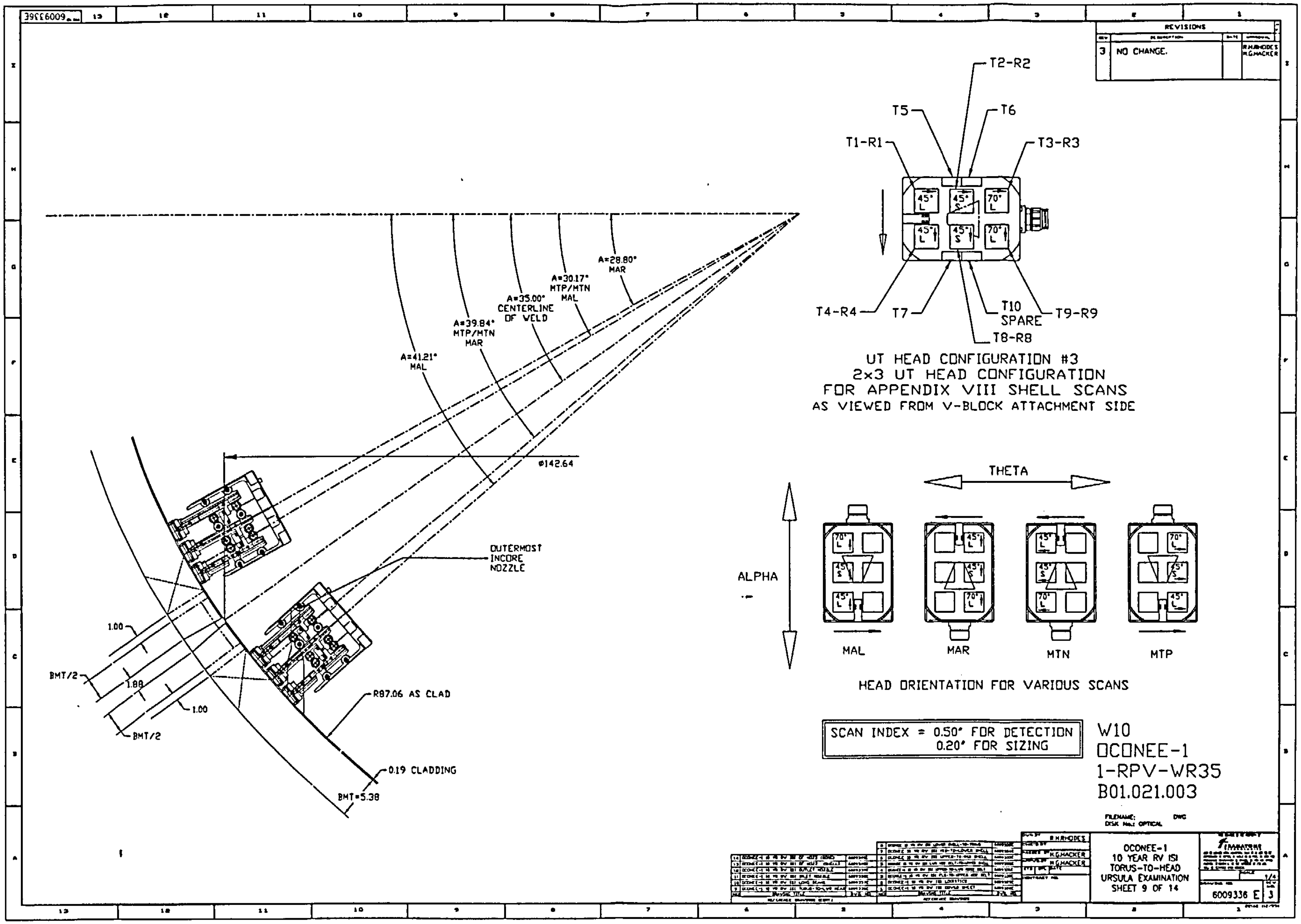
WELD (NEAR SURFACE):
4.12 SQ IN. (70°L)
WELD (BALANCE OF VOLUME):
7.17 SQ IN. (45°L & 45°S)
BASE METAL (NEAR SURFACE):
5.62 SQ IN. (70°L)
BASE METAL (BALANCE OF VOLUME):
18.25 SQ IN. (45°L) 26.88 SQ IN. (45°S)



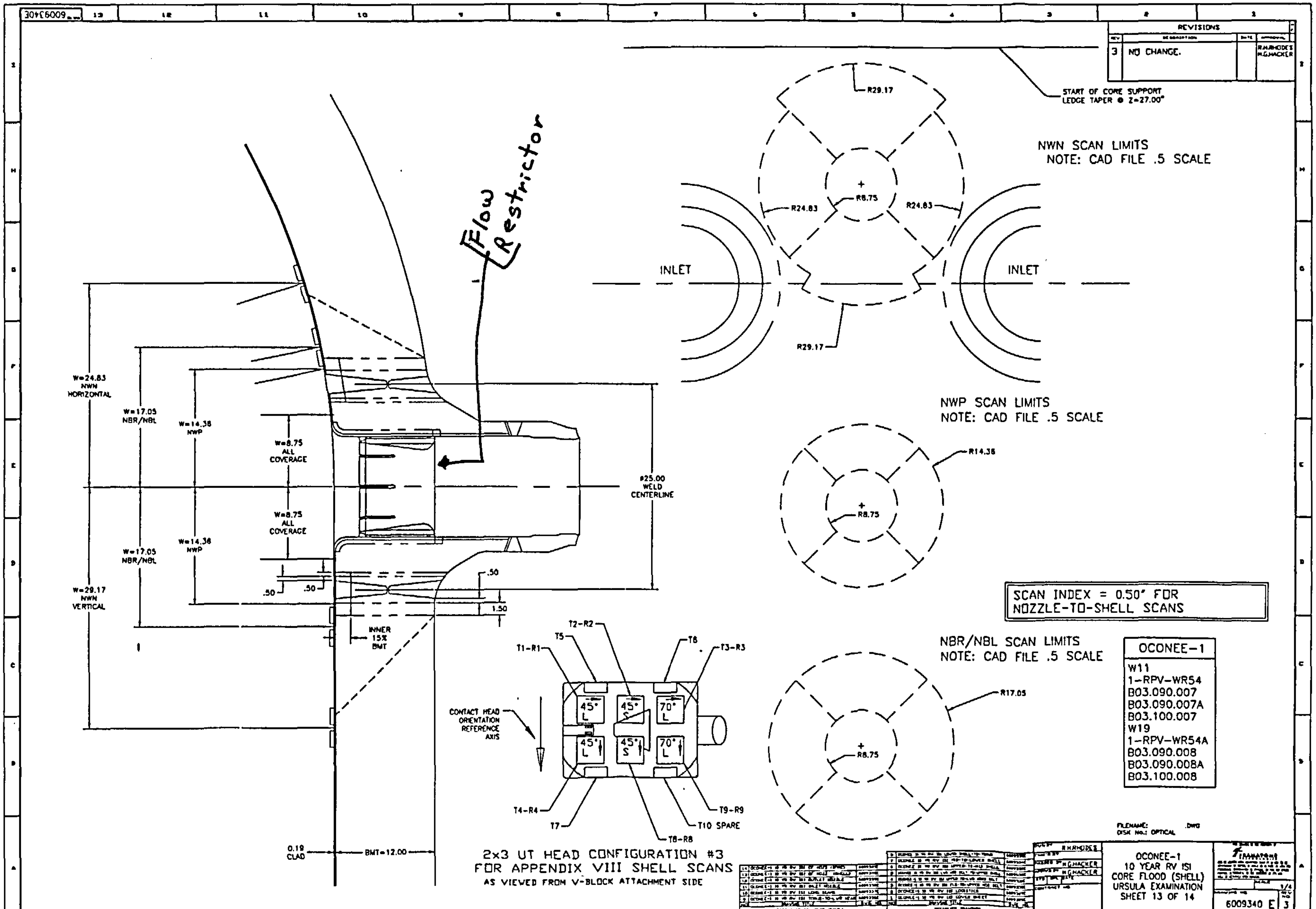
THIS VIEW DEPICTS THETA (CIRC) SCANS (DIRECTION 3 & 4)

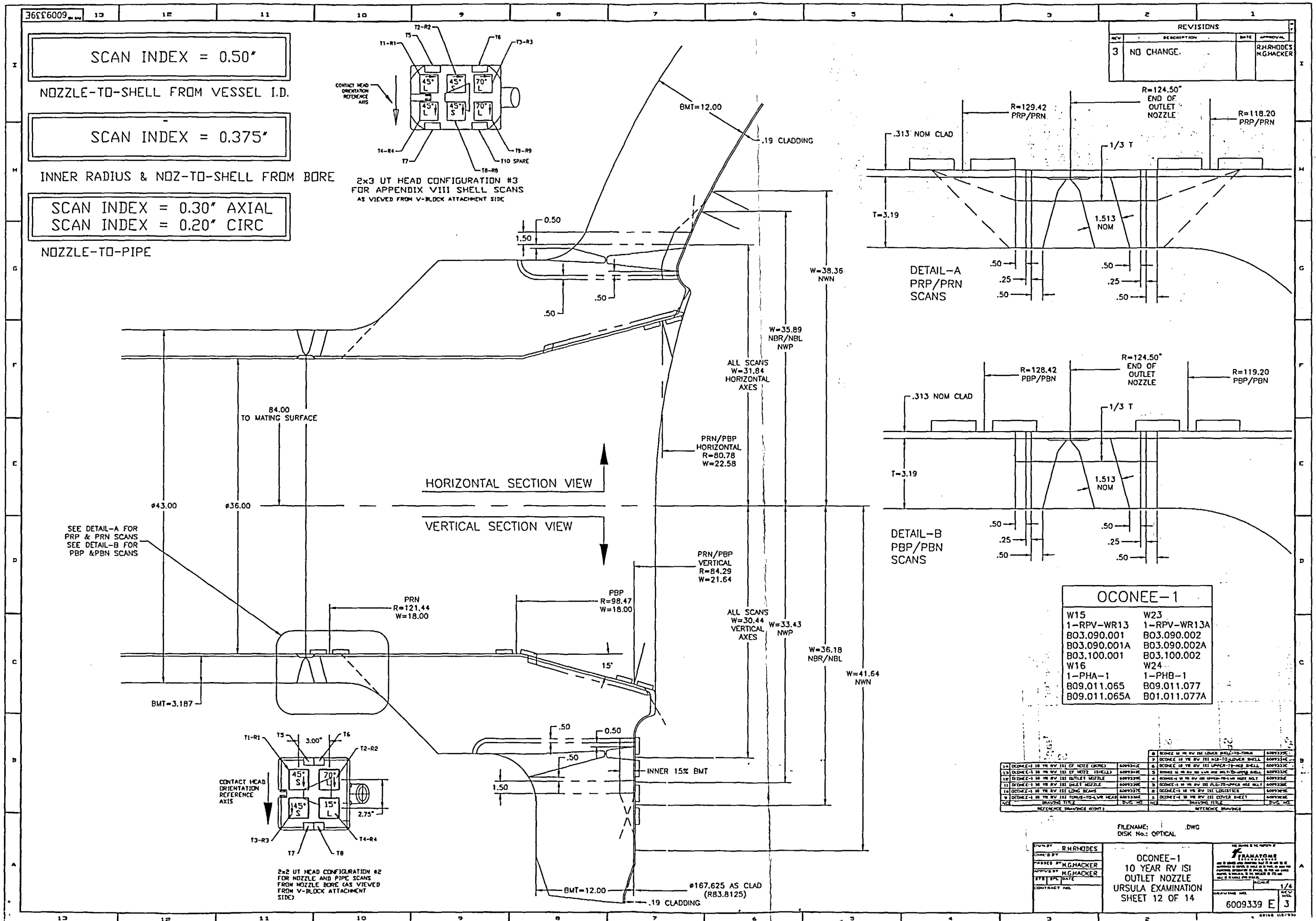
W09
OCONEE-1
1-RPV-WR34
B01.011.005

PARTIAL SCANS DUE TO GUIDE LUGS AND FLOW STABILIZER REMNANTS



Attachment C
Page 1 of 1


REVISIONS
3 NO CHANGE. R.H.RHODES M.G.HACKER
START OF CORE SUPPORT LEDGE TAPER @ Z=27.00"
Flow Restrictor
NWN SCAN LIMITS
NOTE: CAD FILE .5 SCALE
R29.17
R24.83
R8.75
INLET
NWP SCAN LIMITS
NOTE: CAD FILE .5 SCALE
R14.38
NBR/NBL SCAN LIMITS
NOTE: CAD FILE .5 SCALE
R17.05
SCAN INDEX = 0.50" FOR
NOZZLE-TO-SHELL SCANS
OCONEE-1
W11
1-RPV-WR54
B03.090.007
B03.090.007A
B03.100.007
W19
1-RPV-WR54A
B03.090.008
B03.090.008A
B03.100.008
W=24.83 NWN HORIZONTAL
W=17.05 NBR/NBL
W=14.38 NWP
W=8.75 ALL COVERAGE
Ø25.00 WELD CENTERLINE
W=29.17 NWN VERTICAL
.50
1.50
INNER 15% BMT
0.19 CLAD
BMT=12.00
CONTACT HEAD ORIENTATION REFERENCE AXIS
T1-R1
T2-R2
T3-R3
T4-R4
T5
T6
T7
T8-R8
T9-R9
T10 SPARE
45° L
45° S
70° L
2x3 UT HEAD CONFIGURATION #3
FOR APPENDIX VIII SHELL SCANS
AS VIEWED FROM V-BLOCK ATTACHMENT SIDE
FILENAME: .DWG
DISK NO.: OPTICAL
R.H.RHODES
M.G.HACKER
OCONEE-1
10 YEAR RV ISI
CORE FLOOD (SHELL)
URSULA EXAMINATION
SHEET 13 OF 14
6009340 E 3


SCAN INDEX = 0.50"
NOZZLE-TO-SHELL FROM VESSEL I.D.
SCAN INDEX = 0.375"
INNER RADIUS & NOZ-TO-SHELL FROM BORE
SCAN INDEX = 0.30" AXIAL
SCAN INDEX = 0.20" CIRC
NOZZLE-TO-PIPE
2x3 UT HEAD CONFIGURATION #3
FOR APPENDIX VIII SHELL SCANS
AS VIEWED FROM V-BLOCK ATTACHMENT SIDE
REVISIONS
3 NO CHANGE. R.H.RHODES M.G.HACKER
BMT=12.00
.19 CLADDING
R=129.42 PRP/PRN
R=124.50" END OF OUTLET NOZZLE
R=118.20 PRP/PRN
.313 NOM CLAD
1/3 T
T=3.19
1.513 NOM
DETAIL-A
PRP/PRN
SCANS
W=38.36 NWN
W=35.89 NBR/NBL NWP
ALL SCANS W=31.84 HORIZONTAL AXES
R=128.42 PBP/PBN
R=119.20 PBP/PBN
84.00 TO MATING SURFACE
PRN/PBP HORIZONTAL R=80.78 W=22.58
HORIZONTAL SECTION VIEW
VERTICAL SECTION VIEW
ø43.00
ø36.00
DETAIL-B
PBP/PBN
SCANS
SEE DETAIL-A FOR PRP & PRN SCANS
SEE DETAIL-B FOR PBP & PBN SCANS
PRN/PBP VERTICAL R=84.29 W=21.64
PRN R=121.44 W=18.00
PBP R=98.47 W=18.00
ALL SCANS W=30.44 VERTICAL AXES
W=33.43 NWP
W=36.18 NBR/NBL
W=41.64 NWN
BMT=3.187
INNER 15% BMT
2x2 UT HEAD CONFIGURATION #2
FOR NOZZLE AND PIPE SCANS
FROM NOZZLE BORE (AS VIEWED FROM V-BLOCK ATTACHMENT SIDE)
CONTACT HEAD ORIENTATION REFERENCE AXIS
BMT=12.00
ø167.625 AS CLAD (R83.8125)
.19 CLADDING
OCONEE-1
W15
1-RPV-WR13
B03.090.001
B03.090.001A
B03.100.001
W16
1-PHA-1
B09.011.065
B09.011.065A
W23
1-RPV-WR13A
B03.090.002
B03.090.002A
B03.100.002
W24
1-PHB-1
B09.011.077
B01.011.077A
REFERENCE DRAWINGS (CONT.)
REFERENCE DRAWINGS
FILENAME: .DWG
DISK No.: OPTICAL
DWN BY R.H.RHODES
PASSED BY M.G.HACKER
APPVD BY M.G.HACKER
OCONEE-1
10 YEAR RV ISI
OUTLET NOZZLE
URSULA EXAMINATION
SHEET 12 OF 14
FRAMATOME TECHNOLOGIES
SCALE 1/4
DRAWING NO. 6009339 E
REV NO. 3

Proposed Relief in Accordance with 10 CFR 50.55a(g)(5)(iii)
Inservice Inspection Impracticality

Duke Energy Corporation
Oconee Nuclear Station– Unit 1 (EOC-20)
Third 10-Year Interval – Inservice Inspection Plan
Interval Start Date=7-15-1994 Interval End Date=1-1-2004
ASME Section XI Code – 1989 Edition with No Addenda

	I.	II. & III.	IV.	V.	VI.	VII.
Limited Area/Weld I.D. Number	**System / Component for Which Relief is Requested:** Area or Weld to be Examined	**Code Requirement from Which Relief is Requested:** 100% Exam Volume Coverage &/or 4 Scan Directions Exam Category Item No. Fig. No. Limitation Percentage	**Basis for Relief**	**Alternate Examinations or Testing**	**Justification for Granting Relief**	**Implementation Schedule**
1-SGA-WG25	RC System Steam Generator 1A Nozzle-to-Vessel Weld	Exam Category B-D Item No. B03.130.005 Fig. IWB-2500-7(a) 57.98% Volume Coverage	See Paragraph "A"	See Paragraph "O"	See Paragraph "P"	See Paragraph "T"
1-SGB-WG25	RC System Steam Generator 1B Nozzle-to-Vessel Weld	Exam Category B-D Item No. B03.130.006 Fig. IWB-2500-7(a) 57.98% Volume Coverage	See Paragraph "A"	See Paragraph "O"	See Paragraph "P"	See Paragraph "T"
1-SGA-WG25	RC System Steam Generator 1A Nozzle Inside Radius Section	Exam Category B-D Item No. B03.140.005 Fig. IWB-2500-7) (a) 70.21% Volume Coverage	See Paragraph "A"	See Paragraph "O"	See Paragraph "Q"	See Paragraph "T"
1-SGB-WG25	RC System Steam Generator 1B Nozzle Inside Radius Section	Exam Category B-D Item No. B03.140.006 Fig. IWB-2500-7(a) 70.21% Volume Coverage	See Paragraph "A"	See Paragraph "O"	See Paragraph "Q"	See Paragraph "T"
1-LDCB-IN-V1	HPI System Let Down Cooler 1B Inlet Nozzle-to-Channel Body Weld	Exam Category B-D Item No. B03.150.003 Fig. IWB-2500-7(a) 27.48% Volume Coverage	See Paragraph "B"	See Paragraph "O"	See Paragraph "Q"	See Paragraph "T"

	I.	II. & III.	IV.	V.	VI.	VII.
Limited Area/Weld I.D. Number	**System / Component for Which Relief is Requested:** Area or Weld to be Examined	**Code Requirement from Which Relief is Requested:** 100% Exam Volume Coverage &/or 4 Scan Directions Exam Category Item No. Fig. No. Limitation Percentage	**Basis for Relief**	**Alternate Examinations or Testing**	**Justification for Granting Relief**	**Implementation Schedule**
1-LDCB-OUT-V2	HPI System Let Down Cooler 1B Outlet Nozzle-to-Channel Body Weld	Exam Category B-D Item No. B03.150.004 Fig. IWB-2500-7(a) 27.48% Volume Coverage	See Paragraph "B"	See Paragraph "O"	See Paragraph "Q"	See Paragraph "T"
1-RPV-LIGAMENTS	RC System Reactor Vessel Threads in Flange 180° to 360°	Exam Category B-G-1 Item No. B06.040.001A Fig. IWB-2500-12 (a-b-c-d) 84.52% Volume Coverage	See Paragraph "C"	See Paragraph "O"	See Paragraph "Q"	See Paragraph "T"
1LP-128-80	LP System Reducer to Valve 1LP-18 Weld	Exam Category C-F-1 Item No. C05.011.007 Fig. IWC-2500-7(a) 59.74% Volume Coverage	See Paragraph "D"	See Paragraph "O"	See Paragraph "S"	See Paragraph "T"
1HP-192-15	HPI System Pipe to Flange Orifice Weld	Exam Category C-F-1 Item No. C05.021.006 Fig. IWC-2500-7(a) 60.99% Volume Coverage	See Paragraph "E"	See Paragraph "O"	See Paragraph "S"	See Paragraph "T"
1-51A-01-91A	HPI System Pipe to Valve 1HP-128 Weld	Exam Category C-F-1 Item No. C05.021.043 Fig. IWC-2500-7(a) 60.84% Volume Coverage	See Paragraph "F"	See Paragraph "O"	See Paragraph "S"	See Paragraph "T"
1HP-324-118B	HPI System Tee to Valve 1HP-119 Weld	Exam Category C-F-1 Item No. C05.021.065 Fig. IWC-2500-7(a) 61.54% Volume Coverage	See Paragraph "G"	See Paragraph "O"	See Paragraph "S"	See Paragraph "T"
1-51A-01-32AA	HPI System Pipe to Valve 1HP-23 Weld	Exam Category C-F-1 Item No. C05.021.078 Fig. IWC-2500-7(a) 60.39% Volume Coverage	See Paragraph "H"	See Paragraph "O"	See Paragraph "S"	See Paragraph "T"
1HP-393-127A	HPI System Pipe to Valve 1HP-105 Weld	Exam Category C-F-1 Item No. C05.021.084 Fig. IWC-2500-7(a) 59.31% Volume Coverage	See Paragraph "I"	See Paragraph "O"	See Paragraph "S"	See Paragraph "T"

	I.	II. & III.	IV.	V.	VI.	VII.
Limited Area/Weld I.D. Number	**System / Component for Which Relief is Requested:** Area or Weld to be Examined	**Code Requirement from Which Relief is Requested:** 100% Exam Volume Coverage &/or 4 Scan Directions Exam Category Item No. Fig. No. Limitation Percentage	**Basis for Relief**	**Alternate Examinations or Testing**	**Justification for Granting Relief**	**Implementation Schedule**
1-51A-02-34B	HPI System Elbow to Valve 1HP-134 Weld	Exam Category C-F-1 Item No. C05.021.090 Fig. IWC-2500-7(a) 61.30% Volume Coverage	See Paragraph "J"	See Paragraph "O"	See Paragraph "S"	See Paragraph "T"
1HP-193-12	HPI System Tee to Valve 1HP-26 Weld	Exam Category C-F-1 Item No. C05.021.096 Fig. IWC-2500-7(a) 59.37% Volume Coverage	See Paragraph "K"	See Paragraph "O"	See Paragraph "S"	See Paragraph "T"
1HP-70-11	HPI System Expansion Joint M-0891 to Elbow Weld	Exam Category C-F-1 Item No. C05.021.102 Fig. IWC-2500-7(a) 56.22% Volume Coverage	See Paragraph "L"	See Paragraph "O"	See Paragraph "S"	See Paragraph "T"
1-51A-01-103A	HPI System Pipe to Valve 1HP-109 Weld	Exam Category C-F-1 Item No. C05.021.110 Fig. IWC-2500-7(a) 60.71% Volume Coverage	See Paragraph "M"	See Paragraph "O"	See Paragraph "S"	See Paragraph "T"

Note: See Attachment A for a drawing on the Steam Generator welds listed above.

See Attachment B for a drawing on the Let Down Cooler welds listed above.

See Attachment C for examination data for all items listed above.

See Attachment D for a drawing on 1-RPV-LIGAMENTS (Item B06.040.001A).

IV. Basis for Relief

Paragraph A: (The steam generator head material is SA 302, Gr. B and the nozzle material is SA 508, Cl. 1. The diameter of the Nozzle to Vessel weld is 48 inches and it has a wall thickness of 8 inches. These steam generators are scheduled to be replaced in the fall of 2003.)

Welds:
During the ultrasonic examination of welds 1-SGA-WG25 & 1-SGB-WG25, 100% coverage of the required examination volume could not be obtained. The examination coverage was limited to 57.98%. The examination was performed in accordance with the requirements of ASME Section V, Article 4 as amended by ASME Section XI, Appendix I. Single sided access caused by the weld design prevents scanning the welds from four directions. Scanning was performed from three directions, parallel and perpendicular to the welds from the vessel head side using 45°and 60° shear wave beams and straight beam search units. Scanning was limited from the nozzle side due to the tapered geometry. The percentage of coverage reported represents the aggregate coverage obtained by all scans over the full length of the weld. The 45° and 60° scans parallel to the welds covered 50% of the weld metal and 100% of the base material on the head side from one direction. The 45° and 60° scans perpendicular to the weld covered 37% of the base material on the nozzle side of the weld from one direction, 100% of the base material on the vessel head side of the weld from one direction and 97% of the weld metal from one direction. In order to achieve more coverage the nozzle would have to be re-designed to allow scanning from both sides of the weld, which is impractical. There were no recordable indications found during the inspection of these welds.

Inner Radii:
During the ultrasonic examination of the inside radius sections associated with both nozzle to vessel welds, 1-SGA-WG25 & 1-SGB-WG25, 100% coverage of the required examination volume could not be obtained. The examination coverage was limited to 70.21%. The nozzle inner radii were examined from the vessel shell in two opposing directions using 60° and 70° shear wave beam angles. The search units were skewed from the nozzle centerline in order to provide a 45° intercept angle between the sound beam and any flaws oriented in the axial/radial plane within the required examination volume. The examination was performed in accordance with the requirements of ASME Section V, Article 4 as amended by ASME Section XI, Appendix I. There were no recordable indications found during the inspection of these inner radii.

Paragraph B: (Material type for both welds is SA182, F316L. The diameter of the inlet nozzle to channel body weld and the outlet nozzle to channel body weld is 3 inches and they have a wall thickness of .875 inches.)

During the ultrasonic examination of welds 1-LDCB-IN-V1 and 1-LDCB-OUT-V2, 100% coverage of the required examination volume could not be obtained. The examination coverage was limited to 27.48%. Although these welds are classified as Category B-D the actual configuration is similar to a pipe branch connection.

The percentage of coverage reported represents the aggregate coverage from all scans performed on the weld and base material. The examination was performed from both the vessel shell side and the nozzle side of the weld. The 45° and 60° beam angles directed perpendicular to the weld covered 88.24% of the base material examination volume. The axial scans with 45° beams covered 37.46% of the examination volume including the weld and base material in two opposite directions. In order to achieve more coverage, the nozzle would have to be re-designed to allow additional scanning from both sides of the weld, and across the width of the weld, which is impractical. There were no recordable indications found during the inspection of these welds.

In order to examine similar metal stainless steel welds refracted longitudinal wave and refracted shear wave search units are used. The refracted longitudinal wave search units have an inherent limitation in that the useful portion of the sound beam lies in the first beam path leg between the transducer and the inside surface of the component. Beam paths beyond the inside surface of the component cannot be used to extend the examination coverage through the weld because of mode conversion that occurs at the inside surface. However, refracted longitudinal wave search units have better penetration through stainless steel weld metal than shear wave search units. When calibrating in accordance with ASME Section XI, Appendix III and using refracted longitudinal wave there is not enough sound energy available to establish a distance-amplitude-correction curve beyond the inside surface notch located in the basic calibration block.

Paragraph C:
During the ultrasonic examination of 1-RPV-LIGAMENTS, 100% coverage of the required examination volume could not be obtained. The examination coverage was limited to 84.52%. Limitations are caused by the clad area at each stud hole that causes the search unit to lift off the scanning surface. There were no recordable indications found during the examination for this item. In order to achieve more coverage the cladding would have to be removed to allow for scanning, which is impractical.

Paragraph D: (This weld is 12 inches in diameter with a wall thickness of 1.168 inches and made of stainless steel.)

During the ultrasonic examination of reducer-to-valve weld 1LP-128-80, coverage of the required examination volume was limited to 59.74%. The percentage of coverage reported represents the aggregate coverage from all scans performed on the weld and base material. Single sided access, caused by the proximity of the valve taper, prevents access to both sides of the weld. In order to achieve coverage from four directions, the weld would have to be re-designed to allow scanning from both sides of the weld, which is impractical. There were no recordable indications found during the inspection of this weld.

See Paragraph N for additional basis for relief. (Note: When "near side" is referenced in Paragraph N for weld 1LP-128-80, it is referring to reducer side.)

Paragraph E: (This weld is 4 inches in diameter with a wall thickness of .531 inches and made of stainless steel.)

During the ultrasonic examination of pipe-to-flange orifice weld 1HP-192-15, the examination coverage was limited to 60.99%. The percentage of coverage reported represents the aggregate coverage from all scans performed on the weld and base material. Single sided access, caused by the proximity of the flange, prevents access to both sides of the weld. In order to achieve coverage from four directions, the weld would have to be re-designed to allow scanning from both sides of the weld, which is impractical. There was one recordable indication found during the inspection of this weld. It was determined to be a geometric reflector due to weld root geometry.

See Paragraph N for additional basis for relief. (Note: When "near side" is referenced in Paragraph N for weld 1HP-192-15, it is referring to pipe side.)

Paragraph F: (This weld is 4 inches in diameter with a wall thickness of .531 inches and made of stainless steel.)

During the ultrasonic examination of pipe-to-valve weld 1-51A-01-91A, the examination coverage was limited to 60.84%. The percentage of coverage reported represents the aggregate coverage from all scans performed on the weld and base material. Single sided access, caused by the proximity of the valve taper, prevents access to both sides of the weld. In order to achieve coverage from four directions, the weld would have to be re-designed to allow scanning from both sides of the weld, which is impractical. There were no recordable indications found during the inspection of this weld.

See Paragraph N for additional basis for relief. (Note: When "near side" is referenced in Paragraph N for weld 1-51A-01-91A, it is referring to pipe side.)

Paragraph G: (This weld is 2.5 inches in diameter with a wall thickness of .375 inches and made of stainless steel.)

During the ultrasonic examination of tee-to-valve weld 1HP-324-118B, the examination coverage was limited to 61.54%. The percentage of coverage reported represents the aggregate coverage from all scans performed on the weld and base material. Single sided access, caused by the proximity of the valve taper, prevents access to both sides of the weld. In order to achieve coverage from four directions, the weld would have to be re-designed to allow scanning from both sides of the weld, which is impractical. There were no recordable indications found during the inspection of this weld.

See Paragraph N for additional basis for relief. (Note: When "near side" is referenced in Paragraph N for weld 1HP-324-118B, it is referring to tee side.)

Paragraph H: (This weld is 4 inches in diameter with a wall thickness of .237 inches and made of stainless steel.)

During the ultrasonic examination of pipe-to-valve weld 1-51A-01-32AA, the examination coverage was limited to 60.39%. The percentage of coverage reported represents the aggregate coverage from all scans performed on the weld and base material. Single sided access, caused by the proximity of the valve taper, prevents access to both sides of the weld. In order to achieve coverage from four directions, the weld would have to be re-designed to allow scanning from both sides, which is impractical. There were no recordable indications found during the inspection of this weld.

See Paragraph N for additional basis for relief. (Note: When "near side" is referenced in Paragraph N for weld 1-51A-01-32AA, it is referring to pipe side.)

Paragraph I: (This weld is 3 inches in diameter with a wall thickness of .438 inches and made of stainless steel.)

During the ultrasonic examination of pipe-to-valve weld 1HP-393-127A, the examination coverage was limited to 59.31%. The percentage of coverage reported represents the aggregate coverage from all scans performed on the weld and base material. Single sided access, caused by the proximity of the valve taper, prevents access to both sides of the weld. In order to achieve coverage from four directions, the weld would have to be re-designed to allow scanning from both sides, which is impractical. There were no recordable indications found during the inspection of this weld.

See Paragraph N for additional basis for relief. (Note: When "near side" is referenced in Paragraph N for weld 1HP-393-127A, it is referring to pipe side.)

Paragraph J: (This weld is 4 inches in diameter with a wall thickness of .531 inches and made of stainless steel.)

During the ultrasonic examination of elbow-to-valve weld 1-51A-02-34B, the examination coverage was limited to 61.30%. The percentage of coverage reported represents the aggregate coverage from all scans performed on the weld and base material. Single sided access, caused by the proximity of the valve taper, prevents access to both sides of the weld. In order to achieve coverage from four directions, the weld would have to be re-designed to allow scanning from both sides, which is impractical. There were no recordable indications found during the inspection of this weld.

See Paragraph N for additional basis for relief. (Note: When "near side" is referenced in Paragraph N for weld 1-51A-02-34B, it is referring to elbow side.)

Paragraph K: (This weld is 4 inches in diameter with a wall thickness of .531 inches and made of stainless steel.)

During the ultrasonic examination of tee-to-valve weld 1HP-193-12, the examination coverage was limited to 59.37%. The percentage of coverage reported represents the aggregate coverage from all scans performed on the weld and base material. Single sided access, caused by the proximity of the valve taper, prevents access to both sides of the weld. In order to achieve coverage from four directions, the weld would have to be re-designed to allow scanning from both sides, which is impractical. There were no recordable indications found during the inspection of this weld.

See Paragraph N for additional basis for relief. (Note: When "near side" is referenced in Paragraph N for weld 1HP-193-12, it is referring to tee side.)

Paragraph L: (This weld is 4 inches in diameter with a wall thickness of .237 inches and made of stainless steel.)

During the ultrasonic examination of expansion joint-to-elbow weld 1HP-70-11, the examination coverage was limited to 56.22%. The percentage of coverage reported represents the aggregate coverage from all scans performed on the weld and base material. Single sided access, caused by the proximity of the expansion joint, prevents access to both sides of the weld. In order to achieve coverage from four directions, the weld would have to be re-designed to allow scanning from both sides, which is impractical. There were no recordable indications found during the inspection of this weld.

See Paragraph N for additional basis for relief. (Note: When "near side" is referenced in Paragraph N for weld 1HP-70-11, it is referring to elbow side.)

Paragraph M: (This weld is 3 inches in diameter with a wall thickness of .438 inches and made of stainless steel.)

During the ultrasonic examination of pipe-to-valve weld 1-51A-01-103A, the examination coverage was limited to 60.71%. The percentage of coverage reported represents the aggregate coverage from all scans performed on the weld and base material. Single sided access, caused by the proximity of the valve taper, prevents access to both sides of the weld. In order to achieve coverage from four directions, the weld would have to be re-designed to allow scanning from both sides, which is impractical. There were no recordable indications found during the inspection of this weld.

See Paragraph N for additional basis for relief. (Note: When "near side" is referenced in Paragraph N for weld 1-51A-01-103A, it is referring to pipe side.)

Paragraph N:
Duke Energy Corporation does not take credit for the weld metal and far side examination volume when performing ultrasonic examination of similar metal austenitic piping welds where scanning is limited to one side of the weld. However, a best effort examination using a 60° refracted longitudinal wave search unit was conducted in one direction perpendicular to the weld covering 100% of the weld metal and 100% of the far side base. The near side was examined using a 60° shear wave search unit covering 100% of the base material volume. Circumferential scans using a 45° shear wave search unit were performed over 100% of the examination volume in two opposite directions.

In order to examine similar metal stainless steel welds refracted longitudinal wave and refracted shear wave search units are used. The refracted longitudinal wave search units have an inherent limitation in that the useful portion of the sound beam lies in the first beam path leg between the transducer and the inside surface of the component. Beam paths beyond the inside surface of the component cannot be used to extend the examination coverage through the weld because of mode conversion that occurs at the inside surface. However, refracted longitudinal wave search units have better penetration through stainless steel weld metal than shear wave search units. When calibrating in accordance with ASME Section XI, Appendix III and using refracted longitudinal wave there is not enough sound energy available to establish a distance-amplitude-correction curve beyond the inside surface notch located in the basic calibration block.

V. Alternate Examinations or Testing

Paragraph O:
The scheduled 10-year code examination was performed on the referenced area/weld and it resulted in the noted limited coverage of the required ultrasonic volume. No alternate examinations or testing is planned for the area/weld during the current inspection interval.

VI. Justification for Relief

Paragraph P:
Ultrasonic examination of welds for item number B03.130 were conducted in accordance with ASME Section XI, Appendix I, and ASME Section V, Article 4 of the 1989 Edition with no addenda. Although 100% coverage of the examination volume could not be achieved, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. (See Paragraph R for additional justification.)

Paragraph Q:
Ultrasonic examination of welds for item numbers B03.140, B03.150 and B06.040 were conducted in accordance with ASME Section XI, Appendix I, 1989 Edition with no Addenda. Although 100% coverage of the examination volume could not be achieved, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. (See Paragraph R for additional justification.)

Paragraph R:
Duke Energy Corporation will use pressure testing and VT-2 visual examination to compliment the limited examination coverage. The Code requires (reference Table IWB-2500-1, item numbers B15.050, B15.030 and item number B15.040) that a system leakage test be performed after each refueling outage for Class 1. Additionally, a system hydrostatic test (reference Table IWB-2500-1, item numbers B15.051, B15.031 and item number B15.041) is required once during each 10-year inspection interval. These tests require a VT-2 visual examination for evidence of leakage. These tests to date show no evidence of leakage or flaws. This testing will provide adequate assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric and pressure test), there are other activities which provide a high level of confidence that, in the unlikely case that leakage did occur through these areas/welds, it would be detected and isolated. Specifically, leakage from these areas/welds would be detected by monitoring of the Reactor Coolant System (RCS) inventory, which is performed once each shift under procedure PT/1,2,3/A/0600/10, "RCS Leakage". This RCS leakage monitoring is a requirement of Technical Specification 3.4.13, "Reactor Coolant System Leakage". Leakage is also evaluated in accordance with this Technical Specification. The leakage could be detected through several methods. One is the RCS mass balance calculation. A second is the Reactor Building air particulate monitor. This monitor is sensitive to low leak rates. The iodine monitor, gaseous monitor and area monitor are capable of detecting any fission products in the coolant and will make these monitors sensitive to coolant leakage. A third is the level indicator in the Reactor Building normal sump. A fourth is a loss of level in the Letdown Storage Tank. These methods will provide reasonable assurance of weld/component integrity.

Duke Energy Corporation has examined the welds/components referenced in this request to the maximum extent possible utilizing the latest in examination techniques and equipment. The welds/components identified in Section I of this request were rigorously inspected by volumetric NDE methods during construction and verified to be free from unacceptable fabrication defects. Based on the coverage and results of the required volumetric exams during this outage, the additional pressure testing (VT-2) exams, and the various methods for leakage detection, it's our opinion that this combination of examinations provides a reasonable assurance of component integrity.

Potential Failure Mechanism:
The subject steam generator nozzle to vessel welds join two similar metal, carbon steel components; therefore, the only failure mechanism applicable to these welds and inner radius sections is thermal fatigue, which is typically initiated on the inside diameter.

Thermal fatigue is not expected to result in cracking of the welds or inner radii because it was accounted for by the number of acceptable heat-up and cool-down cycles factored into the primary coolant system design. However, in the unexpected event of initiation, the best available UT methodology used by Duke Energy Corporation to perform the weld and inner radii sections examination should have detected it in the areas covered by the sound beams (see UT scan data sheets).

Paragraph S:
Ultrasonic examination of welds for item numbers C05.011 and C05.021 were conducted in accordance with ASME Section XI, Appendix I, 1989 Edition with no Addenda. Although 100% coverage of the examination volume for Figure IWC-2500-7(a) could not be achieved, the amount of coverage obtained for this examination provides an acceptable level of quality and integrity. These welds were examined using procedures, personnel and equipment qualified through the Performance Demonstration Initiative (PDI). In addition, these welds were examined during initial installation using volumetric and surface NDE methods.

Current ultrasonic technology is not capable of consistently detecting and sizing flaws on the far side of an austenitic weld for configurations common to U.S. nuclear applications. Refracted longitudinal wave search units were applied during the performance qualifications conducted under the Performance Demonstration Initiative (PDI). This is considered a best effort examination by PDI. Therefore, the far side of the austenitic weld, which can only be accessed from one side, will be listed as an area of no coverage.

A surface examination was performed on each of the C05.011 and C05.021 welds that are included in this relief request. The surface examinations did not find any reportable indications. In addition to the C05.011 and C05.021 welds that relief is being requested for limited ultrasonic coverage, there were 14 additional C05.021 welds that surface and volumetric examinations were performed on. The examinations didn't identify any reportable indications and greater than 90% coverage was obtained on each of the 14 welds. The 14 additional welds were from the same system as the C05.021 welds of this request.

Duke Energy Corporation will use pressure testing and VT-2 visual examination to compliment the limited examination coverage. The Code requires (reference IWC-2500-1, Item Number C07.030) that a functional/system inservice test once each period for Class 2 items. Additionally, a system hydrostatic test (reference Table IWC-2500-1, Item Number C07.40) is required once during each 10-year inspection interval. These tests require a VT-2 visual examination for evidence of leakage. No leakage was discovered in the most recent visual examinations performed on the low & high pressure injection systems. This testing will provide adequate assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric and pressure test), there are other activities which provide a high level of confidence that, in the unlikely case that leakage did occur through these welds, it would be detected and isolated. One is that leakage from these welds would be detected by Operations personnel during their regular rounds (reference Operations Procedure OP/1/A/1102/020). The Nuclear Equipment Operator has been trained to look for any unusual conditions, such as leaks. In addition, the procedure addresses leaks as being an item to consider during rounds. All C05.011 and C05.021 items in this request are located in areas where operations personnel will be walking through as part of their rounds, with the exception of item number C05.021.078 (located in the letdown storage tank room which is a high radiation area during operation); therefore, any leak would be identified by visual observation. A second is air monitors in the exhaust stacks. A third is if a specific sump has to be pumped frequently. All of these activities together will provide reasonable assurance of weld/component integrity.

Duke Energy Corporation has examined the welds/components referenced in this request to the maximum extent possible utilizing the latest in examination techniques and equipment. The welds/components identified in Section I of this request were rigorously inspected by volumetric NDE methods during construction and verified to be free from unacceptable fabrication defects. Based on the coverage and results of the required volumetric exams during this outage and the additional pressure testing (VT-2) exams, and the various activities for leak detection, it's Duke's belief that this combination of elements provides a reasonable assurance of component integrity.

VII. Implementation Schedule

Paragraph T:
The scheduled third 10-year interval plan code examination was performed on the referenced area/weld resulting in limited volumetric coverage. No additional examinations are planned for the area/weld during the current inspection interval. The same area/weld may be examined again as part of the next (fourth) 10-year interval plan, depending on the applicable code year edition and addenda requirements adopted in the future.

VIII. Other Information

The following individuals contributed to the development of this relief request:

Jim McArdle (NDE Level III Inspector) provided Sections II through V and part of Section VI.

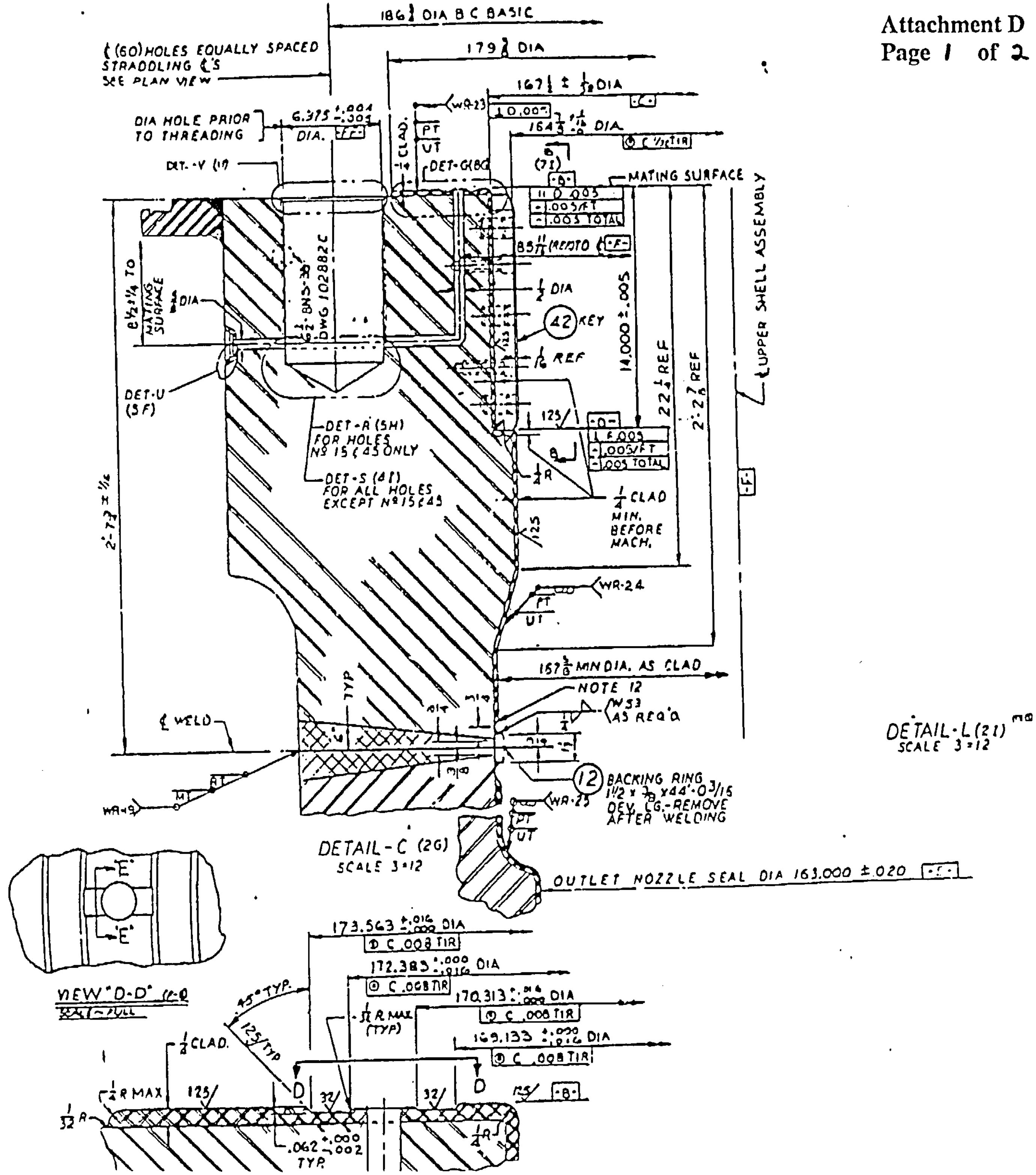
B. W. Carney, Jr. (Oconee Engineering) provided part of Section VI.

Larry C. Keith, (Oconee ISI Plan Manager) compiled the remaining sections.

Sponsored By: Larry C. Keith **Date** 5-1-03

Approved By: R. Kevin Rhyne **Date** 5-1-03

Attachment A	Drawing on Steam Generator
Attachment B	Drawing on Let Down Cooler
Attachment C	Copies of Examination Data
Attachment D	Drawing on 1-RPV-LIGAMENTS (Item B06.040.001A)


186 1/4 DIA B C BASIC
(60) HOLES EQUALLY SPACED STRADDLING ℄'S SEE PLAN VIEW
179 3/8 DIA
167 1/2 ± 1/8 DIA
DIA HOLE PRIOR TO THREADING
6.375 DIA.
WR-23
PT
UT
CLAD.
DET-V (17)
DET-G(8G)
MATING SURFACE
UPPER SHELL ASSEMBLY
1/2 DIA
42 KEY
1/16 REF
14.000 ± .005
22 1/4 REF
DET-U (5F)
DET-R (5H) FOR HOLES Nº 15 & 45 ONLY
DET-S (4I) FOR ALL HOLES EXCEPT Nº 15 & 45
1/4 CLAD MIN. BEFORE MACH.
WR-24
157 3/8 MIN DIA. AS CLAD
NOTE 12
W53 AS REQ'D
℄ WELD
TYP
12 BACKING RING
DEV. FG.-REMOVE AFTER WELDING
WR-25
DETAIL-C (2G)
SCALE 3=12
OUTLET NOZZLE SEAL DIA 163.000 ±.020
VIEW "D-D"
SCALE ~ FULL
173.563 DIA
172.383 DIA
170.313 DIA
169.133 DIA
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1/4 CLAD.
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1/32 R
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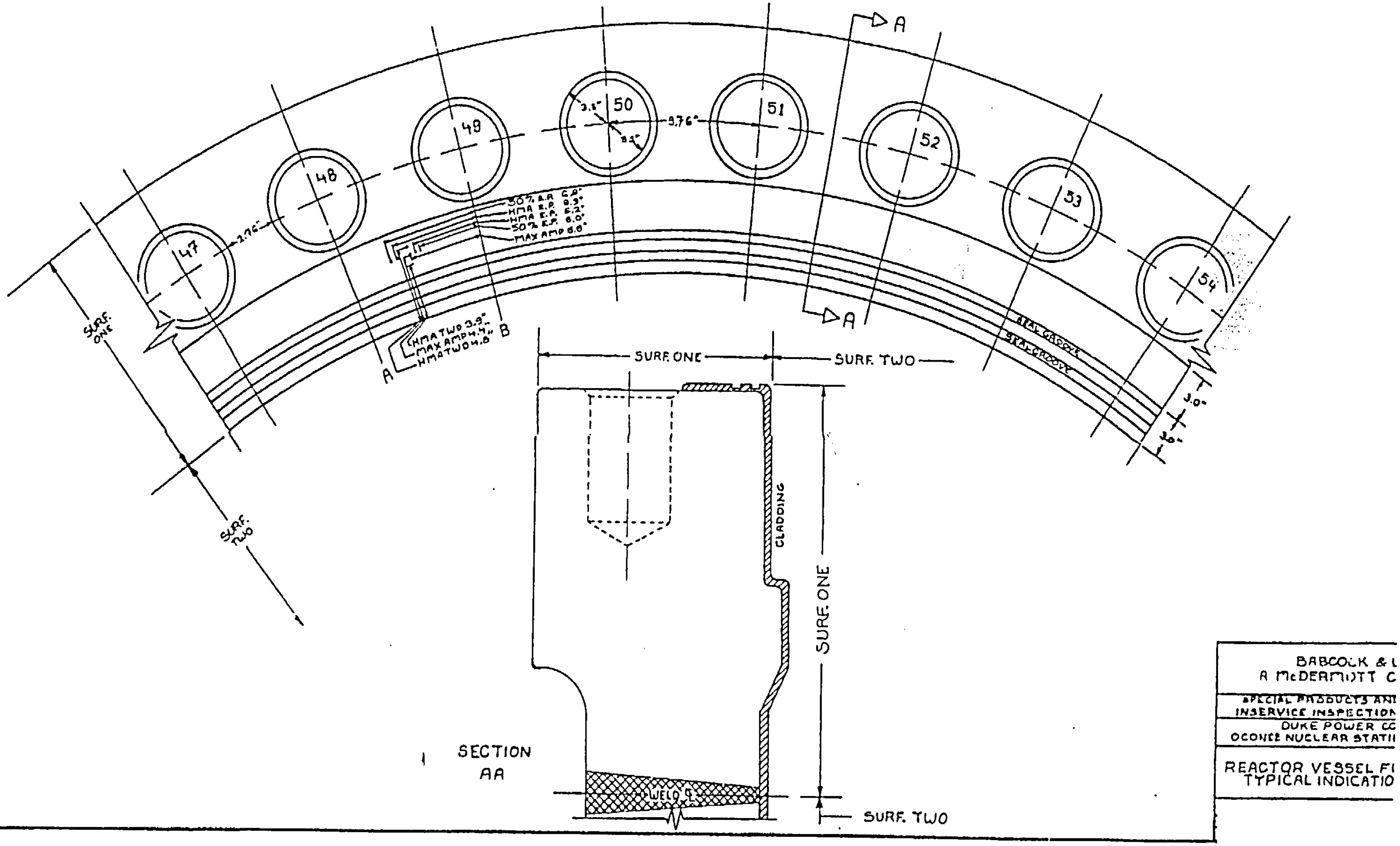
DETAIL-L (21)
SCALE 3=12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