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NewYork Power Authority

James Knubel
Senior Vice President and
Chief Nuclear Officer

August 5, 1999
JPN-99-026

U.S. Nuclear Regulatory Commission
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Subject: James A. FitzPatrick Nuclear Power Plant (Relief Requests #18 and #19)
Docket 50-333
Proposed Alternatives in Accordance with 10CFR50.55a(a)(3)(i) and Relief From ASME Section XI Code Regarding Inspection of RPV Vertical Shell and Shell to Flange Welds

Reference:
1. JPN-99-025, NYPA Letter to NRC, "Proposed Alternatives in Accordance with 10CFR50.55a(a)(3)(i) for Reactor Pressure Vessel Circumferential Shell Weld Examinations," dated August 5, 1999.
2. NRC letter, S. Richards to O. Kingsley, "Evaluation of Second 10-Year Interval Inservice Inspection Requests for Relief for Byron Nuclear Power Station, Units 1 and 2 (TAC No.s MA3982 and MA3933), dated March 26, 1999.

Dear Sir:

This letter transmits Relief Requests 18 and 19 to the James A. FitzPatrick's Inservice Inspection Program. 10CFR 50.55a(g)(6)(ii)(A)(2) states that all licensees shall augment their reactor vessel examinations by implementing the examination requirements for Reactor Pressure Vessel (RPV) shell welds specified in item B1.10 of Examination Category B-A, "Pressure Retaining Welds in Reactor Vessel," in Table IWB-2500-1 of Subsection IWB of the 1989 Edition of Section XI, Division 1, of the ASME Boiler and Pressure Vessel Code, subject to the conditions specified in 50.55a(g)(6)(ii)(A)(3) and (4). Additionally, 10CFR50.55a(g)(6)(ii)(A)(5) requires licensees that are unable to completely satisfy the augmented RPV shell weld examination requirement to submit information to the U.S. Nuclear Regulatory Commission to support the determination, and propose an alternative to the examination requirements that would provide an acceptable level of quality and safety. The Authority is unable to obtain essentially 100% of each vertical weld without disassembly or removal of internal interference, removal of permanently installed bio-shield, or modification of the inspection equipment. The Authority's intention is to review and evaluate methods to allow accessibility to greater than 90% of the vertical RPV shell welds in the belt-line region. The alternative plan (Relief Request 18) would allow time for review and evaluation of alternatives that could provide greater vertical weld examination coverage and ensure an acceptable level of safety and quality. The alternative plan, however, would exceed the time provisions, for

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A047

completion of the augmented exams, specified in 50.55a(g)(6)(ii)(A)(2) and (3). Relief is requested for the inservice inspection requirements of 10 CFR 50.55a(g) for the volumetric examination of reactor pressure vessel vertical shell welds (ASME Code Section XI, Table IWB-2500-1, Examination Category B-A, Item B1.12, Longitudinal (Vertical) Shell Welds). Permanent deferral of the circumferential shell welds (ASME Code Section XI, Table IWB-2500-1, Examination Category B-A, Item B1.11, Circumferential Shell Welds), in accordance with Generic Letter 98-05, was requested in Reference 1.

In addition, pursuant to the provisions specified in 10 CFR 50.55a(g)(5)(iii) and in accordance with 10 CFR 50.55a(a)(3)(ii), this submittal requests relief (Relief Request 19) from the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, Subsection IWB, 1989 Edition, for the volumetric examination requirement of the shell to flange weld during the first inspection period, as required by the ASME Code, Section XI, 1989 Edition, IWB-2500, Table IWB-2500-1 for Examination Category B-A, Item Number B1.30. Also, relief is requested from IWB-2420(a) to allow James A. FitzPatrick to defer the entire vessel shell to flange weld inspection to the end of the inspection interval. A similar relief request for the vessel shell to flange weld was approved by the NRC staff for the Byron Station (Reference 2). This relief request is submitted in conjunction with the relief request for the augmented inspection of the RPV vertical shell welds (Relief Request 18).

Attachment I contains the basis for Relief Request 18 and Attachment II contains the basis for Relief Request 19. The Authority would like to use these reliefs in the upcoming refueling outage (RO 14) at James A. FitzPatrick, and therefore requests disposition of these relief requests prior to December 15, 1999.

This letter contains no new commitments. If you have any questions, please contact Ms. C. D. Faison.

Very truly yours,

J. Knubel
Senior Vice President and
Chief Nuclear Officer

Attachments: As stated
cc: See next page

cc: Regional Administrator
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Attachment I to JPN-99-026

Relief Request 18

Relief Request Regarding Augmented Inspection of Reactor Pressure Vessel Vertical Shell Welds

NEW YORK POWER AUTHORITY
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
DOCKET NO. 50-333
DPR-59

Relief Request 18
Relief Request from ASME Section XI Code Regarding
Reactor Pressure Vessel Vertical Shell Welds

Background:

10CFR 50.55a(g)(6)(ii)(A)(2) states that all licensees shall augment their reactor vessel examinations by implementing the examination requirements for Reactor Pressure Vessel (RPV) shell welds specified in item B1.10 of Examination Category B-A, "Pressure Retaining Welds in Reactor Vessel," in Table IWB-2500-1 of Subsection IWB of the 1989 Edition of Section XI, Division 1, of the ASME Boiler and Pressure Vessel Code, subject to the conditions specified in 50.55a(g)(6)(ii)(A)(3) and (4). As stated in 10CFR50.55a(g)(6)(ii)(A)(2) for the purposes of this augmented examination, essentially 100 percent as used in Table IWB-2500-1 means more than 90 percent of the examination volume for each weld. Additionally, 10CFR50.55a(g)(6)(ii)(A)(5) requires licensees that are unable to completely satisfy the augmented RPV shell weld examination requirement to submit information to the U.S. Nuclear Regulatory Commission to support the determination, and propose an alternative to the examination requirements that would provide an acceptable level of quality and safety. The Authority is unable to obtain essentially 100% of each vertical weld without disassembly or removal of internal interference, removal of permanently installed bio-shield, or modification of the inspection equipment. The Authority's intention is to review and evaluate methods to allow accessibility to greater than 90% of the vertical RPV shell welds in the belt-line region. The alternative plan would allow time for review and evaluation of alternatives that could provide greater vertical weld examination coverage and ensure an acceptable level of safety and quality. The alternative plan, however, would exceed the time provisions, for completion of the augmented exams, specified in 50.55a(g)(6)(ii)(A)(2) and (3).

The purpose of this letter is to request approval, pursuant to provisions contained in 10CFR50.55a(a)(3)(i), of an alternative plan for performing the reactor pressure vessel (RPV) augmented examination requirements of 10CFR55a(g)(ii)(A)(2) for the James A. FitzPatrick Nuclear Power Plant. The Authority's alternative plan would defer the augmented exams to no later than refueling outage 16 (currently scheduled for 4th quarter 2004). The deferred inspection plan would include performance of RPV vertical weld examinations to the maximum extent possible, close to or exceed 90% coverage of the vertical welds in the belt-line region and incidental coverage of 2-3 percent of the intersecting circumferential welds.

A. Component Identification:

ISI Class 1, Code Category B-A, "Pressure Retaining Welds in Reactor Vessel", Item B1.12, "Longitudinal Shell Welds".

B. Examination Requirements:

10CFR 50.55a(g)(6)(ii)(A)(2) states that all licensees shall augment their reactor vessel examinations by implementing the examination requirements for Reactor Pressure Vessel (RPV) shell welds specified in item B1.10 of Examination Category B-A, "Pressure Retaining Welds in Reactor Vessel," in Table IWB-2500-1 of Subsection IWB of the 1989 Edition of Section XI, Division 1, of the ASME Boiler and Pressure Vessel Code, subject to the conditions specified in 50.55a(g)(6)(ii)(A)(3) and (4). As stated in 10CFR50.55a(g)(6)(ii)(A)(2) for the purposes of this augmented examination, essentially 100 percent as used in Table IWB-2500-1 means more than 90 percent of the examination volume for each weld. Additionally,

10CFR50.55a(g)(6)(ii)(A)(5) requires licensees that are unable to completely satisfy the augmented RPV shell weld examination requirement to submit information to the U.S. Nuclear Regulatory Commission to support the determination, and propose an alternative to the examination requirements that would provide an acceptable level of quality and safety.

C. Alternative To The Examination Requirements:

The alternative plan would defer the augmented exams of vertical welds to be completed no later than on refueling outage 16 (3rd-10 year ISI interval 9/97-9/06). Refueling outage 16 is currently scheduled for 4th quarter 2004. Unusual and a large number of RPV internal obstructions/interference prevents achieving the "essentially 100%" coverage requirements of 10CFR50.55a(g)(6)(ii)(A) "Augmented Examination of Reactor Vessel". Calculated exam coverage obtained by three vendors using present tooling and technology is limited to a range of no more than 51% to 64% for all vertical welds and 33% to 52% for belt-line region welds only. While the low end range values can be achieved by the conventional, well experienced tooling, it would take a newer less proven tooling to presently achieve the higher end values but nevertheless, still lower than code requirement. Therefore, the Authority has recently pursued and encouraged as many as available domestic and foreign vendors to research and develop with "new generation" scanner tooling to take advantage of best technology that when developed, would increase coverage of the belt-line region vertical welds at the JAFNPP Reactor Vessel to close to or exceed 90%, including incidental coverage of 2% to 3% of the intersecting circumferential welds.

Four of the contacted vendors showed interest in the challenge. These vendors have already started the tooling conceptualization process. The newer scanner tooling will be smaller sized, thinner, and lighter weight equipment, some with flexible delivery systems, using phased array ultrasonic technique, shear wave (full vee coverage) methods to maximize scanning coverage, and for specific applications, using tooling that has been successfully used in the aeronautics industry. Some of the proposed new tooling (but not limited to these) is listed below:

- Standard UT transducers and/or phase array, with a flexible delivery mast, magnetic wheels and a telescopic arm for greater side reach.
- Unique lightweight/thinner scanner which can be carried by one person, remotely controlled, but only requiring a delivery connector for specific applications.
- A low profile flexible scanner used for aircraft fuselage and wing inspections (for OD use)
- A low profile phased array probe wand that could be used in the access panel region from the vessel OD, to increase belt-line coverage beyond areas previously not able to be accessed by present tooling methods used for RPV inspections (clearance less than 1" between vessel OD and insulation).
- A remotely-operated manipulator presently used in PWR reactor vessels.
- A retrofitted suction cup scanner presently used for core shroud weld inspections.

UT scanning coverage for the belt-line vertical welds is estimated at equal to or greater than 80% for current conceptualized tooling. Enclosure 1 (4 drawings) provides a weld inspection coverage mapping and relevant notes for each of the four vendors.

The Authority's present implementation plan is listed below. This plan takes into consideration the development, fabrication, mock-up testing, and qualification of the new tooling(s). It is estimated that the plan will take a minimum of 12-18 months after vendor selection. Also, the EPRI NDE Center is currently conducting experimental trials to determine the effectiveness of phased array techniques for the examination of BWR and PWR reactor pressure vessels.

Results of demonstrations from the OD surface indicate that improved coverage and detection capability can be achieved using sector scans with the ultrasonic beam focused at the clad to base metal interface. The beam is swept over a range of angles producing acceptable detection sensitivity over 10 to 12 inches of the clad to base-metal interface from a single probe position. Demonstrations from the internal surface are scheduled to start within the next two months and be completed by mid-2000. The demonstration would evaluate the effectiveness of "full Vee path" techniques as well as other limited access approaches. Commercialization of the internal approach could potentially be initiated by the end of the year 2000 or 2001.

Implementation Plan:

1. RO14 - Measure as-built gap between vessel OD and reflective insulation from the access openings to recirculation inlet/outlet nozzles. These measurements will help determine extent of tooling accessibility.
2. Cycle 14/15 - Select vendor consistent with most weld coverage and tooling reliability.
3. RO15 – Tentative start of weld examination during RO15 with the newly developed tooling.
4. RO16 – Start or complete the weld inspections.

D. Basis For Alternative Plan:

The Authority is unable to meet the greater than 90% coverage requirement for each weld due to internal interference of the JAF reactor vessel components and the examination tooling equipment lower scan limitations. The alternative proposed in Reference 1 (and authorized by NRC in Reference 2) was to perform an augmented examination of the RPV welds in refueling outage 14 (currently scheduled for 4th quarter of 2000), and to evaluate methods for performing the examinations to the maximum extent possible from the inner diameter (ID) and provide greater than 90% coverage of the vertical welds in the belt-line region. Accessibility studies by three different vendors would allow a maximum of 64% of the cumulative length of all vertical shell welds. This would have only allowed coverage of approximately 52% of the cumulative length of the belt-line region vertical welds. Further examination from the ID is not possible without disassembly of vessel internal components. The alternative to defer the inspection until no later than RO16 will allow for development, testing and qualifying of a newer technology and smaller size tooling. The proposed plan will enable scanning of welds in confined areas not accessed by present tooling.

The industry basis document, BWRVIP-05, considered several issues related to BWR RPV integrity to provide a basis for eliminating the requirement to perform circumferential welds and the performance of only 50 % of the vertical RPV shell welds. These issues included fabrication practices, in-service inspection data, operational issues, degradation mechanics, and probabilistic fracture mechanics analysis results. As stated in the report "Results of the evaluation performed in this report clearly demonstrate the inherent safety and integrity of BWR reactor pressure vessels." The following basis for deferral uses a similar approach but utilizes more plant specific data to justify deferral of the required vertical examinations to RO-16.

Previous Shell Weld Examinations:

During the fabrication process of the RPV, all of the shell welds were thoroughly examined using several examination methods as required by the original construction code. Additionally, all of the shell welds received volumetric examination prior to initial plant operations, as prescribed by ASME Section XI pre-service inspection requirements.

A search of original construction "weld travelers" records identified among others, a Report of Ultrasonic Testing for Vessel Assembly dated 4/10/71, stating "UT of Pressure Boundary Welds. No Indications Reportable"; and a Shop Quality Control, Inspection and Document Record document (by Stone and Webster), with a listing of performed and checked tests, dated 9/16/70. All shell weld original radiographs have been digitized per latest EPRI guidelines. The digitized radiographs, for the vertical welds in the belt-line region, were reviewed by a JAFNPP QA Level III inspector. The review identified minor inclusions/slag/porosity randomly oriented throughout the welds. These indications are considered minor with no safety significance. These radiographs were accepted during original vessel fabrication.

Selected shell welds have received outer diameter (OD) volumetric examinations during the first and second interval in accordance with ASME Section XI in-service inspection requirements. The OD examination totaled 28% of total vertical length of shell welds with 12% at belt-line vertical welds. Most of the intersecting welds, 10 of 15, were inspected. Some welds only received partial coverage (i.e., one sided examination coverage only). The OD examinations resulted in only four recorded spot indications, with no measurable length or width. These indications were found acceptable for operation. A sketch of the previous OD exams, locations and results was included in transmittal to NRC via NYPA Letter (JAFP-98-0292), from Michael J. Colomb, to NRC, dated September 10, 1998.

Industry Results of Past Examinations:

Survey data compiled by [3]EPRI for the BWR fleet indicate that a total of 5,257 feet (63,084 inches) of vessel shell weld length was examined, or 36% of the total possible weld length of 24 units, resulting in only 16 indications exceeding the acceptance criteria of ASME Section XI, IWB-3500. All 16 indications were subsurface flaws shown to be acceptable by meeting the criteria of IWB-3600. The total length of the indications was 29.9 inches, which is just 0.05% of the total weld length examined.

Recent data provided by General Electric indicate that the reportable 16 indications (15 on circumferential welds and one on vertical welds) have only been recorded on *non-CE (Combustion Engineering) Reactor Pressure Vessels*; JAF is a CE plant. All indications were determined to be construction related, and were evaluated and accepted for operation. No service related flaws were present.

Separate data by General Electric (Enclosure 2) show segregated ID (Inside Diameter) coverage data for vertical welds and are summarized below as follows:

BWR Fleet Vertical Welds:		BWR-4 Vertical Welds:	
Total Welds	= 17,050"	Total Welds	= 8,350"
Total Examined	= 11,600"	Total Examined	= 6,000"
Total Belt-line	= 8,500"	Total Belt-line	= 4,100"
Total Examined	= 5,450"	Total Examined	= 2,700"

It is clear from these survey results that a substantial amount of examinations have been performed which verify the integrity of BWR vessels, and that only a negligible number of construction related indications have been detected as a result of these inspections with no service related defects.

Fatigue Life, Radiation Embrittlement and Stress Corrosion Cracking:

Some known degradation mechanisms may influence crack initiation and growth in the RPV low alloy steel (A 533B1); fatigue life, radiation embrittlement and stress corrosion cracking (SCC).

[5]*Fatigue life* can be correlated with the water chemistry. Test results show a significant improvement in the number of cycles (load and unload) it takes to develop a 0.1 inch deep crack with conductivity approaching 0.06μS/cm when compared with 0.4-0.5μS/cm. A 0.1-inch crack is often considered to be the size of a crack of engineering significance. JAF conductivity values for the reactor coolant water have decreased substantially over the past years from a high of 0.31μS/cm in 1990 to a range of 0.066-0.067μS/cm for 1997 and 1998 respectively (Enclosure 3). For JAF, the number of startup and shutdown transient cycles is within overall limits of the Technical Specifications.

[6]*Radiation embrittlement* can be correlated with neutron fluence, which is highest at the belt-line region. JAF has lower fluence values than the limiting plants analyzed by the NRC's evaluation of the BWRVIP-05 report. Below is a comparison between FitzPatrick versus the limiting plants contained in the BWRVIP report for the projected exposure at 32 EFPY.

[8]JAF – peak fluence values at each belt-line weld (Enclosure 4):
1.06 E + 18 (welds VV-3A and VV-3C)
8.20 E + 17 (welds VV-3B and VV-4B)
1.10 E + 18 (weld VV-4A)
7.40 E + 17 (weld VV-4C)

[4]Plant 1 – peak fluence at belt-line weld:
6.76 E + 18

[4]Plant 2 – peak fluence at belt-line weld
1.50 E + 18

[7]There are no cases of RPV damage in BWR plants that indicate susceptibility of the low-alloy steel base material to *SCC* during normal reactor operation. This is attributed to good BWR water chemistry. JAF conductivity, chloride and sulfate values have significantly improved over the last ten years and have consistently been within EPRI limits with average conductivity in 1998 being best in the GE BWR fleet. JAF has used hydrogen water chemistry and zinc addition since 1989 and is planning to initiate noble metal chemical application in November 1999.

Conditional Failure Probability

[4]A comparison of the probability of failure of vertical welds shows JAF lower than for plants, Clinton and Pilgrim, which are expected to bound the vertical weld concern for all BWR's, as follows:

Plant	Probability
JAF	4.78 E – 03
Clinton	1.55 E – 02
Pilgrim	1.05 E - 02

Both plants, Clinton and Pilgrim have completed their ISI exams without relevant indications. Although no credit may be taken to reduce the probability of weld failure for the inspected plants, the fact remains that the bounding BWR plants have not shown signs of service degradation for the RPV shell welds.

Low-Temperature Over-Pressure Event (LTOP)

At an industry meeting on August 8, 1997, the NRC indicated that the potential for, and consequences of, non-design basis events not addressed in the BWRVIP-05 report should be considered. Later, in a Request for Additional Information (RAI) to the BWRVIP, the NRC requested that the BWRVIP evaluate the potential for a non-design basis cold over-pressure transient. The BWRVIP responded in a letter to NRC dated December 18, 1997. The NRC also considered beyond design basis events, such as low temperature over-pressure (LTOP) events in their PFM analysis. In the BWRVIP response to the RAI the total probability of an occurrence of cold overpressure for BWR-4s was reported as 9E-4. It was concluded that it is highly unlikely that a BWR would experience a cold over-pressure transient. In fact, for a BWR to experience such an event would generally require several operator errors. The NRC described several types of events that could be precursors to BWR RPV cold over-pressure transients. These were identified as precursors because no cold over-pressure event has occurred at a U.S. BWR. Also, the NRC identified one actual cold over-pressure event that occurred during shutdown at a non-U.S. BWR. This event apparently included several operational errors that resulted in a maximum RPV pressure of 1150 psi with a temperature range of 79°F to 88°F.

The high-pressure injection sources, administrative controls, and operator training regarding a cold overpressure event for the FitzPatrick plant were addressed in Relief Request 17 (Reference 10), which requested permanent deferral of the RPV circumferential shell weld examinations. Based upon the information provided in Relief Request 17 it is considered that the probability of a low temperature over-pressure event at the FitzPatrick plant is less than or equal to that used in the staff's July 30, 1998, safety evaluation.

RPV Internal Obstructions/Interference

Graph data provided by General Electric (Enclosure 5) shows lowest vertical weld coverage achieved with the GERIS 2000 tooling for BWR CE Plants, at approximately 60% average for belt-line and non-belt-line welds. The low coverage is attributed to RPV internal obstructions. No domestic plant has removed these obstructions to increase weld coverage.

As noted before, unusual circumstances at JAF prevent an examination of "essentially 100%" of the length of all vertical welds. There is an excessive amount of vessel internal obstructions/ interference, which can be seen in the NYPA prepared three-dimensional clearance diagram drawings (Enclosure 6, Sheets 1 to 3) and in the GE prepared Figure 1 based on actual accessibility study surveys for FitzPatrick "Projected Examination Coverage" (Enclosure 7). The internal obstructions/ interference are listed below:

1 Jet pump assemblies, support plates and gussets restrict access to at least three vertical welds;
2 Some of the core shroud repair tie-rods restrict access to at least two vertical welds. JAF has an installed 10 tie-rod system;
3 FW sparger and core spray piping restrict significant coverage to at least 34% of length over three vertical welds;
4 Guide rod at 180° restricts access to two vertical welds located at the same azimuth;

5 Steam dryer brackets obstruct local access for two welds; and
6 The Surveillance specimen holder would have to be temporarily relocated to access Weld VV-3C, and subsequently placed back with same orientation. This would be controlled by a plant procedure and would be performed to aide in inspection coverage.

Removal of obstructions other than the surveillance specimen holder, would involve substantial risk, cost and person-rem exposure. [9]Estimate for removing/re-installing two tie-rods and one guide rod is 4.106 person-rem exposure, approximately 460 duration hours, and 6,000 person-hours total. These estimates are based on actual hours used in RO-11 to install two tie-rods at JAF and on other plant specific historical data relevant for this work (i.e., Jet Pump Beam replacement). Duration hours are strictly Radiological Control Area accessed hours. It excludes duration hours spent for engineering, tooling/mock-up development, training, installation, etc. Without the two tie-rods and one guide rod, net coverage for the belt-line area would be increased by approximately 20% to a 72% total, still short of the minimum 90% code requirement. There would be an increase of dose of approximately 4.1 REM at a total cost of over $750,000 due to material and labor and approximately one week of additional critical path time without a compensating increase in safety. Substantial risk is involved with the cutting and removal of parts with remote tooling with the potential of dropping cut material into the vessel but even riskier would be the material condition of the removed parts or components, probably requiring contingency material stand-by. Removal of other vessel internals would risk permanent damage to the vessel inside wall, potential for loose parts (i.e., metal shavings that could cause fuel damage), it would involve significant amount of person-hours of direct labor with severe impact to the outage schedule, with a substantial increase in person-rem exposure, and without a compensating increase in safety.

Conclusion:

Deferral of the RPV shell weld exams to no later than refueling outage 16 (currently scheduled for 4th quarter 2004) will ensure a higher belt-line UT scan coverage by use of "new generation" tooling. This tooling will also be able to benefit the whole BWR fleet in terms of increased scan coverage. Based on the documentation in the BWRVIP-05 report, the risk-informed independent assessment performed by the NRC staff, the lower neutron fluence, the less challenging design and operational loading for BWRs, the quality of the original vessel fabrication, the lack of significant degradation mechanisms, the results of the previous vessel examinations, and controls to prevent a cold over-pressure event, the Authority believes a deferral in completing the inspection of the RPV shell welds until no later than RO-16 provides an acceptable level of quality and safety.

E. Alternative Examinations

The JAFNPP alternative plan would require the deferral of the augmented exams to no later than refueling outage 16 (currently scheduled for 4th quarter 2004). The Authority will work with interested vendors to encourage development of newer tooling/technology that will provide greater than 90% coverage of the belt-line region vertical welds, and incidental coverage of 2% to 3% of the intersecting circumferential welds. The inspections can be done over two refueling outages (RO15/16) if new tooling is used.

The newer smaller tooling will be able to access weld areas not previously accessible due to access limitation of the present tooling. To date vertical welds examined for the BWR fleet are 68% of the total vertical weld length and 64% of the belt-line. For BWR-4's vertical weld length examined is 72% of the total vertical and 66% for belt-line. Segregating out the CE Vessels, average examination for all vertical welds, including belt-line, is approximately 60%. The data demonstrate the potential benefits for developing newer tooling/technology to augment coverage.

Further examination of the circumferential welds would depend on NRC review, resolution, and approval of the Authority's submitted Relief Request No. 17 for a permanent deferral of weld examinations for these welds.

References:

1. NYPA Letter (JAFP-98-0316) to NRC, Proposed Alternatives in Accordance with 10CFR50.55a(a)(3)(i) for RPV Shell Weld Exam, September 29, 1998 (RR No.15).

2. NRC Letter to NYPA, JAFNPP-Authorization of Alternative Reactor Vessel Weld Exams (TAC No. MA 1954), November 3, 1998.

3. BWRVIP-05 (EPRI TR-105697), BWR RPV Shell Weld Inspection Recommendations, September 1995.

4. BWRVIP response to NRC Request for Additional Information on BWRVIP-05, June 8, 1998, transmitted to NRC on December 15, 1998.

5. EPRI TR-109051, Environmentally-Assisted Fatigue Crack Growth Initiation in Low Alloy Steels, Final Report, November 1997

6. EPRI TP-110168, NDE for Life Cycle Management Strategic Plan, May 1999.

7. BWRVIP-60 (EPRI TR-108708), Evaluation of Stress Corrosion Crack Growth in Low Alloy Steel Vessel Materials in the BWR Environment, Final Report, March 1999.

8. Memorandum RE-99-223, JAF Vessel Belt-Line Fluence, A.Ramachandran to P. Okas, April 22, 1999.

9. Memorandum, Exposure Estimate for the Removal/Installation of Two Tie and one Guide Rod at JAF, A. Stark to P. Okas, May 18, 1999.

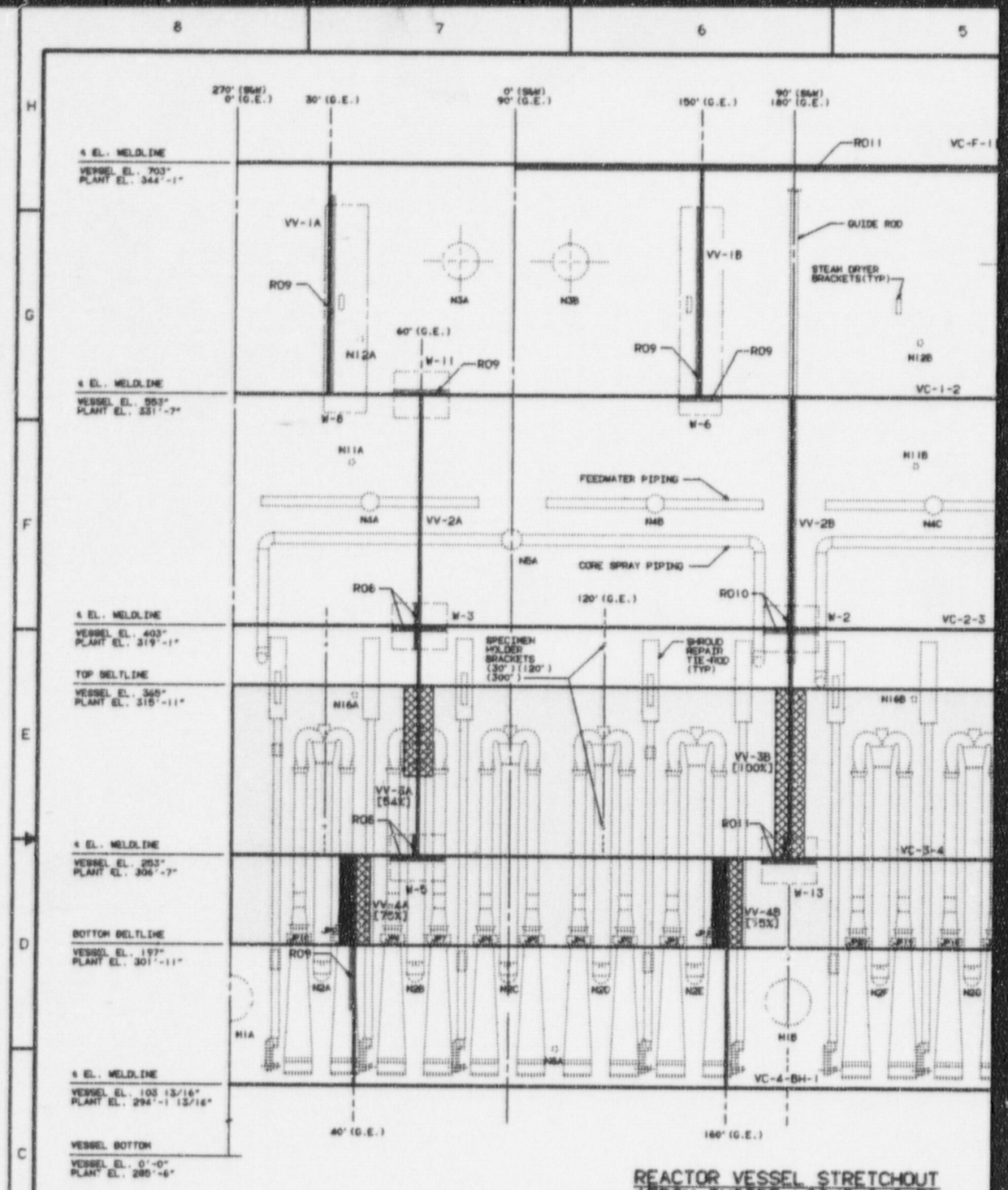
10. JPN-99-025, NYPA Letter to NRC, "Proposed Alternatives in Accordance with 10CFR50.55a(a)(3)(i) for Reactor Pressure Vessel Shell Weld Examinations," Relief Request #17, dated August 5, 1999.

ENCLOSURE 1

RPV SHELL WELD INSPECTION COVERAGE (SH. 1-4)

NEW YORK POWER AUTHORITY
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
DOCKET NO. 50-333
DPR-59

COMMENT=
GROUP=JMZ SUBGRP=WRK SCALE= 0.3200 DRAWID=JAF RV VENDOR 4 1 LAST FILE=99203 15:39
DATE= 7/22/99 TIME=15.40 ACCESS=NONE FMT=
LOGON ID=RICHARDH
PLOT= 1 MULTICOPY



REACTOR VESSEL STRETCHOUT
(FROM INSIDE LOOKING OUT)

GENERAL NOTES:

- ESTIMATED BELTLINE EXAM COVERAGE = 80% (SEE TABLE 2 WITH NOTES)
- VESSEL STRETCHOUT SHOWS BELTLINE COVERAGE ONLY. ESTIMATED 80% MIN. COVERAGE FOR TOTAL VERTICAL WELDS.

SCHEDULE:

- EXAM ESTIMATED AT 10 DAYS
- PRELIMINARY DEPLOYMENT DURING RO14
- PERFORM EXAM DURING RO15

ADVANTAGES (VENDOR 4):

- GOOD EXPERIENCE WITH TOOLIN
- TWO TOOLINGS TO MAXIMIZE CO
- "URSULA" USED ON NUMEROUS P

DISADVANTAGES (VENDOR

- LIMITED EXPERIENCE WITH THI
- WOULD REQUIRE CONSTANT COOR PERFORMING IVVI / REFUEL AC

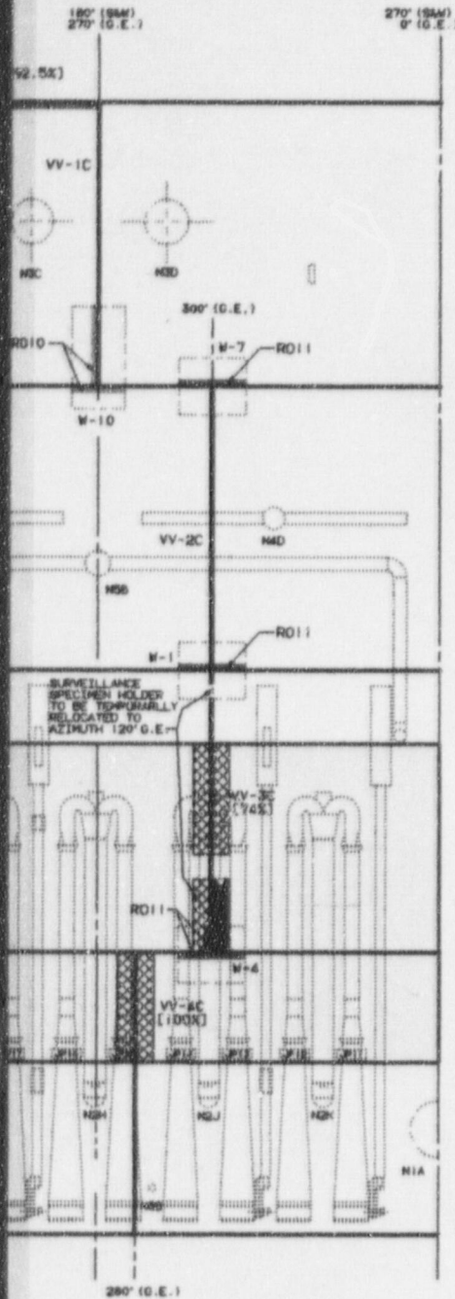


TABLE 1 - PREVIOUS OD INSPECTION

WELD NUMBER	WELD LENGTH (IN)	ACTUAL WELD LENGTH O.D. OBTAINED			
		RO8(1988)	RO9(1990)	RO10(1992)	RO11(1995)
VC-F-1	686.3(ID) 730.4(OD)	-	-	-	90%
VC-1-2	686.3(ID) 730.4(OD)	-	(4)162"TOP/145"BOT	44"	36"
VC-2-3	686.3(ID) 730.4(OD)	(6)36"	-	36"	38"
VC-3-4	686.3(ID) 730.4(OD)	(5)37"	-	-	73"
VV-1A	150	-	(1)150"	-	-
VV-1B	150	-	(2)150"	-	-
VV-1C	150	-	-	52"	-
VV-2A	150	(6)14"	-	-	-
VV-2B	150	-	-	14"	-
VV-2C	150	-	-	-	-
VV-3A	150	(6)33"	-	-	-
VV-3B	150	-	-	-	16"
VV-3C	150	-	-	-	17.5"
VV-4A	150	-	(3)56"	-	-
VV-4B	150	-	-	-	-
VV-4C	150	-	-	-	-

NOTES 1:
(1) RECORDED ONE SPOT INDICATION AT 0° LONGITUDINAL AND AT 45° SHEAR WAVE. NO MEASURABLE LENGTH OR WIDTH
(2) RECORDED TWO SPOTS INDICATION AT 0° LONGITUDINAL. NO MEASURABLE LENGTH OR WIDTH.
(3) THE CLOCKWISE SIDE OF THE WELD DID NOT RECEIVE FULL ASME CODE VOLUME COVERAGE.
(4) RECORDED A SINGLE SPOT INDICATION AT 0° HAZ SCAN AT MID-WALL WITH ESSENTIALLY NO LENGTH OR THRU WALL DEPTH.
(5) INCOMPLETE SCAN.

TABLE 2 - RO15/16 BELTLINE VERTICAL WELD COVERAGE - ESTIMATE VENDOR 4

WELD NUMBER	WELD LENGTH IN BELTLINE REGION	ESTIMATED ID COVERAGE SEE NOTES - 1 & 2		ESTIMATED ID COVERAGE SEE NOTES - 2 & 3	
	INCHES	INCHES	%	INCHES	%
VV-3A	112	60	54%	60	54%
VV-3B	112	112	100%	112	100%
VV-3C	112	60	54%	83	74%
VV-4A	56	28	50%	42	75%
VV-4B	56	28	50%	42	75%
VV-4C	56	56	100%	56	100%
		TOTAL	68%	TOTAL	82%

TOTAL BELTLINE VERTICAL WELDS (ESTIMATED)	= 80%
TOTAL BELTLINE VERTICAL WELDS (INCLUDING PRIOR O.D. EXAM)	= 83%
TOTAL VERTICAL WELDS (ESTIMATED)	≥ 80%

NOTES 2:
(1) COVERAGE ASSUMING WELD SCANNED FYOM EACH SIDE.
(2) ADDITIONAL COVERAGE MAY BE ACHIEVABLE ON LOWER SECTION OF VV-3A IF TOOLING CAN BE INSTALLED THROUGH JET PUMP RISER BRACE(TO BE DEMONSTRATED IN MOCKUP TESTING).
(3) ADDITIONAL COVERAGE SCANNING FROM ONE SIDE BUT TAKING CREDIT FOR PARTIAL FAR SIDE COVERAGE.
(4) LEGEND: COVERAGE ASSUMING WELD SCANNED FROM EACH SIDE
ADDITIONAL COVERAGE SCANNING FROM ONE SIDE BUT TAKING CREDIT FOR PARTIAL FAR SIDE COVERAGE
(5) TOOLING
- BWR RPV SCANNER LOW - HEIGHT X-Y INSPECTION DEVICE WOULD ATTACH TO THE ID OF THE RPV USING SUCTION CUPS. WOULD USE A SINGLE PHASED ARRAY TRANSDUCER. THE SCANNER WOULD BE DELIVERED VIA HANDLING POLES.
- "URSULA" - PREVIOUSLY USED IN PWR VESSEL EXAMS WOULD BE USED TO INSPECT THE UPPER PORTION OF THE RPV.

G AT CORE SHROUD WELDS.
VERAGE
WR VESSEL EXAMS

9908100183-01

6) 1
S WORK AT BWR'S
DINATION WITH VENDOR
TIVITIES

NO.	DATE	DESCRIPTION	DRN	CHK	SE	MFY	APP

REVISIONS

JAMES A. FITZPATRICK
NUCLEAR POWER PLANT

RPV SHELL WELD INSPECTION COVERAGE - VENDOR 4

New York Power Authority

SCALE NTS
DWG NO VENDOR 4
SHEET 6
REV

COMMENT=
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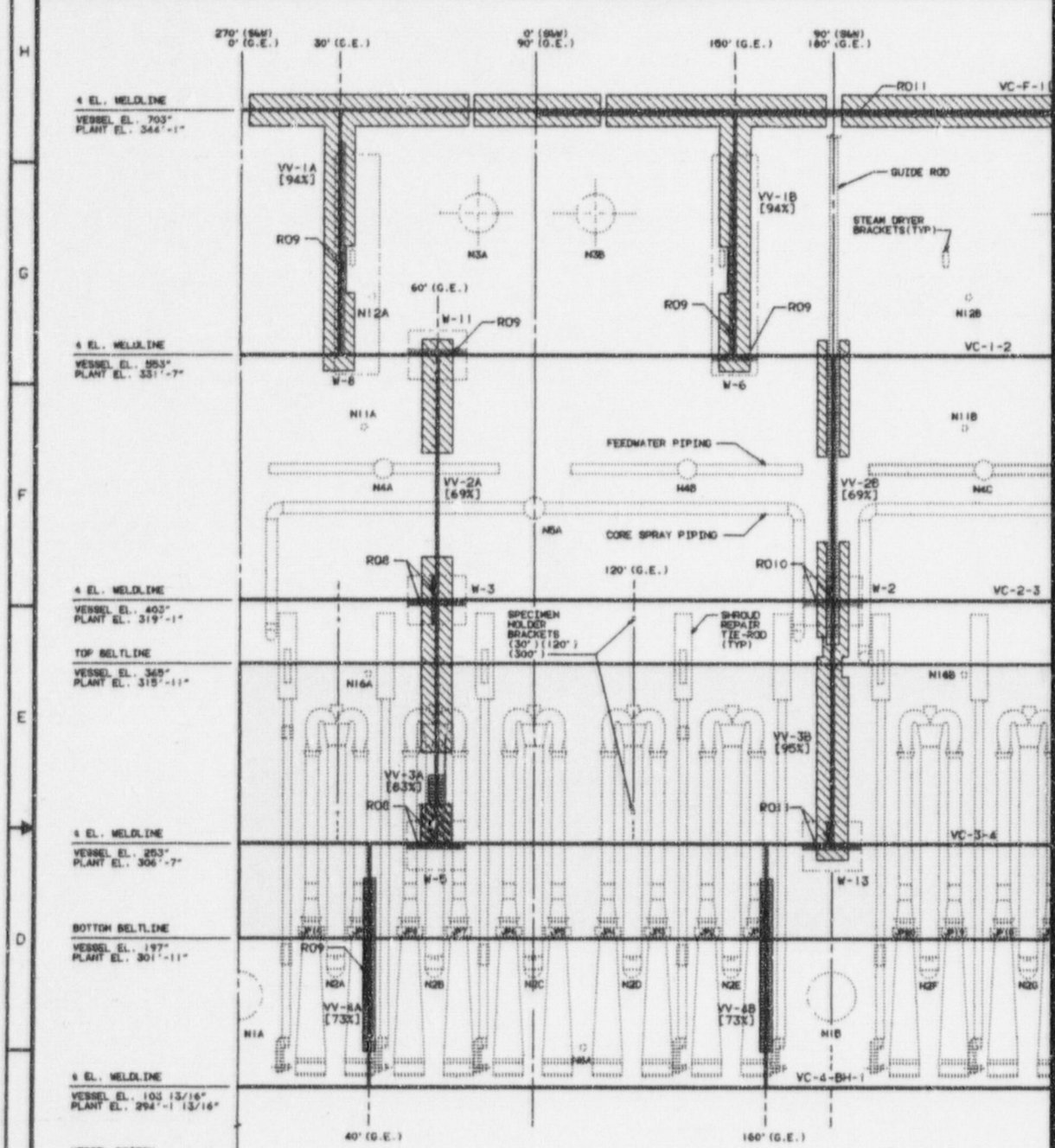


REACTOR VESSEL STRETCHOUT
(FROM INSIDE LOOKING OUT)

GENERAL NOTES:

- ESTIMATED BELTLINE AND TOTAL VERTICAL EXAM COVERAGE ≥ 80% MIN. (SEE TABLE 2 WITH NOTES)
- FOR PREVIOUS OD INSPECTIONS (SEE TABLE 1 WITH NOTES)
- FOR PROPOSED TOOLING (SEE TABLE 2 WITH NOTES)
- ASSUMES 67% CREDIT FOR FULL VEE COVERAGE
- ASSUMES 100% CREDIT FOR PHASED ARRAY COVERAGE

SCHEDULE:

- IT IS ESTIMATED THAT THE COMPLETION OF THESE TECHNIQUES (DEVELOPMENT, FABRICATION, MOCK-UP TESTING AND QUALIFICATION DEMONSTRATIONS) WILL REQUIRE APPROXIMATELY 12-18 MONTHS FROM CONTRACT AWARD.

ADVANTAGES (VENDOR 3):

- WILL MAXIMIZE EXAM COVERAGE
- VERSATILITY OF ID/OD EQUIPM
- LIGHT WEIGHT EQUIPMENT - DO
- WILL PERFORM FULL MOCK-UP T
- MANAGEABLE LAYDOWN AREA ON

DISADVANTAGES (VENDOR

- OD SCANNING SUBJECT TO CLEA
- WILL REQUIRE SOME TOOLING R
- WOULD REQUIRE CONSTANT COOR PERFORMING IVVI/ REFUEL ACT

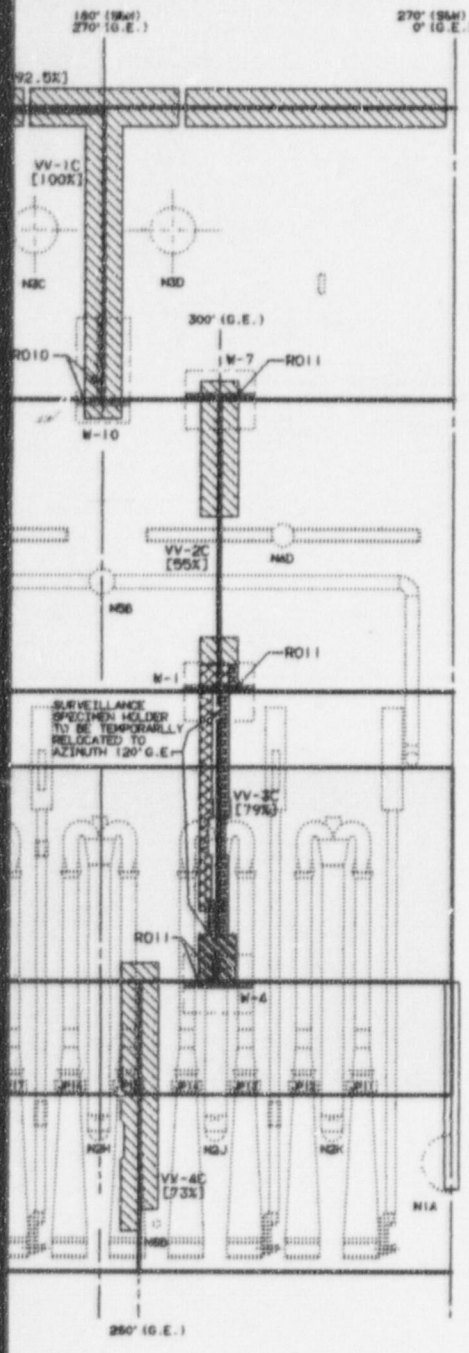


TABLE 1 - PREVIOUS OD INSPECTION

WELD NUMBER	WELD LENGTH (IN)	ACTUAL WELD LENGTH O.D. OBTAINED			
		RO8(1988)	RO9(1990)	RO10(1992)	RO11(1995)
VC-F-1	686.3(ID) 730.4(OD)	-	-	-	90%
VC-1-2	686.3(ID) 730.4(OD)	-	(4)162°TOP/145°BOT	44°	36°
VC-2-3	686.3(ID) 730.4(OD)	(5)36°	-	36°	36°
VC-3-4	686.3(ID) 730.4(OD)	(5)37°	-	-	73°
VV-1A	150	-	(1)150°	-	-
VV-1B	150	-	(2)150°	-	-
VV-1C	150	-	-	52°	-
VV-2A	150	(5)14°	-	-	-
VV-2B	150	-	-	10°	-
VV-2C	150	-	-	-	-
VV-3A	150	(5)33°	-	-	-
VV-3B	150	-	-	-	16°
VV-3C	150	-	-	-	17.5°
VV-4A	150	-	(3)58°	-	-
VV-4B	150	-	-	-	-
VV-4C	150	-	-	-	-

NOTES 1:
(1) RECORDED ONE SPOT INDICATION AT 0° LONGITUDINAL AND AT 45° SHEAR WAVE. NO MEASURABLE LENGTH OR WIDTH
(2) RECORDED TWO SPOTS INDICATION AT 0° LONGITUDINAL. NO MEASURABLE LENGTH OR WIDTH.
(3) THE CLOCKWISE SIDE OF THE WELD DID NOT RECEIVE FULL ASME CODE VOLUME COVERAGE.
(4) RECORDED A SINGLE SPOT INDICATION AT 0° HAZ SCAN AT MID-WALL WITH ESSENTIALLY NO LENGTH OR THRU WALL DEPTH.
(5) INCOMPLETE SCAN.

TABLE 2 - DETAILED WELD COVERAGE - ESTIMATE VENDOR 3

WELD I.D.	LENGTH (IN)	ESTIMATE EXAM COVERAGE(%)	PROPOSED TOOLING	OBSTRUCTION COMMENTS
MC-F-1	686	92.5	A	STEAM PLUG LINES, GUIDE RODS
VV-1A	150	94	A	STEAM DRYER BRACKET
VV-1B	150	94	A	STEAM DRYER BRACKET
VV-1C	150	100	A	NONE
VV-2A	150	69	A	F.W. SPARGER, C.S. PIPING
VV-2B	150	69	A	F.W. SPARGER, GUIDE ROD
VV-2C	150	55	A	F.W. SPARGER, C.S. PIPING, SHROUD REPAIR
VV-3A	150	83	A,B,C/D	JP RISER BRACE, SHROUD REPAIR
VV-3B	150	95	A	GUIDE ROD, C.S. PIPING
VV-3C	150	79	A,B,C/D	JP RISER BRACE, SURVEILLANCE SPECIMEN BRACKETS, SHROUD REPAIR
VV-4A	150	73	B	SHROUD REPAIR
VV-4B	150	73	B	SHROUD REPAIR
VV-4C	150	73	A	JP SENSING LINES, SHROUD SUPPORT PLATE AND GUSSETS
TOTAL VERT.	1800	80		
BELTLINE VERTS. (197-369°)	504	80		

NOTES 2:
(1) UT 2-3% OF CIRCUMFERENTIAL WELDS AT INTERSECTION WITH EACH VERTICAL WELD AS SHOWN.
(2) [ ] % ESTIMATED I.D. COVERAGE - VENDOR 3
(3) LEGEND:
- DOUBLE COVERAGE
- SINGLE COVERAGE
- FULL VEE COVERAGE
- OD PHASED ARRAY COVERAGE
- OD COVERAGE W/ CATAMARAN

(4) PROPOSED TOOLING
A. STANDARD TOOLING / ONE-HALF MAST (ID)
B. PHASED ARRAY PROBE WAND (OD)
C. CATAMARAN (OD)
D. NAVIGATOR (OD)

TOTAL BELTLINE VERTICAL WELDS(ESTIMATED)	≥	80%
TOTAL VERTICAL WELDS (ESTIMATED)	≥	80%

(FROM ID/OD)
ENT INCREASES PROBABILITY OF SUCCESS.
ES NOT REQUIRE HEAVY LOAD ANALYSIS
ESTING
REFUEL FLOOR

3):
RANCE VERIFICATION (RO14)
E-DESIGN
DINATION WITH VENDOR
IVITIES.

9908100183-02

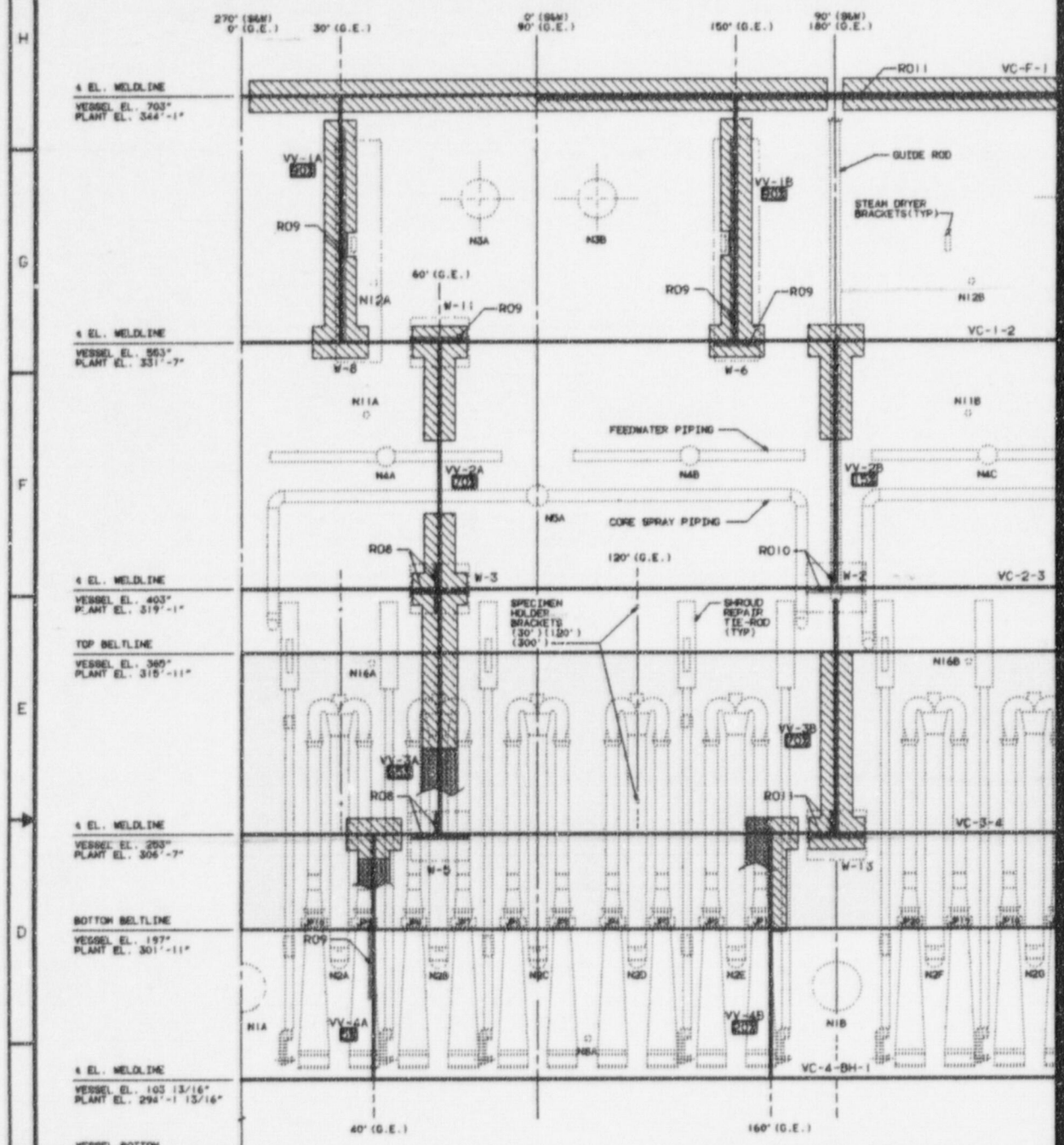
DRAWN	JAMES A. FITZPATRICK NUCLEAR POWER PLANT	
CHK'D		
PROJ. ENG.		
MECHANICAL	RPV SHELL WELD INSPECTION COVERAGE - VENDOR 3	
APPROVAL		
DATE		

New York Power Authority

SCALE NTS
DWG NO VENDOR 3
REV
SHEET 6

NO.	DATE	DESCRIPTION	DRAWN	CHK	ME	MFT	APP

REVISIONS



REACTOR VESSEL STRETCHOUT
(FROM INSIDE LOOKING OUT)
(ABOVE SHOWN COVERAGE BY EXISTING TOOL

GENERAL NOTES:

- ESTIMATED BELTLINE EXAM COVERAGE (WITH NEW TOOLING) = 80% - 90%*
  *SUBJECT TO FEASIBILITY STUDY FOR A THINNER TOOL (LESS THAN 1.5" THICK) IF FEASIBLE, IT WOULD ALLOW SCANNING OF THE ENTIRE LENGTH OF WELD BEHIND THE JET PUMP RESTRAINER BRACKET.
- ESTIMATED TOTAL VERTICAL WELDS ≥ 80%

SCHEDULE:

- REQUIRES 12-18 MONTHS TO COMPLETE FEASIBILITY STUDIES, DESIGN, FABRICATION, AND MOCK-UP TESTING.

ADVANTAGES (VENDOR 2):

- RESPECTABLE EXAM COVERAGE,
- LIGHT WEIGHT EQUIPMENT - DO
- PDI QUALIFIED
- PROVEN DATA ACQUISITION SYS
- SMALL LAYOUT AREA ON REFUEL
- COULD USE TWO SCANNERS (EXIS

DISADVANTAGES (VENDOR

- VERY HIGH DEVELOPING COST O
- REQUIRES FEASIBILITY STUDY
- EXISTING SCANNER HAS LIMITE (PERFORMED WELL IN TESTING)
- ONE DIMENSIONAL TOOLING.

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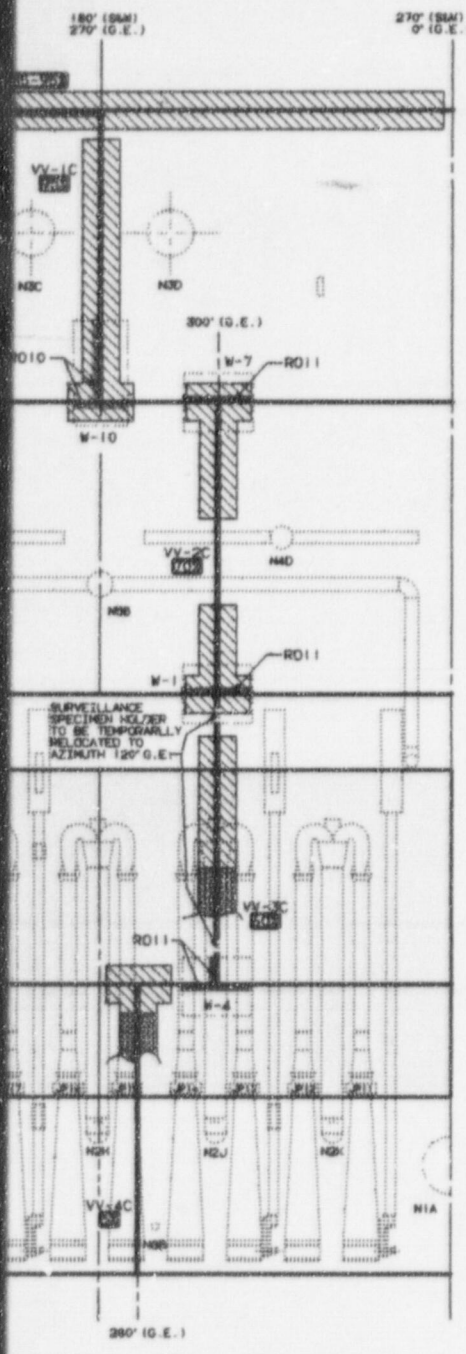


TABLE 1 - PREVIOUS OD INSPECTION

WELD NUMBER	WELD LENGTH (IN)	ACTUAL WELD LENGTH O.D. OBTAINED			
		RO8(1988)	RO9(1990)	RO10(1992)	RO11(1995)
VC-F-1	686.3(ID) 730.4(OD)	-	-	-	50"
VC-1-2	686.3(ID) 730.4(OD)	-	(4)162°TOP/145°BOT	44"	38"
VC-2-3	686.3(ID) 730.4(OD)	(5)36"	-	36"	38"
VC-3-4	686.3(ID) 730.4(OD)	(5)37"	-	-	73"
VV-1A	150	-	(1)150"	-	-
VV-1B	150	-	(2)150"	-	-
VV-1C	150	-	-	52"	-
VV-2A	150	(5)14"	-	-	-
VV-2B	150	-	-	10"	-
VV-2C	150	-	-	-	-
VV-3A	150	(5)33"	-	-	-
VV-3B	150	-	-	-	16"
VV-3C	150	-	-	-	17.5"
VV-4A	150	-	(3)56"	-	-
VV-4B	150	-	-	-	-
VV-4C	150	-	-	-	-

TOTAL VERTICAL WELDS (EXISTING TOOLING ESTIMATE)	=	55%
TOTAL VERTICAL WELDS (NEW TOOLING ESTIMATE)	≥	80%

TABLE 2 - DETAILED VERTICAL WELD COVERAGE - ESTIMATE VENDOR 2 (EXISTING TOOLING)

WELD I.D.	IDENTIFICATION	ESTIMATE EXAM COVERAGE(%)	OBSTRUCTION COMMENTS
VC-F-1		-	
VV-1A	UPPER SHELL @ 30°	90	LIMITED BY FLANGE TAPER AND/OR STEAM DRYER BRACKET
VV-1B	UPPER SHELL @ 150°	90	LIMITED BY FLANGE TAPER AND/OR STEAM DRYER BRACKET
VV-1C	UPPER SHELL @ 270°	95	LIMITED BY FLANGE TAPER
VV-2A	UPPER INTERMEDIATE SHELL @ 60°	70	LIMITED BY F.W. SPARGER AND C.S. PIPING
VV-2B	UPPER INTERMEDIATE SHELL @ 180°	15	LIMITED BY F.W. SPARGER, C.S. PIPING AND DRYER GUIDE ROD
VV-2C	UPPER INTERMEDIATE SHELL @ 300°	70	LIMITED BY F.W. SPARGER AND C.S. PIPING
VV-3A	LOWER INTERMEDIATE SHELL @ 60°	65	LIMITED BY JP RISER BRACKET, & POSSIBLY TIE-ROD SEISMIC SUPPORT
VV-3B	LOWER INTERMEDIATE SHELL @ 180°	70	LIMITED BY C.S. DOWNCOMER PIPING
VV-3C	LOWER INTERMEDIATE SHELL @ 300°	60	LIMITED BY JP RISER BRACKET, SURVEILLANCE CAPSULE BRACKETS, AND POSSIBLY TIE-ROD SEISMIC SUPPORT
VV-4A	LOWER SHELL @ 40°	5	LIMITED BY JET PUMP RESTRAINER BRACKET
VV-4B	LOWER SHELL @ 160°	20	LIMITED BY JET PUMP RESTRAINER BRACKET
VV-4C	LOWER SHELL @ 280°	5	LIMITED BY JET PUMP RESTRAINER BRACKET

TABLE 3 - BELTLINE VERTICAL WELD COVERAGE - ESTIMATE VENDOR 2 (EXISTING TOOLING)

WELD NUMBER	WELD LENGTH IN BELTLINE REGION	PROJECTED ID EXAM(RO14)		PRIOR OD EXAM(APPROX.)		TOTAL CUMULATIVE EXAM(APPROX.) (ID+OD)	
	INCHES	INCHES	%	INCHES	%	INCHES	%
VV-3A	112	56	50	16.5[NW]	15[NW]		
VV-3B	112	112	100	16	14		
VV-3C	112	56	50	17.5	16		
VV-4A	56	5.6	10	6	11		
VV-4B	56	1 SIDE SCAN	40	0	0		
VV-4C	56	5.6	10	0	0		

TOTAL BELTLINE VERTICAL WELDS (EXISTING TOOLING ESTIMATE)	=	51%
TOTAL BELTLINE VERTICAL WELDS (NEW TOOLING ESTIMATE)	=	80%-90%

NOTES:
(1) RECORDED ONE SPOT INDICATION AT 0° LONGITUDINAL AND AT 48° SHEAR WAVE. NO MEASURABLE LENGTH OR WIDTH
(2) RECORDED TWO SPOTS INDICATION AT 0° LONGITUDINAL. NO MEASURABLE LENGTH OR WIDTH.
(3) THE CLOCKWISE SIDE OF THE WELD DID NOT RECEIVE FULL ASME CODE VOLUME COVERAGE.
(4) RECORDED A SINGLE SPOT INDICATION AT 0° HAZ SCAN AT MID-WALL WITH ESSENTIALLY NO LENGTH OR THRU WALL DEPTH.
(5) INCOMPLETE SCAN.
(6) UT 2-3% OF CIRCUMFERENTIAL WELDS AT INTERSECTION WITH EACH VERTICAL WELD AS SHOWN.
(7) [ ] % ESTIMATED I.D. COVERAGE - VENDOR 2
(8) LEGEND: ESTIMATED SCANN COVERAGE WITH EXISTING TOOLING
ADDITIONAL COVERAGE IF NEW PROPOSED TOOLING IS FEASIBLE.

9908100183-03

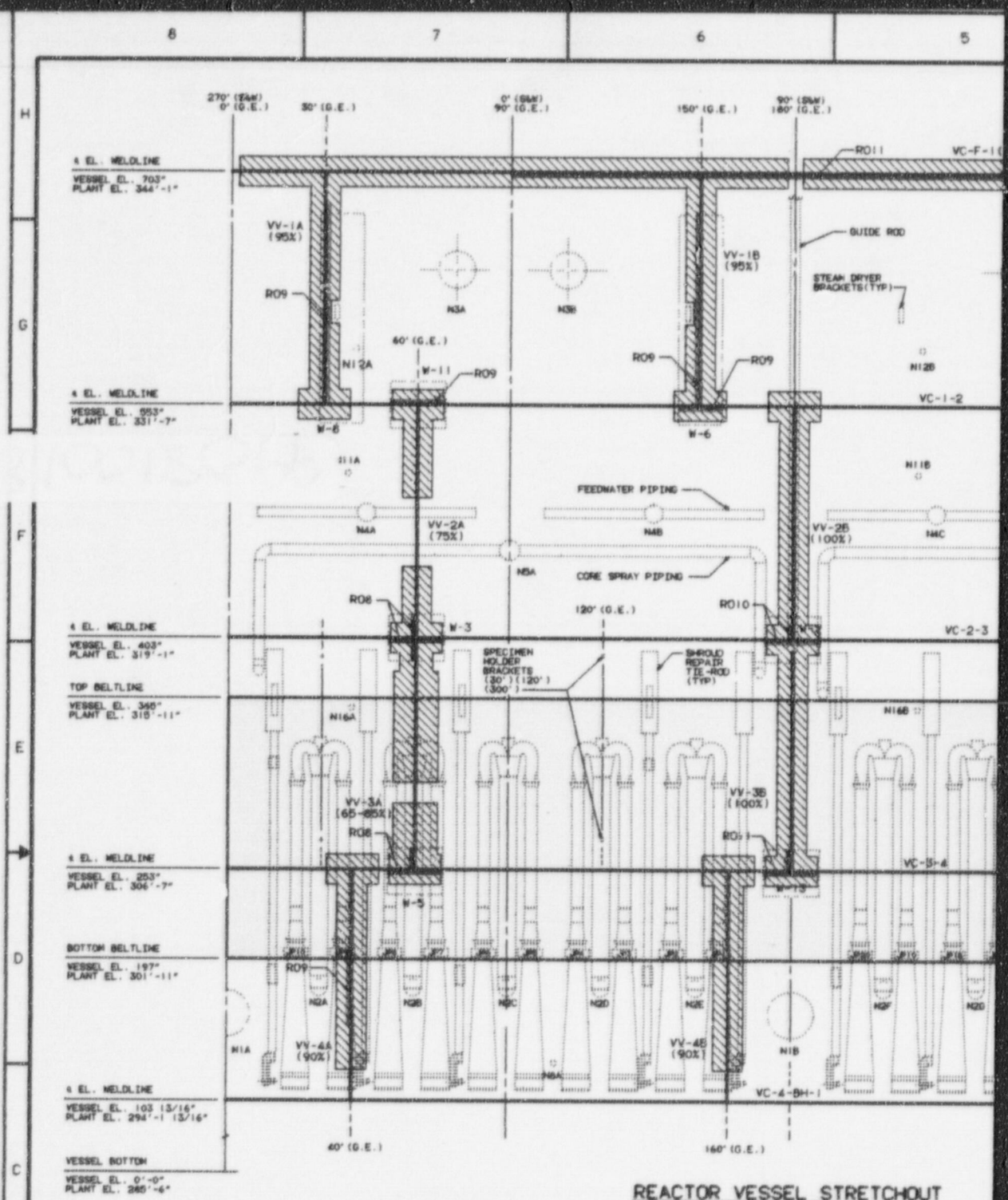
JAMES A. FITZPATRICK
NUCLEAR POWER PLANT

RPV SHELL WELD INSPECTION COVERAGE - VENDOR 2

New York Power Authority

SCALE NTS
DWG NO VENDOR 2
REV

REVISIONS
REV | DATE | DESCRIPTION | DRN | CHK | EE | MFY | APP



REACTOR VESSEL STRETCHOUT
(FROM INSIDE LOOKING OUT)

GENERAL NOTES:

- ESTIMATED BELTLINE AND TOTAL VERTICAL EXAM COVERAGE = 85-90% (SEE TABLE 2 WITH NOTES)
- PROPOSED NEW TOOLING - FLEXIBLE MAST, TITANIUM S.S. LINKS, MAGNETIC WHEELS AND TELESCOPIC ARM WITH EITHER UT TRANSDUCER OR PHASE ARRAY. ARM HAS 20" LATERAL MOTION.

SCHEDULE:

- REQUIRES 12-18 MONTHS INCLUDING TOOLING DEVELOPMENT AND QUALIFICATION, AFTER CONTRACT AWARD.

ADVANTAGES (VENDOR 1):

- MAY BE USED BY SAME CREW PE
- RESPECTABLE EXAM COVERAGE

DISADVANTAGES (VENDOR

- NEW TOOLING - WOULD REQUIRE

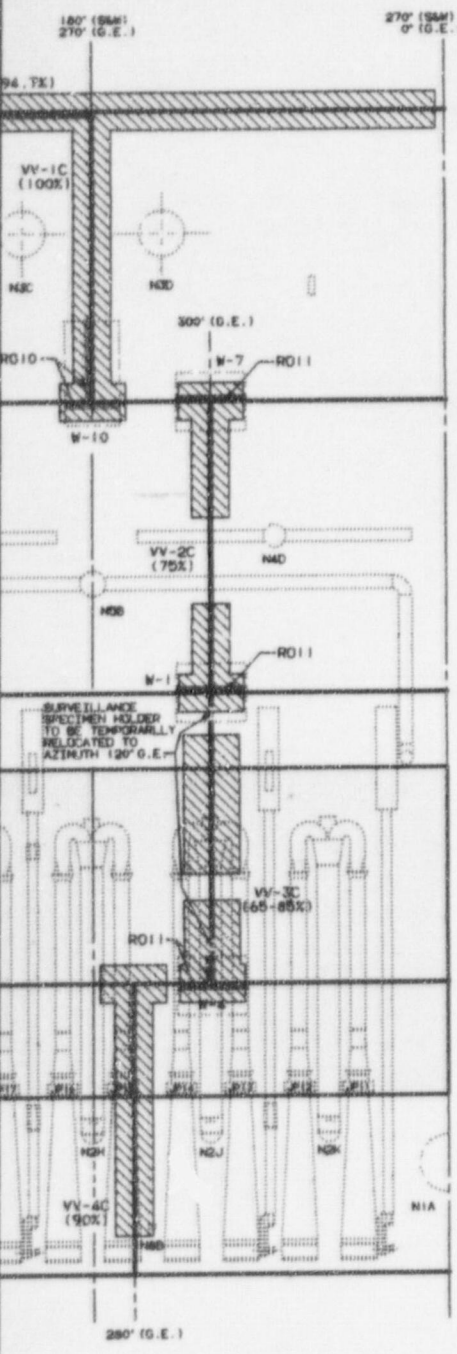


TABLE 1 - PREVIOUS OD INSPECTION

WELD NUMBER	WELD LENGTH (IN)	ACTUAL WELD LENGTH O.D. OBTAINED			
		RO8(1988)	RO9(1990)	RO10(1992)	RO11(1995)
VC-F-1	686.3(ID) 730.4(OD)	-	-	-	50%
VC-1-2	686.3(ID) 730.4(OD)	-	(4)162°TOP/145°BOT	44°	36°
VC-2-3	686.3(ID) 730.4(OD)	(5)36°	-	36°	38°
VC-3-4	686.8(ID) 720.4(OD)	(5)37°	-	-	73°
VV-1A	150	-	(1)150°	-	-
VV-1B	150	-	(2)150°	-	-
VV-1C	150	-	-	52°	-
VV-2A	150	(5)14°	-	-	-
VV-2B	150	-	-	10°	-
VV-2C	150	-	-	-	-
VV-3A	150	(5)33°	-	-	-
VV-3B	150	-	-	-	16°
VV-3C	150	-	-	-	17.5°
VV-4A	150	-	(3)56°	-	-
VV-4B	150	-	-	-	-
VV-4C	150	-	-	-	-

TABLE 2 - DETAILED WELD COVERAGE - ESTIMATE

WELD I.D.	ESTIMATE EXAM COVERAGE(%)	OBSTRUCTION COMMENTS
VC-F-1	94.7	GUIDE ROD @ 0° & 180°
VV-1A	95	STEAM DRYER BRACKET
VV-1B	95	STEAM DRYER BRACKET
VV-1C	100	NONE
VV-2A	75	FW SPARGER, CS PIPING
VV-2B	100	GUIDE ROD @ 180°
VV-2C	75	FW SPARGER, CS PIPING
VV-3A	65-85	JP RISER BRACE, SHROUD REPAIR
VV-3B	100	GUIDE ROD @ 180°
VV-3C	65-85	JP RISER BRACE, SURV. SPEC.
VV-4A	90	SHROUD REPAIR, JP RISER
VV-4B	90	SHROUD REPAIR, CS DOWNC.
VV-4C	90	JP RISER, MANIPULATOR LOWER SCAN LIMIT
TOTAL BELTLINE AND VERTICAL WELDS(ESTIMATED)	*	85-90%

NOTES:
(1) RECORDED ONE SPOT INDICATION AT 0° LONGITUDINAL AND AT 45° SHEAR WAVE. NO MEASURABLE LENGTH OR WIDTH
(2) RECORDED TWO SPOTS INDICATION AT 0° LONGITUDINAL. NO MEASURABLE LENGTH OR WIDTH.
(3) THE CLOCKWISE SIDE OF THE WELD DID NOT RECEIVE FULL ASME CODE VOLUME COVERAGE.
(4) RECORDED A SINGLE SPOT INDICATION AT 0° HAZ SCAN AT MID-WALL WITH ESSENTIALLY NO LENGTH OR THRU WALL DEPTH.
(5) INCOMPLETE SCAN.
(6) UT 2-3% OF CIRCUMFERENTIAL WELDS AT INTERSECTION WITH EACH VERTICAL WELD AS SHOWN.
(7) ( ) = % ESTIMATED I.D. COVERAGE - VENDOR 1.

RFORMING IVVI/ REFUEL OPERATIONS.

9908100183-04

1):
TESTING AND QUALIFICATION

REV NO	DATE	DESCRIPTION	DRN	CHK	RE	MFY	APP

REVISIONS

JAMES A. FITZPATRICK
NUCLEAR POWER PLANT

RPV SHELL WELD INSPECTION COVERAGE - VENDOR 1

New York Power Authority

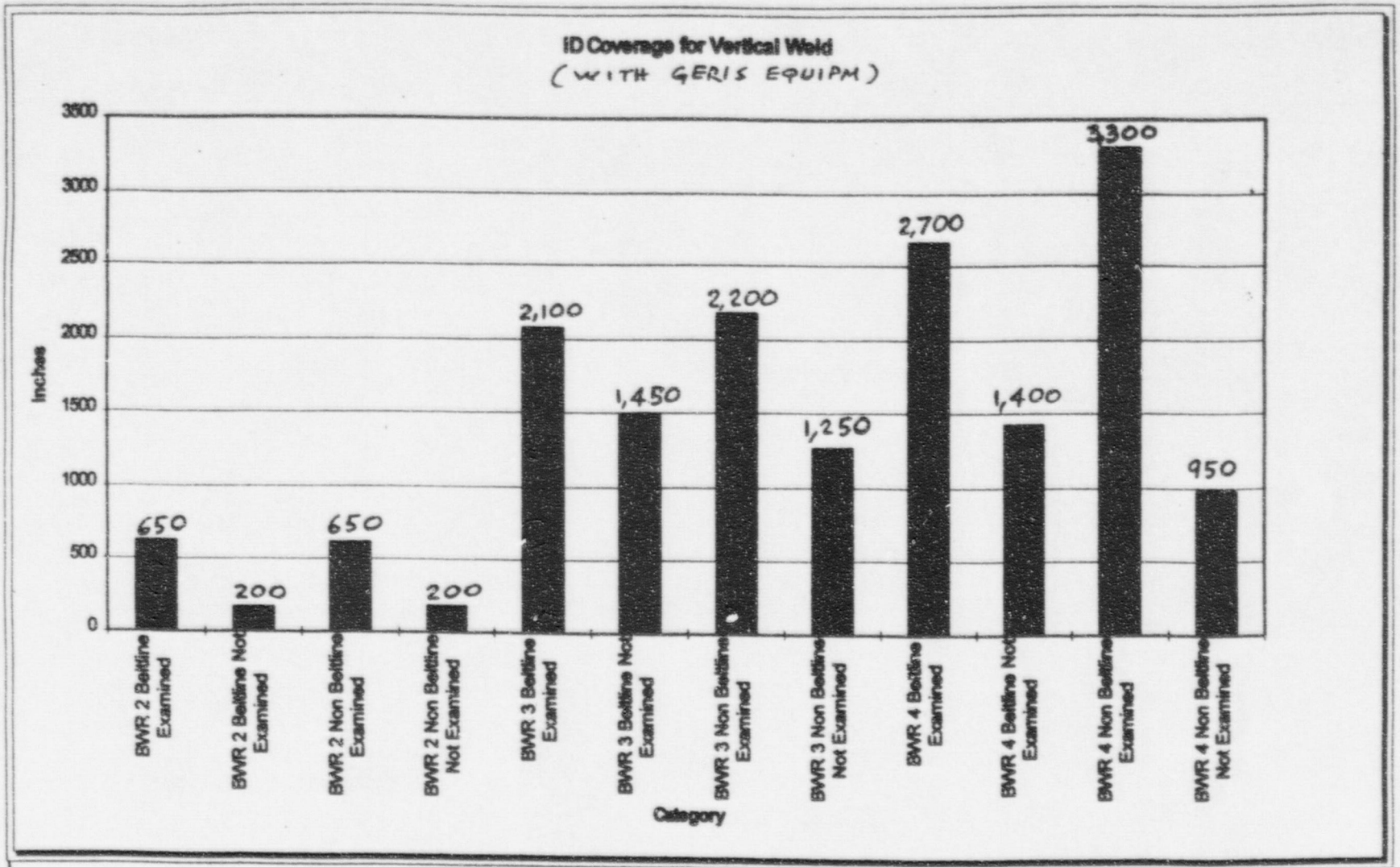
SCALE NTS
DWG NO VENDOR 1
REV

Attachment I to JPN-99-026

ENCLOSURE 2

GENERAL ELECTRIC DATA INDUSTRY GERIS EXAM COVERAGE

NEW YORK POWER AUTHORITY
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
DOCKET NO. 50-333
DPR-59



FLEET VERTICAL WELDS		BWR-4 VERTICAL WELDS	
TOTAL WELDS : 17,050 IN TOTAL EXAMINED : 11,600 IN	68%	TOTAL WELDS : 8,350 IN TOTAL EXAMINED : 6,000 IN	72%
TOTAL BELTLINE : 8,500 IN TOTAL EXAMINED : 5,450 IN	64%	TOTAL BELTLINE : 4,100 IN TOTAL EXAMINED : 2,700 IN	66%

ENCLOSURE 3

JAFNPP REACTOR COOLANT CHEMISTRY DATA

NEW YORK POWER AUTHORITY
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
DOCKET NO. 50-333
DPR-59

ENCLOSURE 3

JAMES A. FITZPATRICK NUCLEAR POWER PLANT
REACTOR COOLANT CHEMISTRY
1989 - 1998
(>10% power)

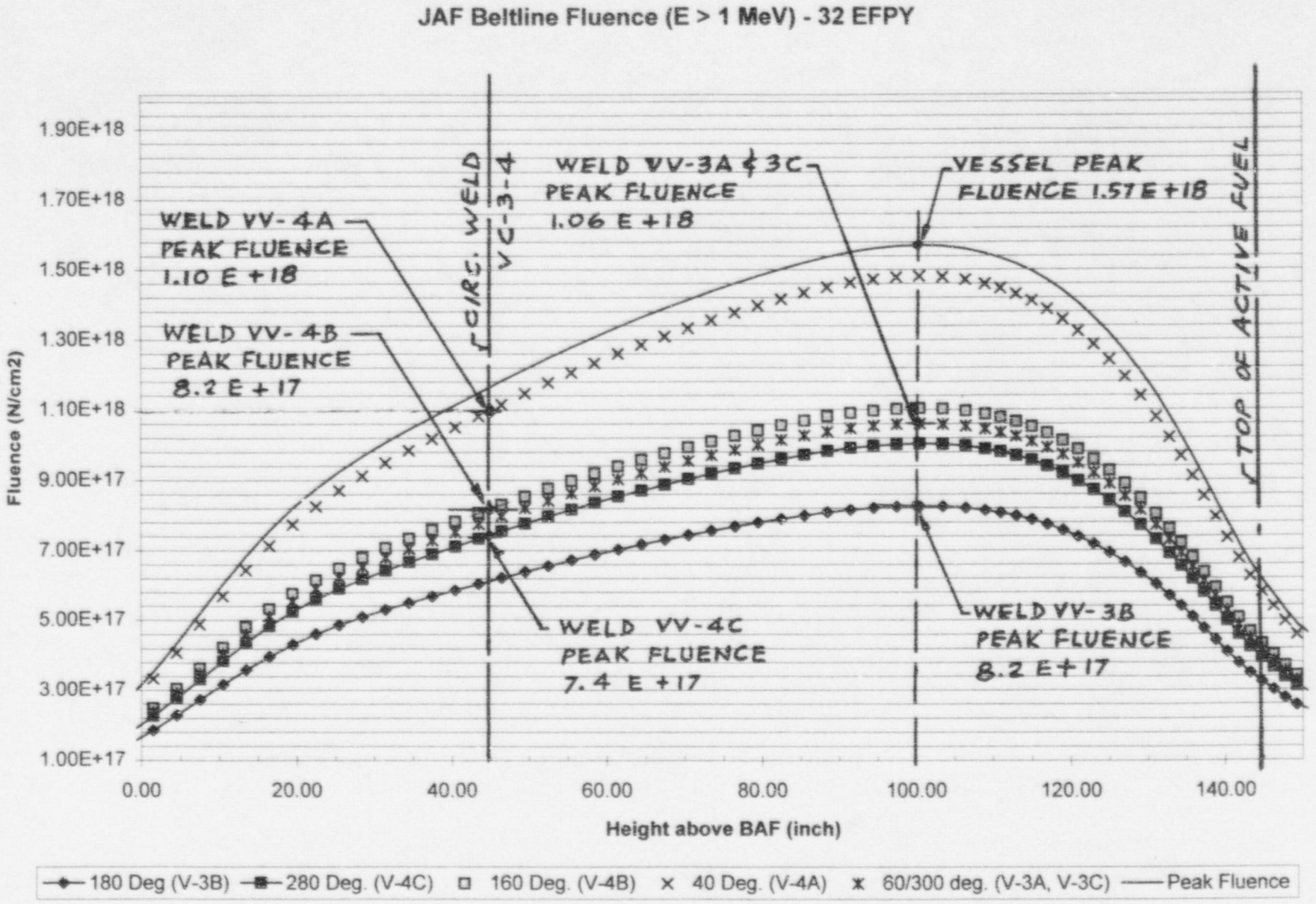
YEAR	CONDUCTIVITY (μS/cm)	EPRI LIMIT [1] (μS/cm)	CHLORIDE (ppb)	EPRI LIMIT [1] (ppb)	SULFATE (ppb)	EPRI LIMIT [1] (ppb)
1998	0.067	0.30	0.5	<5	2.5	<5
1997	0.066	0.30	0.5	<5	2.6	<5
1996	0.071	0.30	0.5	<5	3.4	<5
1995	0.074	0.30	1	<5	4.2	<5
1994	0.095	0.30	2.3	<5	3.9	<5
1993	0.100	0.30	4.4	<20	6.5	<20
1992	Note:	Plant was	Shutdown	All of	1992	
1991	0.112	0.30	1.8	<20	5.6	<20
1990	0.310	0.30	3.5	<20	17	<20
1989	0.271	0.30	4.1	<20	9.2	<20

Note: [1] - EPRI BWR CHEMISTRY GUIDELINES -1996 Revision. EPRI TR-103515-R1 (BWRVIP-29)

August 1999

ENCLOSURE 4

JAFNPP BELT-LINE WELD FLUENCE -- 32 EFPY

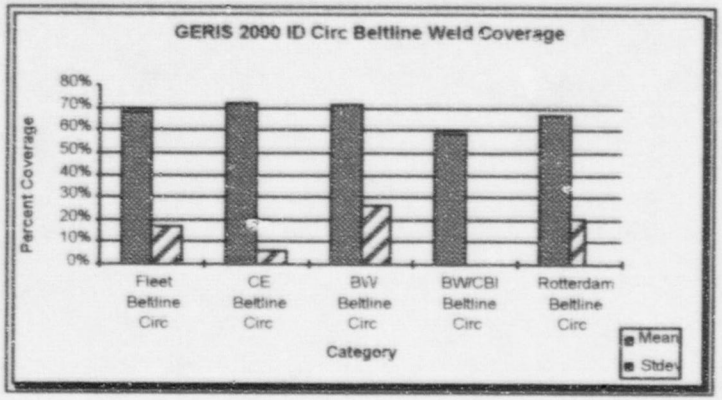

JAF Beltline Fluence (E > 1 MeV) - 32 EFPY
Fluence (N/cm2)
1.90E+18
1.70E+18
1.50E+18
1.30E+18
1.10E+18
9.00E+17
7.00E+17
5.00E+17
3.00E+17
1.00E+17
0.00
20.00
40.00
60.00
80.00
100.00
120.00
140.00
Height above BAF (inch)
CIRC. WELD VC-3-4
WELD VV-3A & 3C PEAK FLUENCE 1.06 E+18
VESSEL PEAK FLUENCE 1.57 E+18
TOP OF ACTIVE FUEL
WELD VV-4A PEAK FLUENCE 1.10 E+18
WELD VV-4B PEAK FLUENCE 8.2 E+17
WELD VV-4C PEAK FLUENCE 7.4 E+17
WELD VV-3B PEAK FLUENCE 8.2 E+17
180 Deg (V-3B)
280 Deg. (V-4C)
160 Deg. (V-4B)
40 Deg. (V-4A)
60/300 deg. (V-3A, V-3C)
Peak Fluence

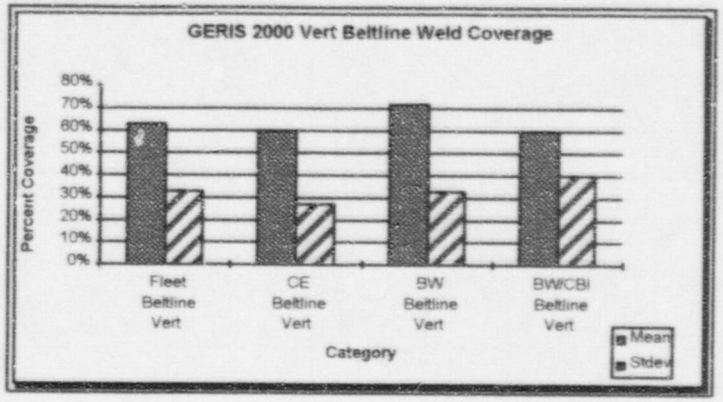
Attachment I to JPN-99-026

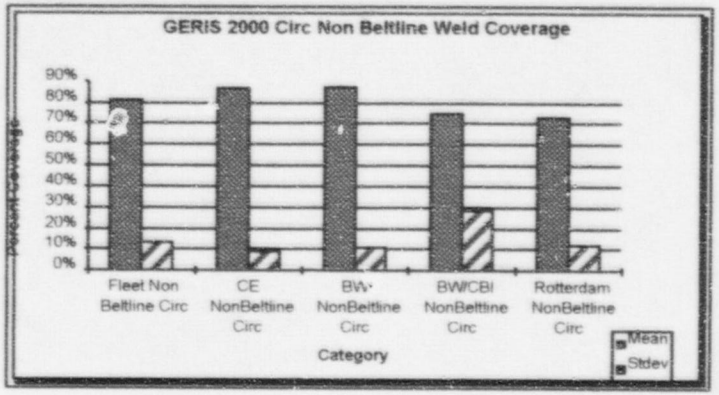
ENCLOSURE 5

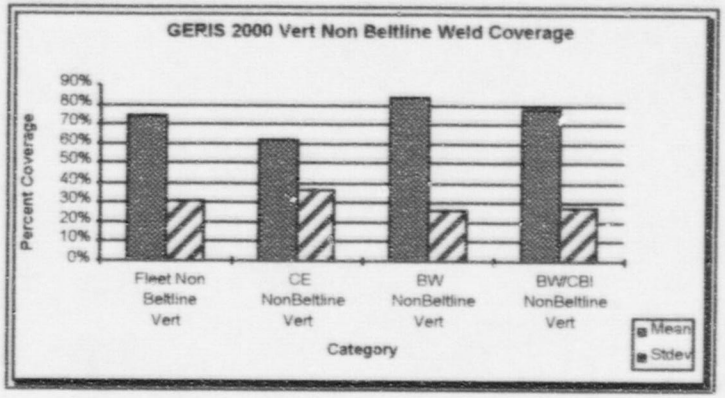
GENERAL ELECTRIC DATA GERIS 2000 WELD COVERAGE GRAPHS

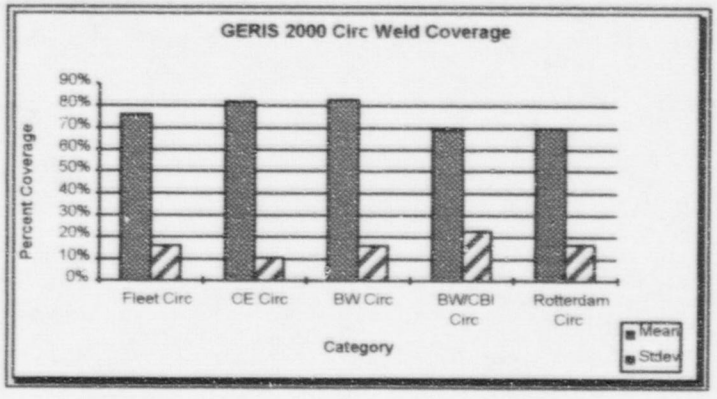
NEW YORK POWER AUTHORITY
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
DOCKET NO. 50-333
DPR-59

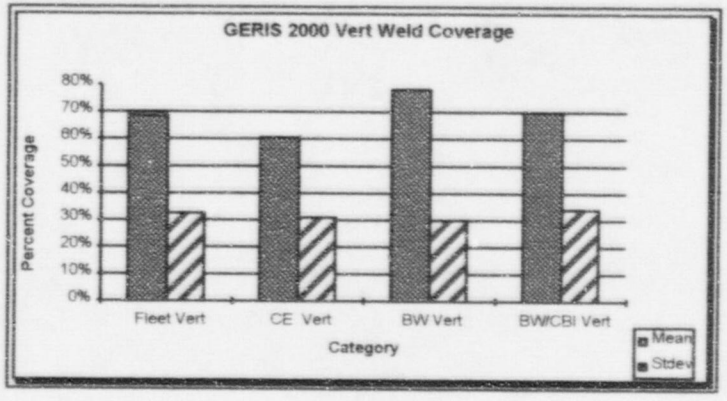

GERIS 2000 ID Circ Beltline Weld Coverage
Percent Coverage
80%
70%
60%
50%
40%
30%
20%
10%
0%
Fleet Beltline Circ
CE Beltline Circ
BW Beltline Circ
BW/CBI Beltline Circ
Rotterdam Beltline Circ
Category
Mean
Stdev


GERIS 2000 Vert Beltline Weld Coverage
Percent Coverage
80%
70%
60%
50%
40%
30%
20%
10%
0%
Fleet Beltline Vert
CE Beltline Vert
BW Beltline Vert
BW/CBI Beltline Vert
Category
Mean
Stdev


GERIS 2000 Circ Non Beltline Weld Coverage
Percent Coverage
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Fleet Non Beltline Circ
CE NonBeltline Circ
BW NonBeltline Circ
BW/CBI NonBeltline Circ
Rotterdam NonBeltline Circ
Category
Mean
Stdev

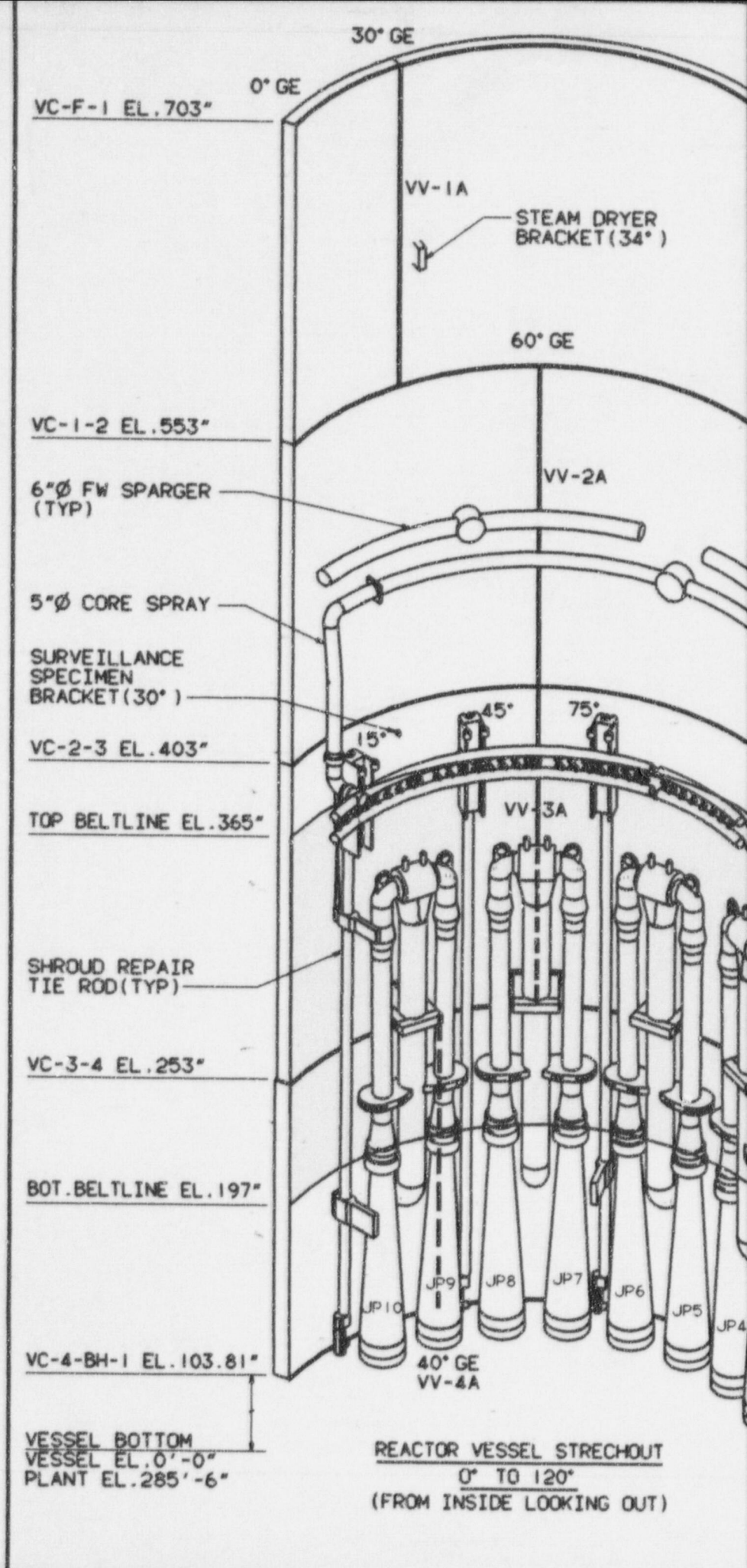

GERIS 2000 Vert Non Beltline Weld Coverage
Percent Coverage
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Fleet Non Beltline Vert
CE NonBeltline Vert
BW NonBeltline Vert
BW/CBI NonBeltline Vert
Category
Mean
Stdev


GERIS 2000 Circ Weld Coverage
Percent Coverage
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Fleet Circ
CE Circ
BW Circ
BW/CBI Circ
Rotterdam Circ
Category
Mean
Stdev


GERIS 2000 Vert Weld Coverage
Percent Coverage
80%
70%
60%
50%
40%
30%
20%
10%
0%
Fleet Vert
CE Vert
BW Vert
BW/CBI Vert
Category
Mean
Stdev

ENCLOSURE 6

JAFNPP RPV STRETCHOUT WITH INTERNAL OBSTRUCTION AND CLEARANCE DIAGRAMS (SH. 1-3)



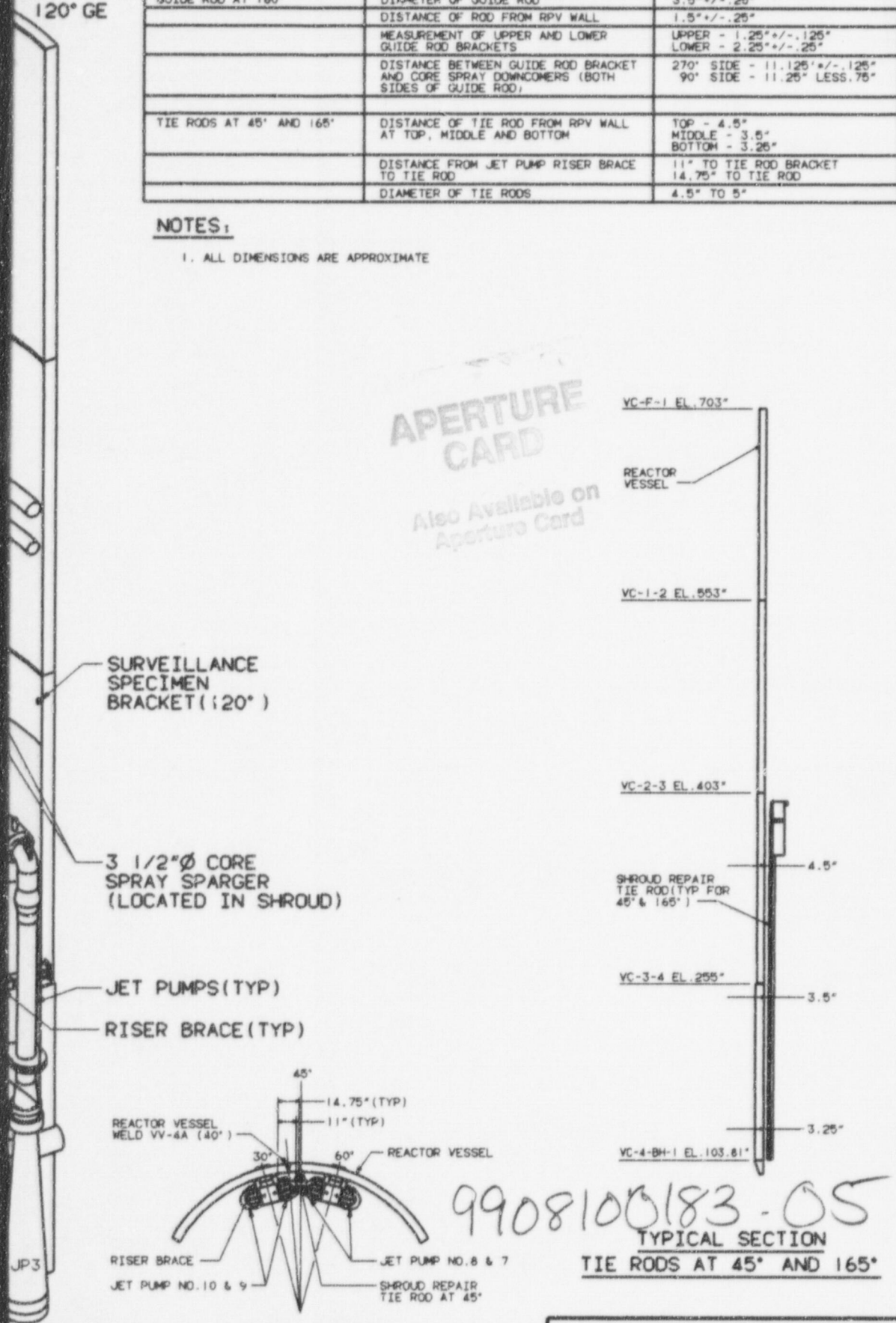
REACTOR VESSEL STRECHOUT
0° TO 120°
(FROM INSIDE LOOKING OUT)

COMMENT=
GROUP=JMZ SUBGRP=WRK SCALE= 0.0175 DRAWID=PJAF RV 0-120 PAR LAST FILE=99204 07:23
DATE= 7/23/99 TIME=07.24 ACCESS=NONE FMT=
LOGON ID=RICHARDH
PLOT= 3 MULTICOPY

INSPECTION AREA	CRITERIA	RESULTS
GUIDE ROD AT 180°	DIAMETER OF GUIDE ROD	3.5"+/-.25"
	DISTANCE OF ROD FROM RPV WALL	1.5"+/-.25"
	MEASUREMENT OF UPPER AND LOWER GUIDE ROD BRACKETS	UPPER - 1.25"+/-.125" LOWER - 2.25"+/-.25"
	DISTANCE BETWEEN GUIDE ROD BRACKET AND CORE SPRAY DOWNCOMERS (BOTH SIDES OF GUIDE ROD)	270° SIDE - 11.125"+/-.125" 90° SIDE - 11.25" LESS.75"
TIE RODS AT 45° AND 165°	DISTANCE OF TIE ROD FROM RPV WALL AT TOP, MIDDLE AND BOTTOM	TOP - 4.5" MIDDLE - 3.5" BOTTOM - 3.25"
	DISTANCE FROM JET PUMP RISER BRACE TO TIE ROD	11" TO TIE ROD BRACKET 14.75" TO TIE ROD
	DIAMETER OF TIE RODS	4.5" TO 5"

NOTES:

1. ALL DIMENSIONS ARE APPROXIMATE

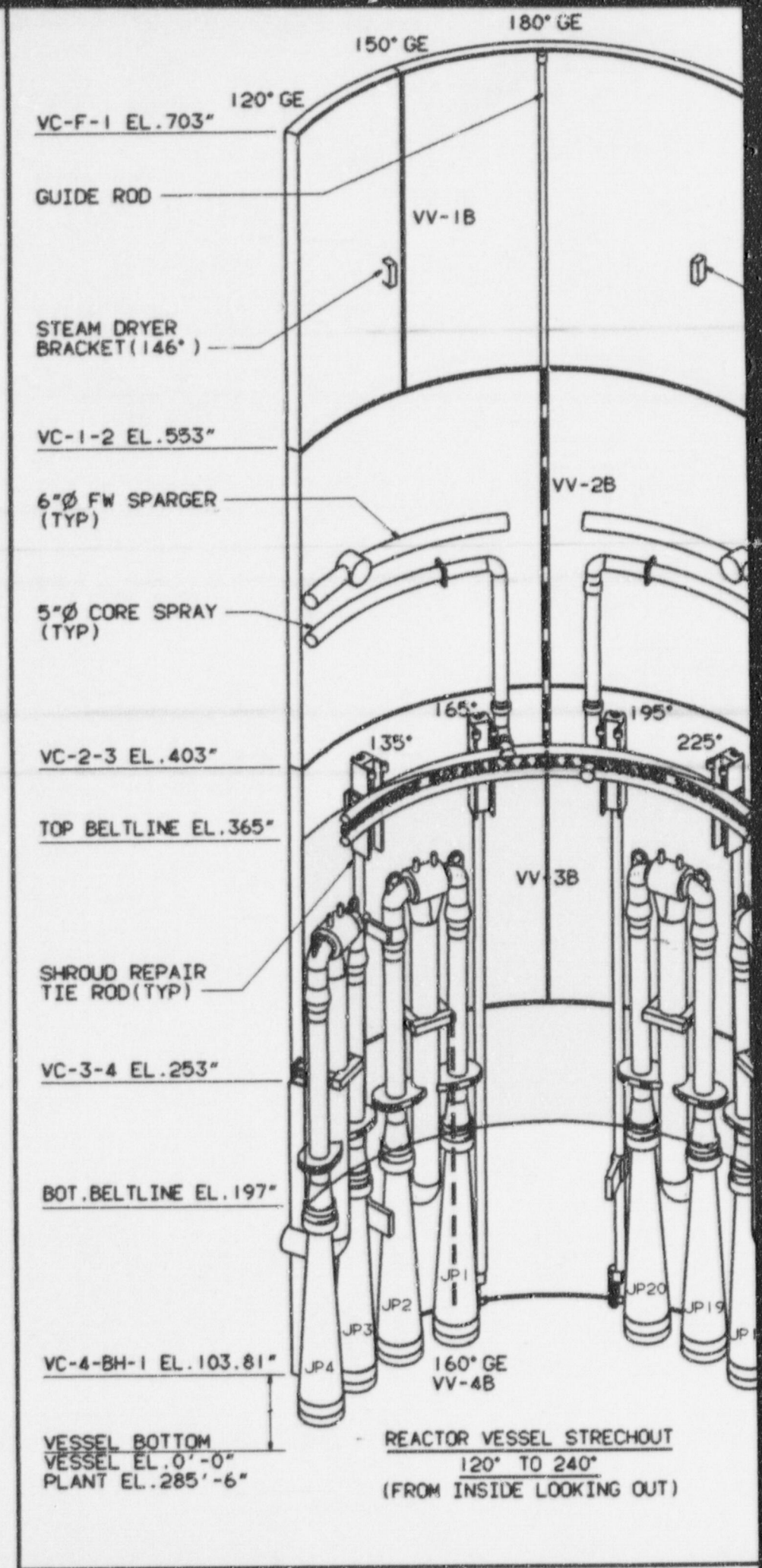


PART PLAN
SHROUD REPAIR TIE ROD(45°)
AND JET PUMP RISER BRACE

9908100183-05

TYPICAL SECTION
TIE RODS AT 45° AND 165°

NEW YORK POWER AUTHORITY
JAF - NUCLEAR POWER PLANT
REACTOR VESSEL STRECHOUT
WITH INTERNAL OBSTRUCTIONS
AND CLEARANCE DIAGRAMS
SHEET 1 OF 3
NTS



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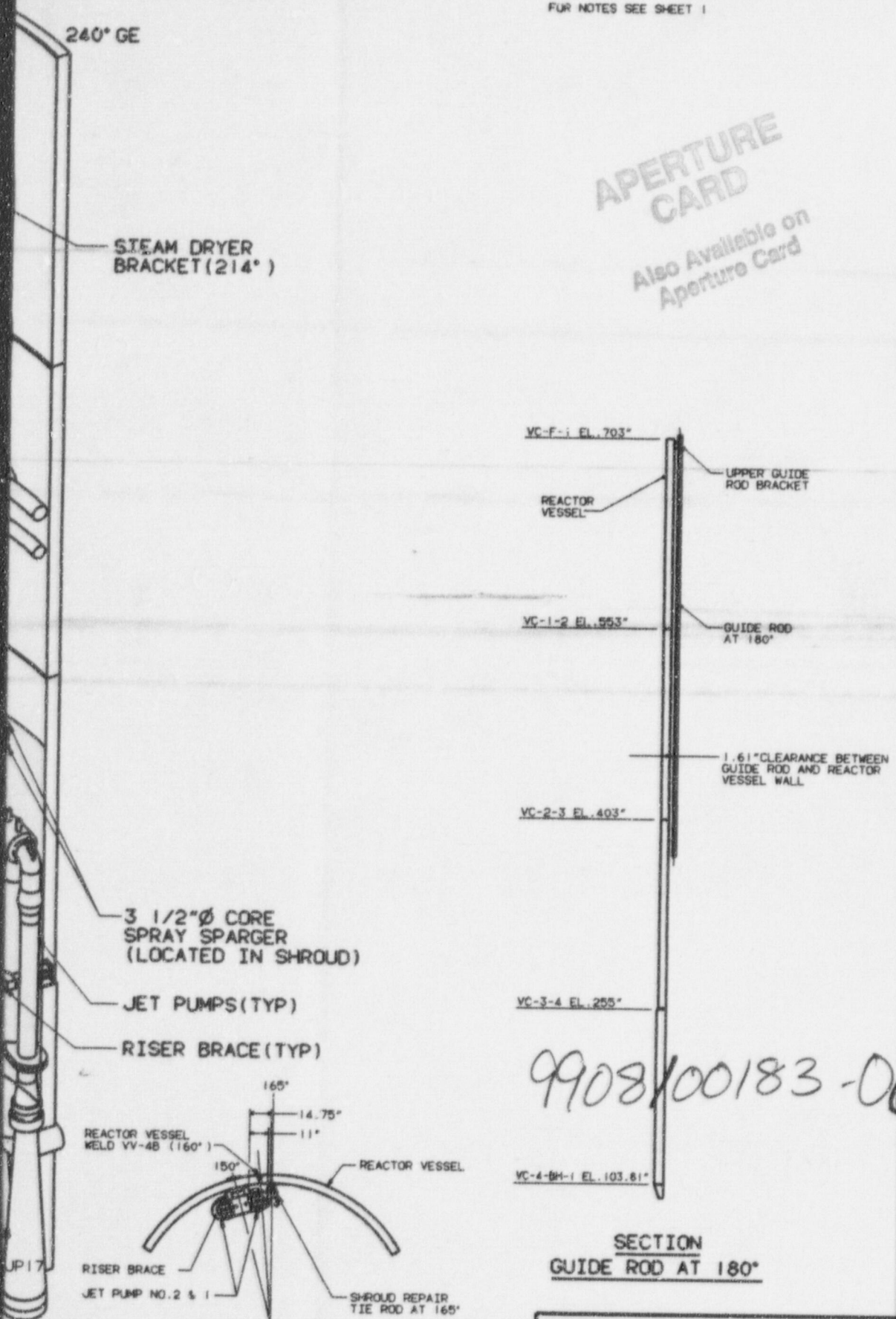
LOGON ID=RICHARDH
PLOT= 2 MULTICOPY

FOR NOTES SEE SHEET 1

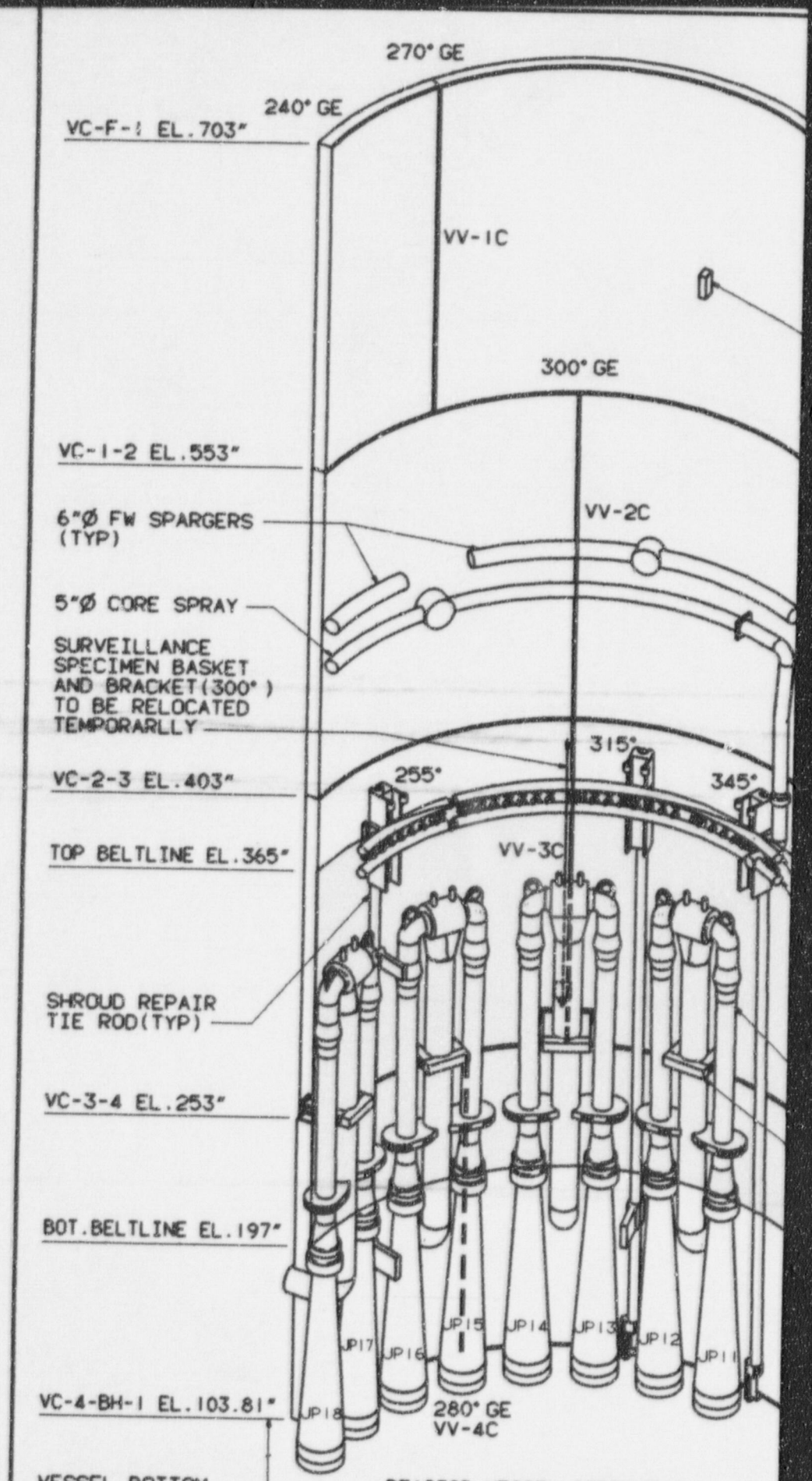


SECTION
GUIDE ROD AT 180°

PART PLAN
SHROUD REPAIR TIE ROD (165°)
AND JET PUMP RISER BRACE

9908100183-06

NEW YORK POWER AUTHORITY
JAF - NUCLEAR POWER PLANT
REACTOR VESSEL STRECHOUT
WITH INTERNAL OBSTRUCTIONS
AND CLEARANCE DIAGRAMS
SHEET 2 OF 3
NTS



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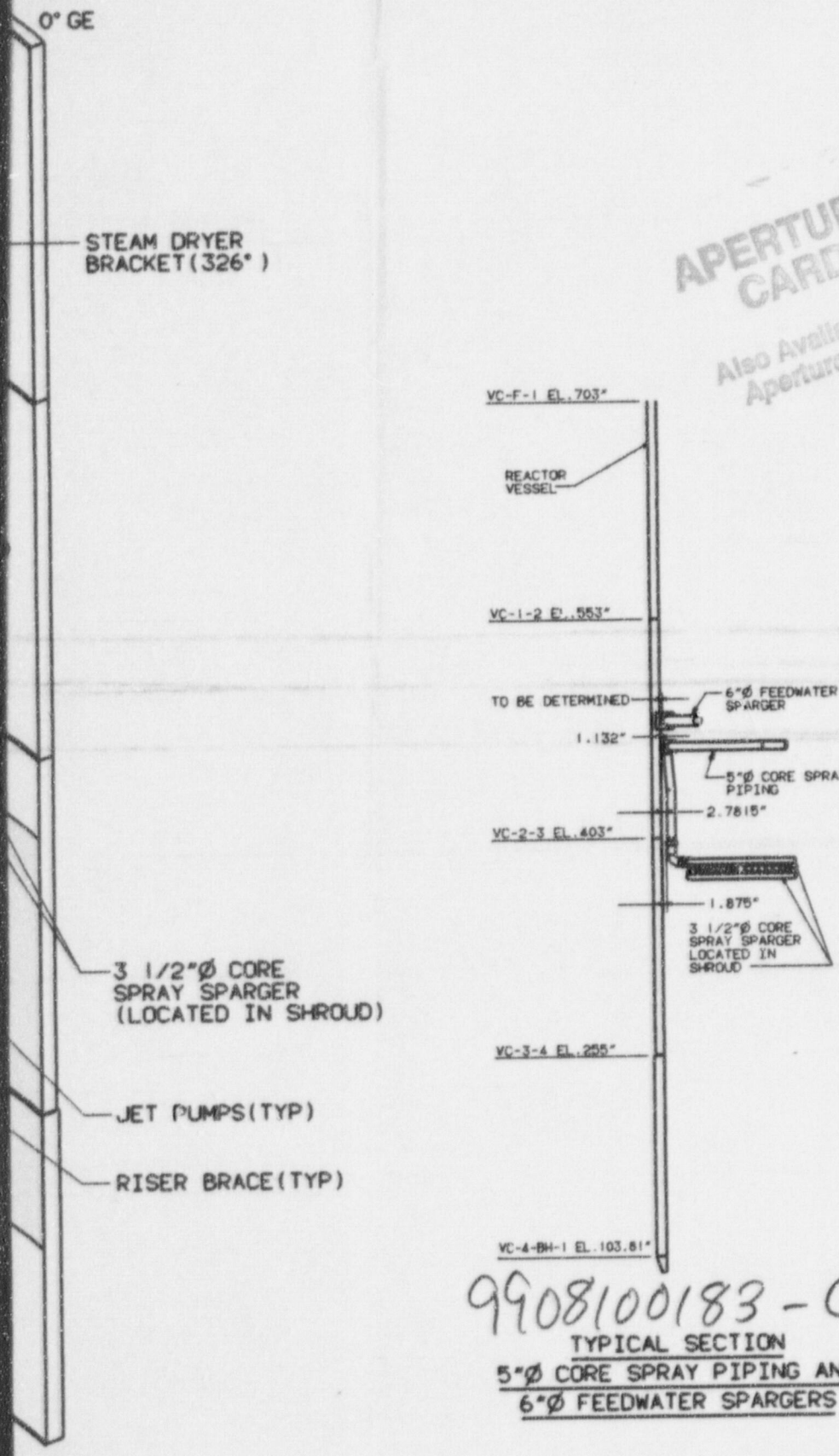
LOGON ID=RICHARDH
PLOT= 2 MULTICOPY

FOR NOTES SEE SHEET 1



TYPICAL SECTION
5"Ø CORE SPRAY PIPING AND
6"Ø FEEDWATER SPARGERS

NEW YORK POWER AUTHORITY
JAF - NUCLEAR POWER PLANT
REACTOR VESSEL STRECHOUT
WITH INTERNAL OBSTRUCTIONS
AND CLEARANCE DIAGRAMS
SHEET 3 OF 3
NTS

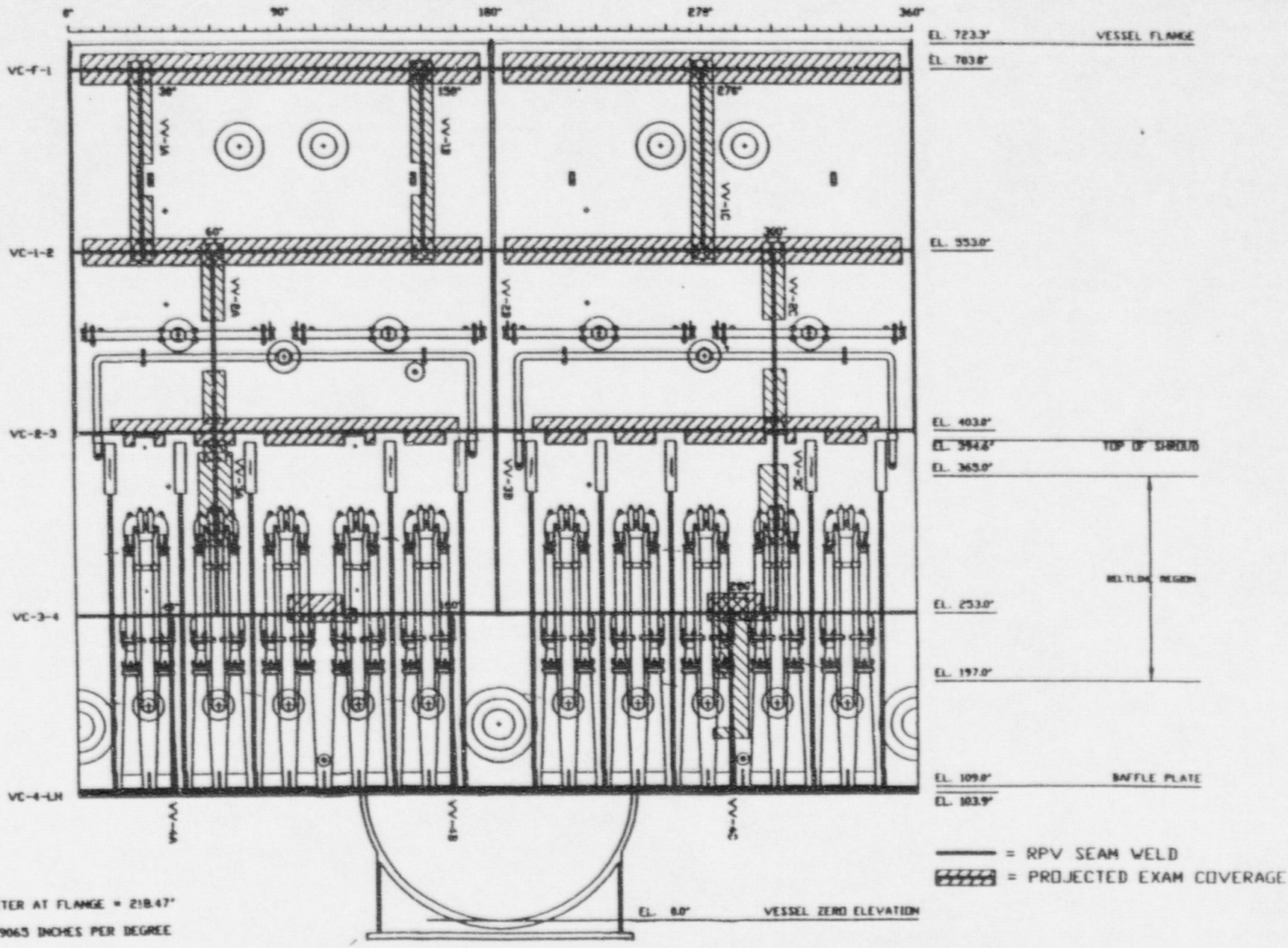
ENCLOSURE 7

GENERAL ELECTRIC PREPARED PROJECTED EXAMINATION COVERAGE FOR JAFNPP (SH. 1-2)

TABLE 1 PROJECTED WELD EXAMINATION SHROUD REPAIR IN PLACE

Weld ID	Weld Length (in)	Projected Exam Coverage (%)	Projected Exam Length (in)	Obstructions
WC-F-1	686.3	94.7	649.9	Guide Rod @ 0° and 180°
WC-1-2	686.3	94.7	649.9	Guide Rod @ 0° and 180°
WC-2-3	686.3	80.2	550.4	CS Downcom., Shroud Repair Surv. Spec.
WC-3-4	686.3	18.3	125.6	CS Downcom., Shroud Repair JP Riser Brace, Surv. Spec.
VV-1A	150	89.2	133.8	Steam Dryer Bracket
VV-1B	150	89.5	134.3	Steam Dryer Bracket
VV-1C	150	100	150	None
VV-2A	150	76.2	114.3	FW Sparger, CS Piping
VV-2B	150	0	0	Guide Rod @ 180°
VV-2C	150	76.2	114.3	FW Sparger, CS Piping
VV-3A	150	62.4	93.6	JP Riser Brace, Shroud Repair
VV-3B	150	0	0	Guide Rod @ 180°
VV-3C	150	41.9	62.9	JP Riser Brace, Surv. Spec.
VV-4A	150	0	0	Shroud Repair, JP Riser
VV-4B	150	0	0	Shroud Repair, CS Downc.
VV-4C	150	74.1	111.2	JP Riser, Manipulator Lower Scan Limit
TOTAL	4545	64	2890	

SHROUD REPAIR IN PLACE



REV	DATE	PREPARED	REVIEWED	INIT	APPROVED	INIT	PURPOSE
0	6-03-97	DHC/CHM	J. GILLIARD	JG	D. BRAGG	DB	

REFERENCE GE DRAWING NO. 197R564,
GE DWG NO. E-233-230, E-233-231, E-233-234, E-233-234, E-233-240

NOTE: THIS SKETCH IS FOR ISI PROGRAM USE ONLY AND SHALL NOT BE USED FOR FABRICATION/INSTALLATION	PROJECT GERIS 2000 J. A. FITZPATR	TITLE: FIGURE 1 FITZPATRICK PROJECTED EXAMINATION COVERAGE	SKETCH NO. F FIG1

Attachment II to JPN-99-026

Relief Request 19

Relief Request from ASME Section XI Code Regarding Inspection of Shell to Flange Weld

NEW YORK POWER AUTHORITY
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
DOCKET NO. 50-333
DPR-59

Relief Request 19
Relief Request from ASME Section XI Code Regarding
Inspection of Shell to Flange Weld

A. Component Identification:

The component for which relief is requested is the shell to flange weld, Examination Category B-A, Item Number B1.30 of IWB-2500, Table IWB-2500-1, ASME Section XI, 1989 Edition. (All future references to ASME Section XI requirements are taken from the 1989 Edition.)

B. Examination Requirements:

ASME Section XI, IWB-2420(a) requires the repetition of the sequence of component examinations which was established during the first inspection interval during successive intervals.

ASME Section XI, IWB-2500, Table IWB-2500-1, Examination Category B-A requires a volumetric examination of the shell to flange weld (Item B1.30) during the first inspection period of the interval and during each successive inspection interval.

C. Relief Requested:

Relief is requested from performing the code required volumetric examinations on the shell to flange weld during the first period of the third ten year inspection interval. Rather, the entire shell to flange weld examination will be deferred to no later than the third period of the inspection interval. The examination will be performed in conjunction with the RPV vertical weld inspections (Attachment 1).

D. Basis for Relief:

Pursuant to 10 CFR 50.55a(a)(3)(ii), relief is requested on the basis that the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

The third ten year Inservice Inspection (ISI) plan for the James A. FitzPatrick plant states that 50 percent of the shell to flange weld (Weld VC-F-1) will be inspected during the first inspection period and the remaining 50 percent will be inspected during the third period of the interval. This inspection schedule complies with the requirements of ASME Section XI, Table IWB-2500-1, Examination Category B-A, Item B1.30.

This relief request defers examination of the entire shell to flange weld until the third inspection period of the interval, in conjunction with the RPV vertical weld inspections. However, deferral of the entire exam to the third period does not follow the sequence of examinations followed during the previous intervals. Therefore, relief is also requested from section IWB-2420(a) of ASME, Section XI. This deferral will allow the inspection of the shell to flange weld to coincide with the augmented inspections of the reactor pressure vessel (RPV) shell welds. Performing the inspection of the shell to flange weld during the same outage as the RPV shell welds affords the following advantages.

- The inspection of the shell to flange weld, in conjunction with the inspection of the RPV shell welds, reduces the radiation exposure to plant workers. If the shell to flange weld is inspected as currently scheduled (50 percent during the first inspection period and 50

percent during the third period of the inspection interval), these examinations will be completed manually and estimates of total radiation exposure are approximately 2 person-Rem. If the inspection of the shell to flange weld is deferred until the latter portion of the interval, then the inspection can be done in conjunction with the RPV shell welds. As stated in Attachment 1, a remote controlled, automated tool will be used to examine the RPV shell welds from inside the refueling cavity. This automated tool can also be utilized to examine the shell to flange weld if it is examined during the same outage as the RPV shell welds. The use of this tool to inspect the entire shell to flange weld, rather than manually inspecting the welds during two different outages, is expected to reduce exposure by approximately 2 person-Rem.

- Use of the automated equipment to examine the shell to flange weld and the other RPV shell welds improves the reliability and reproducibility of examinations, and therefore provides reasonable assurance of the structural integrity of the shell to flange weld.

- The inspection of the entire shell to flange weld during the latter portion of the interval, in conjunction with the RPV shell welds, reduces the outage time and cost associated with this inspection. The automated tool will be inside the reactor cavity to inspect the RPV shell welds and can then be utilized to inspect the shell to flange weld with a minimal incremental impact on cost and outage schedule. In contrast, a manual inspection of the shell to flange weld during the first and third inspection periods would incur higher costs and have a greater impact on outage schedules. Specifically, it is estimated that use of the automated tool, rather than inspecting manually, will result in a two to three shift (24 – 36 hours) outage savings in critical path time.

In conclusion, deferral of the examination of the reactor vessel shell to flange weld to the end of the inspection interval will provide an acceptable level of safety and quality. JAF's shell to flange weld was manually examined during the second ten year interval with fifty percent of the examination completed in 1990 and fifty percent completed in 1995. These exams did not reveal any rejectable indications. Therefore, based upon a lack of any rejectable indications, deferral of the third interval exams until the third period does not constitute a safety hazard. Therefore, requiring a partial inspection of the flange weld during RO 14 would constitute an exposure, economic and schedule hardship without a compensating increase in quality or safety.

E. Alternative Examination(s):

JAF will perform the code required shell to flange exam using a remote controlled, automated inspection tool no later than the third period of the inspection period, in conjunction with the RPV shell welds.

F. Implementation Schedule:

This relief request, if approved, will be implemented during the current Inservice Inspection (ISI) interval for JAF. The Authority would like to use this relief in the upcoming refueling outage (RO 14), and therefore requests disposition of this relief request prior to December 15, 1999.