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January 11, 2012

10 CFR 50.55a

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

Subject: Duke Energy Carolinas, LLC (Duke Energy)  
McGuire Nuclear Station, Unit 2  
Docket No. 50-370  
Relief Request Serial # 12-MN-002  
Limited Weld Examinations during Refueling Outage 2EOC20

Pursuant to 10 CFR 50.55a(g)(5)(iii), Duke Energy hereby requests NRC approval of relief for the weld listed in Table 1 of the proposed relief request. This weld was required to be examined in accordance with Inservice Inspection Plan for McGuire Unit 2, Third 10-Year Inservice Inspection Interval. The details of the request are included in the enclosure.

This submittal contains no regulatory commitments.

If you have any questions or require additional information, please contact P.T. Vu at (980) 875-4302.

Sincerely,

Regis T. Repko

Enclosure

A047  
NRR

U. S. Nuclear Regulatory commission  
January 11, 2012  
Page 2

xc:

V. M. McCree, Region II Administrator  
U. S. Nuclear Regulatory Commission  
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J. Zeiler  
NRC Senior Resident Inspector  
McGuire Nuclear Station

ENCLOSURE

Relief Request 12-MN-002

## McGuire Relief Request 12-MN-002

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### 1.0 Scope of Relief Request

Relief is requested pursuant to 10 CFR 50.55a(g)(5)(iii) for the weld listed in Table 1. This weld was required to be examined in accordance with Inservice Inspection (ISI) Plan for the following Unit:

McGuire Nuclear Station – Unit 2  
Third 10-Year ISI Interval  
Interval Start Date: 03/01/2004

Table 1					
<u>Relief Request Section Number</u>	<u>McGuire Unit Number</u>	<u>Examination Performed (Refueling Outage)</u>	<u>Weld ID Number</u>	<u>Item/Summary Number</u>	<u>Examination Data</u>
2.0	2	2EOC20	2NV2FW216-60	M2.R1.11.0276	See Attachment A Pages 1-6

2.0 Weld #2NV2FW216-60

2.1 ASME Code Component(s) Affected

Unit 2, Pipe to Pipe Weld #2NV2FW216-60, Summary Number M2.R1.11.0276.

2.2 Applicable Code Edition and Addenda

ASME Boiler and Pressure Vessel Code, Section XI, 1998 Edition through the 2000 Addenda.

2.3 Applicable Code/Licensing Requirement

WCAP-14572, Rev. 1-NP-A, Supplement 2, Table 4.1-1, Examination Category R-A, Item Number R1.11, Figure IWB-2500-8(c), 100% Volume Coverage of Examination Volume C-D-E-F.

The NRC authorized the inclusion of the Risk Informed ISI program as an acceptable alternative to the ASME Code, Section XI requirements for ASME Code Class 1 piping welds, Examination Categories B-F and B-J and ASME Code Class 2 piping welds, Examination Categories C-F-1 and C-F-2 for the third ISI interval by letter dated 06/12/2002.

2.4 Impracticality of Compliance

Surface 1: Stainless Steel Pipe  
Surface 2: Stainless Steel Pipe  
Nominal Pipe Size: 2.0 inch  
Thickness: 0.344 inch

The limitations were due to proximity of a permanent welded pipe support that did not allow complete scanning from the pipe side (Scan 2). Scanning requirements are described in 10 CFR 50.55a(b)(2)(xv)(A)(1). The aggregate coverage was calculated as follows:

- 70° shear waves obtained 76.5% coverage in one axial direction (Scan 1- pipe).
- 70° shear waves obtained 53.0% coverage in one axial direction (Scan 2 – pipe).
- 45° shear and longitudinal waves obtained 76.5% coverage in one circumferential direction (Scan 3 – clockwise).
- 45° shear and longitudinal waves obtained 76.5% coverage in one circumferential direction (Scan 4 – counterclockwise).
- The aggregate coverage was calculated to be  $(76.5\% + 53.0\% + 76.5\% + 76.5\%)/4 = 70.625\%$ .

In order to scan all of the required volume for this weld, the permanent welded pipe support would have to be redesigned to allow scanning from both sides of the weld, which is impractical. The McGuire ISI Plan allows the use of Code Case N-460, which required greater than 90% volumetric coverage of examination volume C-D-E-F. Therefore, the available coverage will not meet the acceptance criteria of this Code Case.

2.5 Proposed Alternative and Basis for Use

No alternative examinations are planned for the weld during the current inspection interval. Radiography (RT) is not a desired option because RT is limited in the ability to detect expected degradation mechanisms such as thermal fatigue cracking and stress corrosion crack initiating at the pipe inside surface. Additionally, RT has not been qualified through performance demonstrations.

2.6 Duration of Proposed Alternative

This request is for the duration of the third ISI interval, currently scheduled to end on 07/15/2014.

2.7 Justification for Granting Relief

Ultrasonic examination of the weld for the Item Number M2.R1.11.0276 was conducted using personnel, equipment and procedures qualified in accordance with ASME Section XI, 1998 Edition with the 2000 Addenda.

The system leakage test performed each inspection period in accordance with Table IWC-2500-1, Examination category C-H requires a VT-2 visual examination to detect evidence of leakage. This test and VT-2 examination provide additional assurance of pressure boundary integrity.

In addition to the above Code required examinations (volumetric and pressure test), Reactor Building Normal Sump monitoring provides additional assurance that, in the event that leakage did occur through this weld, it would be detected and proper action taken.

Duke Energy has examined the weld/component to the maximum extent possible utilizing approved examination techniques and equipment. Based on the acceptable results for the coverage completed by the volumetric examination, the pressure testing (VT-2) examinations required by Section XI, and the leakage monitoring, it is Duke Energy's position that the combination of examinations provides a reasonable assurance of quality and safety.



## UT Calibration Examination

Site/Unit:	McGuire / 2	Procedure:	PDI-UT-2	Outage No.:	M2-20
Summary No.:	M2.R1.11.0276	Procedure Rev.:	E	Report No.:	UT-11-159
Workscope:	ISI	Work Order No.:	01929201	Page:	1 of 6

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Code:	1998/2000 Addenda	Cat./Item:	R-A/R1.11	Location:	Rx Bldg.
Drawing No.:	MCFI-2NVZ16	Description:	Pipe To Pipe		
System ID:	NV				
Component ID:	2NV2FW216-60	Size/Length:	N/A	Thickness/Diameter:	0.344/2.0/SS
Limitations:	Yes - See attached sheets (welded pipe support)	Start Time:	1613	Finish Time:	1642

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<b>Instrument Settings</b> Serial No.: 011MBT Manufacturer: KRAUTKRAMER Model: USN-60 Delay: 6.2497 Range: 1.0 M'U Cal/Vel: .123 Pulsar: High Damping: 1K Reject: 0% Rep. Rate: Autohigh Freq.: 5.0 Filter: Fixed Mode: PE Voltage: Fixed Other: Fullwave Ax. Gain (dB): 36.2 Circ. Gain (dB): 52.5 1 Screen Div. = .10 in. of Sound Path Linearity Report No.: L-11-085	<b>Search Unit</b> Serial No.: 00DBVW Manufacturer: KBA Size: 0.25 Shape: Round Freq.: 5 MHz Style: Comp - G Exam Angle: 45 # of Elements: SINGLE Mode: SHEAR Measured Angle: 45 Wedge Style: MSWQC Search Unit Cable Type: RG-174 Length: 6' No. Conn.: 0 Scan Coverage Upstream <input checked="" type="checkbox"/> Downstream <input checked="" type="checkbox"/> Scan dB: 41.4 CW <input checked="" type="checkbox"/> CCW <input checked="" type="checkbox"/> Scan dB: 52.5 Exam Surface: O.D. Surface Condition: Smooth
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<b>Calibration Block</b> Cal. Block No. 8279-0410 Thickness 0.344 Dia.: 2.375 Cal. Blk. Temp. 72 Temp. Tool: MCNDE40129 Comp. Temp. 67 Temp. Tool: MCNDE40129 Recordable Indication(s): Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (If Yes, Ref. Attached Ultrasonic Indication Report.) Results: Accept <input type="checkbox"/> Reject <input checked="" type="checkbox"/> Info <input type="checkbox"/>	<b>Reference Block</b> Serial No.: 97-5590 Type: ROMPAS Gain dB: 52.5 Reflector: FSDH Signal Amplitude %: 80 Sweep Division: 9.6 Sound Path: .962
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<b>Axial Orientated Search Unit</b> <table border="1" style="width: 100%; text-align: center;"> <tr> <th>Calibration Reflector</th> <th>Signal Amplitude %</th> <th>Sweep Division</th> <th>Sound Path</th> </tr> <tr> <td>ID Notch</td> <td>81</td> <td>4.5</td> <td>.446</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>	Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path	ID Notch	81	4.5	.446																									<b>Couplant</b> Cal. Batch: 09325 Type: ULTRAGEL II Mfg.: SONOTECH Exam Batch: 09325 Type: ULTRAGEL II Mfg.: SONOTECH
Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path																														
ID Notch	81	4.5	.446																														

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<b>Circumferential Orientated Search Unit</b> <table border="1" style="width: 100%; text-align: center;"> <tr> <th>Calibration Reflector</th> <th>Signal Amplitude %</th> <th>Sweep Division</th> <th>Sound Path</th> </tr> <tr> <td>ID Notch</td> <td>81</td> <td>5.4</td> <td>.540</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>	Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path	ID Notch	81	5.4	.540																									<b>Reference/Simulator Block</b> <table border="1" style="width: 100%; text-align: center;"> <tr> <th>Gain dB</th> <th>Reflector</th> <th>Signal Amplitude %</th> <th>Sweep Division</th> <th>Sound Path</th> </tr> <tr> <td>52.5</td> <td>FSDH</td> <td>80</td> <td>9.6</td> <td>.962</td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table>	Gain dB	Reflector	Signal Amplitude %	Sweep Division	Sound Path	52.5	FSDH	80	9.6	.962																														
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52.5	FSDH	80	9.6	.962																																																																					

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Percent Of Coverage Obtained > 90%: No Reviewed Previous Data: No

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Examiner	Level	Signature	Date	Reviewer	Signature	Date
Ellis II, Kenneth R.	II-N	<i>Kenneth R. Ellis II</i>	3/1/2011	<i>ME Lawson</i>		3-9-11
Examiner	Level	Signature	Date	Site Review	Signature	Date
Lester, Robert M.	II-N	<i>Robert M. Lester</i>	3/1/2011			
Other	Level	Signature	Date	ANII Review	Signature	Date
N/A	N/A			<i>J. F. Lawan</i>		3-15-11



## UT Calibration / Examination

Site/Unit: McGuire / 2 Procedure: PDI-UT-2 Outage No.: M2-20  
 Summary No.: M2.R1.11.0276 Procedure Rev.: E Report No.: UT-11-159  
 Workscope: ISI Work Order No.: 01929201 Page: 2 of 6  
 Code: 1998/2000 Addenda Cat./Item: R-A/R1.11 Location: Rx Bldg.  
 Drawing No.: MCFI-2NV216 Description: Pipe To Pipe  
 System ID: NV  
 Component ID: 2NV2FW216-60 Size/Length: N/A Thickness/Diameter: 0.344/2.0/SS  
 Limitations: Yes - See attached sheets (welded pipe support) Start Time: 1630 Finish Time: 1642

Instrument Settings				Search Unit				Cal. Checks			Axial Orientated Search Unit			
Serial No.:	011MBT			Serial No.:	00DC6W			Initial Cal	1312	3/1/2011	Calibration Reflector	Signal Amplitude %	Sweep Division	Sound Path
Manufacturer:	KRAUTKRAMER			Manufacturer:	KBA			Inter. Cal.			ID Notch	81	3.9	.952
Model:	USN-60			Size:	0.25	Shape:	Round	Inter. Cal.	1630	3/1/2011				
Delay:	6.7906	Range:	2.5	Freq.:	2.25 MHz	Style:	Comp - G	Inter. Cal.						
M/H Cal/Vel:	.123	Pulser:	High	Exam Angle:	70	# of Elements:	SINGLE	Final Cal	1905	3/1/2011				
Damping:	1K	Reject:	0%	Mode:	SHEAR									
Rep. Rate:	Autohigh	Freq.:	2.25	Measured Angle:	67									
Filter:	Fixed	Mode:	PE	Wedge Style:	MSWQC									
Voltage:	Fixed	Other:	Fullwave											
Ax. Gain (dB):	61.0	Circ. Gain (dB):	N/A	Search Unit Cable										
1 Screen Div. =	.25	In. of	Sound Path	Type:	RG-174									
Linearity Report No.:	L-11-085			Length:	6'	No. Conn.:	0							
Calibration Block				Scan Coverage				Reference Block						
Cal. Block No.	8279-0410			Upstream <input checked="" type="checkbox"/>	Downstream <input checked="" type="checkbox"/>	Scan dB:	58.0							
Thickness	0.344	Dia.:	2.375	CW <input type="checkbox"/>	CCW <input type="checkbox"/>	Scan dB:	N/A							
Cal. Blk. Temp.	72	Temp. Tool:	MCNDE40129	Exam Surface:	O.D									
Comp. Temp.	67	Temp. Tool:	MCNDE40129	Surface Condition:	Smooth									
Recordable Indication(s):	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (If Yes, Ref. Attached Ultrasonic Indication Report.)													
Results:	Accept <input type="checkbox"/> Reject <input checked="" type="checkbox"/> Info <input type="checkbox"/>							Comments: Initial Section XI Exam						
Percent Of Coverage Obtained > 90%: <u>No</u>				Reviewed Previous Data: <u>No</u>										

Examiner	Level	Signature	Date	Reviewer	Signature	Date
Ellis II, Kenneth R.	II-N	<i>Kenneth R. Ellis</i>	3/1/2011	<i>DE Johnson</i>	<i>3.9.11</i>	
Lester, Robert M.	II-N	<i>Robert M. Lester</i>	3/1/2011			
Other	Level	N/A		ANII Review	<i>J.F. Swan</i>	<i>3-15-11</i>



DUKE POWER COMPANY			
ISI LIMITATION REPORT			
Component/Weld ID: <u>2NV2FW216-60</u>		Item No: <u>M2.R1.11.0276</u>	
<input checked="" type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN		SURFACE <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2	
BEAM DIRECTION <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> cw <input checked="" type="checkbox"/> ccw		remarks: Due to welded pipe support.	
FROM L <u>0</u> to L <u>+/-1.75"</u>		INCHES FROM W0 <u>CL</u> to <u>Beyond</u>	
ANGLE: <input checked="" type="checkbox"/> 0 <input checked="" type="checkbox"/> 45 <input type="checkbox"/> 60 other <u>70°</u>		FROM <u>N/A</u> DEG to <u>N/A</u> DEG	
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN		SURFACE <input type="checkbox"/> 1 <input type="checkbox"/> 2	
BEAM DIRECTION <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw			
FROM L _____ to L _____		INCHES FROM W0 _____ to _____	
ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 other _____		FROM _____ DEG to _____ DEG	
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN		SURFACE <input type="checkbox"/> 1 <input type="checkbox"/> 2	
BEAM DIRECTION <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw			
FROM L _____ to L _____		INCHES FROM W0 _____ to _____	
ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 other _____		FROM _____ DEG to _____ DEG	
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN		SURFACE <input type="checkbox"/> 1 <input type="checkbox"/> 2	
BEAM DIRECTION <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw		UT-11-159	
FROM L _____ to L _____		INCHES FROM W0 _____ to _____	
ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 other _____		FROM _____ DEG to _____ DEG	
<input type="checkbox"/> NO SCAN <input type="checkbox"/> LIMITED SCAN		SURFACE <input type="checkbox"/> 1 <input type="checkbox"/> 2	
BEAM DIRECTION <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> cw <input type="checkbox"/> ccw		Sketch(s) attached <input checked="" type="checkbox"/> yes <input type="checkbox"/> No	
FROM L _____ to L _____		INCHES FROM W0 _____ to _____	
ANGLE: <input type="checkbox"/> 0 <input type="checkbox"/> 45 <input type="checkbox"/> 60 other _____		FROM _____ DEG to _____ DEG	
Prepared By: <u>Kenneth Ellis</u>		Level: <u>II</u> Date: <u>03/01/11</u>	
Reviewed By: <u>W. E. Hansen</u>		Date: <u>3.5.11</u>	
Authorized Inspector: <u>J. F. [Signature]</u>		Date: <u>3-15-11</u>	

**AGGREGATE COVERAGE SHEET**

M2.R1.11.0276 / 2NV2FW216-60			
Angle/Scan	% Length	% Volume	% Coverage
45° - Scan 1	53.0	100	53.0
70° - Scan 1	47.0	50	23.5
Aggregate Coverage			76.5
70° - Scan 2	53.0	100	53.0
70° - Scan 2	47.0	0.0	0.0
Aggregate Coverage			53.0
45° - Scan 3	53.0	100	53.0
45° - Scan 3	47.0	50	23.5
Aggregate Coverage			76.5
45° - Scan 4	53.0	100	53.0
45° - Scan 4	47.0	50	23.5
Aggregate Coverage			76.5
Total Aggregate Coverage = $76.5 + 53.0 + 76.5 + 76.5 = 282.5/4 = 70.6\%$			

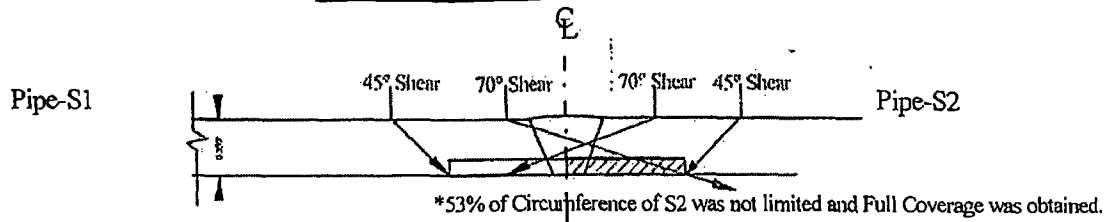
*Ken H. Bazz* 3/1/2011

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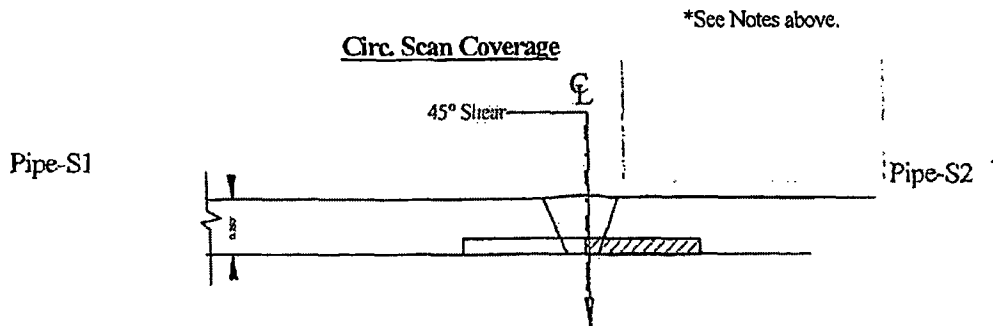
M2.R1.11.0276  
Weld No. 2NV2FW 216-60

Note: \*Welded Pipe Support 47% of Total Circ. of Weld Length.  
 Limitation +/- 1.75" from T.D.C due to Pipe support.  
 See Attached Limitation sheets

Axial Scan Coverage



Circ. Scan Coverage



Scale : 1" = 1"

% Coverage Calculations

S1 = Pipe = 76.5% (100% of the length x 76.5% of the volume)

S2 = Pipe = 53% (100% of the length x 53% of the volume)

S3 = CW = 76.5% (100% of the length x 76.5% of the volume)

S4 = CCW = 76.5% (100% of the length x 76.5% of the volume)

Total =  $282.5 / 4 = \underline{70.6 \%}$  Aggregate Coverage

Inspector / Date: Kenner A.R. CBS 3/1/2011

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ATTACHMENT A  
 PAGE 5 OF 6



## Determination of Percent Coverage for UT Examinations - Pipe

Site/Unit: McGuire / 2 Procedure: PDI-UT-2 Outage No.: M2-20  
Summary No.: M2.R1.11.0276 Procedure Rev.: E Report No.: UT-11-159  
Workscope: ISI Work Order No.: 01929201 Page: 6 of 6

### 45 deg

Scan 1	<u>                    </u>	% Length X	<u>                    </u>	% volume of length / 100 =	<u>                    </u>	% total for Scan 1
Scan 2	<u>                    </u>	% Length X	<u>                    </u>	% volume of length / 100 =	<u>                    </u>	% total for Scan 2
Scan 3	<u>100.000</u>	% Length X	<u>76.500</u>	% volume of length / 100 =	<u>76.500</u>	% total for Scan 3
Scan 4	<u>100.000</u>	% Length X	<u>76.500</u>	% volume of length / 100 =	<u>76.500</u>	% total for Scan 4

Add totals and divide by # scans = 76.500 % total for 45 deg

### Other deg - 70 (to be used for supplemental scans)

The data to be listed below is for coverage that was not obtained with the 45 deg scans.

Scan 1	<u>100.000</u>	% Length X	<u>76.500</u>	% volume of length / 100 =	<u>76.500</u>	% total for Scan 1
Scan 2	<u>100.000</u>	% Length X	<u>53.000</u>	% volume of length / 100 =	<u>53.000</u>	% total for Scan 2
Scan 3	<u>                    </u>	% Length X	<u>                    </u>	% volume of length / 100 =	<u>                    </u>	% total for Scan 3
Scan 4	<u>                    </u>	% Length X	<u>                    </u>	% volume of length / 100 =	<u>                    </u>	% total for Scan 4

### Percent complete coverage

Add totals for each scan required and divide by # of scans to determine;

70.625 % Total for complete exam

Site Field Supervisor: David K. Z III

Date: 03/08/11