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SCE&G®
A SCANA COMPANY

June 30, 2015
RC-15-0105

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

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) UNIT 1
DOCKET NO. 50-395
OPERATING LICENSE NO. NPF-12
RELIEF REQUEST RR-4-07 REQUEST TO USE ALTERNATIVE ROOT MEAN SQUARE (RMS) DEPTH SIZING REQUIREMENTS - RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Reference:
1. Thomas D. Gatlin (VCSNS) Letter to NRC Document Control Desk, "Relief Request RR-4-07 Request to Use Alternative Root Mean Square (RMS) Depth Sizing Requirements," dated January 20, 2015 [ML15022A655]

2. Shawn Williams (NRC) Letter to Thomas D. Gatlin (VCSNS), "Virgil C. Summer Nuclear Station, Unit No.1 – Request for Additional Information Regarding Alternative Request (TAC No. MF5612)," dated May 19, 2015 [ML15118A459]

South Carolina Electric & Gas Company (SCE&G), acting for itself and as agent for South Carolina Public Service Authority pursuant to 10 CFR 50.55a(z)(1), requested relief associated with the fourth inservice inspection (ISI) interval from ASME code requirements per Reference 1. NRC review of this relief request determined that additional information was required and a request for additional information (RAI) was issued per Reference 2. The Enclosure to this submittal contains SCE&G's responses to the RAIs. An updated version of RR-4-07 is contained in Attachment 1, and Attachment 2 contains Reactor Vessel Inlet Nozzle weld information.

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This letter contains no commitments. Should you have any questions, please call Bruce L. Thompson at 803-931-5042.

Very truly yours,

Thomas D. Gatlin

WLT/TDG/ts

Enclosure: VCSNS Response to Request for Additional Information
Attachment 1: VCSNS Relief Request RR-4-07 – Updated
Attachment 2: VCSNS Reactor Vessel Nozzle Sketch

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PRSF (RC-15-0105)

VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) UNIT 1
DOCKET NO. 50-395
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ENCLOSURE

VCSNS RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

REQUEST FOR ADDITIONAL INFORMATION
ALTERNATIVE REQUEST
DEPTH SIZING ROOT MEAN SQUARE ERROR CRITERIA
VIRGIL C. SUMMER NUCLEAR STATION, UNIT NO. 1
DOCKET NUMBER 50-395

By letter dated May 19, 2015 [ML15118A459], NRC requested the following information to continue review of Relief Request RR-4-07 Request to Use Alternative Root Mean Square (RMS) Depth Sizing Requirements.

RAI No.1

The NRC authorizes a proposed alternative pursuant to 10 CFR 50.55a(z)(1) only if the alternative is equivalent in quality to the ASME Code requirement. The NRC staff finds that the licensee's proposed alternative RMSE criteria in RR-4-07 is not equivalent in quality to the Supplement 10, Appendix VIII of Section XI requirements. Furthermore, the NRC staff has approved similar requests submitted in the past by other plants, under impractically in accordance with 10 CFR 50.55a(g)(6)(i). Therefore, the NRC staff suggests that the licensee revises RR-4-07 to state that the licensee is requesting relief pursuant to 10 CFR50.55a(g)(5)(iii).

VCSNS Response:

Virgil C. Summer Nuclear Station (VCSNS) has updated RR-4-07 to request an alternative RMSE under 10CFR50.55a(g)(5)(iii). See Attachment 1 of this submittal for a revision to Section 5.3 of RR-4-07.

RAI No. 2

In the past, the NRC staff approved similar requests (e.g., Accession Nos. ML13064A425 and ML14073A544) provided that the licensee's proposed alternative also included the following compensatory measures.

If any cracks are detected and measured by Ultrasonic Testing (UT) as 50 percent through wall depth or greater, and to remain inservice without mitigation or repair, a flaw evaluation shall be performed and submitted for the NRC review and approval prior to reactor startup. The flaw evaluations shall include:

- **the inner profile of the weld, pipe, and nozzle in the region at and surrounding the flaw**

- **an estimate of the percentage of potential surface areas with UT probe lift-off**
- **information on mechanism which caused the crack**

If any cracks are detected and measured by the UT as less than 50 percent through wall depth, adding the industry proposed correction factor (procedure RMSE - 0.125 inch) to the depths of any flaw found by the UT prior to flaw evaluation for flaws less than 50 percent through wall satisfactorily reduces the effect of the increased sizing error associated with not meeting the ASME Code required 0.125 inch RMSE.

The above measures will provide reasonable assurance of structural integrity of the examined welds. Therefore, the NRC staff suggests that the licensee revises RR-4-07 to include the above compensatory measures; or justify why these compensatory measures are not needed.

VCSNS Response:

VCSNS has included the proposed language from this RAI into the updated version of RR-4-07 found in Attachment 1. See Attachment 1 of this submittal for a revision to Section 5.1 of RR-4-07.

RAI No. 3

(a) Provide materials of construction for the subject pipes, elbows, and welds.
(b) Provide dimensions (e.g., wall thickness and diameter) for the subject welds.
(c) Provide a sketch of the welds.

VCSNS Response:

VCSNS has supplied the weld information in Attachment 2.

(a) The materials of construction can be found on Page 2 of Attachment 2.
(b) The dimensions of the welds can be found on Page 3 of Attachment 2.
(c) Page 2 and 3 both provide sketches of the subject welds.

VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) UNIT 1
DOCKET NO. 50-395
OPERATING LICENSE NO. NPF-12

ATTACHMENT 1

VCSNS RELIEF REQUEST RR-4-07 - Updated

South Carolina Electric & Gas Co. (SCE&G)
Virgil C. Summer Nuclear Station Unit 1 (VCSNS)
VCSNS Relief Request RR-4-07

1. ASME Code Component(s) Affected

The affected VCSNS components are the Class 1, Code Case N-770-1, Inspection Item B, Unmitigated butt weld at Cold Leg operating temperature. The affected welds are:

1-4100A-15 (DM) A	"A" Loop Inlet Safe-End Elbow
1-4200A-15 (DM) B	"B" Loop Inlet Safe-End Elbow
1-4300A-15 (DM) C	"C" Loop Inlet Safe-End Elbow
1-4100A-16 (DM) A	"A" Inlet Nozzle to Safe-End
1-4200A-16 (DM) B	"B" Inlet Nozzle to Safe-End
1-4300A-16 (DM) C	"C" Inlet Nozzle to Safe-End

2. Applicable Code Edition and Addenda

ASME Code Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 2007 Edition with 2008 Addenda.

Testing of personnel, procedures, and equipment for the ultrasonic examination of applicable Class 1 components is governed by Appendix VIII, "Performance Demonstration for Ultrasonic Examination Systems," of the ASME Code, Section XI.

3. Applicable Code Requirement

The examination of Class 1 and 2 piping welds are required to be performed using procedures, personnel and equipment qualified to the criteria of the ASME Code, Section XI, Appendix VIII, and specifically Supplement 10, "Qualification Requirements for Dissimilar Metal Pipe Welds," for the examination of nozzle-to-piping dissimilar metal welds.

Paragraph 3.3, "Depth Sizing Test," Subparagraph (c) of Supplement 10 states "examination procedures, equipment, and personnel are qualified for depth sizing when the RMS (root mean square) error of the flaw depth measurements, as compared to the true flaw depths, is less than or equal to 0.125-inch (3 mm)."

4. Reason for Request

VCSNS is performing an ultrasonic re-examination of the indicated welds from the inside diameter (ID) surface during the upcoming refueling outage as required by Code Case N-770-1.

VCSNS proposes using an alternative RMS error depth-sizing requirement as compared to the 0.125 inches RMS error value stated in ASME Code, Section XI, Appendix VIII, Supplement 10, Paragraph 3.3, Subparagraph (c). To date, no vendor has been capable of meeting this criterion.

5. Proposed Alternative and Basis for Use

5.1 Proposed Alternative

SCE&G proposes to use ASME Code, Section XI, Appendix VIII, Supplement 10, Paragraph 3.3 with a root mean square error (RMSE) of 0.189 inches instead of the 0.125 inches specified for depth sizing in the Code. In the event that an indication is detected and requires depth sizing, the 0.064 inches difference between the required RMSE and the demonstrated RMSE (0.189-0.125 = 0.064) will be added to the measured through wall extent for comparison to the applicable acceptance standard. Should the contracted vendor demonstrate an improved depth sizing RMSE prior to the performance of these examinations, the difference of that improved RMSE will be substituted for the 0.189 inches.

In the event a surface connected flaw is detected that requires depth sizing, SCE&G proposes that the following method for reporting flaw through-wall sizes shall be used in addition to the comparison with applicable ASME Section XI acceptance criteria:

- For flaw(s) detected and measured by the Ultrasonic Testing UT as less than 50 percent through wall depth, adding the industry proposed correction factor (procedure RMSE - 0.125 inch) to the depth of any flaw found by the UT prior to flaw evaluation for flaws less than 50 percent through wall satisfactorily reduces the effect of the increased sizing error associated with not meeting the ASME Code required 0.125 inch RMSE.

- For flaw(s) detected and measured by Ultrasonic Testing (UT) as 50 percent through wall depth or greater, and to remain inservice without mitigation or repair, a flaw evaluation shall be performed and submitted for the NRC review and approval prior to reactor startup. The flaw evaluations shall include the inner profile of the weld, pipe and nozzle in the region at and surrounding the flaw, an estimate of the percentage of potential surface areas with UT probe lift-off, and information on mechanism which caused the flaw.

5.2 Technical Basis for Proposed Alternative

ASME Code Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," 2007 Edition with 2008 Addenda as approved by 10 CFR 50.55a. To date, although examination vendors have qualified for detection and length sizing on these welds, these examination vendors have not met the established RMSE requirement for depth sizing. The contracted vendor for SCE&G has demonstrated the ability to meet the depth sizing qualification requirement with a RMSE of 0.189 inches instead of the 0.125 inches established by the Code Case.

The addition of the difference in allowable depth sizing tolerance from that actually demonstrated to the flaw depths measured will compensate for the possible variance in measured depth.

5.3 Safety Evaluation Compliance

The proposed alternative assures that the indicated welds will be fully examined by procedures, personnel and equipment qualified by demonstration in all aspects except depth sizing. In order to compensate for the depth sizing, the addition of the difference between the qualified and demonstrated sizing tolerance will provide an acceptable level of safety and quality in accordance with 10 CFR 50.55a(g)(5)(iii). The proposed alternative has been previously approved for VCSNS via NRC Letter dated November 21, 2006, (TAC NO. MD2422) [ML063070540].

6. Duration of Proposed Alternative

This relief request will be implemented during the VCSNS fourth ISI interval, which commenced on January 1, 2014 and ends on December 31, 2023.

This is a new relief request based on ASME Code, Section XI, Appendix VIII, Supplement 10, and the examination vendors' most accurate demonstrated depth sizing performance.

7. Precedents

Requests to use an alternative RMSE value have been previously approved by the NRC. In Reference 3, the NRC previously approved the proposed alternative RMSE relief request submitted by VCSNS in References 1 and 2 for hot leg welds. The NRC approved a similar alternative, with a larger RMS value, for Point Beach Unit 1 Reactor Vessel Nozzle welds in Reference 6.

8. References

1. Letter from J. Archie (VCSNS) to Document Control Desk (NRC), "Request to Use Alternatives to ASME Code Requirements in VCSNS Third Inservice Inspection Interval (RR-III-03, RR-III-04)," dated June 20, 2006 [ML061720495]

2. Letter from J. Archie (VCSNS) to Document Control Desk (NRC), "Supplemental Information Regarding Request to Use Alternatives to ASME Code Requirements in VCSNS Third Inservice Inspection Interval (RR-III-03, RR-III-04)," dated October 19, 2006 [ML062990461]

3. NRC Letter to J. Archie (VCSNS), "Virgil C. Summer Nuclear Station, Unit No.1 - Relief Requests RR-III-03 and RR-III-04 (TAC NO. MD2422)," dated November 21, 2006 [ML063070540]

4. Letter from L. Meyer (NextEra Energy) to Document Control Desk (NRC), "10 CFR 50.55a Request, Relief Request 1-RR-4 Re-Examination of the Unit 1 Reactor Pressure Vessel Indication on the 'A' Inlet Nozzle Weld Fifth Ten-Year Inservice Inspection Program Interval," dated November 9, 2012 [ML12318A125]

5. Letter from L. Meyer (NextEra Energy) to Document Control Desk (NRC), "Supplement to 10 CFR 50.55a Request, Relief Request 1 -RR-4 Re-Examination of the Unit 1 Reactor Pressure Vessel Indication on the 'A' Inlet Nozzle Weld Fifth Ten-Year Inservice Inspection Program Interval," dated December 14, 2012 [ML12349A364]

6. Letter from L. Meyer (NextEra Energy) to Document Control Desk (NRC), "10 CFR 50.55a Request, Relief Request 1-RR-4 Re-Examination of the Unit 1 Reactor Pressure Vessel Indication on the 'A' Inlet Nozzle Weld Fifth Ten-Year Inservice Inspection Program Interval Response to Request for Additional Information," dated February 1, 2013 [ML13035A018]

7. NRC Letter to L. Meyer (NextEra Energy), "Point Beach Nuclear Plant, Unit 1 -Relief from the Requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (B&PV Code), Section XI, for the Re-Examination of the Reactor Pressure Vessel "A" Inlet Nozzle Weld RC-32-MRCL-AIII-03 for the Fifth Inspection Interval (TAC NO. ME9905)," dated March 18, 2013 [ML13064A425]

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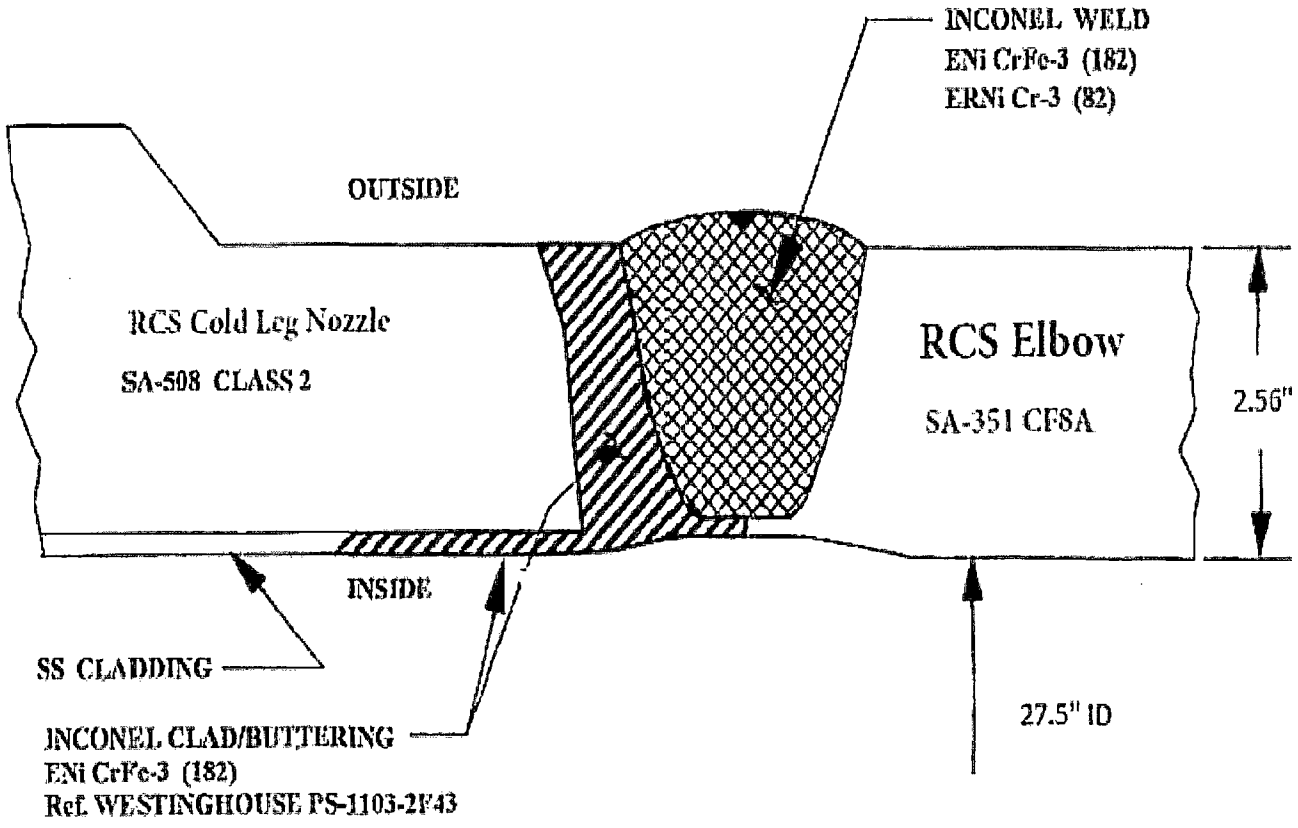
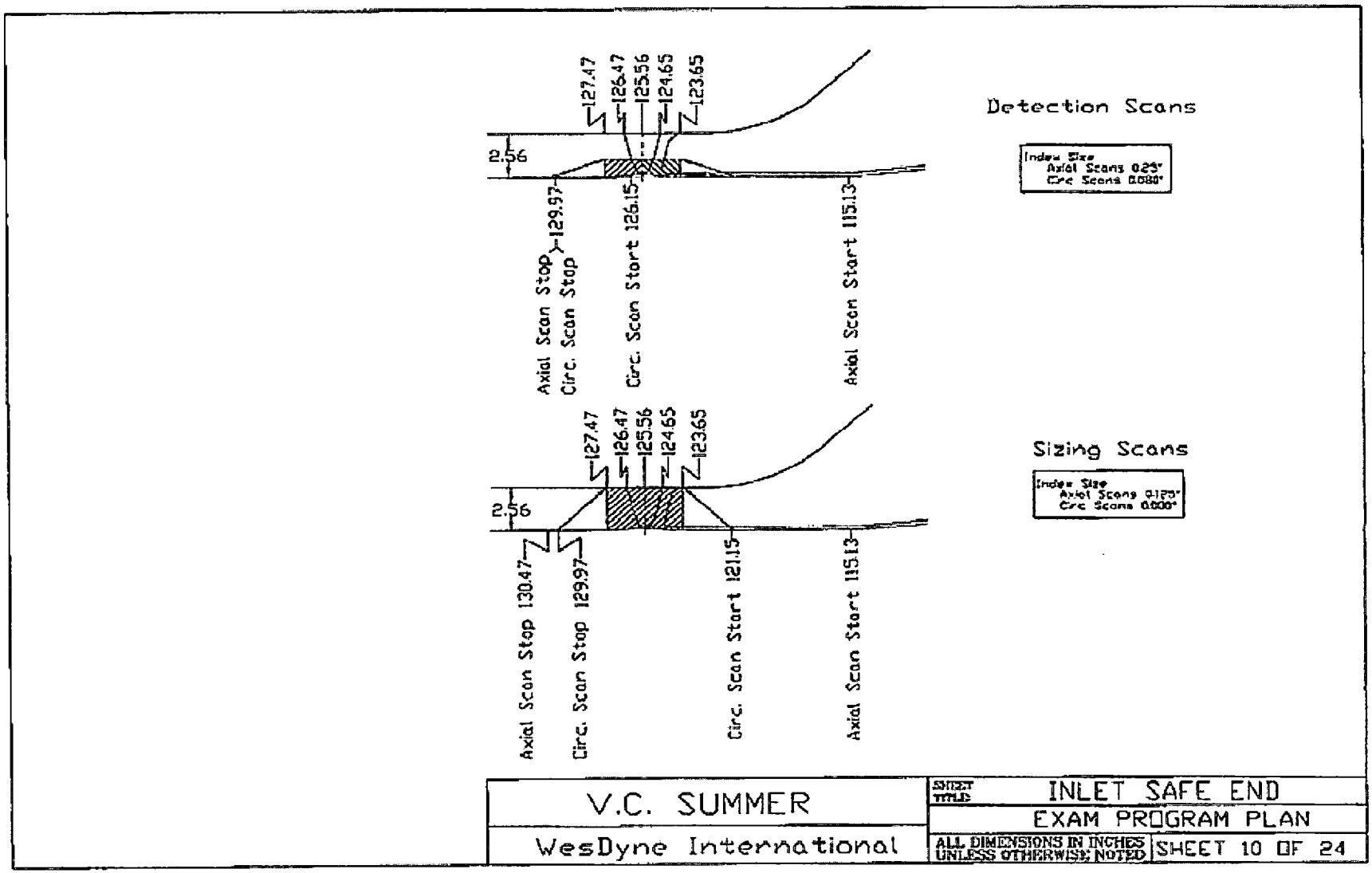
ATTACHMENT 2

VCSNS REACTOR VESSEL NOZZLE SKETCH



Schematic Representation of Original Design Geometry of the Loop Cold Leg Nozzle to Elbow Weld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Axial Scans 0.25"
Circ Scans 0.080"
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126.47
125.56
124.65
123.65
2.56
Axial Scan Stop 129.97
Circ. Scan Stop
Circ. Scan Start 126.15
Axial Scan Start 115.13
Sizing Scans
Index Size
Axial Scans 0.125"
Circ Scans 0.000"
127.47
126.47
125.56
124.65
123.65
2.56
Axial Scan Stop 130.47
Circ. Scan Stop 129.97
Circ. Scan Start 121.15
Axial Scan Start 115.13
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