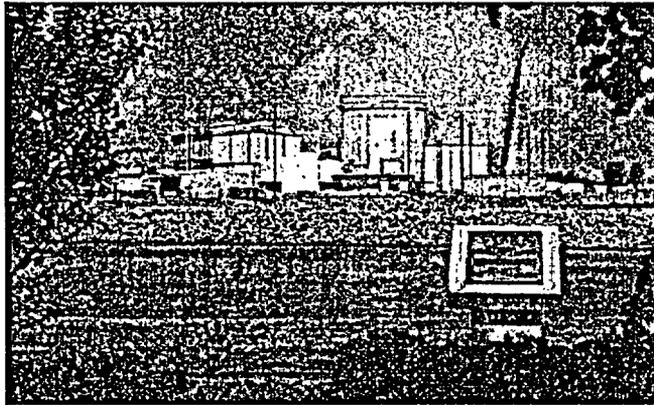


V. C. Summer Nuclear Station Reactor Vessel RF-14 ISI



VCS Participants

Ron Clary	Manager, Nuclear Licensing
Rob Sweet	Supervisor, Nuclear Licensing
Gil Williams	Supervisor, Design Engineering
Terry McAlister	Project Mgr, Planning and Scheduling



Technical Support-Westinghouse and EPRI Participants

Dave Kurek	WESDYNE
Warren Bamford	Westinghouse
Carl Latiolais	EPRI



Agenda

Introductory Remarks	Ron Clary
Current SER	Rob Sweet
RF-14 Relief Request*	Terry
McAlister	

* Specifically R/R number 20



Purpose of Meeting

- Discuss Relief Request # 20 which deals with inspections of dissimilar metal welds on the Reactor Vessel nozzle piping.
- Discuss Relief Requests #'s 15- 19, and 21 that deal with other 10 year ISI activities occurring during RF-14 at the discretion of the NRC representatives



Desired Meeting Results

- Relief Requests and associated urgency are clearly understood. NRC has adequate understanding of the proposed alternatives and adequacy of the proposed inspection
- NRC has adequate information relative to VCS plans for RF-14 to resolve the RF-13 SER



SER Expectations

- Review of SER requirements from RF-13
 - Operation was granted for one additional cycle without weld repair
 - SCE&G committed to performing an inservice inspection of the nozzles in accordance with ASME Section XI in RF 14
 - Inspection results will be submitted to the NRC
- Discuss NRC plans for issuing an SER after RF-14



RF-14 Strategy

- The examination of the Hot and Cold legs in RF-14 will consist of an Ultrasonic examination to the requirements of ASME Sec. XI, App. VIII including Supplement 10 as addressed by Relief Request # 20.
- This examination will satisfy the 10 Year ISI as well as the commitment for inspection of the welds addressed in our current SER for restart from RF-13.



RR-II-20

- Relief for examination of dissimilar metal welds as referenced in the ASME Code, Section XI, Appendix VIII, Supplement 10 is requested.



RR-II-20 (Cont'd)

- Code requirements
 - Process qualification specimen flaw requirements as specified by ASME Code, Section XI, Appendix VIII, Supplement 10
 - Through-wall RMS sizing value of less than or equal to 0.125" RMS
 - Detection of 100% of the flaws within the scope of the procedure
- Reason for relief request
 - Vendor procedures are not currently capable of being completely qualified to the Appendix VIII, Supplement 10 for through wall sizing and detection of axially oriented flaws in field weld configurations



RR-II-20

(Cont'd)

- Alternative to sizing
 - Consider the achieved performance of the procedure during evaluations of flaws
 - Evaluate the depth sizing performance of vendor to determine appropriate sizing error to consider during flaw evaluations
 - Add the difference between the achieved sizing error and the required 0.125" RMS to the size of flaws measured during examination for flaw evaluation



RR-II-20

(Cont'd)

- Alternative to detection criteria
 - Use advanced surface geometry profiling software to help the examiner confirm locations where the raw data indicates lack of transducer contact due to problematic surface geometry.
 - Where such areas are identified, the examiner will have the option to use miniature transducers to facilitate detection in those areas.



RR-II-20

(Cont'd)

- During the period of relief, SCE&G will closely monitor industry progress for the examination of dissimilar metal welds.
- If the 0.125" RMS value cannot be achieved, SCE&G will re-apply for relief.
- It is expected that conclusions regarding capabilities versus criteria in this particular qualification category can be made during that time period.



Relief Request #'s 15-19 and 21

- These Relief Requests combine those generically prepared by EPRI and common PWR RPV submittals. These will be discussed at the discretion of the NRR representatives.



RR-II-15

- ASME Boiler and Pressure Vessel Code, Section XI,
- Subsection IWA-2232 requires UT examination of the RPV to flange weld in accordance with ASME Code Section V, Article 4. Regulatory Guide 1.150, Rev. 1, augments these requirements.



RR-II-15

(Cont'd)

- In accordance with 10CFR50.55a(a)(3)(i), SCE&G proposes to use an Appendix VIII qualified performance based procedure for the remote mechanized ultrasonic examination of the reactor vessel flange to upper shell weld similar to that used for reactor vessel shell welds of similar thickness and material composition in lieu of ASME Section V Article 4.



RR-II-15

(Cont'd)

- Use an Appendix VIII qualified procedure for the remote mechanized examination of the reactor vessel flange-to-shell weld, as approved by the NRC with modifications in the Federal Register, September 22, 1999.
- Remote mechanized examination will reduce personnel radiation exposure typically received during manual performance.
- SCE&G will employ procedures and equipment qualified by performance demonstration.



RR-II-15

(Cont'd)

- Appendix VIII procedure is technically superior to ASME Code, Section V, Article 4 methodologies that are amplitude based. Enhanced performance is possible by
 1. Increased sensitivity to flaws
 2. Demonstrated flaw measurement capability using amplitude independent sizing techniques
- Compatibility of the Appendix VIII examination technique with the VCSNS flange-to-shell weld joint geometry should result in good ultrasonic beam coverage.



RR-II-15

(Cont'd)

- Examinations will be conducted to the maximum extent practical in four orthogonal directions.
- The examination sensitivity and flaw measurement capability of the proposed alternative are superior to the method prescribed and coverage will be good considering the difficult geometric presentation.



RR-II-16

- The examination requirements for reactor vessel nozzle to shell welds are defined in ASME Code, Section XI, Appendix VIII, Supplements 4, 6 and 7 as modified by 10 CFR 50.55a.



RR-II-16

(Cont'd)

- SCE&G requests relief from the ts/2 examination volume requirements of ASME Section XI, Figures IWB-2500-7 (a) and (b).
- In accordance with 10CFR50.55a(a)(3)(i), SCE&G proposes relief from the ts/2 examination volume and instead proposes examination of the base material volume extending 0.5" from each side of the weld. This refined examination volume is defined in detail within Code Case N-613-1 (Approved by ASME SC XI, 2/02).



RR-II-16

(Cont'd)

- This proposed alternative would re-define the examination volume boundary to 0.5" of base metal on each side of the thickest portion of the weld.
- This reduction in base metal inspection will not affect the flaw detection capabilities in the weld and heat affected zone.



RR-II-17

Note : This Code Case (N-619) was approved in RG 1.147 Rev. 13. This R/R will be withdrawn.

- ASME Section XI, Table IWB-2500-1, Item No. B3.20 specifies volumetric examination for reactor vessel nozzle inside radius section.
- The boundary of the examination volume is depicted in Figure IWB-2500-7(a).



RR-II-17

(Cont'd)

- In accordance with 10CFR50.55a(a)(3)(i), SCE&G proposes relief from the $ts/2$ examination volume and instead proposes examination of the base material volume extending 0.5" from each side of the weld.



RR-II-17

(Cont'd)

- This proposed alternative is consistent with vendor and regulatory objectives in implementing a comparatively sensitive replacement for a volumetric examination requirement.
- This alternative method has merit in the reduction of time and radiation exposure.
- No prior indications have been reported at VCSNS or in any PWR inner radii examinations in the last 10 years.



RR-II-18

- ASME Sec. XI, Table IWB-2500-1, Item No. B1.21 specifies volumetric examination for circumferential head welds 100 percent of the accessible length.
- Examination volume is defined in figure IWB-2500-3.



RR-II-18

(Cont'd)

- In accordance with 10CFR50.55a(a)(3)(i), SCE&G proposes to examine the lower head circumferential weld to the maximum extent practical using advanced robotics for contact examination.
- Complete ultrasonic interrogation is anticipated to be 88 percent of the weld length. The normal scanning path of the transducer package is obstructed and partially obstructed by the outermost grouping of lower head penetrations.



RR-II-19

- ASME Section XI, Appendix VIII, Supplement 4, Subparagraph 3.2(b) requires that flaw lengths estimated by ultrasonics be the true length (-0.250", +1.0").
- As amended, 10CFR50.55a(b)(2)(xv)(C)(1) requires a depth sizing criteria of 0.15" RMS to be used in lieu of Subparagraph 3.2(b) to Supplement 4 of Appendix VIII, Section XI.



RR-II-19

(Cont'd)

- In accordance with 10CFR50.55a(a)(3)(i), SCE&G proposes to use a length sizing qualification criteria of 0.75" RMSE (Root Mean Square Error) in lieu of subparagraph 3.2(b), and to use the RMSE calculations of 3.2(a) and 3.2(b) in lieu of the statistical parameters of 3.2(c).



RR-II-19

(Cont'd)

- Paragraph 10CFR50.55a(b)(2)(xv)(C)(1) in the rule changed subparagraph 3.2(b) of Supplement 4 to a flaw sizing tolerance of 0.150" for length.
- The PDI, (Performance Demonstration Initiative) uses a length sizing tolerance of 0.75" RMS in the administration of Supplement 4 procedure qualifications.



RR-II-19 (Cont'd)

- The NRC staff acknowledged that paragraph 10CFR50.55a(b)(2)(xv)(C)(1) in the rule was an error and should be 0.75" RMS, consistent with the PDI program.
- In a public meeting on October 11, 2000, at NRC offices in White Flint, MD, PDI identified the discrepancy between Subparagraph 3.2(c) and the PDI program.
- The NRC agreed that Paragraph 10CFR5055.a(b)(2)(xv)(C)(1) should have excluded subparagraph 3.2(c) as a requirement.



RR-II-19

(Cont'd)

- A Code Case reflecting the PDI implementation program was developed and passed by ASME Code as Code Case N-622 "Ultrasonic Examination of RPV and Piping, Bolts and Studs," Section XI, Division 1.
- The parameters of the Code Case are the basis for the regulatory discussions and this relief.



RR-II-21

- ASME, Appendix VIII, Table VIII-3110-1 of Appendix VIII; directs that qualification requirements for piping welds for:
 - A - Supplement 2 as applicable for Wrought Austenitic Piping Welds, and
 - B - Supplement 3 as applicable for Ferritic Piping Welds



RR-II-21

(Cont'd)

- In lieu of the requirements of ASME Sec. XI Appendix VIII, Table VIII-3110-1, the PDI Program for implementation of Appendix VIII, Supplement 2 and 3 as coordinated with the alternative PDI Supplement 10 implementation program shall be used.



RR-II-21(Cont'd)

- To resolve these issues, the PDI Program recognizes the Supplement 10 qualification as the most stringent and technically challenging ultrasonic application.
- The essential variables used for the examination of Supplements 2, 3, and 10 are the same.
- A coordinated add-on implementation would be sufficiently stringent to qualify Supplements 2 and 3 if the requirements used to qualify Supplement 10 are satisfied as a prerequisite.



RR-II-21 (Cont'd)

- The basis for this conclusion is the fact that the majority of the flaws in Supplement 10 are located wholly in austenitic weld material.
- This configuration is known to be challenging for ultrasonic techniques due to the variable dendritic structure of the weld material.
- Conversely, flaws in Supplements 2 and 3 initiate in fine-grained base materials.
- The proposed alternative is more stringent than current Code requirements for detection and length sizing qualification.



RR-II-21

(Cont'd)

- It has been submitted to the ASME Code for consideration as new Supplement 14 to Appendix VIII and as of February 2002 has been approved by the Subcommittee on Nuclear Inservice Inspection.



Summary

- These examinations will demonstrate the continued integrity of the VCS RPV welds, including the Hot and Cold leg welds.
- The inspection results will be provided to NRC as soon as possible to support the revision of the current SER and provide for timely start-up of VCS.



Questions?

