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Proprietary Notice
This letter forwards proprietary information in accordance with 10CFR2.390. Upon the removal of Enclosure 3, the balance of this letter may be considered non-proprietary.

MFN 06-053
Supplement 1

Docket No. 52-010

October 27, 2006

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555-0001

Subject: NRC Inspection 05200010/2005-201 Unresolved Items

NRC Quality Inspection 05200010/2005-201 resulted in two Unresolved Items related to the Quality Program documentation (Reference 1). Both of these items remained Open Items following the more recent NRC Quality Inspection 05200010/2006-201 because GE still was re-compiling detailed testing related information from previous SBWR submittals and drafting a Quality Oversight road-map (Reference 2) to assist NRC understanding of the previous testing information. Along with Reference 3, Enclosures 1 through 4 provide the resulting detailed documentation to complete and close these two Unresolved Items.

Enclosure 3 contains proprietary information as defined in 10CFR2.390. This information was originally submitted and accepted as GE proprietary information and nothing has changed relative to the content or the claim of protection under the regulation. Therefore, GE requests the NRC continue protecting the information under the original submittal, even though GE has reproduced copies of the originally submitted information. Enclosure 4 contains a copy of the non proprietary information contained in Enclosure 3.

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If you have any questions about the information provided here, please let me know.

Sincerely,



David H. Hinds
Manager, ESBWR

References:

1. MFN 06-031, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *NRC Inspection Report 0500010/2005-201 and Notice Of Nonconformance*, January 11, 2006
2. MFN 06-193, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *NRC Inspection Report 0520010/2006-201 And Notice Of Nonconformance*, June 14, 2006
3. MFN 06-368, Letter from David Hinds to U.S. Nuclear Regulatory Commission, *Response to NRC Request for Additional Information Letter No. 56 –DCD Chapter 17 – RAI Numbers 17.1-1, 17.2-1, and 17.4-1 through 17.4-12*, October 4, 2006

Enclosures:

1. MFN 06-053, Supplement 1 – NRC Inspection 05200010/2005-201 Unresolved Items
2. MFN 06-053, Supplement 1 – Quality Oversight for the SBWR Test Program
3. MFN 06-053, Supplement 1 – Correspondence Referenced in the Quality Oversight for the SBWR Test Program – GE Proprietary Information
4. MFN 06-053, Supplement 1 – Correspondence Referenced in the Quality Oversight for the SBWR Test Program – Non Proprietary Content

cc: AE Cabbage USNRC (with enclosures)
GB Stramback GE/San Jose (with enclosures)

ENCLOSURE 1

MFN 06-053

Supplement 1

NRC Inspection 05200010/2005-201 Unresolved Items

1 URI 05200010/2005-201-01

1.1 Unresolved Item Description:

“The NRC inspectors determined that the GE ESBWR QA program requirements were adequately described in Chapter 17 of the ESBWR DCD, NEDO-11209-04A, and the various implementation procedures and guidelines and were consistent with the requirements of 10 CFR Part 50, Appendix B. The NRC inspectors determined, however, that an introduction section is required in Chapter 17 of the ESBWR DCD to describe what the ESBWR QA program is based upon and how it is to be implemented by GENE and its various domestic and international ESBWR team participants. This issue was identified as URI 05200010/2005-201-01.”

The required modifications to DCD Chapter 17 were further elaborated and repeated within the Requests For Additional Information (RAIs) for that chapter.

1.2 Unresolved Item Resolution:

A response to the DCD Chapter 17 Requests For Additional Information (RAIs) have been submitted to the NRC in GE Letter MFN 06-368, dated October 4, 2006. (Ref 3 letter) Included in that response is a preliminary copy of the DCD Chapter 17 revision 2, providing the modifications requested in UI 05200010/2005-201-01 to describe the QA Program applied during the SBWR Test Program.

2 URI 05200010/2005-201-02:

2.1 Unresolved Item Description:

“The staff also identified the need for a GENE effort to recapture the NRC inspection documentation records related to the GENE SBWR design certification testing programs that will be used to support design certification of the ESBWR. This issue was identified as URI 05200010/2005-201-02.”

During Inspection 05200010/2006-201, the intent of the item was further clarified as:

“The data from these qualification testing activities is being used to support ESBWR design certification. This documentation should include all NRC Inspection Reports, GENE responses to inspection findings, and NRC replies to GENE responses. GENE was requested to recapture this SBWR inspection documentation for inclusion in the ESBWR Chapter 21 Final Safety Evaluation Report (FSER) for Quality Assurance Inspections related to Testing and Computer Code Evaluation.”

2.2 Unresolved Item Resolution:

a) GE CAR 40523 Corrective Action 2 required GE to recover the test program design records from the microfiche archives and enter them into the currently-used digital archives. This has been completed and a list of the Design Record Files (DRFs) supporting the test program was generated concurrently.

b) Supplemental discussion during the NRC 2006 Inspection clarified the intent of the request for data supporting Chapter 21 of the SER to be a summary of the Quality Inspection activities for the Panda, Panthers and Giraffe tests as represented by the correspondence records between GE and the NRC, and a courtesy copy of the correspondence items. These Items are attached to this letter as:

Enclosure 2: Quality Oversight For The SBWR Test Program

Enclosure 3: Copies of correspondence referenced in the Oversight summary description. These copies are provided as a convenience in assessing the Oversight summary (Enclosure 2).

ENCLOSURE 2

MFN 06-053

Supplement 1

Quality Oversight for the SBWR Test Program

Quality Oversight for the SBWR Test Program

The Panda, Panthers and Giraffe thermal-hydraulic test programs are used to support qualification of analytical codes used in the design and licensing of the GE ESBWR nuclear power plant. These test were performed as a part of the prior SBWR plant design. NRC performed Quality Inspections of these test programs as a part of the oversight activities needed to prepare the SBWR design for a licensing submittal. During the inspections, procedural defects were noted and corrected, and in the end, the programs were accepted as meeting appropriate quality requirements.

The following sections summarize the course of the Quality Inspection activities for each of the test programs and relates the activities to letters exchanged between GE and the NRC.

1 PANDA Test Program Oversight

1.1 Background

PASSive Nachwarmeabfuhr-und DrueckAbbau Testanlage (Passive Decay Heat Removal and Depressurization Test Facility) (PANDA) testing was performed as a joint effort between GE and the Paul Scherrer Institut (PSI) in Wuerenlingen, Switzerland. The PANDA facility included all the major components of the SBWR design, and had the capability to perform both steady-state component performance, and transient system response testing.

The PANDA S-series tests were steady state performance tests of the PCC and IC heat exchanger, with the objective of identification of any scale effects on PCC heat exchanger performance. The PANDA M-series were integral systems transient performance tests to demonstrate startup and long-term operation of the Passive Containment Cooling System, and investigation of potential systems interaction effects.

1.2 Oversight Documentation

Ref. 116-94 (September 28, 1994) transmitted the Review Plan for a joint GE-ENEA-EPRI Test Readiness Review of the PANDA facility and test program to be performed October 19-21, 1994. Personnel from the NRC and DOE also attended the review as observers. The purpose of this assessment was to assure the technical adequacy of the facility and personnel to conduct the PANDA tests in accordance with the test requirements. The assessment was divided into horizontal and vertical reviews. The horizontal review consisted of determining the overall readiness of the facility, its personnel, and documentation. The vertical review looked at a more detailed examination of a part of the facility (e.g. a single instrument line, data calculation, etc.) to verify the technical adequacy and correctness of the work. This review was held early in the program development to assure that adequate time was available to address any potential deficiencies.

GE has been unable to find any evidence that the documented results of the above referenced Readiness Review were transmitted to the NRC. Perhaps this was not felt to be required because of the extensive NRC participation (J. Kudric, A. Drozd, and R. McIntyre) during the review. The review resulted in 15 Open Items and 9 Recommendations.

Ref. 145-94 (November 7, 1994), Ref. 028-95 (February 16, 1995) and Ref. 044-95 (March 27, 1995) all transmit specific information requested by the NRC with respect to the PANDA facility

design and Quality Assurance requirements. These documents transmit color facility schematics, the Project Control Plan and Quality Assurance Procedures, and the Facility As-Built Drawing Package, respectively.

Ref. 052-95 (April 17, 1995) transmitted to the NRC the results of GE Audit Report No ARP 95-2, "Quality Assurance Audit of the SBWR PANDA Test Program by Services and Projects Quality, dated January 31 Through February 2, 1995". This audit examined the adequacy, implementation, and resulting documentation of the GE PANDA Project Control Plan. The readiness of the PANDA test facility to perform tests was examined, and the applicable requirements of NQA-1/1a-1983 were addressed.

The audit resulted in three Corrective Action Requests (CARs), and seven Recommendations to provide opportunities for continuous improvement. The identified CARs included:

- Missing Instructions and Procedures Affecting Quality
- Follow-up on the Disposition of Conditions Adverse to Quality, and
- Non-conforming As-Built dimensions.

The audit concluded that, "The PSI/GE-NE quality system applicable to the PANDA test program and its implementation is acceptable, to the extent audited, except as noted in the three Corrective Action Requests."

Ref. 051-95 (April 13, 1995), Ref. 116-95 (July 6, 1995), and Ref. 122-95 (July 20, 1995) are transmittal to the NRC of the non-proprietary version of the above referenced audit report; the NRC response that they did not concur with the proprietary content of the material, and the GE request that the proprietary version of the audit report be withdrawn from the docket. This was required since PSI considered the results to be proprietary. GE committed to make the proprietary version of the audit report available to the NRC at the GE offices in San Jose, CA.

Ref. 023-96 (February 20, 1996) formally notified GE that the NRC intended to conduct a quality assurance team inspection at PSI on March 5-8, 1996. Ref. 029-96 (February 26, 1996) confirmed the date of the inspection and documented the proposed scope.

Ref. 068-96 (May 10, 1996) transmits NRC Inspection Report 999900403/96-01, which documented the results of the March 5 through 8, 1996 NRC inspection of PANDA at PSI. The purpose of the inspection was to determine if the testing activities performed at the PANDA test facility to support design certification of the SBWR were conducted under the appropriate provisions of the SBWR Design Certification Program Quality Assurance Plan, as implemented by the GE PANDA Project Control Plan and the GE PANDA Quality Assurance Procedures. The inspection concluded that, "GE, in general, was adequately implementing the Project Control Plan and the Quality Assurance Procedures for testing activities performed at PANDA with the exception of two non-conformances". Specifically, the inspection team identified Non-conformances with program implementation with respect to (1) the preparation and issue of Apparent Test Results and Data Transmittal Reports, and (2) the failure to document abnormal occurrences detected during testing. Three additional unresolved items were also identified.

Ref. 081-96 (June 10, 1996) requested a 30-day extension for the GE Response of the Non-conformances. Ref. 101-96 (July 8, 1996) transmitted the GE responses to both the Non-conformances and unresolved items.

Ref. 34-096 (March 4, 1996) and Ref. 037-96 (March 14, 1996) are letters from GE to the NRC and ACRS, respectively, redirecting the focus of SBWR activities from a plant rating of 670 MWe to a rating of 1000 MWe or larger, and requesting an orderly closure of 670 MWe SBWR review activities. The NRC responded with Ref. 061-96 (April 12, 1996), which committed to "...characterize the staff's opinion on the quality of the test program" within the SER for Revision C of the Test and Analysis Program Description (TAPD) report.

Ref. 119-096 (July 11, 1996) transmitted the NRC Staff's draft evaluation of Rev. C of the TAPD. The draft SER contains the staff characterization of the test programs, "In the DSER, the Staff indicated that it would also review the implementation of Quality Assurance (QA) in the conduct of the test programs, to determine if GE and its partners in the SBWR Program fulfilled GE's commitment to meet NQA-1 requirements for SBWR design certification testing activities. The staff has conducted QA inspections of all of GE's major design certification test programs (GIST, Panthers/PCC, Panthers/IC, GIRAFFE, and PANDA) and has concluded that for GIST, Panthers, and Giraffe, NQA-1 standards were met, or that appropriate remedial actions were taken to correct deficiencies found during those inspections. The PANDA QA inspection was performed in March 1996, and two non-conformances were reported to GE as a result of that review. The staff therefore requires that GE implement corrective actions to close the deficiencies identified during the PANDA inspection"

Ref. 175-96 (November 1, 1996) provided the NRC response to Ref. 101-96. The letter states, "We have reviewed your responses to Unresolved Items 9999000403/96-03, 96-04, and 96/05, and generally found them to be responsive to the concerns raised..." With regard to the Non-conformances, the letter states, "The review and reply to Notice of Non-conformance 9999000403/96-01-01 and Nonconformance 9999000403/96-01-02 is being handled by the appropriate NRC technical staff, and you will receive a response under separate cover letter in the future." No record of such a NRC response was found in the GE files.

1.3 References

- Ref. 116-94 GE Letter (McIntyre) to NRC (Borchardt), "PANDA Readiness Review", dated September 28, 1994
- Ref. 145-94 GE Letter (Marriott) to NRC (Borchardt), "PANDA Facility Schematic", dated November 7, 1994
- Ref. 028-95 GE Letter (Quinn) to NRC (Borchardt), "Transmittal of PANDA Project Control Plan and Quality Assurance Procedures", dated February 16, 1995
- Ref. 044-95 GE Letter (Quinn) to NRC (Borchardt), "PANDA As-Built Drawing Package", dated March 27, 1995
- Ref. 051-95 GE Letter (Quinn) to NRC (Borchardt), "GE PANDA Audit Report (Non Proprietary)", dated April 13, 1995
- Ref. 052-95 GE Letter (Quinn) to NRC (Borchardt), "GE PANDA Audit Report (Proprietary)", dated April 17, 1995
- Ref. 116-95 NRC Letter (Scaletti) to GE (Quinn), "Request for Withholding from Public Disclosure, General Electric Audit Repr ARP 95-2 Quality Assurance Audit of Simplified Boiling Water Reactor (SBWR) PANDA test Program by Service and Projects Quality January 31 through February 2, 1995", dated July 6, 1995

- Ref. 122-95 GE Letter (Quinn) to NRC (Quay), "SBWR – withdrawal of GE PANDA Audit Report and Associated Affidavit", dated July 20, 1995
- Ref. 023-96 NRC Letter (Scaletti) to GE (Quinn), Confirmation of Nuclear Regulatory Commission inspection Regarding the Simplified boiling Water Reactor (SBWR) Testing Activities at the PANDA Test Facility), dated February 20, 1996
- Ref. 029-96 GE Letter (Quinn) to NRC (Quay), "SBWR – NRC Site Visits to PANDA, ANSALDO, and Dodewaard", dated February 26, 1996
- Ref. 034-96 GE Letter (Quinn) to NRC (Quay), "SBWR - Redirecting Focus", dated March 4, 1996
- Ref. 037-96 GE Letter (Quinn) to NRC (Boehnert), "SBWR - Redirecting Focus", dated March 14, 1996
- Ref. 061-96 NRC Letter (Crutchfield) to GE (Quinn), "Status of the Simplified Boiling Water Reactor (SBWR) Test Programs and Status Review", dated April 12, 1996
- Ref. 068-96 NRC Letter (Gallo) to GE (Quinn), "NRC Inspection Report No. 999900403/96-01", dated May 10, 1996
- Ref. 081-96 GE Letter (Quinn) to NRC (Gallo), "SBWR PANDA Testing – Reply to Notice of Nonconformance NRC Inspection Report 999900403/61-01" dated June 10, 1996 (NOTE: There appears to be a typographical error in this letter's subject – the actual inspection report number is 999900403/96-01, and that is the subject of the letter.)
- Ref. 101-96 GE Letter (Quinn) to NRC (Gallo), "SBWR PANDA Testing – Reply to Notice of Nonconformance NRC Inspection Report 999900403/96-01" dated July 8, 1996
- Ref. 119-96 NRC Letter (Quay) to GE (Quinn), "Staff Evaluation of General Electric's (GE's) Test and Analysis Program Description, NEDC-32391 Rev. C", dated July 11, 1996
- Ref. 175-96 NRC Letter (Gallo) to NRC (Quinn), "GE Nuclear Energy Response to NRC Notice of Nonconformance and Unresolved Items Identified During SBWR PANDA Inspection", dated November 1, 1996

2 PANTHERS Test Program

2.1 Background

As part of the Simplified Boiling Water Reactor (SBWR) design process, full-size prototype heat exchangers for the Passive Containment Cooling System (PCCS) and Isolation Condenser System (ICS) were tested by SIET and ENEA at the Performance ANalysis and Testing of HEat Removal System (PANTHERS) test facility in Piacenza, Italy. The prototype PCCS and IC heat exchangers were designed and built by Ansaldo Spa.

2.2 Oversight Documentation

Ref. 064-94 (April 29, 1994) transmits to NRC the initial Readiness Assessment Report for the PANTHERS-PCC test program at SIET. On April 12-14, 1994 a team from GE, DOE, and EPRI conducted a readiness assessment for the PANTHERS-PCC test program at SIET. The purpose

of the assessment was to assure the technical adequacy of the facility and personnel to conduct the planned tests in accordance with test requirements. A specific goal was to ensure that all preparations are either complete or proceeding so that test may be initiated with a high confidence that quality results could be obtained.

The Assessment Team concluded that personnel assigned to perform the tests were technically capable to conduct the test according to the requirements. Procedures and associated quality assurance practices were in place and adequate to control the work.

Ref. 170-94 (December 21, 1994) documents the comments from Dr. Alan Levin of the NRC who witnessed testing at PANTHERS on October 16, 1994. Dr. Levin made several technical comments, but also concluded that, "...the test operations crew demonstrated the same sort of competence and professionalism in PANTHERS testing as has previously been noted for operation of SPES-2."

Ref. 196-95 (September 25, 1995) transmits Inspection Report 999900404/95-02 which documents the results of a July 19-21, 1995 inspection by NRC of the PANTHERS test facility. The purpose of the inspection was to determine if the testing activities were performed in conformance with the GE Nuclear Energy Quality Assurance Plan (NEDO 11209-04A). [Note: the report also included inspection results for the Gravity Driven Integral Full-Height Test for Passive Heat Removal (GIRAFFE) performed by Toshiba in Japan.]

The inspections consisted of examination of procedures and representative records, interviews with personnel, and observations by inspectors. The results of the inspection indicate that, in general, GENE, "was adequately implementing the SBWR quality assurance program at GIRAFFE and SIET PANTHERS and no non-conformances were identified." One Unresolved Item was identified concerning the appropriateness of GENE's acceptance of design services.

Specifically, implementation of test control, control of measurement and test equipment, identification of conditions adverse to quality, documentation of critical components, documentation and control of procedures, and audits were all judged to be satisfactory at SIET PANTHERS. However, there was no documentation that GENE had performed audits of Ansaldo, nor placed them on their Approved Suppliers list for design and procurement of the prototype heat exchangers. This later item was identified as the Unresolved Item.

Ref. 252-95 (October 31, 1995) provides GENE's response to the Unresolved Item, documenting that an audit was performed of Ansaldo's QA program on September 20-21, 1990, and that it was determined that the portions of NQA-a/1a(1983) applicable to the SBWR were met.

Ref. 281-95 (December 14, 1995) documents the NRC's acceptance of the GE response provided in MFN 252-95, and closes the Unresolved Item.

Ref. 064-96 (April 29, 1996) provided the Staff's evaluation of GE's PANTHER-PCC tests. The Staff concluded, "The test matrix is well conceived and covers an adequate range of boundary conditions, that there were no failures of critical thermal-hydraulic instruments, and that the data are of good quality and sufficient for determining the global heat rejection of the test system...". The Staff's evaluation also included several concerns relative to the technical details of the test program.

Ref. 086-96 (June 13, 1996) provides the GE response to each of the specific technical concerns noted by the NRC staff in Ref. 064-96.

Ref. 34-096 (March 4, 1996) and Ref. 037-96 (March 14, 1996) are letters from GE to the NRC and ACRS, respectively, redirecting the focus of SBWR activities from a plant rating of 670 MWe to a rating of 1000 MWe or larger, and requesting an orderly closure of 670 MWe SBWR review activities. The NRC responded with Ref. 061-96 (April 12, 1996), which committed to "...characterize the staff's opinion on the quality of the test program" within the SER for Revision C of the Test and Analysis Program Description (TAPD) report.

Ref. 119-096 (July 11, 1996) transmitted the NRC Staff's draft evaluation of Rev. C of the TAPD. The draft SER contains the staff characterization of the test programs, "In the DSER, the Staff indicated that it would also review the implementation of Quality Assurance (QA) in the conduct of the test programs, to determine if GE and its partners in the SBWR Program fulfilled GE's commitment to meet NQA-1 requirements for SBWR design certification testing activities. The staff has conducted QA inspections of all of GE's major design certification test programs (GIST, Panthers/PCC, Panthers/IC, GIRAFFE, and PANDA) and has concluded that for GIST, Panthers, and Giraffe, NQA-1 standards were met, or that appropriate remedial actions were taken to correct deficiencies found during those inspections."

2.3 References

- Ref. 064-94 GE Letter (Letterman) to NRC (Borchardt), "Readiness Assessment Report for PANTHERS - PCC", dated April 29, 1994
- Ref. 170-94 NRC Memorandum (Ninh) to distribution, "Summary of the visit October 16, 1994 at SIET Performance Analysis and Testing of Heat Removal Systems (PANTHERS) Test Facility for the SBWR Design", dated December 21, 1994
- Ref. 196-95 NRC Letter (Crutchfield) to GE (Gallo), "NRC INSPECTION REPORT NO. 99900404/95-02", dated September 25, 1995
- Ref. 252-95 GE Letter (Quinn) to NRC (Gallo), "NRC INSPECTION REPORT NO. 99900404/95-02, UNRESOLVED ITEM 99900404/95-02-01 dated September 25, 1995", dated October 31, 1995
- Ref. 281-95 NRC Letter (Gallo) to GE (Quinn), "GE Nuclear Energy Response to Unresolved Item - NRC Inspection Report 99900404/95-02", dated December 14, 1995
- Ref. 034-96 GE Letter (Quinn) to NRC (Quay), "SBWR - Redirecting Focus", dated March 4, 1996
- Ref. 037-96 GE Letter (Quinn) to NRC (Boehnert), "SBWR - ACRS, Redirecting Focus", dated March 14, 1996
- Ref. 061-96 NRC Letter (Crutchfield) to GE (Quinn), "Status of the Simplified Boiling Water Reactor (SBWR) Test Programs and Status Review", April 12, 1996
- Ref. 064-96 NRC Letter (Quay) to GE (Quinn), "Staff Evaluation of GE's PANTHERS - PCC Tests", dated April 29, 1996
- Ref. 086-96 GE Letter (Quinn) to NRC (Quay), "SBWR - GE Response to the NRC Review of the SBWR PANTHERS - PCC Test Program", dated June 13, 1996
- Ref. 119-96 NRC Letter (Quay) to GE (Quinn), "Staff Evaluation of General Electric's (GE's) Test and Analysis Program Description, NEDC-32391 Rev. C", July 11, 1996

3 GIRAFFE Test Program

3.1 Background

Three separate sets of tests were performed by Toshiba at their Nuclear Engineering Laboratory in Kawasaki City, Japan, in support of the SBWR. The Gravity Driven IntegRAI Full-Height Test for Passive Heat Removal (GIRAFFE) tests facility included all the major components of the SBWR design, and had the capability to perform both steady-state component performance, and transient system response testing.

The first series of GIRAFFE tests (hereafter designated GIRAFFE Phase 1) were performed as development tests to confirm the operational feasibility of the SBWR concept, and did not include the level of Quality Assurance expected of a design basis test. For this reason, only limited segments of the data base were used in support of the SBWR, and only for comparison to the steady-state PCC performance tests of PANDA and PANTHERS.

The GIRAFFE/Helium and GIRAFFE/SIT series were transient system performance tests run to design-basis QA standards, and investigated the effects of lighter-than steam non-condensable gases on PCC system performance and potential systems behavior (e.g. Isolation Condenser operation during LOCA) respectively.

3.2 Oversight Documentation

During late 1993 and early 1994 there were several communications between GE and the NRC with regard to the overall quality of the SBWR submittal, and specifically the QA documentation of the Gravity Driven integral System Test (GIST) SBWR test program. As a result of these issues, the NRC conducted an inspection in the GE offices in San Jose, California on June 21 through June 23, 1994. Ref. 083-94 (June 8, 1994) is the notification of this inspection, and provides a scope that included the QA program and controls applied to the GIRAFFE program during the approximate 1989-1992 time frame (i.e. the time period of the GIRAFFE Phase 1 tests), as well as other test and analysis activities. GE has been unable to locate documentation of the findings of this inspection, although several references, including Ref. 140-94 (October 11, 1994) document that it actually occurred. Subsequent references make it clear that it was at this inspection that it was jointly determined by the NRC inspectors and GE that the GIRAFFE Phase 1 program was not of appropriate QA standards to support a design basis test.

Ref. 087-94 (July 1, 1994) documents the limited use of the Phase 1 GIRAFFE data in support of the SBWR design. The SBWR program had committed to testing under the requirements of ANSI/ASME NQA-1/1a, 1983. The GIRAFFE Phase 1 tests were not explicitly performed to NQA-1/1a, 1983 standards, but were conducted in a disciplined and professional manner, and the intent was to use this data only in a confirmatory manner to demonstrate consistency with other tests.

Ref. 074-94 (May 9, 1994), Ref. 127-95 (January 13, 1995) and Ref. 082-95 (June 1, 1995) document the NRC plans for a formal inspection of the GIRAFFE program at the Toshiba Nuclear Engineering Laboratory. The inspection was initially scheduled for August 8 through 12, 1994, and subsequently postponed to February 23 through March 1, 1995, and again to June 8-14, 1995. These postponements were caused by the change in focus from the original GIRAFFE Phase 1 data to the later GIRAFFE/Helium test data in support of the SBWR design. For the inspection scope, Ref. 074-94 specifies the QA program and controls applied to

GIRAFFE during the approximate 1989-1992 time frame, while the latter two references specify, “the quality assurance (QA) program and controls implemented during design, procurement, construction, and testing associated with GIRAFFE Test Specification No. 25A5677”, the specification for the GIRAFFE/Helium test program.

Ref. 113-94 (September 26, 1994) transmitted to the NRC responses to several Requests for Additional Information (RAIs), including RAI 900.67 regarding the Quality Assurance Program that would be applied to the GIRAFFE/Helium tests. GE stated that the tests in support of design certification would be performed in accordance with Japanese National Standard JEAG 4101-1990 “Guide for Quality Assurance of Nuclear Power Plants”, and that JEAG 4101-1990 meets the intent of Appendix B to 10 CFR 50 and ANSI/ASME NQA-1-1983.

Ref. 036-95 (March 1, 1995) transmitted to the NRC the results of GE Audit Report No ARP 95-1, “Quality Assurance Audit of the SBWR GIRAFFE Test Program by Services and Projects Quality, dated January 24-26, 1995”. This audit examined the adequacy, implementation, and resulting documentation of the Toshiba Quality Assurance Program for the SBWR, the specific Toshiba GIRAFFE Quality Assurance Plan, and applicable procedures that implemented the requirements of the GE SBWR Design and Certification Program Quality Assurance Plan. The audit was specifically directed toward the adequacy of quality assurance on the GIRAFFE/Helium test program. Since GE had committed to the requirements of NQA-1/1a-1983, but Toshiba was performing the tests in accordance with Japanese standard JEAG-4101, 1990, the applicable elements of both standards were covered in the audit.

The audit resulted in five Corrective Action Requests (CARs), and four Recommendations to improve the documentation associated with the GIRAFFE/Helium test program. The CARs Included:

- Interface Control – Responsibility and Authority
- Test Facility Configuration – Incorrect as-built dimensions
- Design Verification – Lack of documentation
- Control of Measurement and Test Equipment (M&TE) – Calibration out of date
- Document Control - Lack of a system/procedure to document the current revision level of drawings

The audit concluded that, “The control of the GIRAFFE/Helium test program is satisfactory, to the extent audited, except as noted in the five CARs attached and the four Recommendations. Testing can be started upon satisfactory correction of the five CARs and resolution of the four Recommendations.”

Ref. 053-95 (April 13, 1995), Ref. 118-95 (July 6, 1995), and Ref. 099-95 (July 20, 1995) are transmittal to the NRC of the non-proprietary version of the above referenced audit report; the NRC response that they did not concur with the proprietary content of the material, and the GE request that the proprietary version of the audit report be withdrawn from the docket. This was required since Toshiba considered the results to be proprietary. GE committed to make the proprietary version of the audit report available to the NRC at the GE offices in San Jose, CA.

Ref. 196-95 (September 25, 1995) documents NRC Inspection Report 999900404/95-02, which documented the results of the June 8 through 14, 1995 NRC inspection of GIRAFFE at the

Toshiba Nuclear Engineering Laboratory in Kawasaki City, Japan. The purpose of the inspection was to determine if the testing activities were performed in conformance with the GE Nuclear Energy Quality Assurance Plan (NEDO 11209-04A). [Note: the report also included inspection results for the Performance Analysis and Testing of Heat Removal System (PANTHERS) test performed by SIET in their facility in Piacenza, Italy.] The GIRAFFE portion specifically addressed the GIRAFFE/Helium test program.

The inspections consisted of examination of procedures and representative records, interviews with personnel, and observations by inspectors. The results of the inspection indicate that, in general, GENE, "was adequately implementing the SBWR quality assurance program at GIRAFFE and SIET PANTHERS and no non-conformances were identified."

Specifically, implementation of test control, control of measurement and test equipment, identification of conditions adverse to quality, documentation of critical components, documentation and control of procedures, and audits were all judged to be satisfactory at GIRAFFE. The effectiveness of closure of the CARs identified in the GE audit of January 1995, was assessed, and found to be satisfactory. The NRC team verified that all recommended corrective actions associated with CAR No 3 had been implemented. The team also provided several technical comments, which were addressed in subsequent RAIs.

Ref. 276-95 (November 7, 1995) documents the comments from Dr. Alan Levin of the NRC who witnessed testing at GIRAFFE/SIT. Dr. Levin made several technical comments, but also concluded that, "...overall, the recent GIRAFFE "H"-series and SIT tests appear to comprise well-run test programs, conducted with appropriate attention to QA concerns. Some issues, such as scaling and test control (e.g. microheater power) still require additional discussion with GE for resolution, but the data provided by these test programs should be useful for code validation as part of the SBWR design certification effort."

Ref. 34-096 (March 4, 1996) and Ref. 037-96 (March 14, 1996) are letters from GE to the NRC and ACRS, respectively, redirecting the focus of SBWR activities from a plant rating of 670 MWe to a rating of 1000 MWe or larger, and requesting an orderly closure of 670 MWe SBWR review activities. The NRC responded with Ref. 061-96 (April 12, 1996), which committed to "...characterize the staff's opinion on the quality of the test program" within the SER for Revision C of the Test and Analysis Program Description (TAPD) report.

Ref. 119-096 (July 11, 1996) transmitted the NRC Staff's draft evaluation of Rev. C of the TAPD. The draft SER contains the staff characterization of the test programs, "In the DSER, the Staff indicated that it would also review the implementation of Quality Assurance (QA) in the conduct of the test programs, to determine if GE and its partners in the SBWR Program fulfilled GE's commitment to meet NQA-1 requirements for SBWR design certification testing activities. The staff has conducted QA inspections of all of GE's major design certification test programs (GIST, Panthers/PCC, Panthers/IC, GIRAFFE, and PANDA) and has concluded that for GIST, Panthers, and Giraffe, NQA-1 standards were met, or that appropriate remedial actions were taken to correct deficiencies found during those inspections."

3.3 References

Ref. 074-94 NRC Letter (Borchardt) to GE (Marriott), "Confirmation of NRC Inspection Regarding GE Nuclear Energy (GE) Simplified Boiling Water Reactor (SBWR)

- Testing Activities at the Toshiba Nuclear Engineering Laboratory”, dated May 4, 1994
- Ref. 083-94 NRC Letter (Borchardt) to GE (Marriott), “Confirmation of NRC Inspection at GE Nuclear Energy Regarding GE Oversight of the SBWR GIRAFFE Test Activities at the Toshiba Nuclear Engineering laboratory”, dated June 8, 1994
- Ref. 087-94 GE Letter (Marriott) to NRC (Borchardt), “Use of GIRAFFE Test Data in the SBWR”, dated July 1, 1994.
- Ref. 113-94 GE Letter (McIntyre) to NRC (Borchardt), “Responses to the Referenced Letters”, dated September 26, 1994
- Ref. 140-94 NRC Letter (Borchardt) to GE (Marriott), “Nuclear Regulatory Commission Inspection Regarding GE Nuclear Energy (GE) Simplified Boiling Water Reactor (SBWR) Testing Activities at the Toshiba Nuclear Engineering Laboratory Planned for August 8 through 12, 1994”, dated October 11, 1994
- Ref. 036-95 GE Letter (Quinn) to NRC (Borchardt), “GE GIRAFFE Audit Report”, dated March 1, 1995
- Ref. 053-95 GE Letter (Quinn) to NRC (Borchardt), “GE GIRAFFE Audit Report (Non Proprietary)”, dated April 13, 1995
- Ref. 082-95 NRC Letter (Borchardt) to GE (Marriott), “Confirmation of the Nuclear Regulatory Commission (NRC) Activities Regarding GE Nuclear Energy (GE) Simplified Boiling Water Reactor (SBWR) Testing Activities at the Toshiba Nuclear Engineering Laboratory”, dated June 1, 1995
- Ref. 099-95 GE Letter (Quinn) to NRC (Quay), “Withdrawal of GE GIRAFFE Audit Report & Associated Affidavit”, dated July 20, 1995
- Ref. 118-95 NRC Letter (Scaletti) to GE (Quinn), “Request for Withholding Information from Public Disclosure, General Electric (GE) Audit Report No. ARP 95-1 “Quality Assurance Audit of SBWR GIRAFFE Test Program by Service and Projects Quality January 24 through 26, 1995”, dated July 6, 1995
- Ref. 127-95 NRC Letter (Borchardt) to GE (Marriott), “Confirmation of the Nuclear Regulatory Commission (NRC) Activities Regarding GE Nuclear Energy (GE) Simplified Boiling Water Reactor (SBWR) Testing Activities at the Toshiba Nuclear Engineering Laboratory”, dated January 13, 1995
- Ref. 196-95 NRC Letter (Gallo), “NRC Inspection Report 99900404/95-02”, dated September 25, 1995
- Ref. 276-95 NRC Memorandum (Levin to Holahan), “Trip to Japan, October 8-14 1995”, dated October 27, 1995
- Ref. 034-96 GE Letter (Quinn) to NRC (Quay), “SBWR – Redirecting Focus”, dated March 4, 1996
- Ref. 037-96 GE Letter (Quinn) to NRC (Boehnert), “SBWR – ACRS, Redirecting Focus”, dated March 14, 1996

- Ref. 061-96 NRC Letter (Crutchfield) to GE (Quinn), "Status of the Simplified Boiling Water Reactor (SBWR) Test Programs and Status Review", April 12, 1996
- Ref. 119-96 NRC Letter (Quay) to GE (Quinn), "Staff Evaluation of General Electric's (GE's) Test and Analysis Program Description, NEDC-32391 Rev. C", July 11, 1996