UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

October 20, 2005

MEMORANDUM TO: ACRS Members

FROM: John G. Lamb, Senior Staff Engineer
ACRS/ACNW

SUBJECT: CERTIFICATION OF THE MINUTES OF THE JOINT MEETING OF THE ACRS SUBCOMMITTEES ON PLANT OPERATIONS AND LICENSE RENEWAL REGARDING BROWNS FERRY UNIT 1 PLANT RESTART AND LICENSE RENEWAL APPLICATION, SEPTEMBER 21, 2005 - ROCKVILLE, MARYLAND

The minutes of the subject meeting were certified on October 20, 2005, as the official record of the proceedings of that meeting. A copy of the certified minutes is attached.

Attachment: As stated

cc: J. Larkins
A. Thadani
M. Scott
M. Snodderly
S. Duraiswamy

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

MEMORANDUM TO: John G. Lamb, Senior Staff Engineer,
Technical Support Staff
ACRS/ACNW

FROM: John D. Sieber, Chairman
ACRS Plant Operations Subcommittee

SUBJECT: CERTIFICATION OF THE MINUTES OF THE JOINT MEETING OF ACRS SUBCOMMITTEES ON PLANT OPERATION AND LICENSE RENEWAL REGARDING BROWNS FERRY UNIT 1 RESTART AND LICENSE RENEWAL APPLICATION, SEPTEMBER 21, 2005 - ROCKVILLE, MARYLAND

I hereby certify, to the best of my knowledge and belief, that the minutes of the subject meeting on September 21, 2005, are an accurate record of the proceedings for that meeting.

John D. Sieber 10-20-05

John D. Sieber, Date
Plant Operations Subcommittee Chairman

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

September 23, 2005

MEMORANDUM TO: John D. Sieber, Chairman
ACRS Plant Operations Subcommittee

FROM: John G. Lamb, Senior Staff Engineer,
Technical Support Staff
ACRS/ACNW

SUBJECT: WORKING COPY OF THE MINUTES OF THE JOINT MEETING OF THE ACRS SUBCOMMITTEES ON PLANT OPERATIONS AND LICENSE RENEWAL REGARDING BROWNS FERRY UNIT 1 PLANT RESTART AND LICENSE RENEWAL APPLICATION, SEPTEMBER 21, 2005 - ROCKVILLE, MARYLAND

A working copy of the minutes for the subject meeting is attached for your review. Please review and comment on them at your earliest convenience. If you are satisfied with these minutes please sign, date, and return the attached certification letter.

Attachments: Certification Letter
Minutes (DRAFT)

cc w/o Attachment:
J. Larkins
A. Thadani
M. Scott
M. Snodderly
S. Duraiswamy
C. Santos

CERTIFIED on 10/20/2005 by John Sieber
Issued 09/23/05

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
MINUTES OF THE JOINT ACRS PLANT LICENSE RENEWAL AND PLANT OPERATIONS SUBCOMMITTEES MEETING
ON BROWNS FERRY UNIT 1 RESTART AND LICENSE RENEWAL
SEPTEMBER 21, 2005
ROCKVILLE, MARYLAND

On September 21, 2005, the Plant License Renewal and Plant Operations Subcommittees held a joint meeting in Room T-2B3, 11545 Rockville Pike, Rockville, Maryland. The purpose of the meeting was to gather information regarding the current status and condition of Browns Ferry (BF) Unit 1 to support ACRS reviews of the license renewal application for BF Units 1, 2, and 3 and the restart of BF Unit 1. The Subcommittees will hear presentations by and hold discussions with representatives of the staff and Tennessee Valley Authority (TVA).

The meeting was open to the public. No written comments or requests to make oral statements were received from members of the public related to this meeting. Mr. John G. Lamb was the Designated Federal Official for this meeting. The meeting was convened at 8:31 a.m. and adjourned at 4:23 p.m. on September 21, 2005

ATTENDEES:

ACRS MEMBERS/STAFF
Mario Bonaca, Chairman
John Sieber, Chairman
Graham Wallis, Member
Tom Kress, Member
Richard Denning, Member
John Barton, Consultant
Graham Leitch, Consultant
Cayetano Santos Jr., ACRS Staff
John G. Lamb, ACRS Staff

NRC STAFF/PRESENTERS
Y. Diaz, NRR
K. Tanabe, NRR
M. Chernoff, NRR
J. Tapp, NRR
J. Strhisha, NRR
M. Heath, NRR
R. McNally, NRR
B. Elliott, NRR
L. Lund, NRR
N. Iqbal, NRR
K. Naidu, NRR
G. Cranston, NRR
D. Reddy, NRR
J. Zimmerman, NRR
R. Subbaratnam, NRR
S. Lee, NRR
E. Brown, NRR
G. Taylor, NRR
R. Auluck, NRR
E. Hackett, NRR
G. Cheruvenki, NRR
B. Rodgers, NRR
P.Y. Chen, NRR
P.T. Kuo, NRR
R. Pettis, NRR
J. Guo, NRR
B. Wolfgang, NRR

OTHER ATTENDEES

W. Crouch, TVA
J. McCarthy, TVA
K. Bryne, TVA
T. McGrath, TVA
J. Valente, TVA
K. Sutton, Morgan-Lewis
C. Beasley, TVA
H. Jones, TVA
R. DeLong, TVA
D. Burrell, TVA
R. Cutsinger, TVA
S. Dort, FENOC
R.G. Jones, TVA
R. Moll, TVA

The presentation slides, handouts used during the meeting, and a complete list of attendees are attached to the Office Copy of the meeting minutes. The presentations to the Subcommittees are summarized below.

Opening Remarks

Mr. Sieber, Chairman of the Subcommittee on Plant Operations, convened the meeting and made a few introductory remarks. The purpose of the meeting was to gather information regarding the current status and condition of Browns Ferry (BF) Unit 1 to support ACRS reviews of the license renewal application for BF Units 1, 2, and 3 and the restart of BF Unit 1.

Dr. Bonaca stated that the Committee is concerned about how BF Units 2 and 3 operating experience applies to BF Unit 1, restart inspections, material condition, corrective action program, restart activities with license renewal, and periodic inspections vs. one-time inspection should be clear.

Mr. Leitch stated he is concerned about how BF Units 2 and 3 operating experience applies to BF Unit 1, and he is concerned about the uprated power level.

Mr. Barton stated he is concerned that some equipment is 30 years old.

Mr. Sieber called upon Mr. P.T. Kuo of the Office of Nuclear Reactor Regulation (NRR) to make a statement. Mr. Kuo introduced NRR staff members present. He said TVA submitted an application for license renewal of BF Units 1, 2, and 3 on December 31, 2003 (ADAMS Accession No. ML040060361). Mr. Kuo stated TVA subsequently submitted Extended Power Uprate (EPU) applications for Unit 1 and Units 2 & 3 on June 28, 2004 (ADAMS Accession No. ML041840109), and June 25, 2004 (ADAMS Accession No. ML041840301), respectively. He said the EPU has been decoupled from the license renewal application (LRA) based on a TVA letter dated January 7, 2005 (ADAMS Accession No. ML050100180). Mr. Kuo explained the BF LRA is based on the current power level. He said the staff Safety Evaluation Report (SER) with open items (ADAMS Accession No. ML052210484) was supplied to the ACRS on August 9, 2005. Mr. Kuo stated ACRS Members visited the BF site on August 24, 2005. Dr. Bonaca asked about the modifications for the EPU. Mr. Kuo answered the modifications will be explained at the October 5, 2005, Plant License Renewal Subcommittee meeting. He said the staff is not making any presentations today.

Mr. Sieber turned it over to Bill Couch of TVA to begin the discussion.

Discussion

Mr. Couch introduced TVA staff in attendance. He stated the following are agenda items: Regulatory Background, BF Unit 1 Fidelity with Units 2 and 3, License Renewal Application, EPU Impact on License Renewal, and Summary. Mr. Couch stated there are three major Nuclear Regulatory Commission (NRC) approval issues: (1) license renewal at current power, (2) EPU, and (3) Unit 1 restart. He said ACRS approval is required for the LRA and the EPU. Mr. Couch stated final approval is required for Unit 1 restart by the Region II Regional Administrator and NRR Director.

Regulatory Background

Mr. Couch provided the presentation slides regarding regulatory background. He said the three Browns Ferry Nuclear Plant Units consist of a General Electric Type 4 boiling water reactor with a Mark I containment that were designed and constructed by TVA. Mr. Couch explained Units 1 and 2 were licensed in 1973 and 1974, respectively, and both units shutdown after the March 22, 1975 Browns Ferry fire. He said Unit 1 and 2 were returned to service in 1976 and operated until 1985. Mr. Couch stated Unit 3 was licensed in 1976 and operated until 1985. He said TVA voluntarily shut down all three units in March 1985 to correct a variety of issues. Mr. Couch stated Unit 1 has approximately 10 years of operations, Unit 2 has approximately 23 years of operations, and Unit 3 has approximately 18 years of operations. He said Units 2 and 3 were restarted in 1991 and 1995, respectively. Mr. Couch said TVA submitted a proposed update to the regulatory framework for Unit 1 in December 2003.

Note:
The TVA regulatory framework letter is dated December 13, 2002 (ADAMS Accession No. ML023600026). In a letter dated August 14, 2003 (ADAMS Accession No. ML032190680), the NRC issued the Regulatory Framework for the Restart of Browns Ferry Unit 1. This letter lists the significant regulatory actions that require resolution before restart. Region II has been monitoring the Unit 1 recovery efforts.

Mr. Couch stated the Unit 1 NRC oversight is governed by Manual Chapter 2509, "Browns Ferry Unit 1 Restart Project Inspection Program." He said the restart oversight panel is scheduled to begin in Fall 2005 and will provide its recommendation to the Region II Regional Administrator and the NRR Director for Unit 1 restart approval.

Mr. Couch explained when the LRA and EPU applications were submitted. He said LRA approval is expected in June 2006 and EPU approval is expected prior to Unit 1 restart in May 2007.

Member Comments on the Regulatory Background

Mr. Leitch asked if the design discussed in the LRA is the present design or the future design. Mr. Couch answered the LRA design is the future design at the EPU conditions. Mr. Leitch asked about piping modifications. Mr. Couch provided three handouts: (1) Description of Modifications Planned for Unit 1 Restart, (2) Table 1 - Browns Ferry Unit 1 Restart Poject - Piping System Replacements, and (3) [Non-Destructive Examination] NDE Examinations Performed for Original Non-Replaced Piping. Mr. Leitch asked when the Units expect to reach the EPU conditions provided TVA receives approval of the EPU applications. Mr. Couch responded Unit 1 and 2 expect to irnplement EPU in 2007 and Unit 3 in 2008. He said Unit 1 is the lead BF plant for EPU. Mr. Leitch asked about procedures at BF. Mr. Couch answered that each Unit has its own set of procedures.

Mr. Sieber asked if Browns Ferry is an Appendix R plant. Mr. Couch responded that Units 2 and 3 meet Appendix R with five exemptions and Unit 1 will be brought into compliance with Appendix R. Mr. Sieber asked what version of Generic Aging Lessons Learned (GALL) did TVA use. Mr. Couch stated Revision 1; however, this was corrected to Revision 0 later in the meeting. Mr. Sieber questioned which topical reports are being used for the EPU. Mr. Couch answered that TVA is using General Electric (GE) topical reports ELTR1 and ELTR2 for the EPU.

Dr. Bonaca asked if the proposed 2002 LRA has changed significantly to today. Mr. Couch responded that originally in 2002 TVA was working on LRA for Units 2 and 3 only; however, added Unit 1 based on the 2002 TVA Board decision to restart Unit 1. He said TVA had a good handle on what components needed to be replaced based on its experience restarting Units 2 and 3. Mr. Couch said the LRA application was complete when it was submitted to the NRC in December 2003. Dr. Bonaca stated there is no coherent description of the Unit 2 and 3 operating experience applying to Unit 1 in the LRA application or the staff SER with open items. Mr. Couch responded that TVA will work with the staff to come up with words for the SER. Mr. Ram Subbaratnam of NRR stated it will be in the final SER. Dr. Bonaca stated BF Unit 1 will start-up at a 20% higher power level. He said he would expect a commitment in the LRA for TVA to submit a report a couple of years before entering the period of extended operation explaining and justifying the EPU for the license renewal.

Unit 1 Fidelity with Units 2 & 3

Mr. Joe Valente of TVA presented the slides regarding Unit 1 fidelity with Units 2 and 3. He said the scope of Unit 1 restart project incorporated the same restart programs as Unit 2 and 3 and upgrades installed on Units 2 and 3 since restart. Mr. Valente stated Unit 1 will be operationally the same as Units 2 and 3. He said Unit 1 will have the same systems, equipment, operating procedures, Technical Specifications, and Updated Safety Analysis Report. Mr. Valente said TVA deleted the low pressure coolant injection motor generator sets. Mr. Valente described three items from its nuclear performance plan: (1) design baseline verification program, (2) fire protection - Appendix R, and (3) Intergranular Stress Corrosion Cracking. He described the Unit 1 lay-up program. Mr. Valente described the assessment process for the condition of Unit 1. He stated 39 Unit 1 mechanical systems are in scope for Unit 1 recovery and 47 Unit 1 mechanical systems are in scope for license renewal. Mr. Valente stated one system was completely replaced. He described the detailed work performed for 3 systems: (1) high pressure coolant injection (HPCI), (2) reactor water cleanup (RWCU), and (3) feedwater (FW). Mr. Valente described the long-term passive components replaced.

Mr. R.J. Jones of TVA presented the slides regarding Unit 1 system return to service process. He described the system plant acceptance evaluation (SPAE) process, the phase I system pre-operability checklist (SPOC) process, and the phase II SPOC process. Mr. Jones described the Unit 1 restart test program. He said the Unit 1 restart test program is the same as the programs performed on Unit 2 and 3. Mr. Jones described the testing for 3 systems: (1) HPCI, (2) RWCU, and (3) FW. He described the integrated/power ascension test program. Mr. Jones said Phase 1 testing is open vessel testing. He said Phase II testing will be up to 55% power. Mr. Jones stated Phase 3 will be 55% to 83% power. He said Phase 4 will be from 83% to 100%. Mr. Jones stated that 100% will be EPU conditions or 120% of the current licensed power level. He said Phase 4 will be performed in plateaus of 2% - 5%. Mr. Jones stated TVA will not perform large transient testing for Unit 1, because he said it offers minimal benefit and does not justify the risk. Mr. Jones stated that TVA is increasing the staff by 126 people. He said the Operations crews work 12 hour shifts on a 6 week schedule. Mr. Jones stated BF has 2 simulators: one for Unit 3 and one for Unit 1. He said the Emergency Plan Guidelines (EPGs) are plant-specific.

Member Comments on Unit 1 Fidelity with Units 2 & 3

Mr. Leitch asked why TVA deleted the low pressure coolant injection motor generator sets. Mr. Valente answered that it simplified the electrical system. Mr. Leitch asked if TVA re-did its Probabilistic Risk Assessment (PRA) based on modifications to Unit 1. Mr. Valente responded that TVA re-did its Level 1 PRA and provided a slide with the results (Core Damage Frequency (CDF) at EPU conditions: Unit 1 - 1.77 E-6; Unit 2 - 1.55 E-6; and Unit 3 - 2.76 E-6). Mr. Leitch asked if any EPU modifications were done due to PRA. Mr. Valente stated TVA increased the volume in the Standby Liquid Control System. Mr. Leitch asked how TVA came up with the list for the performance plan. Mr. Valente responded these special programs were developed due to problems at shutdown in 1985. Mr. Leitch asked about net positive suction head (NPSH) on

Emergency Core Cooling System (ECCS) pumps. Mr. Valente answered that TVA takes credit for containment overpressure. Mr. Leitch expressed a concern regarding the blockage of Electro-Hydraulic Control (EHC) piping. Mr. Couch responded that TVA plans to work with GE to flush the EHC and lube oil system. Mr. Leitch asked about medium voltage cables. Mr. Valente stated that TVA has not replaced medium voltage cables; however, TVA has performed 4 kV cable splices. Mr. Leitch asked how many Technical Specification (TS) changes are needed for BF. Mr. Couch stated there are 21 TS changes: 16 submitted and 5 completed. Mr. Leitch asked if Quality Assurance (QA) is involved in the SPOC process. Mr. Jones responded that Quality Control (QC) is in the process and QA looked at 6 systems returned to service with no findings. Mr. Leitch asked about restart test procedures. Mr. Jones answered that TVA has surveillance instructions, surveillance tests, post-maintenance tests (PMTs), and technical procedures. Mr. Leitch asked when would TVA test if the RWCU pumps worked. Mr. Jones responded it would occur after SPOC Phase I and before SPOC Phase II. Mr. Leitch asked how long the Phase 1 power ascension test program would last. Mr. Jones responded Phase 1 power ascension test program will take approximately 3 weeks. Mr. Leitch asked if a turbine overspeed test will be performed as part of the Phase 2 power ascension test program. Mr. Jones responded that a turbine overspeed test will be conducted during the Phase 2 power ascension test program. Mr. Leitch asked about the closure time of the Main Steam Isolation Valve (MSIV) at the EPU higher steam flow conditions and how can TVA justify a MSIV closure time of 3 - 5 seconds without dynamic testing. Mr. Couch responded that BF 1 has a steam flow rate, not in terms of mass flow rate, but in terms of velocity, significantly below what other plants are running at the EPU conditions and TVA performs stroke time testing on Unit 1 the same as Units 2 and 3. Mr. Leitch expressed concern that the stroke time cannot be ensured at EPU conditions without a dynamic test.

Dr. Denning asked for an explanation in the different PRA numbers for the three units. Mr. Couch responded TVA has shared pumps such as the Residual Heat Removal (RHR). Dr. Denning asked if any new scenarios developed due to the higher power level of EPU. Mr. Valente said no. Dr. Denning asked if TVA plans to perform PRA in other modes such as fire PRA or shutdown PRA. Mr. Couch responded TVA does not plan to perform a fire PRA or shutdown PRA. Dr. Denning asked if TVA uses an on-line risk monitor. Mr. Couch responded that TVA does use an on-line risk monitor and it is called Sentinel. Dr. Denning asked what alternatives did TVA consider instead of taking credit for containment overpressure. Mr. Couch responded that TVA looked for pumps with less NPSH and could not identify any pump to meet the 3 psi short-term and long-term containment pressure. Dr. Denning asked if the credit for containment overpressure was needed for a 5% power uprate. Mr. Couch responded yes. Dr. Denning asked if the 83% power in the Phase 3 power ascension test program the same as the current 100% licensed power level. Mr. Couch responded that 83% at the EPU conditions represents the current 100% licensed power level. Dr. Denning asked how TVA looks at transient performance. Does TVA use a thermal hydraulic calculation to compare plant performance during testing? How does TVA judge plant performance during power ascension? How long will Phase 3 last? Mr. Couch stated TVA is using the simulator for plant performance comparisons and Phase 3 will last approximately 70 days. Dr. Denning asked if TVA had pre-defined values or bars for various equipment and instrument performance parameters. Mr. Couch stated that TVA does not have pre-defined bars. Dr. Denning stated he is not comfortable without pre-defined bars and Mr. Couch said TVA can do it.

Dr. Kress asked if TVA plans to do a Level 3 PRA. Mr. Couch responded no.

Mr. John Barton asked about fire protection modifications. Mr. Valente answered that all the fire sprinklers were replaced. Mr. Barton asked about the fuse program. Mr. Valente responded that all the fuses and fuse holders that support Unit 1 recovery have been replaced. Mr. Barton asked about re-packing old valves. Mr. Valente responded that TVA cycled all small valves. Mr. Barton expressed his concern that cycling the valves may not be adequate to determine the condition of the packing. Mr. Barton asked if the FW tubes were replaced and what was the tube material. Mr. Valente stated the FW heaters were not replaced and the tube material is 304 stainless steel. Mr. Barton asked about the shroud inspections, what were the corrective actions, and asked about coatings in containment. Mr. Valente said there were minor

indications on the shroud welds and there were no through-wall flaws. He said there were no corrective actions at this time regarding the shroud. Mr. Valente stated the coatings in containment looked good overall. Mr. Barton asked why TVA performed 4 kV splices instead of replacing the cable. Mr. Valente stated it was due to conduit problems. Mr. Barton asked if TVA owns the BF switchyard and how work is coordinated in the switchyard. Mr. Couch stated that a TVA subsidiary owns the switchyard and all work is coordinated through the control room. Mr. Barton asked if labels must be permanent after the completion of SPOC Phase II. Mr. Jones answered that the labels must be permanent after completion of SPOC Phase II. Mr. Barton asked about pressure testing. Mr. Jones responded TVA performs in-service leak test. Mr. Barton stated that a large transient test can find problems.

Mr. Sieber asked if the combustible loading was analyzed for abandoned circuits in-place. Mr. Valente responded that abandon circuits are taken into account in the analysis. Mr. Sieber asked about the Appendix R exemptions. Mr. Valente stated TVA has 5 exemptions: (1) short-term core uncovery, (2) fire suppression in the control room, (3) RHR pump room lack of separation is compensated by a water fire curtain, (4) intervening combustibles - fire loading low, and (5) fixed suppression in the control building. Mr. Sieber asked about the condition of the station batteries. Mr. Valente answered the station batteries have been replaced. Mr. Sieber asked what are the open items for Unit 1 for Three Mile Island action items. Mr. Valente responded the control room human performance/factors analysis. Mr. Sieber asked if hangers and supports were replaced or upgraded. Mr. Valente stated 85% of the hangers were changed due to a new response spectrum in the seismic analysis. Mr. Sieber asked if the transmission system operator has the same type of procedures as the plant. Mr. Valente said the transmission system operator has the same level of procedures as the plant. Mr. Sieber asked if TVA performed a heavy loads lifting analysis and who is the TVA crane manufacturer. Mr. Couch responded that TVA has performed a heavy load analysis and the crane manufacturer is Ederer. Mr. Sieber asked who signs for the acceptance after the completion of SPOC Phase I & II. Mr. Jones responded that the shift manager and plant manager sign for the acceptance after the completion of SPOC Phase I & II. Mr. Sieber asked how engineering calculations are checked at BF. Mr. Couch responded that TVA engineering calculations are peer-reviewed. Mr. Sieber stated that TVA has not performed a large transient test above the current 100% licensed power level.

Dr. Bonaca asked if there were problems with lay-up such as moisture concern or lube oil, if TVA took credit for lay-up, and one-time inspections vs. periodic inspections. Dr. Bonaca stated that there is no discussion in the application or the SER with open items regarding these inspections. Mr. Couch stated TVA will perform baseline inspections, perform inspections prior to entering the extended period of operation, perform inspections during the period of extended operation, then assess the extent and frequency of further inspections.

License Renewal Application

Mr. Rich DeLong of TVA presented slides regarding the license renewal. He said the LRA was submitted on December 31, 2003. Mr. DeLong stated the NRC SER with open items was issued on August 9, 2005. He said there were two open items: (1) drywell shell corrosion and (2) stress relaxation of the core plate hold-down bolts. Mr. DeLong stated there are 39 Aging Management Programs (AMPs) total, with 38 common to all three units and 1 for Unit 1 only. He said the Unit 1 specific AMP is the Unit 1 Periodic Inspection program. Mr. DeLong stated there are 12 existing AMPs requiring no enhancements since they are consistent with GALL. He said there are 10 existing AMPs requiring enhancements for all Units in order to comply with GALL. Mr. DeLong stated there are 11 existing AMPs revised to include Unit 1 and are already consistent with GALL. He said there are 6 new AMPs. Mr. DeLong described the Unit 1 Periodic Inspection Program.

Mr. Joe McCarthy of TVA presented slides on operating experience. He said Unit 1 met the requirement of 10 CFR 54.17(c). Mr. McCarthy stated that operating experience is not limited to that of the license renewal applicant.

Member Comments on License Renewal Application

Dr. Bonaca stated the LRA and the SER with open items is confusing regarding one-time inspections and periodic inspections. Dr. Bonaca said the new AMP for all three units regarding One-Time Inspection Program and the new AMP for Unit 1 only Unit 1 Periodic Inspection Program need to be kept separate in the SER. Dr. Bonaca stated he would expect TVA to perform a periodic inspection 2 years before entering the period of extended operation and at least one inspection during the extended operation period. Mr. DeLong responded TVA will make a determination of a frequency of periodic inspections after reviewing the rate of degradation. Dr. Bonaca stated the license renewal rule has never interpreted other utilities units operating experience can be applied generically. Dr. Bonaca said there is no operating experience for Unit 1 since lay-up. Dr. Bonaca said that Unit 1 does not need 20 years of operating experience but Unit 1 has not started up. Dr. Bonaca stated that nowhere in the SER or application is the justification for using Units 2 and 3 operating experience acceptable to apply to Unit 1. Mr. McCarthy stated that TVA will work with the staff to put the justification into the SER. Mr. Subbaratnam stated that the staff would need a letter from TVA regarding this justification to get it on the docket.

Extended Power Uprate Impact on License Renewal

Mr. Couch presented slides regarding the EPU impact on license renewal. He said the EPU was prepared using GE's ELTR1 and ELTR2 topical reports. Mr. Couch stated Unit 1 has GE 14 fuel and Units 2 and 3 are transitioning to Framatome A-10 fuel. He said the original licensed thermal power for Unit 1 is 3293 MWt and the requested EPU power is 3952 MWt. Mr. Couch described the modifications required to support EPU. He also explained the parameter increases for the various systems.

Member Comments on Extended Power Uprate Impact on License Renewal

Dr. Bonaca stated he would expect TVA to supply a report to the NRC for review which justifies the acceptability of entering the extended period of operation with the extended power uprate prior to entering the period. Dr. Bonaca stated that TVA needs to look at EPU before the license renewal extended period since BF Unit 1 is unique; it operated for 10 years, was in lay-up for 22 years, then will have only 4 years of operation at 120%.

Summary

Mr. Couch stated there are three major NRC approval issues: (1) license renewal at current power, (2) EPU, and (3) Unit 1 restart. He said ACRS approval is required for the LRA and the EPU. Mr. Couch stated final approval is required for Unit 1 restart by the Region II Regional Administrator and NRR Director.

Mr. Couch appreciated the Committee for allowing TVA the opportunity to present information.

Member Comments

Mr. Sieber stated that the ACRS has statutory responsibility for license renewal and power uprate. He said the ACRS is interested in reviewing the BF Unit 1 Restart Oversight Panel report when it is completed.

Dr. Bonaca stated the meeting for the Subcommittee on Plant License Renewal will meet on October 5, 2005. He said he would expect the meeting to be similar to other License Renewal Subcommittee meeting with some additional topics related to Unit 1 such as lay-up and the justification to use Units 2 and 3 operating experience for Unit 1.

Mr. Sieber thanked TVA for its presentation and he said it was helpful. Then, Mr. Sieber solicited comments from the ACRS consultants and Members.

Mr. Leitch stated the presentation was helpful especially the list of modifications. He said the clarification of the modifications performed on the three units was good. Mr. Leitch expressed his concern regarding the lack of EPU large transient testing. He stated he is especially concerned regarding the closure of the MSIV at 120% power. Mr. Leitch stated the MSIV closure at 120% power needs to be demonstrated.

Mr. Barton stated the presentation was helpful especially knowing what is being replaced. He expressed concern regarding the lack of large transient testing and the timing of the application.

Dr. Denning stated the presentation was helpful. He said separation of EPU and license renewal is key. He said he does not see a concern regarding periodic inspections. Dr. Denning stated EPU and start-up are not separable. Sr. Denning asked rhetorically if TVA should do a major trip test. He said Unit 1 will be at different conditions than before.

Dr. Kress stated the presentation was helpful. He said transient testing should be a condition for restart and is certainly an issue for EPU. Dr. Denning stated he would like to see a Level 3 PRA and the impact of risk on the Environmental Impact Statement. He said the SER ignores this risk.

Dr. Bonaca stated the presentation was helpful. He said he would like to see the documentation of the justification of using the Unit 2 and 3 operating experience for Unit 1 in the SER. Dr. Bonaca stated the periodic inspection program is good. He said large transient testing needs to be done. Dr. Bonaca stated this testing will be looked at as part of the EPU review.

Mr. Sieber endorsed Dr. Bonaca's comments. He thanked the staff for the SER and thanked TVA for the presentation. Mr. Sieber adjourned the meeting.

Subcommittee Decisions and Follow-up Actions

The Subcommittee Chairman will summarize the discussions to the full Committee during the October 2005 ACRS meeting.

Background Materials Provided to the Committee

1. TVA, "Application for the Renewal of the Operating Licenses for Browns Ferry Nuclear Units 1, 2, and 3," December 31, 2003 (ADAMS Accession No. ML040060361)
2. TVA, "Browns Ferry Nuclear Plant -Units 1, 2, and 3 - January 28, 2004 Meeting Follow-Up - Additional Information - Supplemental Information - Unit 1 Wet Lay-Up," February 19, 2004 (ADAMS Accession No. ML040510241)
3. U.S. Nuclear Regulatory Commission, "Browns Ferry Nuclear Plant, Units 1, 2, and 3 NRC License Renewal Scoping, Screening, and Aging Management Inspection Report 05000259/2004012 (DRS); 05000260/2004012 (DRS), 05000296/2004012 (DRS) ," January 27, 2005 (ADAMS Accession No. ML05027022)
4. Brookhaven National Laboratory, "Audit and Review Report for Plant Aging Management Reviews and Programs, Browns Ferry Nuclear Plant Units 1, 2, and 3," April 26, 2005 (ADAMS Accession No. ML051180464)
5. U.S. Nuclear Regulatory Commission, "Safety Evaluation Report with Open Items Related to the License Renewal of the Browns Ferry Nuclear Plant, Units 1, 2, and 3," August 2005 (ADAMS Accession No. ML052210484)

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NOTE:
Additional details of this meeting can be obtained from a transcript of this meeting available in the NRC Public Document Room, One White Flint North, 11555 Rockville Pike, Rockville, MD, (301) 415-7000, downloading or view on the Internet at http://www.nrc.gov/reading-rm/doc-collections/acrs/ can be purchased from Neal R. Gross and Co., 1323 Rhode Island Avenue, NW, Washington, D.C. 20005, (202) 234-4433 (voice), (202) 387-7330 (fax), nrgross@nealgross.com (e-mail).

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

September 7, 2005

MEMORANDUM TO: Michael L. Scott, Branch Chief, ACRS/ACNW

FROM: Cayetano Santos, Senior Staff Engineer

SUBJECT: FEDERAL REGISTER NOTICE REGARDING THE JOINT MEETING OF THE ACRS SUBCOMMITTEES ON PLANT LICENSE RENEWAL AND ON PLANT OPERATIONS, SEPTEMBER 21, 2005, ROCKVILLE, MARYLAND

Attached is a Federal Register Notice regarding the subject meeting. Please have this Notice transmitted for publication as soon as possible.

Attachment:
FR Notice

cc with Attachment:
M. Bonaca, ACRS
J. Larkins, ACRS
J. Szabo, OGC
A. Bates, SECY
J. Dixon-Herrity, OEDO
S. Burnell, OPA
R. W. Borchardt, NRR
D. Matthews, NRR
P. Kuo, NRR
M. Chernoff, NRR
M. Marshall, NRR
E. Hackett, NRR
Y. Diaz Sanabria, NRR
R. Subbaratnam, NRR
T. Marsh, NRR
PMNS
Public Document Room

[7590-01-P]

NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
JOINT MEETING OF THE SUBCOMMITTEES ON PLANT LICENSE RENEWAL
AND ON PLANT OPERATIONS

Notice of Meeting

The ACRS Subcommittees on Plant License Renewal and on Plant Operations will hold a joint meeting on September 21, 2005, Room T-2B3, 11545 Rockville Pike, Rockville, Maryland.

The entire meeting will be open to public attendance.

The agenda for the subject meeting shall be as follows:

Wednesday, September 21, 2005 - 8:30 a.m. until 5:00 p.m.

The purpose of this meeting is to gather information regarding the current status and condition of Browns Ferry Unit 1 in preparation for ACRS reviews of the license renewal application for Browns Ferry Units 1, 2, and 3, and the restart of Browns Ferry Unit 1. The Subcommittees will hear presentations by and hold discussions with representatives of the NRC staff, Tennessee Valley Authority, and other interested persons regarding this matter. The Subcommittees will gather information, analyze relevant issues and facts, and formulate proposed positions and actions, as appropriate, for deliberation by the full Committee.

Members of the public desiring to provide oral statements and/or written comments should notify the Designated Federal Official, Mr. Cayetano Santos (telephone 301/415-7270) five days prior to the meeting, if possible, so that appropriate arrangements can be made. Electronic recordings will be permitted.

Further information regarding this meeting can be obtained by contacting the Designated Federal Official between 7:30 a.m. and 4:15 p.m. (ET). Persons planning to attend this meeting are urged to contact the above named individual at least two working days prior to the meeting to be advised of any potential changes to the agenda.

Date: 9/8/05

Michael L. Scott, Branch Chief, ACRS/ACNW

remediated, surveyed and demolished. CY is less than one year from demolishing the administrative building where many of the records are stored and retained. Retaining records associated with non-existent SSCs and a non-existent nuclear power generator is a significant hardship today as records are shuffled between buildings and administrative support personnel are reduced. It will become more of a hardship and cost increase as they must make provisions for offsite storage well in advance of building demolition.

10 CFR 50.12(a)(2)(vi)

"There is present any other material circumstances not considered when the regulation was adopted for which it would be in the public interest to grant an exemption."

First, the cost associated with maintaining records that no longer serve a safety purpose can be significant, particularly for a facility at an advanced stage in the decommissioning process. Decommissioning costs, including record maintenance, are paid by the ratepayers throughout the multi-state region that benefitted from the power produced by the HNP when it was operating. Since HNP is no longer generating electric power and is in decommissioning, the requested records exemption helps towards maintaining a cost-efficient decommissioning.

Second, elimination of these records ensures their future unavailability to individuals and groups interested in adversely affecting commercial nuclear facilities.

4.0 Conclusion

Based on its evaluation, the staff concludes the requirements for a specific exemption in 10 CFR 50.12 have been satisfied.

The staff concludes that the requested exemption from the recordkeeping requirements of 10 CFR Part 50 Appendix A, Criterion 1, 10 CFR Part 50, Appendix B Criterion XVII, and 10 CFR 50.59(d)(3), will not present an undue risk to the public health and safety. The destruction of the identified records will not impact remaining decommissioning activities, plant operations, configuration, and/or radiological effluents, operational and/or installed SSCs that are quality-related or important to safety, or nuclear security.

Further, the staff concludes that the destruction of the identified records is administrative in nature and does not involve information or activities that could potentially impact the common defense and security of the United States.

The staff agrees that an underlying purpose of the record keeping regulations in 10 CFR Part 50, Appendix A, Criterion 1, 10 CFR Part 50, Appendix B, Criterion XVII, and 10 CFR 50.59(d)(3) is to ensure that the NRC staff has access to information in order for the NRC to perform its regulatory functions including inspection and licensing. For example, in the event of any accident, incident, or condition that could impact public health and safety, the records would assist in the protection of public health and safety during recovery from the given accident, incident, or condition, and also could help prevent future events or conditions at the site adversely impacting public health and safety. Because the CY–HNP reactor primary systems, including the reactor vessel, steam generators, pressurizer, reactor coolant pumps and piping, and their associated support systems have been removed for offsite disposal or resale, there are no longer regulatory functions for NRC to perform associated with these systems or components. Thus, the records identified in the exemption would not provide the NRC with information for carrying out its regulatory function. To the extent that CY had sold components, the new user of the components may have need for the associated records, however, that is an issue for the new owner and not a regulatory issue under CY's license.

Therefore, the Commission grants CY the requested exemption to the recordkeeping requirements of 10 CFR Part 50 Appendix A, Criterion 1, 10 CFR 50 Appendix B, Criterion XVII, and 10 CFR 50.59(d)(3), as described in the February 16, 2005, letter. Specifically, pursuant to the requirements of 10 CFR 50.12, CY is exempted from the record retention requirements of 10 CFR Part 50 Appendix A, Criterion I, 10 CFR Part 50 Appendix B, Criterion XVII, and 10 CFR 50.59(d)(3) for: (1) Records pertaining to structures, systems, and components, or activities associated with the nuclear power unit and associated support systems that no longer exist at the CY site; and (2) records pertaining to the spent fuel pool and associated support systems for the safe storage of fuel in the spent fuel pool after the spent nuclear fuel and GTCC has been completely transferred from the spent fuel pool and the spent fuel pool is ready for demolition. This exemption does not apply to any recordkeeping requirements for storage of spent fuel at the CY ISFSI under 10 CFR Part 50 or the general requirements of 10 CFR Part 72. In addition, this exemption does not apply to any records reflecting spills, releases or other information relevant to remaining decommissioning requirements and activities at the CY site.

Pursuant to 10 CFR 51.32, the Commission has determined that the granting of this exemption will not have a significant effect on the quality of the human environment as documented in **Federal Register** (70 FR 53258, September 7, 2005).

This exemption is effective upon issuance.

Dated at Rockville, Maryland, this 9th day of September, 2005.

For the Nuclear Regulatory Commission.

Claudia M. Craig,

Acting Deputy Director, Decommissioning Directorate, Division of Waste Management and Environmental Protection, Office of Nuclear Material Safety and Safeguards.

[FR Doc. E5–5023 Filed 9–14–05; 8:45 am]

BILLING CODE 7590–01–P

NUCLEAR REGULATORY COMMISSION

Advisory Committee on Reactor Safeguards; Joint Meeting of the Subcommittees on Plant License Renewal and on Plant Operations; Notice of Meeting

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The entire meeting will be open to public attendance.

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Wednesday, September 21, 2005—8:30 a.m. until 5 p.m.

The purpose of this meeting is to gather information regarding the current status and condition of Browns Ferry Unit 1 in preparation for ACRS reviews of the license renewal application for Browns Ferry Units 1, 2, and 3, and the restart of Browns Ferry Unit 1. The Subcommittees will hear presentations by and hold discussions with representatives of the NRC staff, Tennessee Valley Authority, and other interested persons regarding this matter. The Subcommittees will gather information, analyze relevant issues and facts, and formulate proposed positions and actions, as appropriate, for deliberation by the full Committee.

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Dated: September 8, 2005.

Michael L. Scott,

Branch Chief, ACRS/ACNW.

[FR Doc. E5–5021 Filed 9–14–05; 8:45 am]

BILLING CODE 7590–01–P

PENSION BENEFIT GUARANTY CORPORATION

Required Interest Rate Assumption for Determining Variable-Rate Premium; Interest Assumptions for Multiemployer Plan Valuations Following Mass Withdrawal

AGENCY: Pension Benefit Guaranty Corporation.

ACTION: Notice of interest rates and assumptions.

SUMMARY: This notice informs the public of the interest rates and assumptions to be used under certain Pension Benefit Guaranty Corporation regulations. These rates and assumptions are published elsewhere (or can be derived from rates published elsewhere), but are collected and published in this notice for the convenience of the public. Interest rates are also published on the PBGC's Web site (*http://www.pbgc.gov*).

DATES: The required interest rate for determining the variable-rate premium under part 4006 applies to premium payment years beginning in September 2005. The interest assumptions for performing multiemployer plan valuations following mass withdrawal under part 4281 apply to valuation dates occurring in October 2005.

FOR FURTHER INFORMATION CONTACT: Catherine B. Klion, Attorney, Legislative and Regulatory Department, Pension Benefit Guaranty Corporation, 1200 K Street, NW., Washington, DC 20005, 202–326–4024. (TTY/TDD users may call the Federal relay service toll-free at 1–800–877–8339 and ask to be connected to 202–326–4024.)

SUPPLEMENTARY INFORMATION:

Variable-Rate Premiums

Section 4006(a)(3)(E)(iii)(II) of the Employee Retirement Income Security Act of 1974 (ERISA) and § 4006.4(b)(1) of the PBGC's regulation on Premium Rates (29 CFR part 4006) prescribe use of an assumed interest rate (the "required interest rate") in determining a single-employer plan's variable-rate premium. Pursuant to the Pension Funding Equity Act of 2004, for premium payment years beginning in 2004 or 2005, the required interest rate is the "applicable percentage" (currently 85 percent) of the annual rate of interest determined by the Secretary of the Treasury on amounts invested conservatively in long-term investment grade corporate bonds for the month preceding the beginning of the plan year for which premiums are being paid. Thus, the required interest rate to be used in determining variable-rate premiums for premium payment years beginning in September 2005 is 4.61 percent (*i.e.*, 85 percent of the 5.42 percent composite corporate bond rate for August 2005 as determined by the Treasury).

The following table lists the required interest rates to be used in determining variable-rate premiums for premium payment years beginning between October 2004 and September 2005.

For premium payment years beginning in:	The interest rate is:
October 2004	4.79
November 2004	4.73
December 2004	4.75
January 2005	4.73
February 2005	4.66
March 2005	4.56
April 2005	4.78
May 2005	4.72
June 2005	4.60
July 2005	4.47
August 2005	4.56
September 2005	4.61

Multiemployer Plan Valuations Following Mass Withdrawal

The PBGC's regulation on Duties of Plan Sponsor Following Mass Withdrawal (29 CFR part 4281) prescribes the use of interest assumptions under the PBGC's regulation on Allocation of Assets in Single-Employer Plans (29 CFR part 4044). The interest assumptions applicable to valuation dates in October 2005 under part 4044 are contained in an amendment to part 4044 published elsewhere in today's **Federal Register**. Tables showing the assumptions applicable to prior periods are codified in appendix B to 29 CFR part 4044.

Issued in Washington, DC, on this 9th day of September 2005.

Vincent K. Snowbarger,

Deputy Executive Director, Pension Benefit Guaranty Corporation.

[FR Doc. 05–18327 Filed 9–14–05; 8:45 am]

BILLING CODE 7708–01–P

SECURITIES AND EXCHANGE COMMISSION

[Investment Company Act Release No. 27060; 812–13134]

Marshall Funds, Inc., et al.; Notice of Application

September 8, 2005.

AGENCY: Securities and Exchange Commission ("Commission").

ACTION: Notice of application for an order under the Investment Company Act of 1940 (the "Act") under: (i) Section 6(c) of the Act granting an exemption from sections 18(f) and 21(b) of the Act; (ii) section 12(d)(1)(J) of the Act granting an exemption from sections 12(d)(1)(A) and (B) of the Act; (iii) sections 6(c) and 17(b) of the Act granting an exemption from sections 17(a)(1) and 17(a)(3) of the Act; and (iv) section 17(d) of the Act and rule 17d–1 under the Act to permit certain joint transactions.

Summary of Application: Applicants request an order that would permit certain registered open-end management investment companies to participate in a joint lending and borrowing facility.

Applicants: Marshall Funds, Inc., M&I Investment Management Corp. ("M&I Investment Management"), and Marshall & Ilsley Trust Company, N.A. ("M&I Trust").

Filing Dates: The application was filed on November 3, 2004, and amended on September 8, 2005.

Hearing or Notification of Hearing: An order granting the application will be issued unless the Commission orders a hearing. Interested persons may request a hearing by writing to the Commission's Secretary and serving applicants with a copy of the request, personally or by mail. Hearing requests should be received by the Commission by 5:30 p.m. on October 4, 2005, and should be accompanied by proof of service on the applicants, in the form of an affidavit or, for lawyers, a certificate of service. Hearing requests should state the nature of the writer's interest, the reason for the request, and the issues contested. Persons who wish to be notified of a hearing may request notification by writing to the Commission's Secretary.

Advisory Committee on Reactor Safeguards
Joint Meeting of the Plant License Renewal and Plant Operations Subcommittees
Browns Ferry Unit 1
September 21, 2005

-PROPOSED SCHEDULE-

Cognizant Staff Engineers: Cayetano Santos Jr. CXS3@NRC.GOV (301) 415-7270
John Lamb JGL1@NRC.GOV (301) 415-6855

Topics	Presenters	Time	Questions to be Addressed[1]
Opening Remarks	Bonaca and Sieber, ACRS	8:30am - 8:35am	
Regulatory Background	B. Crouch, TVA	8:35am - 9:00am	Background for 1, 2, 6, 8
BFN Unit 1 Fidelity with Units 2 and 3	J. Valente and R. Jones, TVA	9:00am - 10:30am	1 - 11, 15, 16
Break		10:30am - 10:45am	
BFN Unit 1 Fidelity with Units 2 and 3 (continued)	J. Valente and R. Jones, TVA	10:45am - 12:30pm	1 - 11, 15, 16
Lunch		12:30pm - 1:30pm	
BFN Unit 1 Fidelity with Units 2 and 3 (continued)	J. Valente and R. Jones, TVA	1:30pm - 2:45pm	1 - 11, 15, 16
Break		2:45pm - 3:00pm	
Extended Power Uprate Impact on License Renewal	R. DeLong and J. McCarthy, TVA	3:00pm - 4:00pm	12
License Renewal Application	R. DeLong and J. McCarthy, TVA	4:00pm - 5:00pm	13
Subcommittee Discussion	Bonaca and Sieber, ACRS	5:00pm - 5:30pm	

NOTE:
- Presentation time should not exceed 50 percent of the total time allocated for a specific item. The remaining 50 percent of the time is reserved for discussion.
- 50 copies of the presentation materials to be provided.

[1]NRC staff responses to questions 14, 15, and 16 will be presented at the Browns Ferry, Units 1, 2, and 3 license renewal subcommittee meeting on October 5, 2005.

QUESTIONS REGARDING BROWNS FERRY UNIT 1
START-UP AND LICENSE RENEWAL

1. Which systems were replaced entirely? Why were they replaced? Which systems were left intact? Which systems were partially replaced? What was the logic/basis for only partially replacing these systems? What is the schedule for future replacements? How much has been completed? How much still needs to be done? Regarding system replacements or partial system replacements, are there firm commitments or just plans? What are the criteria for replacement?

2. Which components were replaced? Why were they replaced? What was the logic and basis for the component replacement? How much has been completed? How much still needs to be done? Are there firm commitments or just plans? What are the criteria for replacement?

3. Discuss maintenance of Unit 1 equipment during the shutdown period. Any unusual aging of systems, structures, and components (SSCs) during the shutdown period? What criteria were used for evaluation? What standards were used?

4. Which equipment was in lay-up? How was the lay-up performed? What standards were used? Were EPRI lay-up guidelines used? If so, what standards were used prior to the issuance of EPRI lay-up guidelines? What kind of inspection was performed on the laid-up equipment? What were the results? What criteria were used for evaluation?

5. What kinds of NDE were performed on equipment, cables, and piping that were not replaced? How did the equipment, cables, and piping fare since 1985? Is there a projection of when that equipment, cables, and piping would need to be replaced? Are the projections by analysis or engineering judgment?

6. Over the years since Unit 1 has been shut down, most of the BWR fleet has been modified in significant ways. Will Unit 1 be modified to incorporate these changes? (e.g., Materials? 316 L in recirc lines or MSIP or what? Core spray and RWCU system materials? Capping of CRD return line? Removal of LPCI loop selection logic? RWCU Pump and piping modifications? Will there be Hydrogen water chemistry? Noble metals?) Will there be Alternate rod injection? What work and/or inspections have been performed on the Shroud? Will Unit 1 implement the programs associated with the BWR Vessel and Internals Project (BWRVIP)? Explain the status of implementing BWRVIP programs.

7. How are the operators and other permanent staff being expanded to cover the additional requirements of a third unit (Unit 1)? How is the training for the additional crew members being provided? Is it a completely new crew or upgraded crew from Units 2 and 3? What are the major differences between Units 1, 2, and 3? EPGs are plant specific and were developed after Unit 1 was shut down. What EPGs are being used?

8. Is Unit 1 being modified in any significant way from Units 2 and 3? If so, will these modifications be incorporated into Units 2 and 3? When will the simulator be modified? Which unit will it replicate?

9. Is Unit 1 in a separate security/radiological area from 2 and 3? Do permanent plant

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

SUBCOMMITTEE MEETING ON PLANT LICENSE RENEWAL/PLANT OPERATIONS

September 21, 2005
Date

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NAME	AFFILIATION
William D. Crouch	TVA
Henry L. Jones	TVA
Joe McCarthy	TVA
Richard A DeLong	TVA
Kenneth A. Brune	TVA
David Burrell	TVA
Thomas J. McGrath	TVA
Rick Cutsinger	TVA
Joe Valente	TVA
Steven Doty	FENOC - Beaver Valley
Kathryn Sutton	Morgan Lewis
Robert G Jones	TVA
Craig Bowley	TVA
Robert J. Moll	TVA

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

SUBCOMMITTEE MEETING ON PLANT LICENSE RENEWAL/PLANT OPERATIONS

September 21, 2005
Date

NRC STAFF SIGN IN FOR ACRS MEETING

PLEASE PRINT

NAME	NRC ORGANIZATION
Yaira Diaz	NRR /RLEP
Ram Subbaratnam	NRR/DRIP/RLEP.
Kiyoto TANABE	NRR\DRIP\RLEP.\NISA Assignee
SAMSON LEE	NRR/DRIP/RLEP
Margaret Chernoff	NRR/DLPM/PDII-2
Eva Brown	NRR/DLPM/PDII-2
Jeremy Rapp	NRR/DLPM/PDII-2
Gabriel Taylor	NRR /DLPM / PDIV-1
Jim Strnisha	NRR/DE/EMEB
R. Auluck	NRR/DRIP/RLEP
M. HEATH	NRR/DRIP/RLEP
Ed Hackett	NRR /DLPM
Richard McNally	NRR/DE/EMEB
Ganesh Cheruvenki	NRR/DE/EMCB
BARRY ELLIOT	NRR/DE/EMCB
Bill Rogers	NRR/DIPM
Louise Lund	NRR/DE/EMCB
Pei-Ying Chen	NRR/DE/EMEB
Naeem Iqbal	NRR/DSSA/SPLB
P T Kuo	NRR/DRIP/RLEP
KAMAL NAIDU	NRR/DIPM
R PETTIS	NRR/DIPM

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

SUBCOMMITTEE MEETING ON PLANT LICENSE RENEWAL/PLANT OPERATIONS

September 21, 2005
Date

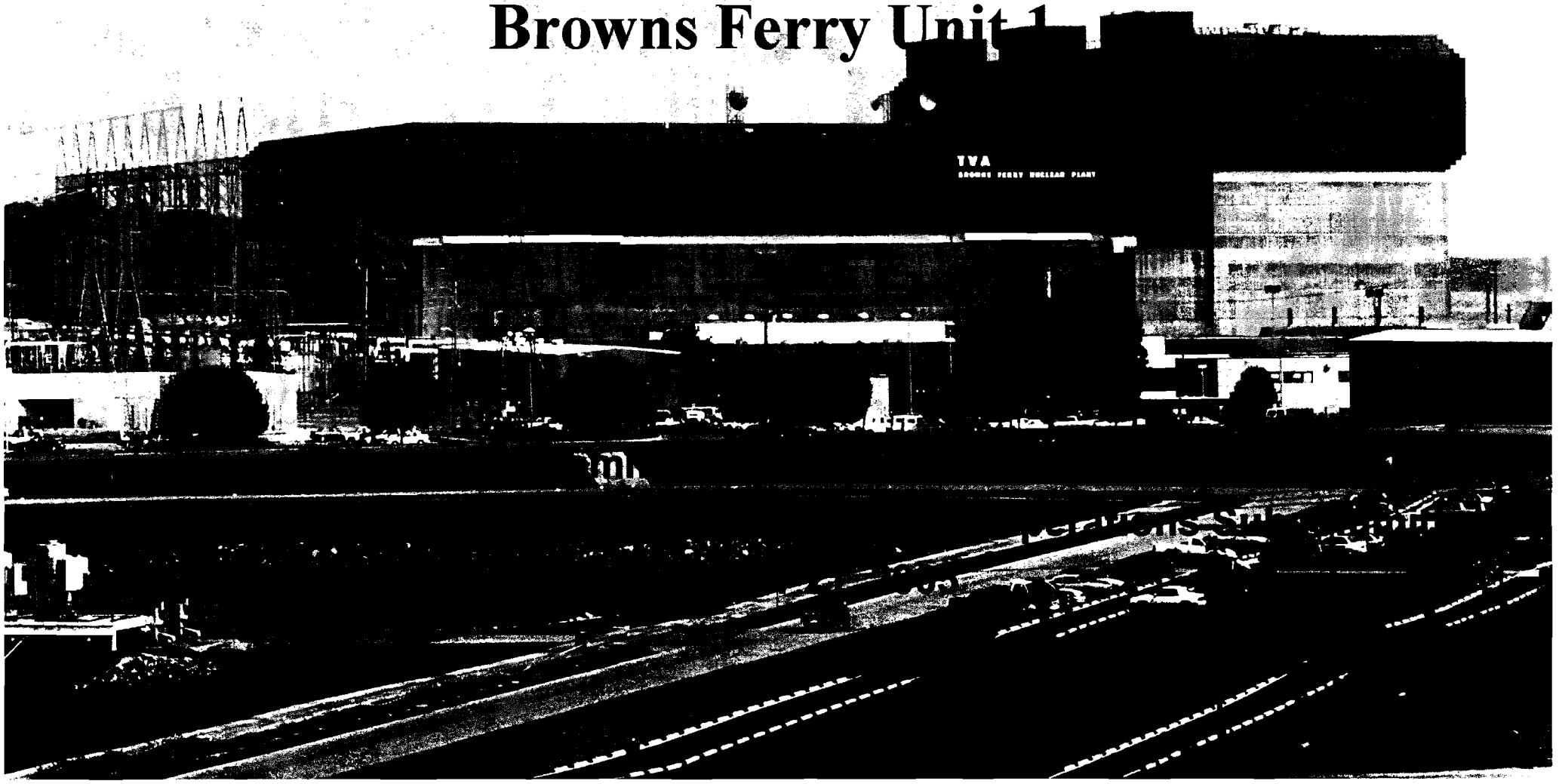
NRC STAFF SIGN IN FOR ACRS MEETING

PLEASE PRINT

NAME	NRC ORGANIZATION
G. CRANSTON	NRR/DRIP/RLEP
Jih-Sien Guo	NRR/DSSA/SPLB
DEVENDER K. REDDY	NRR/DSSA/SPLB
Bob Wolfgang	NRR/DSSA/SPLB

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT

Browns Ferry Unit 1



Agenda

- Regulatory Background
- Browns Ferry Unit 1 Fidelity with Units 2 and 3
- License Renewal Application
- Extended Power Uprate Impact on License Renewal

Summary

- Three Major NRC Approval Issues
  - License renewal at current power
  - Extended Power Uprate
  - Unit 1 restart
- Plan for Integration of the Three Issues Coordinated with NRC Staff
- ACRS Approval Needed for License Renewal Application and Extended Power Uprate
- NRC Staff Approval Required for Unit 1 Restart, License Renewal Application, Extended Power Uprate
- Final NRC Approval Required for Unit 1 Restart (NRR and Region II Administrator)

Regulatory Background

- All Three BFN Units are General Electric Boiling Water Reactor 4, with a Mark I Containment
- Designed and Constructed by TVA
- Units 1 and 2 Licensed in 1973 and 1974, Respectively
- Both Units Shutdown after March 22, 1975 Fire
- Units 1 and 2 were Returned to Service in 1976 and Operated until 1985
- Unit 3 Licensed in 1976 and Operated until 1985
- Approximate Years of Operation
  - Unit 1 – 10
  - Unit 2 – 23
  - Unit 3 – 18

Regulatory Background

- All Three BFN Units, Shutdown in March 1985, Because of Regulatory and Management Issues
  - NRC issued a "show cause" letter for all TVA nuclear plants in September 1985, under 10 CFR 50.54 (f), and requested TVA to specify corrective actions
  - TVA submitted the Nuclear Performance Plan in August 1986. It outlined the steps needed to restart the units.
    - Management and organizational changes
    - Process and program improvements
    - Special programs
  - TVA committed to obtain NRC approval prior to restart of any unit

Regulatory Background

- TVA Implemented the Unit 2 Restart Plan, Obtained NRC Approval, and Restarted Unit 2 in May 1991
- TVA Proposed Regulatory Framework for Restart of Units 1 and 3 in July 1991, Outlining Improvements to the Unit 2 Restart Plan Based on Lessons Learned from the Unit 2 Restart
- NRC Approved the Regulatory Framework in April 1992
- Unit 2 was Removed from the "Problem Plant List" in June 1992
- TVA Implemented the Unit 3 Restart Plan, Obtained NRC Approval, and Restarted Unit 3 in November 1995

Regulatory Background

- NRC Removed Units 1 and 3 from the "Watch List" in June 1996. Unit 1 Removal was Based on TVA Commitments to:
  - Implement the same special programs employed for Unit 3 restart
  - Not to restart Unit 1 without NRC approval
- First of Four Consecutive INPO 1 Ratings Received in 1998
- TVA Board of Directors Decided in May 2002, to Restart Unit 1 after Detailed Study and Supplemental Environmental Impact Statement

Regulatory Background

- TVA Submitted a Proposed Update to the Regulatory Framework for Unit 1 in December 2002
  - Addressed regulatory requirements (outstanding Bulletins, Generic Letters and Three Mile Island items deferred for Unit 1), special programs, commitments, and Technical Specification changes to be completed for restart
- Unit 1 NRC Oversight Governed by Manual Chapter 2509 "Browns Ferry Unit 1 Restart Project Inspection Program"
  - Applicable to Unit 1 through restart until all cornerstones are monitorable under the reactor oversight process
  - Establishes restart oversight panel (tentatively scheduled to begin in Fall 2005) to provide recommendation to Region II Regional Administrator and Director of Nuclear Reactor Regulation on Unit 1 restart approval

Regulatory Background

- License Renewal Application Submitted December 31, 2003 for Units 1, 2, and 3
  - Consistent with Generic Aging Lessons Learned
  - Applies to current licensed thermal power of each unit
- License Renewal Approval Expected in June 2006
- Extended Power Uprate Application Submitted June 28, 2004 for Unit 1 and June 25, 2004 for Units 2 and 3
  - Consistent with General Electric's Extended Power Uprate Topical Reports
  - Incorporated all lessons learned and requests for additional information from previous industry Extended Power Uprate applications
  - Separate submittal for Unit 1 since Units 2 and 3 previously uprated 5%
- Extended Power Uprate Approval Expected Prior to Unit 1 Restart (May 2007)

Unit 1 Project Objective

- Maximize Unit Fidelity
  - Utilize existing BFN design criteria, design process, design calculations
  - Utilize TVA procedures, programs, and processes *(Procurement, Work Control, Nuclear Performance Plan)*
  - Scope of Unit 1 restart project incorporated
    - The same restart programs as Units 2 and 3
    - Upgrades installed on Units 2 and 3 since restart
    - Capital projects on the Units 2 and 3 five-year plan through May 2007, including Extended Power Uprate and License Renewal
  - Unit 1 will be operationally the same as Units 2 and 3 (same systems, equipment, operating procedures, Technical Specifications, Updated Final Safety Analysis Report)
    - Obsolete equipment replacement
    - Extended Power Uprate lead unit
    - Deletion of Low Pressure Coolant Injection Motor Generator sets
    - Outage modifications sequence
- Return Unit 1 in a Better Condition than when it was Originally Licensed

Unit 1 Project Description

- Summary of Unit 1 Major Issues
  - Nuclear Performance Plan
    - °Component and piece part qualification
    - °Containment coatings
    - °Environmental Qualification
    - °Flexible conduit
    - °Instrument sensing lines
    - °Moderate energy line breaks
    - °Seismic design
    - °Design Baseline Verification Program
    - °Electrical issues
    - °Fire Protection – Appendix R
    - °Fuse Program
    - °Intergranular Stress Corrosion Cracking
    - °Restart test
  - Performance upgrades
  - License Renewal
  - Extended Power Uprate

Unit 1 Project Description

- Other
  - Station blackout
  - Anticipated Transient Without Scram Rule
  - BWRVIP
  - Generic Letters – 24
  - Bulletins – 14
  - Three Mile Island action items – 11
  - Technical Specification changes – 21

Unit 1 Project Description

- Lay-up Program
  - Purpose
    - Preserve the asset for potential restart of the unit
  - Criteria
    - EPRI NP-5106, "Sourcebook for Plant Layup and Equipment Preservation", Revisions 0 (1987) and 1 (1992)
  - Types of layup
    - Dry
      - Systems
      - Components
    - Wet

Unit 1 Project Description

- Systems in Layup
  - Dry
    - Core Spray
    - Reactor Core Isolation Cooling
    - High Pressure Coolant Injection
    - Residual Heat Removal
    - Condensate
    - Feedwater
    - Off Gas
    - Main Steam
  - Wet
    - Reactor Vessel
    - Recirculation
    - Control Rod Drive
- Results met or exceeded EPRI Guidelines
- No credit was taken for the lay-up program in determining the acceptability of structures, systems, or components for Unit 1 restart

Unit 1 Project Description

- Assessment of Unit 1 Condition
  - Identified attributes of structures, systems, and components necessary for engineering analysis to ensure design criteria and standards met
  - Performed walk downs and ultrasonic inspections of Nuclear Steam Supply Systems and Balance of Plant Systems
  - Additional visual inspections were performed during component replacement / refurbishment
  - Remote inspections of Core Spray, Residual Heat Removal pump suction, steam lines

Unit 1 Project Scope

- 39 Unit 1 Mechanical Systems in Scope of Unit 1 Recovery
- 47 Unit 1 Mechanical Systems in Scope of License Renewal
- 1 System Completely Replaced
- 33 License Renewal Systems Partially Replaced / Modified
  - 35% of large bore piping replaced
  - 25% of small bore piping replaced
  - 15% of valves replaced
- 8 Systems in Operation to Support Units 2 and 3
- List of Modifications
- Three Example Systems
  - High Pressure Coolant Injection
  - Reactor Water Cleanup
  - Feedwater

High Pressure Coolant Injection

- Function of System
  - The High Pressure Coolant Injection System provides core cooling / injection for small breaks and depressurizes the reactor coolant systems to allow low-pressure coolant injection and core spray flow.
  - Provides reactor vessel make-up, pressure control, and decay heat removal during transient events
- Modifications to System
  - Replace various cables, relays, pressure switches, and transmitters to resolve environmental qualification, separation, and breakage issues
  - Replace valves and motors for environmental qualification and Generic Letter 89-10 Motor Operated Valve testing requirements
  - Refurbish / upgrade GE supplied High Pressure Coolant Injection turbine / pump skid to include impeller replacement and seismic requirements

Reactor Water Cleanup

- Function of System
  - Maintains high reactor-water purity to limit corrosion, chemical interactions, fouling, and deposition on reactor heat transfer surfaces
  - Removes corrosion products to limit impurities available for activation by neutron flux and the resultant radiation from deposition of corrosion products
  - Provides a means for removal of water from the reactor vessel during normal operations
- Modifications to System
  - Remove and replace process piping
  - Replace Motor Operated Valves for GL 89-10 requirements
  - Replace pumps and regenerative heat exchangers
  - Reroute flow to the reactor water cleanup pump suction resulting in lower temperature water entering the pumps
  - Replace instrumentation

Feedwater

- Function of System
  - Provides water at an elevated temperature to the reactor vessel during normal plant operations
- Modifications to System
  - Replace valves due to stellite content
  - Install Digital Feedwater Control system
  - Install zinc injection passivation system
  - Replace Reactor Vessel Level Indicating System reference and sensing lines
  - Replace rotors on feedwater pump turbines to support Extended Power Uprate conditions
  - Replace reactor feedwater pumps, pump / turbine couplings, bearing temperature, and vibration monitoring instrumentation to accommodate increased flows for Extended Power Uprate

Unit 1 Project Scope

- Long-Term Passive Component Replacements
  - Condenser tubes
  - Extraction steam piping
  - Turbine cross-over / cross-under piping
  - Reactor Building Closed Cooling Water heat exchangers
  - Drywell structural steel and electrical penetrations
  - Large and small bore piping
  - Reactor Pressure Vessel safe ends
  - Residual Heat Removal Service Water piping in the Reactor Building

Unit 1 Project Scope

- Long-Term Passive Component Replacements
  - Drywell coolers
  - Cable tray, conduit, and support installation
  - Pipe hanger installation
  - GE in-vessel inspections
  - Torus coatings
  - Cables

Unit 1 Project Scope

- Other Modifications / Refurbishments
  - Control Room Design Review modifications
  - Recirculation pump variable frequency drives
  - Digital Electro-Hydraulic Control system
  - Main generator rewind and rotor balanced
  - Close in-fault protection in switchyard
  - Common accident signal
  - Reactor Core Isolation Cooling turbine reassembly and upgrade
  - Refueling bridge crane modifications
  - Large pump and motor refurbishment
  - Valve replacement / refurbishment

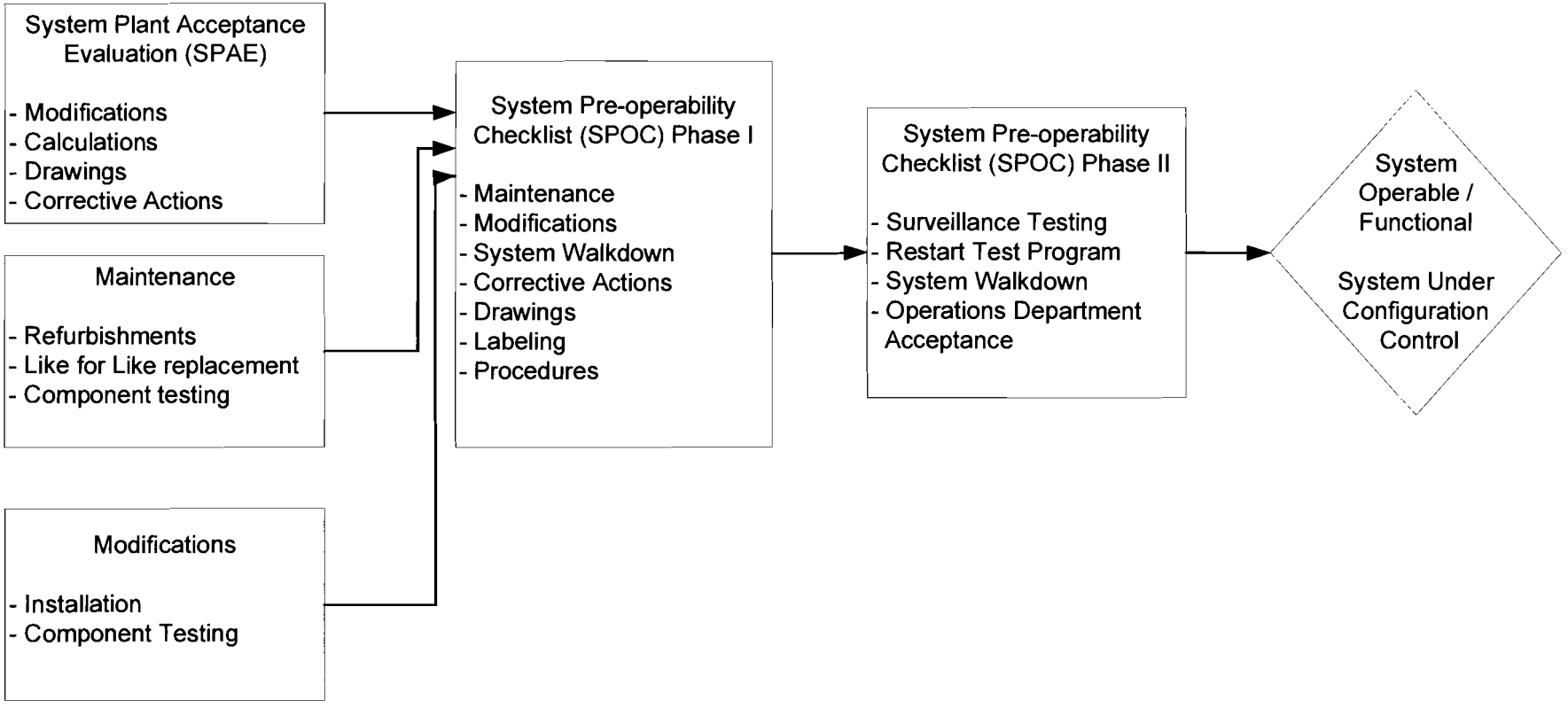
Unit 1 Project Scope

- Extended Power Uprate
  - Approximately 40 modifications to be discussed later
- License Renewal
  - No modifications required

System Return to Service Process

- Process to Ensure all Tasks are Completed Prior to Return to Service
  - Engineering
  - Maintenance
  - Modifications
  - Operations
  - Licensing
- Same Process as used on Units 2 and 3
- Six Systems Returned to Operation

System Return to Service Process



Restart Test Program

- Purpose – to Verify that Systems are Capable of Meeting Safe Shutdown Requirements for Each Mode of Operation as Defined by the Safe Shutdown Analysis
- Verify Design and Operation of Plant are within Licensing Basis
- Commitment to NRC to Test Safety Related Modes of Systems
- Non-safe Shutdown Functions Tested by Post Modification Tests / Component Tests
- Restart Test Program the Same as Performed on Units 2 and 3
- Significant Oversight of Testing by Nuclear Assurance, Restart Test Group, Plant Operations Review Committee, Nuclear Safety Review Board, and NRC

High Pressure Coolant Injection

- Post Modification Testing, Calibrations, Surveillances
  - Valve stroking and timing
  - Leak testing
  - Component calibrations
  - Cold quick start
  - Vessel injection test and tuning
- Restart Test Program Requirements Based on System Modes
  - Automatic High Pressure Coolant Injection system initiation on low water level or high drywell pressure. Includes auto transfer from condensate storage tank to suppression pool and verification of turbine stop valve closure on high reactor water level and that subsequent low water level will open stop valve.
  - Verify system minimum flow rate on auto initiation signal
  - Verify minimum flow bypass valve function and flow
  - Close High Pressure Coolant Injection steam supply on isolation signals

Reactor Water Cleanup

- Post Modification Testing, Calibrations, Surveillances
  - Functional testing of Reactor Water Cleanup pump interlocks
  - Valve stroking and timing
  - Local leak rate testing
  - Component calibrations
- Restart Test Program Requirements Based on System Modes
  - Close isolation valves on Primary Containment Isolation signal
  - Close isolation valves on Standby Liquid Control Initiation
  - Close isolation valves on high area temperature signal

Feedwater

- Post Modification Testing, Calibrations, Surveillances
  - Functional test and tuning of Digital Feedwater Control system
  - Functional test of reactor feedwater pumps and turbines
  - Functional test of zinc passivation system
  - Component calibrations
  - System leak test
  - Valve test for instrument line excess flow check valves
- Restart Test Program Requirements Based on System Modes
  - Verify pressure and water level signals to Reactor Protection System, Emergency Core Cooling Systems, Primary Containment Isolation System, Main Steam System, Feedwater Control System (main turbine and feedwater turbine trip), Recirculation System (Anticipated Transient Without Scram / Alternate Rod Injection), Diesel Generator start, and Automatic Depressurization System
  - System piping vibration test at full power

Integrated/Power Ascension Test Program

- Phase 1 Testing
  - Source Range Monitor and Intermediate Range Monitor testing
  - Control Rod Drive testing
  - Containment integrated leak testing
  - Reactor Pressure Vessel hydrostatic testing
  - High Pressure Coolant Injection and Reactor Core Isolation Cooling runs on auxiliary boiler
  - Backup control panel testing
- Management Assessment of Test Results with Plant Operations Review Committee and Plant Manager Approval Prior to Proceeding

Integrated/Power Ascension Test Program

- Phase 2 Testing (< 55% Power)
  - Initial criticality and shutdown margin testing
  - Source Range Monitor and Intermediate Range Monitor overlap
  - Thermal expansion walk downs
  - Reactor feedwater pumps overspeed testing and balancing
  - High Pressure Coolant Injection and Reactor Core Isolation Cooling testing
  - Safety relief valve cycling
  - Electrohydraulic control tuning / testing
  - Turbine roll / balancing
  - Core thermal limits / computer testing
  - Local Power Range Monitor calibrations
  - Average Power Range Monitor calibrations
  - Scram time testing
  - Reactor scram
- Management Assessment of Test Results with Plant Operations Review Committee and Plant Manager Approval Prior to Proceeding

Integrated/Power Ascension Test Program

- Phase 3 Testing (55% to 83%)
  - Reactor Feedwater Pump tuning / testing
  - Recirculation pump variable frequency drive tuning / testing
  - Electrohydraulic control tuning / testing
  - Recirculation flow calibration
  - High Pressure Coolant Injection and Reactor Core Isolation Cooling vessel injection and tuning
  - Recirculation pump variable frequency drive runback test

- Management Assessment of Test Results with Plant Operations Review Committee and Plant Manager Approval Prior to Proceeding

Integrated/Power Ascension Test Program

- Phase 4 Testing (83% to 100%)
- Performed in Plateaus of 2% to 5%
- Management Assessment at Each Plateau with Plant Operations Review Committee and Plant Manager Approval Prior to Proceeding
- Consists of the Following Testing at Each Plateau
  - Core power distribution
  - Pressure Regulator testing
  - Feedwater System testing
  - Process computer – heat balance and thermal limits verification
  - Reactor Vessel Water Level verification
  - Drywell Atmosphere Cooling System
  - Reactor Building Closed Cooling Water and Raw Cooling Water System monitoring
  - Radiation level monitoring
  - Reactor Pressure Vessel / Feedwater Chemistry monitoring
  - Off gas release monitoring
  - Main Steam Line moisture content monitoring
  - Main Steam, Feedwater, and Recirculation piping vibration monitoring

Large Scale Transient Testing

- No Large Transient Testing to be Performed
  - System functions / actuations tested by comprehensive component and system testing
  - Large scale transient system effects essentially decayed prior to mitigating system actuations
  - Large scale transient at operating conditions not as severe as licensing basis analytical transients
- Minimal Benefit from Test does not Justify the Risk

Other Items

- Three Unit Staffing
- Simulators
- Unit Separation

License Renewal

- Units 1, 2, and 3 License Renewal Application Submitted December 31, 2003
- License Renewal Application at Current Licensed Thermal Power for each Unit
- License Renewal Application Consistent with Generic Aging Lessons Learned
- License Renewal Application Results in 39 Aging Management Programs

Status

- Application Submitted on December 31, 2003
  - Requests for additional information:
    - Total: 230
    - For Unit 1: 30
  - Draft SER with open items issued on August 9, 2005
    - OI-2.4-3 (Section 2.4 - Drywell Shell Corrosion)
    - OI-4.7.7 (Section 4.7.7 - Stress Relaxation of the Core Plate Hold-Down Bolts) – TVA letter dated September 6, 2005

License Renewal
Aging Management Programs

- 39 Aging Management Programs Total
  - 38 are common to Units 1, 2, and 3
  - 1 is for only Unit 1 (i.e., Unit 1 Periodic Inspection Program)
- 12 Existing Aging Management Programs Require no Enhancement Since Consistent with Generic Aging Lessons Learned
- 10 Existing Aging Management Programs Require Enhancing for all Units in Order to Comply with Generic Aging Lessons Learned
- 11 Existing Aging Management Programs Revised to Include Unit 1. Already Consistent with Generic Aging Lessons Learned
- 6 New Aging Management Programs

License Renewal
Aging Management Programs

- Existing Aging Management Programs Requiring No Enhancement
  - 10 CFR 50 Appendix J Program
  - Above ground Carbon Steel Tanks Program
  - ASME Section XI Inservice Inspection Subsections IWB, IWC, and IWD Program
  - ASME Section XI Subsection IWE Program
  - ASME Section XI Subsection IWF Program
  - Bolting Integrity Program
  - BWR Control Rod Drive Return Line Nozzle Program
  - Diesel Starting Air Program
  - Fuel Oil Chemistry Program
  - Inspection of Overhead Heavy Load and Light Load Handling Systems Program
  - Reactor Head Closure Studs Program
  - Systems Monitoring Program

License Renewal
Aging Management Programs

- Existing Aging Management Programs Requiring Enhancement in Order to Comply with Generic Aging Lessons Learned (All Units)
  - Buried Piping and Tanks Inspection Program
  - BWR Vessel Internals Program
  - Compressed Air Monitoring Program
  - Electrical cables not subject to 10 CFR 50.49 Environmental Qualification requirements used in Instrumentation Circuits Program
  - Fatigue Monitoring Program
  - Fire Water System Program
  - Inspection of Water-Control Structures Program
  - Masonry Wall Program
  - Reactor Vessel Surveillance Program
  - Structures Monitoring Program

License Renewal
Aging Management Programs

- Existing Aging Management Programs Consistent with Generic Aging Lessons Learned Requiring Revision to Incorporate Unit 1
  - BWR Feedwater Nozzle Program
  - BWR Penetrations Program
  - BWR Reactor Water Cleanup System Program
  - BWR Stress Corrosion Cracking Program
  - BWR Vessel Inside Diameter Attachment Welds Program
  - Chemistry Control Program
  - Closed-Cycle Cooling Water System Program
  - Compressed Air Monitoring Program
  - Environmental Qualification Program
  - Flow-Accelerated Corrosion Program
  - Open-Cycle Cooling Water System Program

License Renewal
Aging Management Programs

- New Aging Management Programs (for all Three Units)
  - Accessible Non-Environmental Qualification Cables and Connections Inspection Program
  - Bus Inspection Program
  - Inaccessible medium voltage cables not subject to 10 CFR 50.49 Environmental Qualification Requirements Program
  - One-Time Inspection Program
  - Selective Leaching of Materials Program
- New Aging Management Program (Unit 1 Only)
  - Unit 1 Periodic Inspection Program

Unit 1 Periodic Inspection Program

- Targeted Unit 1 Periodic Inspections will be Performed after Unit 1 is Returned to Operation to Verify Aging Management Program Effectiveness for Piping that was not Replaced and to Verify no Additional Aging Effects are Occurring

- The Targeted Periodic Inspection Sample Locations will be a Subset of Non-Replaced Piping Locations Inspected for Restart

- The Periodic Inspections will be Performed Prior to Period of Extended Operation

Appendix F (Unit 1 Differences)

- The Basic TVA Principle for the Unit 1 Restart is that all Three BFN Units will be Operationally Identical upon Completion of Unit 1 Restart Activities
- To Meet this Principle, the Unit 1 Current Licensing Basis at Restart to be the Same as the Current Licensing Basis of Units 2 and 3
- Appendix F to the License Renewal Application Describes the Differences Between Unit 1 and Units 2 and 3
- These Differences will be Eliminated Prior to Unit 1 Restart

Appendix F (Unit 1 Differences)

- Appendix F Delineates 13 Areas of Difference
  - Main Steam Isolation Valve alternate leakage treatment
  - Containment Atmosphere Dilution System modifications
  - Fire Protection Program
  - Environmental Qualification Program
  - Intergranular Stainless Steel Stress Corrosion Cracking
  - BWRVIP Inspection and Flaw Evaluation Guidelines implementation
  - Anticipated Transients Without Scram
  - Reactor Vessel Head Spray removal
  - Hardened Wetwell Vent
  - Service Air and Demineralized Water Primary Containment Penetrations
  - Auxiliary Decay Heat Removal System
  - Maintenance Rule implementation
  - Reactor Water Cleanup System

Operating Experience

- 10 CFR 54.17(c):

  An application for a renewed license may not be submitted to the Commission earlier than 20 years before the expiration of the operating license currently in effect.

- Unit 1 Met This Requirement

- License Renewal Statement of Considerations (1991)
  - Provides the basis for the 20 years
  - Operating Experience not limited to that of the License Renewal Applicant
  - Regulatory history demonstrates that 20 years of plant specific Operating Experience not required by NRC

Operating Experience

- License Renewal Statement of Considerations
  - NRC indicated willingness to consider plant specific exemptions for application seeking license renewal prior to 20 years before license expires

- Schedular Exemptions Granted by the NRC to 10 CFR 54.17(c)
  - Progressive expansion of scope of Operating Experience justification for such exemptions
    - Reliance on Operating Experience of sister units, other utilities' similar units, and industry wide experience

Operating Experience

- Unit 1 has 10 Years of Operation
- Unit 2 and Unit 3 Operating Experience is Applicable to Unit 1
- Unit 3 Shutdown for 10 Years
  - Extensive layup experience with Unit 3 directly applicable to Unit 1
  - No post-layup aging effects during 10 years of ensuing operation
- Layup Experience from Unit 3 Incorporated into Unit 1 Recovery
  - RHR service water
  - Small bore piping
- Unit 1's Design, Configuration, Operating Procedures, Technical Specifications, and Updated Final Safety Analysis Report Identical to Unit 2 and Unit 3
- Unit 1's Licensing Basis will be the same as that of Unit 2 and Unit 3 at Restart (Appendix F)
- Unit 1 Periodic Inspection Program

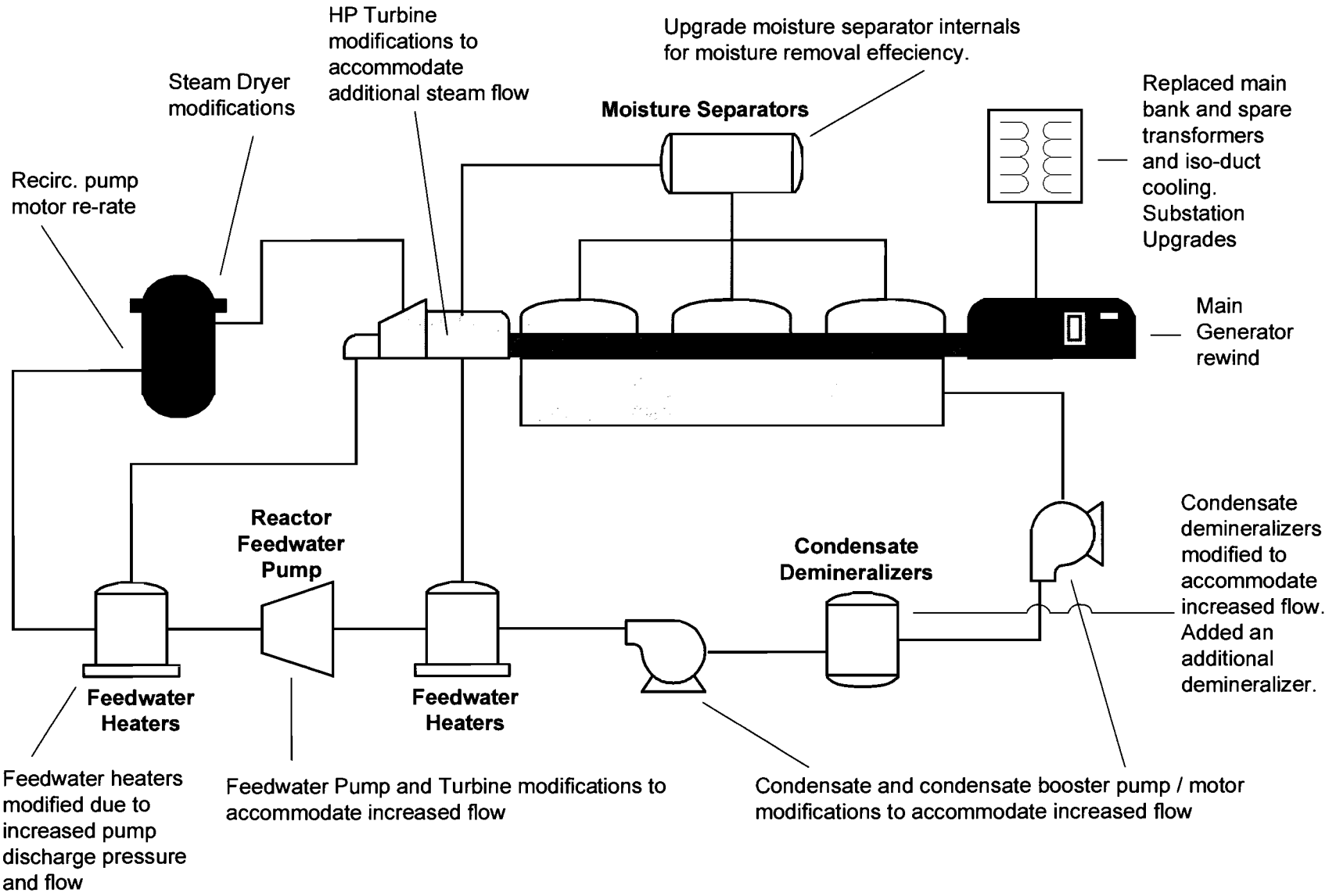
Extended Power Uprate Impact on License Renewal

- Extended Power Uprate Applications Prepared Using GE's Extended Power Uprate Licensing Topical Reports (ELTR1 and ELTR2)
- Submittals Provided Information Requested in NRC RS-001, "Review Standard For Power Uprates," Issued December 2003
- Included Information to Address Request for Additional Information Received on Other Plant Dockets
- BFN Unit 1 – GE14 Fuel
- BFN Units 2 and 3 – FANP A-10 Fuel

BFN Extended Power Uprate

	BFN Unit 1	BFN Units 2 & 3
Original Thermal Power	3293 MWt	3293 MWt
Current Thermal Power	3293 MWt	3458 MWt (5% Uprate)
Requested Thermal Power	3952 MWt	3952 MWt
RPV Pressure	30 psi increase	No change (30 psi increase with prior 5% uprate)
Operations	Operationally the same upon implementation of Extended Power Uprate in all three units.	

Modifications Overview



System Effects for Normal Operation

System	Parameter Increases
Main Steam	Steam Flow, Moisture Content
Extraction Steam	Steam Flow, Moisture Content
Heater Drains and Vents	Liquid Flow, Steam Flow
Condensate	Liquid / Steam Flow, Pressure
Feedwater	Liquid Flow, Pressure
Recirculation	Flow, Pump Motor Electrical Load
Primary Containment / Drywell Coolers	Heat Load
Electrical Distribution	Electrical Output
Electrical Supply	Electrical Load
Iso-phase Bus	Air Flow
Reactor Vessel	Steam Flow
Personnel and Equipment Dose Rates	Dose Rate

- No New Aging Management Programs Required to Monitor or Manage These Effects

System Effects for Normal Operation

- Summary
  - Impact of Extended Power Uprate monitored by existing Aging Management Programs such as Flow Accelerated Corrosion Program
  - Extended Power Uprate submittal has been accepted by NRC staff for review with target approval date in Spring 2007
  - ACRS review of Extended Power Uprate as part of Extended Power Uprate submittal and will consider impact on License Renewal

Summary

- Three Major NRC Approval Issues
  - License Renewal at current power
  - Extended Power Uprate
  - Unit 1 restart
- Plan for Integration of the Three Issues Coordinated with NRC Staff
- ACRS Approval Needed for License Renewal Application and Extended Power Uprate
- NRC Staff Approval Required for Unit 1 Restart, License Renewal Application, Extended Power Uprate
- Final NRC Approval Required for Unit 1 Restart (NRR and Region II Administrator)

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY NUCLEAR PLANT

DESCRIPTION OF MODIFICATIONS PLANNED FOR UNIT 1 RESTART

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
SEPTEMBER 21, 2005

Description of Modifications Planned for Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Main Steam DCN 51112	Provide a seismically rugged alternative leakage treatment (ALT) path for MSIV leakage during a postulated LOCA.	Y
Main Steam DCN 51136	Add capability to place a standby Steam Jet Air Ejector (SJAE) into service from Unit 1 Control Room. Replace various instruments including Main Steam Line pressure transmitters, High Pressure (HP) Turbine 1st stage pressure transmitters, HP and Low Pressure (LP) Steam Flow Transmitters to Reactor Feedwater Pump Turbines, Steam Pressure Indicators to the Steam Jet air Ejectors (SJAEs), Control Valve Steam Chest Pressure Transmitter, Main Steam (MS) Header Pressure Transmitter, Steam Seal Header Pressure Transmitter, High Pressure Turbine Exhaust Pressure Transmitter, and Steam Pressure to Low Pressure Turbine A Transmitter. Replace Main Steam Line Tunnel Leak Detection Temperature Switches with new switches including EQ quick disconnects to prevent moisture intrusion. Install mounting brackets and supports for linear variable differential transformers (LVDTs) used to monitor steady-state vibration of MS piping outside containment during power ascension up to Extended Power Uprate conditions. Provide addition of Auxiliary Boiler steam supply to (SJAE) pressure switches (1-PS-012-80A & -80B), add root valves for new pressure switches, and add interlocks from Auxiliary Steam to SJAE shutoff valves.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Main Steam DCN 51143	Modify and update the four inboard MSIVs by providing new poppet design, new larger stem, new bonnet, new bolting design, new larger actuator, spring housing modification, adapter plate for solenoid control panel, new limit switches (LS-1 & LS-5), and redesigned switch mounting plate to support EPU. Adjust inboard MSIV position limit switch (LS-5) from the 90% open position to the 85% open position per General Electric Service Information Letter (GE SIL) 568. Replace Main Steam Drain Isolation Valve (MSDIV) FCV-1-55, with an equivalent Flowserve valve due to higher leakage trends in Local Leak Rate Tests (LLRTs). Replace the MSDIV motor actuator with a new environmentally qualified motor (GL 89-10). Replace (4) Main Steam Relief Valve (MSRV) bodies with new bodies and new pilot assemblies. Install nine new pilot assemblies on existing bodies. Replace threaded couplings with socket welded couplings in MSRV tailpipes and install new temperature elements in new welded thermowells. Replace existing Main Steam (MS) System cables with new Class 1E and 10CFR50.49 (EQ) qualified cables between the Electrical Penetration Assemblies (EPA) and the Main Steam System components (inboard MSIV limit switches, MSRV pressure control valves and thermocouples, and MSDIV motor actuator and limit switches). Six (6) of the thirteen (13) Main Steam Relief Valves (MSRVs) are associated with the Automatic Depressurization System (ADS) portion of the Main Steam (MS) System (1-PCV-1-5, -19, -22, -30, -31, and -34). Re-label conduit/cables associated with the ADS MSRVs with the 'IS1' suffix. (Cable/conduit associated with the High Pressure Coolant Injection (HPCI) System will be labeled with the 'IS2' suffix per DCN 51150.) Calculation ED-Q0001-920589, (Division I Cables Requiring Separation to Maintain HPCI-ADS Independence Plus Significant ADS Modifications) has been issued to support this change. Replace the mechanical portion of the Standby Liquid Control (SLC) system inside the drywell consisting of (4) valves (1-SHV-63-12, -538, -539, & 1-CKV-63-526).	Y
Main Steam DCN 51162	Replace equivalent MSRV acoustic monitors, acoustic monitor charge converters, cables, conduit, and junction boxes. Replace equivalent inboard MSIV control valve manifold assemblies. Addition of cables/conduit for limit switches added per DCN 51143.	Y
Main Steam DCN 51173	Modify and update the four outboard MSIVs by providing new poppet design, new larger stem, new bonnet, new bolting design, new larger actuator, spring housing modification, adapter plate for solenoid control panel, and redesigned switch mounting plate. Replace Main Steam Drain Isolation Valve (MSDIV) FCV-1-56 with an equivalent valve due to higher leakage trends in Local Leak Rate Tests (LLRTs). Replace the MSDIV motor actuator with a new environmentally qualified motor (GL 89-10). Replace Control Air flex hoses for MSIVs 1-FCV-1-15, 27, 38, & 52. Provide live-loaded packing for outboard MSIVs and MSDV. Leak-off taps are deleted from new MSIV bonnet design.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Main Steam DCN 51211	Replace all safety-related limit switches associated with the outboard MSIVs. Replace cable and conduit in the Reactor Building associated with the outboard MSIV solenoid valves with new Class 1E and 10CFR50.49 (EQ) cable and splices. Replace cable and conduit in the Reactor Building associated with the inboard and outboard MSIV open/close limit switches with new Class 1E and 10CFR50.49 (EQ) cable (for inboard MSIV limit switches LS-3 and LS-4, see DCN 51162). Replace cables for the MSIV Drain Interlock circuit and reroute cables from a Div II Electrical Penetration Assembly (EPA) to a Div I EPA. Remove the Unit 1 outboard MSDIV local control station. Replace cable and conduit in the Reactor Building associated with the MSRV solenoid valves with new Class 1E and 10CFR50.49 (EQ) cable. Modify control switch locations to ensure required numbers of ADS SRVs are available in case of fire in any area of the plant. Replace cable and conduit in the Reactor Building associated with the MSRV acoustic monitoring with new Class 1E and 10CFR50.49 (EQ) cable. Delete temperature sensors TS-1-17A, -17B, 17C, & -17D from main steam tunnel vault. Replace cable and conduit in the Reactor Building associated with the Main Steam Line Leak Detectors with new Class 1E and 10CFR50.49 (EQ) cable.	Y
Main Steam DCN 51230	Equivalent replacement of each Main Steam Line Flow transmitter. Procure and qualify like-for-like outboard MSIV open/close control valve manifolds. Equivalent replacement of each Main Steam line high flow transmitter. Like-for-like replacement of Main Steam instruments located in the Reactor Building.	Y
Main Steam DCN 51333	Provide additions and modifications to the small bore instrument piping supports inside Drywell for Main Steam and HPCI systems (from respective flow element to Penetrations X-30A, -B, -C, -D, X-32E & F, X-34-A, -B, -C, & -D).	Y
Main Steam DCN 51408	Provide additions and modifications to the small bore instrument piping supports inside the Reactor Building for the Main Steam System (from Drywell Penetrations X-30A, -B, -C, -D, X-32E & F, X-34-A, -B, -C, & -D to the instrument panels in the Reactor Building)	Y
Main Steam DCN 51458	Remove Moisture Separator Drain Pumps (MSDPs) and modify the Heater Drain System to operate without MSDPs. Upgrade internals of each moisture separator to increase capacity and increase moisture removal efficiency from 85% to at least 95% at EPU conditions. Clear MSDP room of Heater Drain piping. Tap off of condensate booster pump discharge header to supply injection water to each drain from the moisture separators. Cut and cap Raw Cooling Water supply and return piping to the MSDP room. Remove handswitches and indication for MSDPs from main control board. Remove the closing feature of the flow control valves when the reactor feedwater to the associated high pressure feedwater heaters is manually or automatically isolated.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Main Steam DCN 60534	Implementation of MSRV auto actuation logic (will be safety-related on Unit 1).	Y
Condensate and Demineralized Water DCN 51113	Provide a drainage path from the reactor well to the condensate storage tanks when the condenser is out of service (GE SIL 427). Provide for oxygen injection into the Condensate System from the Hydrogen Water Chemistry System at suction piping of each condensate pump (GE SIL 136). Upgrade condensate demineralizer precoat pump seal equipment to improve pump seal operation. Add precoat inlet and outlet line pressure gauges to improve demineralizer precoat operation. Provide for hydrogen injection into the Condensate System from the Hydrogen Water Chemistry System into each condensate booster pump suction drain piping. Change valves 1-FCV-2-29A and 1-FCV-2-29B from "fail open" to "fail closed". Change system design conditions for temperature and pressure to support new booster pump pressures at EPU conditions. Modify Condensate pump inlet piping with T-section spool piece to accommodate pump suction strainers. Feedwater heaters A3, B3, and C3 and associated piping are re-rated, and the manway opening for Feedwater Heater C3 is reinforced to support new design pressure at EPU conditions.	Y
Condensate and Demineralized Water DCN 51137	Replace the Condensate Demineralizer Control Panel from existing analog to a new Digital Programmable Logic Control (PLC) panel and provide control capability for 10 vessels. Provide primary and alternate 120Vac power to the new panel via separate 480 V feeds, 480/120Vac distribution transformers, and an automatic transfer switch. Replace 27 existing transmitters with "smart" transmitters and replace associated flow elements. (EPU)	Y
Condensate and Demineralized Water DCN 51174	Modify Condensate/Demineralized Water System piping inside Reactor Building as follows: Remove the 20"X24" Y-connection, anchor the 20" return line, install a blind flange on the 20" carbon steel header, and reconstruct the 24" header. The Demineralizer Water supply line to the drywell is cut and capped downstream of SHV-2-1191 and cut and plugged upstream of Penetration X-20.	Y
Condensate and Demineralized Water DCN 51294	Provide for the retubing of the Main Condenser in the Turbine Building. Material substitution only of tubing from brass to stainless steel.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Condensate and Demineralized Water DCN 51335	Modify the support configuration for a portion of the Condensate Storage and Supply System piping outside the drywell in the Reactor Building.	Y
Condensate and Demineralized Water DCN 51344	Provide for modifications and additions to existing supports for a small portion of the Condensate Storage and Supply System piping in the Reactor Building (branch HPCI Pump Test line connecting to Condensate Supply System piping).	Y
Condensate and Demineralized Water DCN 51463	Upgrade the Condensate Demineralizer System air surge backwash system by adding quick-action type valves and upgraded compressors. This will result in higher tank pressures and improved air surge valve operating times. Crosstie capability for Unit 1 to Unit 2 backwash air systems is provided with the addition of manual valve 1-SHV-2-850A.	Y
Reactor Feedwater DCN 51076	Provide equivalent replacement and addition of cables as a result of design/programs. Revise setpoint and scaling calculations applying the effects of EPU, 24-month fuel cycle, and hydrogen water chemistry. Increase setpoint of instrumentation associated with reactor steam dome pressure. Extend channel calibration and logic system functional test frequencies to 24-months. Lower the Reactor Vessel Water Level -Low, Level 3 setpoint.	Y
Reactor Feedwater DCN 51114	Replace valves FCV-3-75, 76, 77, and others due to their stellite content. Replace sample probe and valve SMV-3-549 per GE SIL 257. Install mounting brackets and supports for linear variable differential transformers (LVDTs) used to monitor steady-state vibration of Feedwater (FW) piping outside containment during power ascension up to Extended Power Uprate conditions. Delete stem leak off valves LOV-3-540, 543, & 548 from valves FCV-3-71, 72, & 73 respectively and replace stem packing with Electric Power Research Institute (EPRI)-style packing. Replace 12 obsolete Hancock globe valves. Install a GE zinc injection passivation system to reduce Cobalt-60 build-up in piping systems where condensate water is utilized.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Reactor Feedwater DCN 51163	Replace Reactor Vessel Level Indicating System (RVLIS) reference and sensing lines (four each) to provide more reliable measurement (GL 84-23 and NUREG-0737, Item II.F.2). Replace Reactor Head Seal Leakoff reservoir line, level switch, and reservoir isolation and drain valves. Replace Reactor Head Vent sensing line and flow control valves. Replace Reactor Vessel Main Feedwater inboard isolation valve closed limit switches. Install FW piping vibration monitoring equipment permanent mounting hardware. Replace double vent and drain small bore valves associated with Reactor Vessel Main Feedwater inboard isolation valves.	Y
Reactor Feedwater DCN 51231	Relocate sensing lines associated with penetrations 17A, 17B, 26A, & 26B from penetrations 28A, 28D, 29A, & 29D respectively. Rework sensing lines due to slope concems and separation of functionally redundant lines for various level instrument loops (of 10 sensing lines involved, 5 are being re-routed and 5 are being reworked). Two new 6-inch, core-bore penetrations are required. Penetrations X-28A, X-28D, X-29A, & X-29D are to be capped. Refurbish panels 25-5A, 5B, 5C, 5D, 5-1, 6A, 6B, 6C, 6D, and 6-1, to include replacement of drain valves, isolation valves, equalization valves, quick-connect fittings, and tubing. Add new panel 25-426 to house LT-3-206 & 207.	Y
Reactor Feedwater DCN 63792	Provide separate power supplies to U1 RFP min-flow valve control circuits.	Y
H2 Water Chemistry DCN 51115	Install a Hydrogen Water Chemistry (HWC) system to reduce intergranular stress corrosion cracking (IGSCC) of stainless steel components in the reactor coolant recirculation piping and lower reactor internals. Relocate Unit 2 valves 2-SHV-66-1135 and 1136 which are currently located in Unit 1. Remove existing Offgas hydrogen analyzer panels, associated Offgas sample tubing, Service Air tubing, Demineralizer water tubing, and sample cooler. Install Offgas monitor panel, sample supply/return piping, supports, and valves. Install four hydrogen area monitor sensors (HAMS) to detect hydrogen leakage. Install Offgas calibration gas supply tubing, valves, and interconnecting wiring, conduit, and pull boxes.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Heater Drains and Vents DCN 51116	Replace six tube side heater relief valves and modify piping such that valve inlets are mounted in the vertical direction. (Note: DCN 51464 replaces the associated shell side heater relief valves.) Replace six heater level control valves including operators, positioners, and pressure regulators to prevent unacceptable modulation of water levels (1-LCV-6-11A, -29A, -47A, -14A, -32A, -50A). Replace Number 3 Feedwater heater level control valves with valves that do not incorporate a fluid-filled stem snubber (1-LCV-6-7, -25, & -43). [EPU: Replace 4-inch moisture separator level control valves with 6-inch valves and new operators and positioners (1-LCV-6-62A, -62B, -73A, -73B, -84A, -84B). Expansion joints (bellows) in the No. 2, 3, 4, and 5 extraction steam piping located inside the condenser are being replaced with stainless steel expansion joints to address flow-accelerated corrosion]. Replace level control valves including actuators and positioners (1-LCV-6-1, -19, -37, -4A, -4B, -22A, -22B, -40A, -40B, -11B, -29B, -47B, -14B, -32B, -50B). Replace 4-inch moisture separator level bypass to condenser level control valves with 6-inch valves and new operators, local positioners, and limit switches (1-LCV-6-61A, -61B, -72A, -72B, -83A, -83B). Replace packing for various valve stems with graphite ring packing as described in EPRI Report NP-5967.	Y
Heater Drains and Vents DCN 51139	Provide for refurbishment of Reactor Feedwater heaters as follows: Addition of electronic level switches, addition of control cables from level switches to the associated heater extraction isolation valve, and addition of associated level transmitters. Existing glass level gauges are replaced with all metal gauges and test valves are added. Root valves and their instrument level piping from their connection points on respective heaters are replaced with stainless steel components. Replace existing condensate chambers with new chambers possessing approximately five times greater volume than presently installed chambers capacities.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Control Bay Panels DCN 51094 DCN 51095 DCN 51096 DCN 51097 DCN 51098 DCN 51099 DCN 51100 DCN 51101 DCN 51103 DCN 51104 DCN 51105 DCN 51106 DCN 51108 DCN 51109 DCN 51077 DCN 51111	Summary of changes to PNLs 1-9-3, -4,:-5, -6, -7, -8, -10, -18, -19, -20, -21, -22, -32, -33, -47, -53, -54, -55, 1-25-32 to resolve Control Room Design Review (CRDR) issues: Multiple component relocations within, to, and from other Control Room panels. Multiple indicator replacements as a result of loop signal changes and indicator obsolescence. Multiple indicating scale modifications to adhere to Human Engineering Standards. Installation of new component labels and switch escutcheon plates. Installation of new system mimics. Panel surface enhancements. Replacement of obsolete recorders with Westronics digital paperless recorders. Replacement of the HPCI and RCIC controllers and power supplies. Relocation of the Acoustic Monitoring System from panel 1-9-47 to panel 1-9-3. Installation of the Containment Isolation Status System (CISS) initiation and success indicators. Replacement of Recirculation Pump speed indicators with grouped pushbuttons and status lamps. Replacement of handswitches associated with the lube oil pumps that control Recirculation Drive Cooling Pumps. Replacement and recalibration of Condensate Pump and Condensate Booster Pump monitoring instrumentation. Delete redundant U2 and U3 electrical distribution controls that do not support Unit 1 operations. Installation of a new fiber optic Local Area Network (LAN) throughout the Main Control Room (MCR), connecting all MCR process recorders to a recorder host PC. Install controls and indication to support the new Hydrogen Water Chemistry system. Relocate all System 02, Condensate and Demineralized Water, (Condensate Storage and Transfer portion) controls, indicators, and meters from panel 1-9-20 to panel 1-9-22. Provide new indication for Fire Protection Header Pressure. Remove Circulating Water Traveling Screen Speed Indications. Provide new Standby Gas Treatment outlet flow indication. Remove Standby Gas Treatment Train operability indication. Deletion of IRM, APRM, RBM, & SRM selector switches. Removal of the annunciation for the Rod Sequence Control System. Removal of Core Spray System Testable check valves, indications, and controls. Removal of Residual Heat Removal (RHR) System Testable check valves, indications, and controls. Removal of the Primary Containment Isolation System (PCIS) Group 7, HPCI and RCIC valve indication from the PCIS mimic. Installation of equipment associated with the Hardened Wetwell Vent modification. Support activities for the annunciators, Common Accident Signal (CAS), and Unit 2 CAS. Upgrade analog flow controllers to digital loop controllers (1-FIC-84-19 & -20). Remove, replace, relocate, abandon power supplies and flow instrumentation for RHR, Core Spray, and RHR Service Water.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Boiler Drains and Vents DCN 51065	Provide modifications for the Main Steam Relief Valve discharge piping located in the drywell from the (13) MSRVs to the impingement barrier. Replace existing mechanical snubbers with new mechanical snubbers.	Y
Boiler Drains and Vents DCN 51067	Provide additions and modifications to the supports for the Reactor Head Vent and Reactor Bottom Head Drain piping located in the drywell. Provide for the addition of one new snubber to the Reactor Head Vent piping.	Y
Boiler Drains and Vents DCN 51144	Remove RPV low point drain valves (1-10-503, -504) and associated piping. Replace existing RPV drain line isolation globe valve (1-10-505) with a gate valve. Replace existing RPV head vent drain globe valves (1-10-500, -501, -502) due to obsolescence and leak potential. Replace some sections of RPV head vent piping with new piping of upgraded material and schedule to reduce pipe stresses and minimize the number of pipe supports. Upgrade Main Steam Relief Valve (MSRV) discharge pipe 10-inch vacuum breaker valves.	Y
Central Lube Oil DCN 51117	Install unit isolation valves between Unit 1 and the common header for all three units, including the new crossover line between Unit 1 supply and return headers, and reconnect Unit 1 piping to the common plant purifier header piping. Modify, replace, or add equipment, electrical components, foundations, and piping within the Central Lube Oil System and 480 V Turbine Building Vent Board System to support a new Unit 1 Turbo TOC purifier. Modify High Pressure Fire Protection System to add coverage for the new Turbo TOC.	Y
RHR Service Water DCN 51177	Install replacement equivalent thermocouple assemblies (1-TE-23-32, -35, -38, -41, -44, -47, -50, & -53) in existing thermowells (1-TW-23-32, -35, -38, -41, -44, -47, -50, & -53) respectively. Install new thermowells 1-TW-23-4100 & -4101 and new Resistance Temperature Detectors (RTDs) 1-TE-23-4100 & -4101 to accommodate temperature measurement on the outlet side of the heat exchangers. [EPU: Replace RHRSW Flow Control Valves (1-FCV-23-34, -40, -46, & -52) and their associated Motor Operators (1-MVOP-23-34, -40, -46, & -52)]. Replace relief valves on inlet and outlet of heat exchangers (1-RFV-23-509, -516, -529, -536, -549, -555, -568, & -574). Rework and upgrade Dresser couplings for A and C lines in the Service Water Tunnel. Revise large bore pipe supports for Loops A and C to meet current design requirements including EPU.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Raw Cooling Water DCN 51118	Install two (2-inch) injection lines to allow connection to the U2/U3 skid for chemical injection to the 42-inch Raw Cooling Water (RCW) Supply Header. Replace 1-TCV-24-40 existing 8-inch gate valve with an 8-inch globe valve of stainless steel and reroute control air piping to valve as necessary. Revise setpoints for RFPT bearing lube oil temperature controllers to allow operators to determine setpoint as process dictates. Upgrade 1-TCV-24-75 and install a bypass line for low-flow operation. Replace Stator Cooler outlet valves (1-THV-24-620A, & -620B) with stainless steel valves and replace associated downstream 8-inch piping with stainless steel pipe. Replace Henry Pratt butterfly RCW header isolation valves (1-24-523) 24-inch; and (1-24-534) 10-inch, with Flowserve butterfly valves. Perform underwater repairs on leaking return piping to Wheeler Reservoir. Revise RCW supply and return piping to Condensate Booster Pump area coolers. Refurbish instrument piping in Panels 1-25-178, -179, -182, & -182.	Y
Raw Cooling Water DCN 51178	Eliminate 2-inch RCW supply to H2-O2 Analyzer Panels 1-25-340 & -341. Remove piping, cut and cap just after valve 1-24-882 (2-inch). Install new thermowells 1-TW-24-80, -85, & -90 in Reactor Building Closed Cooling Water (RBCCW) heat exchanger 1A, 1B, & 1C outlets and replace thermocouples. Eliminate RCW supply to RHR Pump Seals and Room Coolers. Eliminate RCW supply to Control Bay Chillers.	Y
Raw Cooling Water DCN 51189	Replace and up size RCW piping, components, and supports to new Drywell Delta P Compressor.	Y
Raw Cooling Water DCN 51219	Installation of RCW supply/return piping to/from each Reactor Recirculation Pump Variable Frequency Drive (VFD) heat exchanger, associated flow and temperature instrumentation, cabling/conduit and supports.	Y
Raw Service Water DCN 51120	Replace existing pairs of CUNO filters with redundant abrasive separators and rough duplex strainers for the Raw Service Water supply to the Condenser Circulating Water (CCW) pump bearings.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
High Pressure Fire Protection and Detection DCN 51180	Replace HPCI Turbine room deluge valve 1-FCV-26-37 with a packaged pre-action valve station. Modify Reactor Building existing pre-action sprinkler system on floor elevations 565', 593', 621', and south half of 639' to achieve area wide coverage. Install pre-action water curtain at the equipment hatch openings between Elevation 565' and 639' at column line R5/R6-T/U. Install pre-action sprinkler water curtain at the RHR Heat Exchanger door openings at Elevation 565'. Install pre-action sprinkler water curtain in the openings in east and west RHR Heat Exchanger rooms on the ceiling immediately below floor Elevation 565'. Install pre-action sprinkler water curtain at the stair openings between Elevation 565' and 639' at column line R1-U. Install pre-action sprinklers beneath stair landings in the southwest stairway at Elevation 605 and 630. Remove the existing fixed-water spray systems on Elevation 565' and 593'. Remove and discard all components of the Aqueous Film Forming Foam (AFFF) system.	Y
Condenser Circulating Water DCN 51120	Design, procure, and install a debris filter for the inlet piping/water box for the Unit 1, C2 water box. Relocate the existing Nash vacuum priming valves and tie-in to the 4-inch water box vent piping. Replace sponge ball recirculation pumps with new pumps of 316SS wetted parts. Replace the collector inlet ball valves and associated motor operators. Replace collector discharge ball valves. Replace existing motor operators on the upper screen and lower screen of the strainer section in the tube cleaning system. Delete Control Air supply to the differential pressure indicating switches in the Amertap ball collection system. Modify valve operator circuitry for Vacuum Breaker valves (1-FCV-27-118A & -118B). Replace existing cables from each CCW pump to its associated capacitor bank. Revise the alarm circuitry for condenser water box level instrument loops (6). Evaluate operation of CCW system at EPU conditions.	Y
Condenser Circulating Water DCN 62015	Replace Cooling Tower No. 4.	Y (Common)
Ventilation DCN 51748	Facilitate the parallel operation of existing redundant air handling units (AHUs), on an as-needed basis, for the Condensate and Condensate Booster Pumps Area Ventilation System in support of EPU. Provide supplemental cooling to the new Hydrogen Water Chemistry (HWC) panel.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Control Air DCN 51122	Install an automatic actuated Unit isolation pressure control valve station on the Turbine Building between Unit 1 and Unit 2 to allow isolation of a leaking portion of the header in Unit 1 from the remainder of the system. Replace Secondary Containment Isolation Valves (1-FCV-32-28 & -29) and rewire associated solenoid valves (1-FSV-32-28A & -29A). Install manual isolation valves to future use with new Hydrogen Water Chemistry (HWC) panels in Turbine Building.	Y
Control Air DCN 51164	Replace pressure switches monitoring control air pressure to the Automatic Depressurization System (ADS) MSRVs (1-PS-32-31A thru -31F). Relocate ADS MSRV accumulators, re-size inlet and outlet lines, and re-route inlet line to top of the accumulator. Balance Control Air distribution between the two Drywell Control Air (DCA) header segments. Determine acceptable leak rate through check valves at the accumulator assemblies for the ADS MSRVs and MSIVs.	Y
Control Air DCN 51182	Delete Drywell Control Air Compressors A and B, and related aftercoolers, surge tanks, dryers, control instruments, piping, valves, and cables. Replace existing Drywell Control Air Receiver Tank Pressure switch (PS-32-70) with a non-mercury filled switch. Provide a source of nitrogen to the DCA system from a 1-inch Containment Inerting System branch connection at check valve (1-CKV-76-542). Nitrogen is regulated to 100 psig by a new DCA pressure regulator station on panel (925-0700). Remove Drywell Control Air prefilter and associated piping and instrumentation. Replace Primary Containment Isolation Valves (1-SHV-32-2160, & -2520 and 1-CKV-32-336 & -2521). Remove Primary Containment Isolation flow control Valves (1-FCV-32-62 & -63).	Y
Service Air DCN 51183	Remove all Service Air piping from the drywell. Piping to be cut between Penetration X-21 and check valve (33-785). Install air supervision system for piping downstream of valve (FCV-26-77). Air supervision supply will connect to existing Service Air header on Elev. 565'. Change Control Air Shutoff valve (1-SHV-32-1469) from Normally Open to Normally Closed. Cut associated line, plug, and label connection as "Spare".	Y
Sampling and Water Quality DCN 51126	Install a permanent tee and sample valve (1-SMV-43-852) in the generator breaker (1-PCBC-35-214) cooling water line to allow for sampling of the demineralized water, to verify proper conductivity. Provide seismically rugged anchors for the Main Steam Sample Station constant temperature bath. Replace generator breaker (1-PCBC-35-214) cooling water conductivity instruments with equivalent models, as was done on Units 2 and 3, in the water cooling plant (1-CLR-35-797).	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Sampling and Water Quality DCN 51140	Replace existing obsolete Generator Cooling Water Conductivity Cells (1-CE-43-16A, -16B, -16C) and associated transmitters (1-CIT-43-16A, -16B, -16C). Add sample test connections at same locations as conductivity elements to enable calibration. Add new oxygen analyzers (1-O2AN-43-12, & -13) using dp across the inlet and outlet of the Stator Cooling Water System Deionizer to drive flow.	Y
Sampling and Water Quality DCN 51168	Replace (1-FSV-43-13) due to age, time in harsh environment, and degraded components. Replacement valve to have stem seal packing which meets EPRI guidelines. Associated switches (1-ZS-43-13A and -13B) are being replaced. Existing globe valves (1-ISV-43-599, 1-TV-43-1054A and -1054B) with gate valves for enhanced performance and replacement valves to have stem seal packing which meets EPRI guidelines. Delete existing vent line from the Reactor Recirculation discharge piping to sampling and associated valves (1-43-812A, & -812B) which serve no design function. Rework instrument sensing lines for flow elements (1-FE-71-1A & -1B) to correct negative slope and provide accurate steam flow indication and line break detection.	Y
Sampling and Water Quality DCN 51478	Replace and relocate instrumentation from the Condensate Demineralizer Sampling Panel (25-148) to the Condensate Sample Panel (25-103). Add oxygen and hydrogen analyzers (1-O2AN-43-9 and 1-H2AN-43-9, respectively) to the new Condensate Sample Panel. Add a sample chiller unit (1-CHR-43-2060() to cool influent sample streams in support of new panel (25-103). Add a Feedwater roughing cooler (1-CLR-43-4B). Provide data feed from new panel (25-103) to the Integrated Computer System (ICS) See DCNs 51082 and 51137. Reroute ducts to provide exhaust capability for sample sink in new panel (25-103). Delete existing Feedwater turbidity instruments from panel (25-149).	Y
Feedwater Level Control DCN 51138	Replace existing Reactor Feed Pump Turbines (RFPT) governor control, lubricating and control oil, vibration monitoring, and trip components in conjunction with the addition of a Foxboro Digital Reactor Feedwater Control System (DRFWCS). Install new panel 9-97 in the MCR and add fiber optic cables from Aux Instrument room and Unit 1 Computer room to two local panels (925-562A & 925-562D). Remove existing RFPT controls including the mechanical linkage, Motor Speed Changer (MSC), and Motor Governor Unit (MGU); and replace with a Woodward Digital Governor and Final Drive.	Y
Standby Liquid Control DCN 51081	Modify loop (1-P-63-7) power supply from 10-50 mA to 4-20 mA in panel (1-9-19).	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Standby Liquid Control DCN 51166	Replace cable and conduit for SLC drywell inboard isolation valve zone switch.	Y
Standby Liquid Control DCN 51233	Modify/replace RTDs (1-TE-63-3 and -4) to upgrade obsolete equipment and ensure monitoring of tank solution instead of area ambient temperature. Replace (1-PI-63-7B and 1-PT-63-7) to remove obsolete equipment and add isolation valve, drain valve (1-ISIV-63-7BA and -7BB) and quick disconnect to facilitate calibration. Remove heat tracing from process lines and components in the SLC system. Replace and rescale temperature switches (1-TS-63-3 and -4) to comply with 10CFR50.62 ATWS equivalency requirements for B10 enriched sodium pentaborate. Revise SLC Storage Tank level alarm setpoints to support implementation of Alternate Source Term and associated Tech Spec change which increases the net injectable volume of sodium pentaborate from 3007 to 4000 gallons.	Y
Reactor Building Ventilation & PCIS DCN 51081	Provide for modification of Primary Containment Isolation System (PCIS) cabling from panel (1-9-15) to panels (1-9-42 and -43) to provide functional redundancy separation. Existing power supply (1-PX-74-51) feeding loops (1-L-64-159A and 1-P-64-160A) and new RTD temperature modifier (1-TM-64-52CA) are rewired to be segregated and powered from panel (1-9-42). In panel (1-9-19) modify loop (1-P-64-67) for conversion from 10-50 mA to 4-20 mA. Modify pressure switches (1-PDS-64-137A, B, C and 1-PDS-64-138A, B, and C) wiring to allow one loop to be removed from service without affecting the redundant loop.	Y
Reactor Building Ventilation & PCIS DCN 51166	Replace obsolete inboard Drywell Personnel Air Lock limit switch (1-ZS-64-53A), associated cable, and conduit. Replace Drywell Air Temperature elements (1-TE-64-52A & -52C) from thermocouples to RTDs and replace associated cable, conduit, and conduit seals. Delete the following Drywell Leak Rate instruments, associated cables and conduit: temperature elements (1-TE-64-82 thru -99) (18 total); humidity sensors (1-ME-64-111 thru -114) (4 total); and pressure sensor (1-PT-64-115) (1 total). Fabricate and install new Unit 1 Drywell Primary Containment Equipment Hatch Cover Lugs.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Reactor Building Ventilation & PCIS DCN 51189	Provide for modification of Drywell Vacuum Breakers (1-FCV-64-28A, thru 28M [except 28I]) by replacing hinge arms, hinge pins, bushings, and other parts per (NUREG-0661). Install Unit 1 Torus vent path to the common header portion of the Hardened Wet Well Vent (HWWV), including Primary Containment Isolation Valves (PCIVs) (1-FCV-64-221, & -222) and associated solenoid valves, air operators, 250V dc power, and Control Room handswitches and indications. Replace the following unqualified valves with 10CFR50.49 qualified models: (1-FSV-64-17, -18, -19, -20, -21, -29, -30, -31, -32, -33, & -34). Replace the following valves, including Bettis actuators (1-FCV-64-17 thru -21; -29, -30; 32, & -33) with new valves having closing times of 2.5 seconds or less. Replace cables/conduits, limit switches, terminal blocks, and other electrical components to satisfy EQ, Class 1E, and ampacity issues, and to resolve component reliability issues due to age, time in harsh environment, and degradation. Replace previously removed Drywell Delta P compressor, motor, aftercooler, and associated controls and cables/conduit. Replace two unqualified Drywell Penetrations (PA), containing airlock lighting, telephone, and door status circuitry, with (1) ASME Section III qualified penetration assembly.	Y
Reactor Building Ventilation & PCIS DCN 51190	Provide for fire damper installation in Reactor Building Ventilation ducts through floor penetrations (27 dampers). Provide for new Main Steam Vault Exhaust Booster Fan installation. Provide for replacement of Core Spray and RHR Pump Room Cooler motors, EQ associated cables, and room temperature instruments. Provide for replacement of Secondary Containment Isolation Valve cables, limit switches, and terminal blocks.	Y
Reactor Building Ventilation & PCIS DCN 51243	Modify/add/replace components and wiring internal to Emergency Core Cooling System (ECCS) Panel (1-9-81). Modify/add/replace components and wiring internal to ECCS Panel (1-9-82). Modify/add/replace components and wiring internal to Reactor Protection System (RPS) Panel (1-9-83). Modify/add/replace components and wiring internal to RPS Panel (1-9-84). Modify/add/replace components and wiring internal to RPS Panel (1-9-85). Modify/add/replace components and wiring internal to RPS Panel (1-9-86). Refurbish components and cabling to Panels (1-25-5A, -5B, -5C, -5D, -6A, -6B, -6C) and replace EQ cables. Refurbish components and cabling in Panels (1-25-31, -34, -57B, -57D, -213, -219, -220, -221, -222, -306, -307, and -308) and replace EQ cables.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Reactor Building Ventilation & PCIS DCN 51245	Replace torus wide range level transmitters (1-LT-64-159A & -159B), install quick-disconnect fittings, and splices. Replace torus narrow range level transmitters (1-LT-64-54 & -66) and associated flow controllers (1-FIC-64-54, & -66). Add level sensors (1-LE-64-54, & -66); sight glasses (1-LG-64-54, & -66) demineralized water connections, platforms, communications, lighting, and power.	Y
Reactor Building Ventilation & PCIS DCN 51318	Remove removable relief panels in Unit 1 to combine four Secondary Containment zones into one zone. One result of this change is the free flow of each reactor zone atmosphere with the common refuel floor atmosphere. For Elev. 639', 621', & 593', remove all vertical removable relief panels and steel frames surrounding the equipment hatch. Install removable handrails around the hatch. The handrails are Seismic Class II/I (position retention). For Elev. 593' to 580', remove all removable relief panels, however, steel frames are left in place. For Elev. 580' to 565', remove all vertical removable panels and vertical steel frames surrounding the truck bay. Remove horizontal roof panels, however, beams and steel frames are left in place. Add three new diagonal braces to the roof steel platform. Seal two (2) 4-inch Dirty Radwaste (DRW) floor drains with removable closure plates to prevent the flow of water from the SE corner of the Rector Building into the HPCI room. Provide for the installation of an 8-inch concrete curb and ramp in the labyrinth passage of the Main Steam Valve Vault (MSVV) to contain water within the vault. Provide for increasing the concrete curb at the entrance to the HPCI room from 12 inches to 18 inches to prevent water from entering the room.	Y
OffGas DCN 51128	Replace existing obsolete Catalytic Recombiner drain valves (1-FSV-66-73, & -88). Install test connections in suction and discharge piping of Vacuum Pumps (1-PMP-66-43A1, & -43B1) to support Condenser air inleakage tests. Install spring-operated piston check valves (1-CKV-66-922, & -923, respectively) on Service Air System connected to Offgas System Train 'A' and 'B', respectively. Replace SJAE inlet and outlet valves (1-FCV-66-11, -14, -15, & -18) with spark-proof seats. Modify Offgas sample connections to H2 & O2 analyzer containing valves (1-SHV-66-575, & -576). Add Chilled Water sample line at (1-PI-66-63). Replace Chilled Water relief valve (1-RFV-66-541). Replace Glycol Recirculation Pumps (1-PMP-66-104, & -105). Replace Offgas Stack discharge valve (1-FCV-66-28) with spark-proof seat and replace associated solenoid (1-FSV-66-28) and limit switches (1-ZS-66-28A, & -28B).	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
OffGas DCN 51142	Modify/upgrade Offgas flow to 6-hour holdup volume loops (1-F-66-111A & -111B): Relocate flow elements (1-FE-66-111A, & -111B) downstream of dehumidifiers to reduce moisture problems and replace with a Kurz combo FE/FT. Remove existing flow transmitters (1-FE-66-111A, & -111B) from panel 25-95. Add blind flanges where previous flow elements were located. Add two Kurz Instrument flow computers to replace existing (1-FI-66-111A, & -111B; 1-FX-66-111A, & -111B; 1-FM-66-111A, & -111B; 1-FS-66-111A, & -111B). Remove GE indicators (1-FIS-66-111A, & -111B) from panel 25-95. Add time delay relay (1-RLY-66-111) on panel 25-95. Upgrade Offgas flow to 6-hour holdup volume loop (1-F-66-20): Replace Fisher and Porter flow indicating transmitter (1-FIT-66-20) with a Rosemount transmitter connecting to the existing sensing lines from (1-FE-66-20) and providing a linear signal to (1-FR-66-20) on panel 9-8, negating the need for (1-FM-66-20). Remove (1-FM-66-20) from panel 9-29 and re-label (1-FT-66-20 to 1-FIT-66-20). Modify/upgrade Offgas Condensed level control loops (1-L-66-93, & -94): Replace existing 10-50 mA transmitters (1-LT-66-93, & -94) with 4-20 mA transmitters on panel 25-335. Replace existing 10-50 mA controllers (1-LIC-66-93, & -94) with 4-20 mA controllers on panel 25-95 that will also power the loops. Replace existing (two) 10-50 mA level switches (1-LS-66-93, & -94) with (four) 4-20 mA level switches (1-LS-66-93A, -93B, -94A, & -94B) on panel 25-95. Replace existing 10-50 mA I/Ps (1-LM-66-93, & -94) with 4-20 mA I/Ps located in the Recombiner Room. Remove existing power supply (1-PX-66-93). Provide standby level loop (94) with its own independent power by feeding power to (1-LIC-66-94) from non-preferred 120V ac from panel 9-9, BKR 522. Add new panel 25-96A. Modify Glycol Tank temperature loop (1-T-66-102) with programmable logic controller (1-TC-66-102) on new panel 25-96A. Modify Offgas Reheater Outlet Moisture Loop (1-M-66-110) to be an offline system with capability to be isolated from the Offgas system without isolating the Offgas system which it monitors. Modify Offgas Condenser outlet temperature loop (1-T-66-95) for higher temperature range (from 155 to 160 deg. F). Replace Offgas Recombiners A & B temperature controllers (1-TC-66-76, & -90). Revise setpoints: 6-hour holdup volume pressure switches (1-PIS-66-21C, & -21D) to 3.5 psig increasing. CNDR vacuum pump seal water temperature switches (1-TS-66-55, & -56) from 110 deg. F to 120 deg. F CNDR vacuum pumps 1A & 1B suction pressure switches (1-PS-66-37, & -41, respectively, from 27" Hg to 26" Hg.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Emergency Equipment Cooling Water DCN 51192	Replace the following carbon steel valves with stainless steel valves: (1-Ckv-67-541, -542, -554, -584, -585,-597, -648, -649, -656, -657, & -598) (1-TV-67-236, -237, -243, -244, -251, -252, & -259) (1-SHV-67-550, -551, -569, -570, -593, -594, -596, -610, & -611) (1-VTV-67-746, & -751). Reroute 1-inch Emergency Equipment Cooling Water (EECW) line to H2 Analyzers that interferes with a permanent ladder required for access to (1-FCV-23-57) during performance of certain Emergency Operating Instruction appendices. Add EECW 1-inch flush connections with piping, shut off valves, and quick disconnects to the supply and discharge lines for RHR Pump Room Coolers 1A, 1B, 1C, & 1D. Add the following 1-inch valves at the flush connections: (1-SHV-67-817 & -818) at RHR Room Cooler 1A return and inlet connections, respectively; (1-SHV-67-827 & -828) at RHR Room Cooler 1B return and inlet connections, respectively; (1-SHV-67-819 & -820) at RHR Room Cooler 1C return and inlet connections, respectively; and (1-SHV-67-829 & -830) at RHR Room Cooler 1D return and inlet connections, respectively. Change motive fluid for valves (1-FCV-67-50 & 51) from water to air. Cut, remove and cap piping downstream of valves (1-RTV-67-6022A & -6009A) and up to the connection to the valve operators for (1-FCV-67-50 & -51) respectively. Provide new ½-inch connections to install pressure switches (1-PS-67-50 & -51) in the 8-inch header at the downstream side of valves (1-SHV-67-640 & -575) respectively. Add a travel stop to valve (1-FCV-67-50) to limit travel to 25%, +/-1% of maximum opening.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Reactor Water Recirculation DCN 51016	Modify the existing RHR Low Pressure Coolant Injection (LPCI) System signal isolation of the Recirculation Pump discharge valve logic so that the Div I RHR (LPCI) signal will only isolate the 1B Recirculation Pump discharge valve associated with the LPCI loop I injection line, while the Div II RHR (LPCI) signal will only isolate the 1A Recirculation Pump discharge valve associated with the LPCI loop II injection line. Delete the interlock signals from pressure switches (1-PS-68-93, & -94) to block the isolation of the LPCI injection valves (1-FCV-74-53, & -67) on a Group 2 PCIS initiation when reactor pressure is ≥105 psig. Pressure switches (1-PS-68-93, & -94) will continue to provide a (reactor pressure ≥105 psig) signal to relays (10A-K97A & 10A-AK97B) to isolation valve (1-FCV-74-48) which prevents shutdown cooling from being in service when reactor pressure is ≥105 psig. Modify Core Spray initiation & ECCS Preferred Pump logic so that U2 Core Spray (CS) Pumps 2A & 2C and Residual Heat Removal (RHR) Pumps 2A & 2C are load shed on a U1 accident signal initiation and U1 CS Pumps 1B & 1D and RHR Pumps 1B & 1D are load shed on a U2 initiating signal if the pumps were running with normal power available. Thus, CS Pumps 1A & 1C and RHR Pumps 1A & 1C are dedicated to U1 and CS Pumps 2B & 2D and RHR Pumps 2B & 2D are dedicated to U2 with either normal or DG power available. Add new load shed initiating signal from CS Relays (14A-K11A & -K11B) which will be redundant to Relays (10A-K73A & -K73B) to avoid single failure and overloading of (2) 4kV Shutdown Boards.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Reactor Water Recirculation DCN 51045	Replace existing Reactor Pressure Vessel (RPV) recirculation outlet safe ends at nozzles N1A and N1B (total of 2) with those made of 316NG stainless steel. Replace existing (RPV) recirculation inlet safe ends at nozzles N2A, N2B, N2C, N2D, N2E, N2F, N2G, N2H, N2J, & N2K (total of 10) with those made of 316NG stainless steel. Remove and replace the existing 28-inch recirculation lines between the RPV recirculation safe end to the RPV recirculation ring headers, including flow elements for loops A & B, with those made of 316NG stainless steel. Remove and replace the existing recirculation risers (total of 10) at RPV nozzles N2A, N2B, N2C, N2D, N2E, N2F, N2G, N2H, N2J, & N2K, with those made of 316NG stainless steel. Remove and replace the existing ring headers in the pump discharge piping for loops A & B, with those made of 316NG stainless steel. Remove valves (1-FCV-68-33 & -35) and associated circuitry and controls inside the Drywell. Remove associated valves (1-68-530, -531, -532, -533, -535, -536, -537, -538, -68-NNN-1, &-68-NNN-2) and the 22-inch piping between loop A & B ring headers. Remove and replace existing Jet Pump Instrumentation (JPI) nozzle safe ends at RPV nozzles N8A & N8B, and proximity piping. Delete valves (1-68-292, -293, -294, & -295). Remove (8) 1-inch sensing lines installed between recirculation discharge risers at RPV nozzles N2A - N2H, and N2J, N2K and their associated containment penetrations. Cut and cap the penetrations. Replace the following thermowell/temperature element sets: (1-TW-68-2 & 1-TE-68-2; 1-TW-68-6 & 1-TE-68-6A & 1-TE-68-6B; 1-TW-68-78 & 1-TE-68-78; 1-TW-68-83 & 1-TE-68-83A & 1-TE-68-83B). Remove and cap the bonnet vent lines for valves (1-FCV-68-1, -77, & -79) and remove associated drain valves (1-68-502, -503, -511, -512, -517, -518, -526, -527). Add (3) new vent valves and piping routed to Clean Radwaste for each Recirculation Pump (valves 1-68-6601, -6602 & -6603 for pump 1A & 1-68-6604, -6605, & -6606 for pump 1B). Provide permanent radiation shielding (lead blankets) for vertical segments of the 12-inch and 28-inch recirculation piping. Replace 2-inch globe valves (1-68-505, -506, -520, & -521) in recirculation pump suction drain lines with valves of non-cobalt trim and EPRI-approved graphite packing. Replace rotating assemblies and seal cartridges for recirculation pumps (1-PMP-68-60A & -60B) including shafts, seals, impellers, and covers. Replace recirculation pump seal injection lines and associated valves.	Y
Reactor Water Recirculation DCN 51167	Replace existing Recirculation Pump/motor 1A & 1B vibration monitoring and speed indicating instrumentation, cabling and conduit. Refurbish and rewind recirculation pump motors.	Y
Reactor Water Recirculation DCN 51178	Provide Raw Cooling Water to Variable Frequency Drives (VFDs) which replace M-G sets (DCN 51219) for Recirculation Pump motors.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Reactor Water Recirculation DCN 51193	Replace existing inner and outer RPV head metallic O-ring seals with new spring-energized O-rings and associated retainer clips. Repair Intergranular Stress Corrosion Cracking (IGSCC) on and around the two Access Hole Covers (AHCs) in the RPV shroud support plate, to include installation of new AHCs if necessary. Install retaining clamps on jet pump instrument sensing lines (internal to the RPV) to resolve vibration issue. Replace the (48) shroud head bolts with newly designed bolts. Replace RPV core plate plugs as required. Replace the following Recirculation Pump seal injection line valves:; (1-CKV-68-550 & -555; 1-SHV-68-552 & -557; 1-VTV -68-551 & -556; and 1-RFV-68-553 & -558). Relocate flow indicators (1-FI-85-52, & -53) to downstream of the inlet connections of seal injection supply relief valves to provide a more accurate indication of seal injection flow to the Recirculation Pumps.	Y
Reactor Water Recirculation DCN 51218	Replace cables identified for replacement in Total Program Breakage Summary. Splice Reactor Water Recirculation System circuits on outboard (reactor building) side of Penetrations (EB, EC, & EE). Abandon/remove cables for components that are deleted. Determ/splice/reterm cables not replaced but requiring wiring changes. Modify breaker compartments, components, and panel wiring for power and control circuits of MOVs (1-FCV-68-3, -33, -35, & -79).	Y
Reactor Water Recirculation DCN 51219	Abandon M-G sets powering Recirculation Pump motors (in -place) and install new solid state Variable Frequency Drives (VFDs). Remove M-G set lube oil skids, heat exchangers, and foundations. Rerate Recirculation Pump motors from 8000 to 8550 hp.	Y
Reactor Water Recirculation DCN 51234	Install new panel (1-LPNL-925-412), vibration monitoring system, associated cables, and system panel to support EPU. Refurbish existing Reactor Water Recirculation System instrument panels/racks (1-25-7A, -7B, -51B, -52A, -52B, & 1-9-18). Replace existing GE Measurement & Control components with Foxboro Intelligent Automation (I/A) components. Refurbish existing affected panels (1-9-38, -18, & -19). Complete implementation of Recirculation Pump Trip (RPT) and portions of the (ATWS) modifications for Unit 1. Affected panels are (1-925-416, -612, -415, -613, -614, -616, -615, & -419). Perform Foxboro and Bentley-Nevada software verification and validation.	Y
Reactor Water Recirculation DCN 60072	Install control circuit isolation fuses in the positive legs of the 250 V dc trip circuits for Normal; and Emergency feeder breakers for Reactor Recirculation Pumps 1A (Breakers 1122 & 1436) and Pump 1B (Breakers 1124 & 1534). Also, a single fuse is added to the positive leg in the 250 V dc circuits for Reactor Recirculation Pumps 1A & 1B Overcurrent Relay and Transfer Selector Switch circuit (Appendix R).	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Reactor Water Cleanup DCN 51046	Remove and replace 6-inch process piping and valves from the 20-inch RHR piping connection to primary containment penetration X-14. Replace Motor Operated Valves (1-FCV-69-1, & -2) per TVA's GL 89-10 program and add valves/capability for Appendix J testing of (1-FCV-69-1). Replace system valves inside the Drywell (1-69-500, -583, -584, -503, & -504). Install a 2-inch decontamination flush connection with 2-inch gate valves (1-69-551, & -552) and a camlock male fitting. Replace cable to (1-FCV-69-1) to correct ampacity/voltage concerns and install (2) T-drains. Install instrument locations to measure piping vibration.	Y
Reactor Water Cleanup DCN 51194	Replace/upgrade various 4-inch and 6-inch piping segments to, from, and interconnecting regen and non-regen heat exchangers and from RWCU pump discharge to the tie-in to the RWCU demineralizer influent pipe. Replace regenerative heat exchangers. Replace RWCU recirculation pumps (1-PMP-69-4A, & -4B). Replace small bore vent, drain, and test connections branching off of the RWCU piping, including the associated valves. Replace instrument lines branching from replaced piping, up to the root valves. Replace flow elements on RWCU discharge lines. Replace various thermowells and temperature elements. Replace strainers (1-STN-69-800 & -801). Reroute RWCU flow from outboard isolation valve (1-FCV-69-2) through regenerative heat exchangers A, B, & C, and non-regenerative heat exchangers A & B, the to the RWCU Pump suction resulting in lower temperature water entering pumps and longer lasting pump seals.	Y
Reactor Building Closed Cooling Water DCN 50977	Complete the piping tie-in to the Unit 1 Reactor Building Closed Cooling Water (RBCCW) System from the existing Drywell Outage Chillers.	Y
Reactor Building Closed Cooling Water DCN 51148	Replace RBCCW System carbon steel piping within the drywell with stainless steel piping. Replace the drywell atmosphere cooling coils and blowers (Drywell Cooler) to improve cooling of drywell atmosphere. Replace the inlet and outlet RBCCW valves to each of (10) coils. Upsize Drywell Cooler blower motor power cables (See DCN 51195). Delete (60) cables, associated conduits and junction boxes due to new Drywell Coolers being completely factory wired. Modify RBCCW piping to new Recirculation Pump seal assemblies and reduce connections to one supply and one return per seal assembly cooler. Replace (44) cables inside the drywell with environmentally qualified (EQ) cables.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Reactor Building Closed Cooling Water DCN 51195	Install isolation, drain, and test valves to provide for LLRT of Primary Containment Isolation Valves (1-CKV-70-506 & 1-FCV-70-47). Replace thermowells and temperature elements for loops (1-T-70-3, -50, -51, -52, -53, -54, -56, -58, & -60). Document thrust requirements and switch settings for motor operated containment isolation valve (1-FCV-70-47) to meet GL 89-10 requirements.	Y
Reactor Core Isolation Cooling DCN 51149	Replace solid wedge gate valve (1-FCV-71-2) with a newer design double disc gate valve. Delete the associated leak-off valve and piping. Add a ¾" test line to bottom of new valve body for between-seat leak testing. Install new motor operator to meet EQ and GL 89-10 requirements. Replace existing cable, conduit, and conduit supports for this new MOV and bypass the torque switch in the motor operator control circuit.	Y
Reactor Core Isolation Cooling DCN 51196	Perform various mechanical modifications to the Reactor Core Isolation Cooling (RCIC) System valves from among the following: Upgrade valve packing to EPRI-approved graphite (live-load) packing, remove leak-off valves, cut, and cap or plug, leak-off lines. Replace solid wedge gate valve with a newer design double disc gate valve. Delete the associated leak-off valve and piping (excluding 1-SHV-71-14). Add a ¾" test line to bottom of new valve body for between-seat leak testing. Install new motor operator to meet EQ and GL 89-10 requirements, including T-drains and grease relief valve for gear case. Bypass the torque switch in the motor operator control circuit. Install test line with test and shutoff valves for 10CFR50 Appendix J testing. Applicable to (1-FCV-71-3, -6A, -6b, -7a, -7B, -8, -9, -17, -18, -25, -34, -37, -38, -39; 1-SHV-71-14 & 1-PCV-71-22). For check valves (1-CKV-71-597, -598, -599, & -600), install a 2-inch gate valve (1-SHV-71-520) in the RCIC turbine exhaust vacuum relief piping to facilitate Appendix J testing. Replace (1-CKV-71-520) with a new T-pattern globe lift check valve. Replace (1-FCV-71-40) with a new pneumatic testable check valve. Replace valve (1-FCV-71-59) and associated motor operator.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Reactor Core Isolation Cooling DCN 51220	Perform various electrical modifications to RCIC System valves (1-FCV-71-3, -8, -9, -10, -17, -18, -25, -34, -38, -39, & -59). Disconnect existing power and control wiring to the MOVs, remove or abandon cables/conduits and replace existing internal wiring with EQ wiring. Relocate power supplies. Remove local control switches. Remove power from valve (1-FCV-71-59) to maintain valve deenergized and open by opening associated 480V Reactor MOV Board 1A breaker. Replace limit switches for (1-FCV-71-10) for valve mid-position indication. Provide 250V dc power to new solenoid-operated RCIC steam line trap bypass valve (1-LCV-71-5); valve to fail closed on loss of power. Provide for automatic restart of RCIC System upon a reactor vessel low water level signal following a reactor vessel high water level trip per NUREG-0737. Remove the electronic overspeed trip function from the RCIC turbine per GE SIL No. 382. Replace existing GE relays (1-RLY-71-13A-K9 & -K42) with Agastat time delay relays and change setpoint of relay (1-RLY-71-13A-K42) in panel (1-25-31) from 30 seconds to 90 seconds to allow RCIC condensate pump to operate until low level is reached without activating annunciator (LA-71-29), RCIC GLAND SEAL VACUUM TANK LEVEL HIGH (XA-55-3B, Window 20). Replace and/or reroute electrical wiring/cables and replace components and instruments to meet EQ requirements, Appendix R breakage requirements, and to resolve electrical and instrument issues/concerns.	Y
Reactor Core Isolation Cooling DCN 51236	Equivalent instrument replacements: Replace existing (1-PDIS-71-1A & 1B) with (1-PDT-71-1A & 1B). Replace (1-PS-71-1A, 1B, 1C, & 1D) to meet EQ and Class 1E requirements. Replace (1-PS-71-21A) due to failed accuracy evaluation and obsolescence. Replace (1-FS-71-36) with (1-FIS-71-36). Replace RCIC Turbine Exhaust High Pressure switches (1-PS-71-13A & -13B). Replace flow solenoid valves (1-FSV-71-6A & -6B) due to obsolescence. Replace flow transmitters (1-FT-71-1A & -1B) due to obsolescence. Replace pressure transmitters (1-PT-71-4, -12, & -35) due to obsolescence. Replace pressure switches (1-PS-71-11A, -11B, -11C, & -11D) due to obsolescence. Replace temperature switches (1-TS-71-2A, -2B, -2C, -2D, -2E, -2F, -2G, -2H, -2J, -2K, -2L, -2M, -2N, -2P, -2R, & -2S) due to obsolescence. Refurbish instrument panels (1-25-7A & 1-25-58). Add new RCIC Turbine Control Panel (1-LPNL-925-672).	Y
Auxiliary Decay Heat Removal DCN 51197	Auxiliary Decay Heat Removal system was established in 1997 when Unit 1 was not operating. Provide auxiliary decay heat removal capability such that RHR system can be made available for maintenance soon after reactor shutdowns. Route new 12-inch and 14-inch piping and components to and from the fuel pool to provide decay heat removal.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
High Pressure Coolant Injection DCN 51083	Remove, abandon, reroute, replace various cables in the HPCI System to resolve Class 1E, Environmental Qualification (EQ), train separation, and breakage issues.	Y
High Pressure Coolant Injection DCN 51150	Replace solid wedge gate valve (1-FCV-73-2) with newer design double disc gate valve. Delete the associated leak-off valve and piping, as applicable. Add a ¾" test line to bottom of new valve body for between-seat leak testing. Install new motor operator to meet EQ and GL 89-10 requirements. Replace existing cable, conduit, and conduit supports for this new MOV and bypass the torque switch in the motor operator control circuit, as applicable. Upsize power cabling to new MOV operator due to larger motor, as applicable.	Y
High Pressure Coolant Injection DCN 51198	Replace motor actuator and spring pack for valves (1-FCV-73-36, & -40) and provide live-load packing and smart stem. Cut and cap stem leak-off lines, as applicable. Replace solid wedge gate valve (1-FCV-73-3) with newer design double disc gate valve. Delete the associated leak-off valve and piping, as applicable. Add a ¾" test line to bottom of new valve body for between-seat leak testing, as applicable. Install new motor operator to meet EQ and GL 89-10 requirements, including T-drains, as applicable. Replace motor actuator and spring pack for valve (1-FCV-73-18) and provide live-load packing and smart stem. Cut and cap stem leak-off lines, as applicable. This valve is changed from globe to a gate valve. Replace motor actuator and spring pack for valve (1-FCV-73-16) and provide live-load packing and smart stem. Cut and cap stem leak-off lines, as applicable. Opening time is increased from 20 seconds to 30 seconds. The new valve has body drain which is plugged. Replace existing EG-R hydraulic actuator (1-SM-73-190) for HPCI Turbine control valve (1-FCV-73-19) with a device qualified by GE. Replace HPCI booster pump suction relief valve (1-RFV-73-506) and lower set pressure from 150 psig to 55 psig per GE SIL No. 129. Replace previously removed HPCI pump test flow control valve 1-FCV-73-35 with a new valve and provide live-load packing and smart stem. Replace the motor operators and valve stem packing on valves (1-FCV-73-26, -34, & -44) and plug stem leak-off lines. Replace testable check valve and pneumatic operator on (1-FCV-73-45). Replace check valve (1-73-603) with a new 'T' pattern globe lift check valve. Add new 2-inch gate isolation valve downstream of check valve (1-73-24) and upstream of penetration X-222. Replace motor actuator and spring pack for valve (1-FCV-73-30) and provide live-load packing and smart stem. Cut and cap stem leak-off line. Add a 4-inch isolation gate valve (1-SHV-73-652) between (1-FCV-73-30) and the connection to the 18-inch RHR test line. Refurbish/ upgrade GE supplied HPCI turbine/pump skid to included impeller replacement and seismic qualifications.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
High Pressure Coolant Injection DCN 51221	Replace existing cables for new level switches (1-LS-73-56A, -56B, -57A, & -57B) (Ref. DCN 51237). Replace existing relay (23A-K17) with time delay relay (1-RLY-73-29-1) to retard the low suction pressure trip function of (1-PS-73-29-1) for 7 seconds. Replace HPCI booster pump suction pressure switch (1-PS-73-29-1) with a Class 1E, EQ device. Replace time delay relays (23A-K43 & -K51) for HPCI discharge pump and suppression chamber High Pressure, with (1-RLY-73-23AK43, & -51) in panel (1-9-39). Replace (LCV-73-5) HPCI condensate drain pot drain valve, with a manual valve. Replace various obsolete handswitches and temperature and level instruments, and upgrade wiring, splices, and connectors to Class 1E, EQ.	Y
High Pressure Coolant Injection DCN 51237	Equivalent instrument replacements: Replace existing (1-LS-73-56A, -56B, 57A, & -57B) Replace the following as a result of design/programs such as EQ & Class 1E requirements. Replace (1-LS-73-5). Replace (1-LS-73-8 with 1-LS-73-8A, & -8B) to allow separate alarm and control functions. Replace HPCI Steam Flow switches (1-PDIS-73-1A & -1B). Replace HPCI Steam Supply pressure switches (1-PS-73-1A, -1B, -1C, & -1D). Replace HPCI System minimum flow switch (1-FS-73-33) with a non-indicating switch and add indicator (1-FI-73-33B). Replace HPCI System flow transmitter (1-FT-73-33). Replace HPCI Turbine Exhaust disc ruptured pressure switches (1-PS-73-20A, -20B, -20C, & -20D). Replace HPCI Turbine Exhaust pressure switches (1-PS-73-22A, & -22B). Replace HPCI Booster Pump suction pressure switch (1-PS-73-29-1). Replace HPCI Turbine instruments (1-SE-73-51) turbine speed pick-up; and (1-TE-73-54B, -54H, & -54J), turbine bearing thermocouples. Replace Gland Seal Condensate Hotwell level switch high (1-LS-73-15A), and low (1-LS-73-15B). Replace HPCI Turbine Steam Line pressure transmitter (1-PT-73-4), Exhaust pressure transmitter (1-PT-73-21), Booster Pump suction pressure transmitter (1-PT-73-28), and Main Pump Discharge pressure transmitter (1-PT-73-31). Replace HPCI Steam Line Leakage temperature switches (1-TS-73-2A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, & S). Refurbish instrument panels/racks (1-25-7B, -25-50, & -25-63).	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Residual Heat Removal DCN 51151	Refurbish valve (1-FCV-74-48) and install new motor operator. Replace existing cables and conduits with new cables. Replace and upgrade materials for the 20-inch suction line and (2) -24-inch shutdown cooling/RHR return lines from first weld inside the drywell to their respective connections to the Reactor Water Recirculation System loops A & B piping. Replace check valves (1-CKV-74-661 & -662) currently installed in vertical piping and unsuitable for this application. Replace large bore valves (1-FCV-74-54, -68, & 1-HCV-74-49, -55, -69). Install new 2-inch Decon connections on the 20-inch suction line and (2) -24-inch shutdown cooling/RHR return lines to allow for future cleaning/decon activities. Eliminate air-actuator and testable feature from check valves (1-FCV-74-54 & -68) and change unit identification numbers (UNIDs) from 'FCV' to 'CKV'. Remove associated solenoid valves, limit switches, cables, handswitches, and indicating lights. Delete piping, valves (1-FCV-74-78, -690, -691, -694, -695 & -697) and associated wiring from reactor vessel head (nozzle N6A) to the drywell penetration to eliminate the head spray function and support RVLIS modifications. Eliminate bonnet vents from valves (1-HCV-74-49, -55, &-69) and delete bonnet vent and body drain from (1-FCV-74-48).	Y
Residual Heat Removal DCN 51199	Replace pressure indicators (1-PI-74-117 & -133) on drain pump "A" suction and pressure indicators (1-PI-74-118 & -134) on drain pump "B" suction. Replace temperature elements (1-TE-74-81, & -82) and (1-TE-74-9, -21, -32, & -43) on the discharge and inlet of RHR heat exchangers. Modify instrument panels (25-2, -62, & -224A): Replace thermowells (1-TW-74-111, -112, -115, & -116). Cut and cap vent lines to valves (1-FCV-74-102, -103, -119, & -120). Install block valves, test connections, and vent lines to allow leak testing of the Core Spray isolation check valves. Replace obsolete system relief valves including (1-RFV-74-509A, -509C, -528A, -528B, -578C, -578D, -587A, -587B, -659, -677, -578A, -578B, -701, -709). Remove cross-tie flow control valve (1-FCV-74-46) actuator and gate valve. Install smart stems on the following GL 89-10 valves (1-FCV-74-7, -30, -47, -53, -57, -58, -59, -60, -61, -67, -71, -72, -73, -74, & -75). Install bypass around the RHR Pump Seal Injection Water Heat Exchangers "A" & "C"and shutoff valves between RHR pumps and the heat exchangers to allow servicing the heat exchangers without removing the associated RHR pump form service.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change		U2/U3 Related DCN(Y/N)
Residual Heat Removal DCN 51222	Replace cables with EQ cables, replace internal wiring, replace EQ components, and reroute cables, as applicable, on the following:		Y
	RHR Pump 1A suction valve(1-FCV_74-1)	RHR Shutdown Cooling valve (1-FCV-74-25)	
	RHR Shutdown Cooling valve (1-FCV-74-2)	RHR Pumps B&D Min Flow bypass valve (1-FCV-74-30)	
	RHR Pumps A&C Min Flow bypass valve (1-FCV-74-7)	RHR Pump 1D suction valve (1-FCV-74-35)	
	RHR Pump 1C suction valve (1-FCV-74-12)	RHR Shutdown Cooling suction valve (1-FCV-74-36)	
	RHR Shutdown Cooling suction valve (1-FCV-74-13)	RHR Discharge crosstie (1-FCV-74-46)	
	RHR Shutdown Cooling suction isolation valve (1-FCV-74-48)	RHR Shutdown Cooling suction isolation valve (1-FCV-74-47)	
	RHR Outboard valve (1-FCV-74-52)	RHR Outboard valve (1-FCV-74-66)	
	RHR Inboard valve (1-FCV-74-53)	RHR Inboard valve (1-FCV-74-67)	
	RHR Pressure Suppression Chamber isolation valve (1-FCV-74-57)	RHR Pressure Suppression Chamber isolation valve (1-FCV-74-71)	
	RHR Pressure Suppression Chamber spray valve (1-FCV-74-58)	RHR Pressure Suppression Chamber spray valve (1-FCV-74-72)	
	RHR Test valve (1-FCV-74-59)	RHR Test valve (1-FCV-74-73)	
	RHR Containment Spray valve (1-FCV-74-60)	RHR Containment Spray valve (1-FCV-74-74)	
	RHR Containment Spray valve (1-FCV-74-61)	RHR Containment Spray valve (1-FCV-74-75)	
	RHR System I flush valve (1-FCV-74-104)	RHR System I flush valve (1-FCV-74-106)	
	RHR System I testable check valve (1-FCV-74-54)	RHR System II testable check valve (1-FCV-74-68)	
	RHR Pump 1C (1-PMP-74-16)	RHR Pump 1B (1-PMP-74-28) & RHR Pump 1D (1-PMP-74-39)	
	(1-FCV-74-102); (1-FCV-74-1119); Panel (1-9-32)	(1-FCV-74-103); (1-FCV-74-1120); Panel (1-9-33)	
	RHR Pump 1B suction valve(1-FCV_74-24)		

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Core Spray DCN 51152	Replace 10-inch and 12-inch Core Spray piping in Drywell from the RPV to containment penetrations X-16a & b. Remove 1-inch bonnet vent lines including (1-SHV-75-27 & -55) and (1-VTV-75-27 & -55) from (1-HCV-75-27 & -55). Plug or cap bonnet vents. Rename (1-HCV-75-27 & -55) to (1-SHV-75-27 & -55). Install improved valve packing and remove leak-off lines for (1-FCV-75-26, & -54). Install live-load packing and hardware for (1-FCV-75-27, & -55) and remove leak-off lines. Replace existing cables and associated conduits inside Drywell with new cables and route in new conduits between penetrations and end devices. Recertify valves (1-SHV-75-27, & -55) to design conditions of 1250 psig at 575 Deg F.	Y
Core Spray DCN 51200	Replace ECCS suction strainers to provide acceptable head loss under all plant design conditions. Replace relief valves (1-RFV-75-507A, -507B, -507C, -507D, -543A, -543B, & -583). Add block valves and test connections to provide for local leak rate testing of check valves (1-CKV-75-606, & -607). Replace check valves (1-CKV-75-606, -607, -609, & -610). Add block valve and test connection upstream of (1-FCV-75-57) to eliminate need for freeze-plugging of associated piping for maintenance. For (1-FCV-75-9, & -37), install new valve and EQ motor operator, including T-drains for the limit switch compartment and motor. New valve to be furnished with smart stem, upgraded gland packing and leak-off connection plugged. For (1-FCV-75-22, & -50) install new EQ motor operator, including T-drains for the limit switch compartment and motor and a new threaded stem nut. Upgrade gland packing and remove leak-off valve. For (1-FCV-75-25, & -53) install new EQ motor operator, including T-drains for the limit switch compartment and motor and a new threaded stem nut. Additionally, modify the valve by drilling a 0.25" hole in the high-pressure side disc face to eliminate pressure binding. Upgrade gland packing and remove leak-off valve. For (1-FCV-75-2, & -30) install new EQ motor operator, including T-drains for the limit switch compartment and motor and a new threaded stem nut. Upgrade gland packing and remove leak-off valve. For (1-FCV-75-11, & -39) install new EQ motor operator, including T-drains for the limit switch compartment and motor and a new threaded stem nut. Upgrade gland packing and remove leak-off valve. For (1-FCV-75-23, & -51) install new EQ motor operator, including T-drains for the limit switch compartment and motor and a new threaded stem nut. Upgrade gland packing and remove leak-off valve. Add sediment traps for PSC head tanks "keep fill" function. Remove Core Spray drain pumps.	Y
Core Spray DCN 51223	Provide new cables/conduit and abandon existing cables in place for SOVs/MOVs/controls and other Core Spray system components:(1-SHV-75-27, -55, 1-FCV-75-2, -9, -11, -22, -23, -25, -30, -37, -39, -50, -51, -53, 1-FSV-75-57 & -58).	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Core Spray DCN 51238	Replace pressure indicators (1-PI-75-4, -13, -32, & -41). Replace pressure switches (1-PS-75-7, -16, -24, -35, -44, & -52). Replace pressure transmitters (1-PT-75-20, & -48). Replace flow transmitters (1-FT-75-21 & -49). Replace flow switches (1-FS-75-21, & -49). Replace temperature transmitters (1-TTS-75-69A, & -69B) Refurbish panels (1-25-1, -57A, -60, & -256) Revise calculations and setpoints for EPU.	Y
Containment Inerting DCN 51169	Remove existing H2 & O2 elements, sample lines, cables, valves, and associated hangers from the drywell. Add (2) new lines for sampling both H2 & O2 with valves (1-SHV-76-74, & -84 and 1-TV-76-75, & -85) at penetrations X-27F & X-52D.	Y
Containment Inerting DCN 51201	Install shutoff valve (1-SHV-76-538) , check valves (1-CKV-76-551, & -552) and pipe branching off existing 1-inch Traversing Incore Probe (TIP) nitrogen supply line to Drywell Control Air to provide a diverse nitrogen source. Install new pressure regulator/indicator (1-PREG-76-50) on TIP nitrogen supply line to provide stable nitrogen supply to TIP purge system. Replace devices, components, and cables due to obsolescence and to meet Class 1E & EQ standards (1-FSV-76-17, -18, -19, -24, & -503); 1-ZS-76-17A, -17B, -18A, -18B, -19A, & -19B). Replace relief valves (1-RFV-76-543, & -656). Replace flow transmitter/totalizer (1-FT-76-25) and pressure transmitter (1-PT-76-14). Route/reroute associated electrical cables/conduit.	Y
Containment Inerting DCN 51369	Remove existing Drywell O2 and Torus sample lines and associated supports. Cap and spare associated penetrations. Replace existing valves (1-FSV-76-49, -50, -55, -56, -57, -58, -59, -60, -65, -66, -67, & -68). Replace existing H2/O2 Analyzers 1A & 1B with one new analyzer. Relocate PASS source connections for Torus and Drywell gas sample points. Install new valve (1-FSV-43-87) in the Division I Torus sample return line, to divert H2/O2 Analyzer discharge flow to PASS sample panel. Included with this new valve are limit switches to provide indication at Control Room Panel 1-9-54.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Radwaste DCN 51154	Remove valves (1-FCV-77-14A, & 14B; 1-DRV-77-666, & -667; 1-VTV-77-632) and associated cables/conduit. Replace and upsize Clean RadWaste (CRW) heat exchangers in drywell equipment drain sump and provide seismic supports. Replace check valves (1-CKV-77-600, -603, -625, & -628) with valves having a 1/16" diameter hole in the disc to prevent possible over-pressurization among Drywell Equipment Drain, floor drain sump pumps, and Primary Containment Isolation Valves (PCIVs). Replace drain sump bypass valves (1-77-602, -605, -627, & -630) and associated piping and shutoff valves (1-77-601, -604, -624, -629). Replace the following instruments: (1-LT-77-1A, -1B, -14A, -14B; 1-TE-77-14; 1-FS-77-51) and associated cables/conduit. With these changes, the temperature control signal is deleted and pumps will operate on level controls.	Y
Radwaste DCN 51202	Replace flow control valves (1-FCV-77-15A, -15B, -2A, & -2B) with air operated ball valves, solenoid controllers, limit switches, and switch mounting brackets. Replace the following small bore valves: (1-DRV-77-, 636, & -1355; 1-TV-77-619, -620, -643, & -644) including piping and fittings. Add relays in panel (1-9-4) and revise wiring such that flow totalizers for Drywell Equipment Drain sump pumps (1A & 1B) will only count when pumps are running. Replace flow transmitters (1-FT-77-6, & -16) and delete converters (1-FM-77-6, & -16). Replace the following instruments, associated cables/conduit: (1-FSV-77-2A, -2B, -3, -15A, & -15B); (1-ZS-77-2AA, -2AB, -2BA, -2BB, -15AA, -15AB, -15BA, & -15BB). Replace (1-FSV-77-17 & 1-TIS-77-17). Add lead shielding blankets to the 6-inch CRW unlimited access area drain header at Reactor building floor Elev. 565', Col. P/R-3, S/R-6, & S/R-2; and to the 4-inch drain header on Elev. 565', 593' & 621', Col S/R-2.	Y
Radwaste DCN 51597	Modify/upgrade RadWaste sump/pump controls to achieve the following: monitor and control sump level, replace elapsed time meters, replace alternating action relay logic, replace manual leakage detection methodology, detect level signal wiring problems, control sump pump operation per existing level setpoints, provide a manual mode of monitoring and controlling sump levels, transmit sump level information to plant computer, provide quantitative inleakage information, and provide future monitoring and control capabilities.	Y
Spent Fuel Pool Cooling and Cleanup DCN 51203	Replace the following (1-LS-78-1A, -1B, -1C, 1D, -1E, -1F, & -1G; 1-PS-78-9, & -14), including associated cables/conduits. Replace thermowells (1-TW-78-8, -13, & -18) and associated fittings. Cut and cap existing crosstie between (1-PIS-78-11 & -16) and rewire annunciator (1-XA-78-51) to differentiate when Pump 1A, or 1B, or both 1A & 1B are running. Remove power from valve (1-FCV-78-62) to preclude spurious opening.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Spent Fuel Pool Cooling and Cleanup DCN 62160	Replace flow switch (1-FS-78-51), and associated cables/conduit.	Y
Spent Fuel Pool Cooling and Cleanup DCN 63631	Install a 2-inch ball valve, a welded 2-inch nipple, a 2-inch threaded cap, and a 6-inch X 2-inch weldolet at various locations of Spent Fuel Pool Cooling piping (primarily at heat exchangers outlet to Radwaste) to facilitate hydrolazing and reduce dose rates.	Y
Fuel Handling and Storage DCN 51204	Add grating and handrails to improve safety on Refueling platform. Replace entire fuel handling control; system utilizing variable speed motor drivers, a programmable Logic Controller (PLC), a solid-state electronic load weighing system for main hoist, software defined boundary zone. protection, new position indication system, updated controllers, an operators cab mounted display, new main trolley motor, new main trolley and mono-rail hoist power tracks, new main hoist assembly, new fuel grapple, updated video equipment, upgraded air system (per GE SIL 272), and an isolation transformer	Y
Primary Containment Temperature Monitoring DCN 51148	Replace (32) thermocouples and relocate (1-TE-70-7, -8, & -9). Upgrade cables for replaced thermocouples to environmentally qualified cables.	Y
Primary Containment Temperature Monitoring DCN 51170	Remove/delete existing Humidity Sensors (1-ME-80-36A & -36B) and associated cables and conduits. These loops were originally intended to assist in determining drywell liquid leakage which is now monitored by drywell sump level/flow.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Primary Containment Temperature Monitoring DCN 51232	Remove/delete existing Humidity instruments (1-MIT-80-36A & -36B) and associated cables and conduits. Revise setpoint for (1-T-56-4, 2-T-56-4, & 3-T-56-4). Issue initial setpoint and scaling documents for temperature recorder loops (1-T-68-37; 1-T-56-2, -3, & -4) for Reactor Water Recirculation and Reactor Temperature Monitoring.	Y
Standby Diesel Generators DCN 51016	Complete the Unit 1 connections to the Unit 1/2 Diesel Generator Unit priority Re-Trip logic by wiring connections from the Unit 1 Re-Trip relay contacts in series with the Unit 2 Re-Trip relay contacts, Relays (10A-K132A, & B and 10A-K134A, & B). Complete the Unit 1 connections to the Unit 1/2 Diesel Generator for ECCS preferred pump logic.	Y
Containment Atmosphere Dilution DCN 51205	Replace the following valves: (1-FSV-84-8A, -8B, -8C, & -8D). Replace control and power cables associated with these valves, with EQ cables. New valves meet ASME Section III, Class 2, Seismic Category I, Class 1E, and 10CFR50.49 (EQ) requirements. Add test connections, block valves, and test valves to facilitate Appendix J leak testing. Provide a backup source of nitrogen from the Containment Atmosphere Dilution (CAD) System to Drywell Control Air system. Provide a backup source of nitrogen from CAD to the Suppression Chamber/Reactor Building Vacuum breaker valves (1-FCV-64-20, & -21). Provide a backup source of nitrogen from CAD to the Hardened Wetwell Vent PCIVs (1-FCV-64-221, & -222). Modify the CAD Vent Pipe Control loop that includes (1-FCCV-84-19), to add an expansion loop to reduce pipe stresses and pipe support loads. Replace various instruments, components, cables/conduit that are obsolete or to address EQ issues. Reconnect Trains A & B CAD nitrogen supply lines from their respective Nitrogen Storage Tank (A & B) to the U1 Drywell and Suppression Chamber. Replace Train A, CAD Vaporizer Power cable splice ($ES-153A).	Y
Control Rod Drive DCN 50985	Provide Control Rod Drive Housing (CRDH) lateral seismic restraints in lower pedestal cavity.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Control Rod Drive DCN 51078	Remove Rod Sequence Control System (RSCS). Remove components of instrument loops (1-P-85-61A, -61B, & -61C) from panels (1-25-110 & -111), and abandon or remove associated cables. Remove group notch logic module for the Rod Sequence Control logic from panel (1-9-28). Remove Logic Card and Aux. Buffer Boards for the Rod Sequence Control Logic and handswitch (1-HS-85-3A/S12) from panel (1-9-27). Replace existing Reactor Manual Control System (RMCS) Automatic Sequence Timer (1-TMR-85-3A/S4) with two Programmable Logic Controllers (PLCs) (1-PLC-85-3A/S4A, & -3A/S4B) with one PLC being an installed spare.	Y
Control Rod Drive DCN 51206	Replace obsolete CRD pump suction relief valve (1-RFV-85-505A). Replace valve (1-ISV-85-586) and relabel as (1-SHV-85-586). Replace packing for the following valves with packing to meet EPRI guidelines: (1-FCV-85-56; 0-SHV-85-500; 1-SHV-85-504A, -516A, -517, -552, -555, -556, -559, -561, -562, -563, -564, -565, -566, -568, -569, -572, -577; 1-BYV-85-519A, & -551; 1-THV-85-527). Replace seal injection flow control valves (1-FCV-85-54, & -55) based on GE recommendations. Replace CRD system flow control valves (1-FCV-85-11A, & -11B). Revise the N2 charging cart relief valves (1-RFV-85-604 & -609) setpoint from 1150 psig to 1200 psig. The system design temperature for a portion of the CRD hydraulics return to RWCU system is revised to 545° F. Install a second door to each Unit 1 Scram Discharge Instrument Volume (SDIV) cage. Modify SDIV level instrumentation to improve response time for inputs to the RPS scram logic by increasing diameter of piping, fittings, and valves for (1-LS-85-45C, -45D, -45E, & -45F) to 2-inches. Disable and abandon Unit 1 low scram pilot air header pressure switches and associated pressure indicators (1-PS-85-35A1, -35A2, -35B1, -35B2: 1-PI-85-35A, & -35B). Remove Scram Discharge Header ultrasonic level detectors (1-LE-85-85A, -85B, -85C, & -85D).	Y
Control Rod Drive DCN 51240	Replace obsolete pressure and level instrumentation of the Hydraulic Control Units with equivalent instrumentation. Replace scram pilot solenoid valves with qualified valves. Install a continuous backfill to the Reactor Vessel Level Instrumentation System reference legs. Install Alternate Rod Insertion system scram and vent valves to meet Anticipated Transient Without Scram (ATWS) requirements. Refurbish CRD local panels. Install a differential pressure indicator across the CRD Pump 1A strainer. Install a new permanent sample station to sample condensate flowing from the condensate storage tanks to the CRD drive water pumps.	Y
Radiation Monitoring DCN 50583	Replace obsolete flow (current) switches (1-FS-90-134B, & -134C) in panel (1-9-93)	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Radiation Monitoring DCN 51171	Remove existing Containment High Range Radiation Monitor (CHRRM) Detectors (1-RE-90-272C, & -273C) and associated cable and conduit from the drywell. Modify penetrations (X-46, & X-105A) by extending the penetrations 15-inches further into the drywell to house CHRRM detectors (1-RE-90-272A, & -273A).	Y
Radiation Monitoring DCN 51241	Replace Air Particulate Radiation monitors (1-RM-90-50, -55, -57, & -58). Replace Main Steam Line Radiation monitors (1-RM-90-136, -137, -138, & -139). Replace flow control valves with flow solenoid valves, rework sample lines, and add Appendix J test connections for:(1-FSV-90-254A, -254B, -255, -257A, & -257B). Replace Primary Coolant Leak Detection (PCLD) Continuous Air Monitor, (1-RM-90-256), replace heat tracing and controls: (1-TS-90-256, 1-RM-90-256, 1-RE-90-256-A, 1-RE-90-256-B, 1-FE-90-256, 1-HTR-90-256, 1-PMP-90-256, 1-PREG-90-256, 1-XI-90-256, 1-XX-90-256A, 1-XX-90-256B, 1-HS-90-256B, -256C, -256D, & -256E). Remove (1-RE-90-133, -133A, -134, -134A) and associated pre-amps, cabling and raceway. Rework sample lines for loops (1-R-90-133, -134, -131, & -132. Replace drywell Radiation Detectors (1-RE-90-272A, & -273A) and install new cables, as needed. Remove cables and raceways associated with (1-RE-90-272C, & -273C) in U1 Reactor Building.	Y
Neutron Monitoring DCN 51079	Replace existing Power Range Monitor electronics with new Nuclear Measurement Analysis and Control (NUMAC) digital Power Range Neutron Monitoring (PRNM) hardware to address GL 94-02. Install new Traversing Incore Probe (TIP) system devices (NUMACs) to replace existing Drive Control Channels A thru E. Install TIP isolation reset Hand Switch and a new relay for PCIS logic seal-in. Perform minor modifications to the Intermediate Range Monitors (IRMs) and Source Range Monitors (SRMs) chassis and SRM Test Switch.	Y
Neutron Monitoring DCN 51158	Replace Source Range Monitor (SRM), Intermediate Range Monitor (IRM), and Local Power Range Monitor (LPRM) cables, detectors, and associated equipment within the drywell and specific portions of the reactor building and reactor vessel.	Y
Neutron Monitoring DCN 61728	Replace existing obsolete Unit 1 Neutron Monitoring 24V dc battery chargers (4). The new chargers have current limit setting of 110%.	Y

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System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Traversing Incore Probe DCN 51172	Provide mounting, installation, and connection of Index Mechanisms (1-MCHR-94-101A thru -101E), to include replacement of Indexer incoming TIP tube from Penetration (1-MPEN-100-35A thru -35E) flange to indexer and Indexer outgoing TIP tubes from indexer to associated LPRM detector assembly connection. Replace blind flange on each indexer tubing penetration listed above and connect it to the Drywell TIP tube to each indexer. Rework N2 purge tubing at indexers and change connection from outboard to inboard side of each indexer.	Y
Traversing Incore Probe DCN 51242	Replace TIP Integrated Drive Mechanisms (1-MCHD-94-101A thru -101E) with upgraded units. Upgraded units to include: DC Drive Motor, allow use of existing field cables, allow use of Gamma TIP style detector, and externally mounted motor starter. Replace TIP Chamber Shields (1-SHDP-94-101A/A, -101B/B, -101C/C, -101D/D, & -101E/E). Replace Shear Valves (1-XCV-94-506, -507, -508, 509, & -510) due to age and valves can not be non-destructively tested. Perform cycle and leak tests on TIP Guide Tube ball isolation valves (1-FCV-94-501, -502, -503, -504, & -505).	Y
Reactor Water Recirculation Flow Control DCN 51219	Remove relays, indications, ammeters, resistors, fuses, instrument and power transformers, diodes, and handswitches from local control panels (1-LPNL-925-23, & -24). Install (3) Motor Management Relays (MMRs) per panel to provide Recirculation motor ground fault, overcurrent, phase reversal, and differential protective functions and trip the associated Variable Frequency Drive (VFD) and VFD feeder breakers. Install (3) Digital Frequency Relays (DFRs) per panel for redundant overfrequency protection. Replace Recirculation Pump Differential Pressure Transmitters (1-PDT-68-65, & -82) with transmitters that have a 4-20 mA output signal for compatibility with control system software.	Y
Reactor Protection DCN 51080	Remove condenser low vacuum trip logic. This was an anticipatory trip and no FSAR transient and accident analysis credit was taken for this feature. Delete CRD air header low pressure trip function. Replace obsolete time delay relays (1-RLY-99-1AK4, & -1AK4B in RPS MG Set Control Panels. Install test switches (1-HS-85-37AA & -37BA) for testing the Scram Discharge Volume Vent and Drain Pilot Valves (1-FSV-85-37A, & -37B).	Y
Penetrations DCN 51159	Replace primary containment electrical penetration assemblies (EPAs) (1-EPEN-100-110A, 100A, & -104F) with environmentally qualified EPAs.	Y
Penetrations DCN 51208	Inspect, document, and install as necessary, fire barrier seals for penetrations between fire zones (1-1, 1-2, 1-3, 1-4, 1-5, & 1-6) in Unit 1 Reactor Building. Replace Doors (490, 635, & 670), including frames and hardware, in Unit 1 Reactor Building, with fire rated doors and designations.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Cranes and Hoists DCN 51740	Install a jib crane above each of three (3) sets of Combined Intercept Valves (CIVs) and relief valves (1-FCV-1-96 & 1-1-553; 1-FCV-1-99 & 1-1-561; & 1-FCV-1-102 & 1-1-567).	Y
Main Generator DCN 51133	Provide back-up power source to the Main Generator Breaker Air Compressor System (MGBACS) to provide redundant capability for operation of the Replenishing Valve Control circuits. Add parallel diodes across Diodes R7D & R8D for Main Generator Exciter Firing Control Circuit to eliminate a potential single point of failure. Add a resistor onto the Maximum Excitation Limit Panel Component board and add a resistor onto the Transfer Panel Component board (43A & J2KX relays). The additional resistors increase the conditioning effect for the boards and eliminate noise in the ground circuit. Remove existing field isolators and install a programmable Field Temperature Module (1-TM-242-45) in generator exciter cabinet to recorder (1-TR-242-59).	Y
Process Computer DCN 51082	Provide for the installation of a new Unit 1 Integrated Computer System (ICS). This modification adds a new redundant process computer, operator work stations, printers, I/O cabinets, I/O wiring, and interface to package systems via data-link. Package systems include Foxboro IA System (includes Reactor Water Recirculation, Reactor Feedwater, Feedwater Heater Drains, Moisture Separator, and Generator Temperature Monitoring) Reactor Recirculation Pump VFDs, Condensate Demineralizers, Containment Isolation System, Neutron Monitoring, Generator Hydrogen, Radwaste Sump Level Control, Turbine EHC, MCR Annunciators, And MCR Recorders.	Y
Civil Structures DCN 51019	Provide modifications to the Drywell Platform structural steel at Elev. 584'. The modifications include horizontal rigidity bracing for the platform due to revised seismic analysis, revised piping loads, NRC IE Bulletin 79-14, added cable trays and conduit.	Y
Civil Structures DCN 51020	Provide modifications to the Drywell Platform structural steel at Elev. 563'. The modifications include horizontal rigidity bracing for the platform due to revised seismic analysis, revised piping loads, NRC IE Bulletin 79-14, added cable trays and conduit.	Y
Civil Structures DCN 51088	Provide for the installation of new cable trays and raceway components in the Cable Spreading Room, Auxiliary Instrument Room, and Control Room in Unit 1. Also, provide transition raceway components to interface with Reactor Building and Turbine Building cable trays.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Civil Structures DCN 51160	Provide design details for cables requiring coating or beta shielding, for junction boxes and terminal boxes requiring sealing against moisture, for junction boxes and terminal boxes requiring ventilation and drainage, and for sealing of conduits terminating at cable trays, all within the Unit 1 Drywell. Additionally, provide details for replacing various Drywell junction boxes with boxes made of stainless steel.	Y
Civil Structures DCN 51286	Provide modifications to the Drywell Platforms structural steel at Elev. 604', 616', & 628'. The modifications are due to revised seismic analysis, revised piping loads, NRC IE Bulletin 79-14, added cable trays and conduit.	Y
Civil Structures DCN 51374	Modify the Unit 1 Reactor Building Elev. 551' Torus Access Platform structural members and associated connections. Modifications are to resolve identified platform deficient items such as insufficient welds, structural members, and anchorage. Structural components are added, modified, or replaced and field cut-outs and unaccounted attachments are evaluated and resolved.	Y
Civil Structures DCN 51375	Provide modifications to various structural steel platforms within the Unit 1 Reactor Building based on evaluation of the steel members, connections, surface mounted baseplates, anchorages, and/or evaluation of embedded plates.	Y
Civil Structures DCN 51377	Provide modifications to the piping penetration anchor frames in the Reactor Building.	Y
Civil Structures DCN 51519	Implement structural modifications necessary to qualify Miscellaneous Steel Support Frames (MSSFs) in the Unit 1 Reactor Building zone, outside of the Drywell, to the requirements of GDC 50-C-7100 and Seismic Design 50-C-7102. The MSSFs serve as structural attachment points for pipe supports and for secondary loads such as cable tray supports and HVAC duct supports. No new frames are added.	Y
Civil Structures DCN 51520	Provide for the modification of various steel platforms for the Core Spray Valve Access platform and Control Rod Drive Relief Valve Access platform, and addition/modification of HVAC duct supports in the Core Spray and RHR pump rooms.	Y
Civil Structures DCN 51521	Provide for modifications to the Unit 1 Reactor Building structural components required for A-46 qualification of cable tray and conduit supports.	Y
Civil Structures DCN 51560	Provide modifications to the Reactor Pressure Vessel (RPV) insulation support frame (base ring supported at Elev. 640') to ensure that frame displacements are within acceptable limits for support of Seismic Class I piping.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Civil Structures DCN 51669	Modify Seismic Class II items located in the Reactor Building, outside the drywell which, if not modified, would degrade the integrity of Class I items as identified by Seismic II/I Spray Evaluation Program. A total of eighteen outliers will require modification. One outlier identified by MSIV Seismic Ruggedness Verification Program, and located in the Reactor Building, is added to the scope of this modification.	Y
Civil Structures DCN 60268	Provide steel frames for permanent shielding at CRD suction/discharge lines, strainers/filters on Elev. 565' & 541' in NE quadrant of Unit 1 Reactor Building to reduce dose rates.	Y
120/208 VAC Electrical Distribution DCN 51085	Replace the existing 1KVA ECCS Analog Trip Unit (ATU) Inverters with 5KVA inverters. Replace the Unit Preferred Motor-Motor-Generator (MMG) Sets with an rectifier/inverter Uninterruptible Power Supply (UPS). Replace the Unit Preferred Transformer with a regulating type transformer. Install/Replace various 120V Distribution system fuses and breakers for proper coordination, protection and/or support of downstream load changes. Modify breaker settings for proper coordination and protection. Structural support modifications are made associated with USI-A46 and Seismic IPEEE Programs for the Control Building.	Y
120/208 VAC Electrical Distribution DCN 51214	Various cables in the 120V Distribution System are added, replaced, rerouted, retagged or abandoned as required to support 10CFR50.49, App R, voltage drop/ampacity/short circuit, Design Criteria Requirements and cable separations analysis.	Y
250 VDC Electrical Distribution DCN 51110	Various cables in the 250V Distribution System are added, replaced, rerouted, retagged or abandoned as required to support 10CFR50.49, App R, voltage drop/ampacity/short circuit, Design Criteria Requirements and cable separations analysis. Modify the internal components in the 250V Motor Control Center (MCC) cubicles to support changes to the loads and cables. Modify breaker settings for proper coordination and protection.	Y
250 VDC Electrical Distribution DCN 51215	Various cables in the 250V Distribution System are added, replaced, rerouted, retagged or abandoned as required to support 10CFR50.49, App R, voltage drop/ampacity/short circuit, Design Criteria Requirements and cable separations analysis. Modify the internal components in the 250V MCC cubicles to support changes to the loads and cables. Modify breaker settings for proper coordination and protection.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
480 VAC Electrical Distribution DCN 51131	Various cables in the 480V Distribution System are replaced as required to support voltage drop/ampacity/short circuit and Design Criteria Requirements. Modify breaker settings for proper coordination and protection. Modify the internal components in the 480V MCC cubicles to support changes to the loads and cables.	Y
480 VAC Electrical Distribution DCN 51090	Various cables in the 480V Distribution System are added, replaced, rerouted, retagged or abandoned as required to support 10CFR50.49, Appendix R, voltage drop/ampacity/short circuit, Design Criteria Requirements and cable separations analysis. A new isolation switch is installed for the Electric Board Room Air Handling Units 1A and 1B to satisfy Appendix R requirements. Modify the internal components in the 480V MCC cubicles to support changes to the loads and cables. Modify breaker settings for proper coordination and protection. Modify the 480V Load Shed Logic for the Drywell Blowers for both Units 1 and 2 and the Control Bay Chilled Water Pumps A and B to satisfy Diesel Generator Loading requirements.	Y
480 VAC Electrical Distribution DCN 51216	Various cables in the 480V Distribution System are added, replaced, rerouted, retagged or abandoned as required to support 10CFR50.49, App R, voltage drop/ampacity/short circuit, Design Criteria Requirements and cable separations analysis. Modify the internal components in the 480V MCC cubicles to support changes to the loads and cables. The 480V Shutdown Boards 1A and 1B oil filled 750KVA transformers are replaced with dry type 1000KVA transformers to meet system load requirements. Isolation fuses are installed in 4160V Shutdown Board BD power feed to 480V Shutdown Boards 1E transformer to eliminate an associated circuit concern for Appendix R requirements. Remove LPCI Motor-Generator Sets and abandon in place the Reactor MOV Boards 1D & 1E.	Y[(1)]
4kV AC Electrical Distribution DCN 51087	Unit 1 4KV breakers are replaced with new vacuum style breakers. Fuses are installed in 4KV Shutdown Boards to provide isolation of control circuit cables to satisfy Appendix R requirements.	Y

[1] The removal of the LPCI M-G sets is unique to Unit 1.

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
4kV AC Electrical Distribution DCN 51217	Various cables in the 4KV Distribution System are added, replaced, rerouted, retagged or abandoned as required to support 10CFR50.49, Appendix R Ampacity/Voltage Drop and Cable Separations analyses. Replace the Terminal Blocks for the U1 Shutdown Board Cooling Units to complete documentation for the requirements of 10CFR50.49	Y
500/161kV Off Site Power DCN 51084	Add a provision to trip the Generator exciter field breaker when the turbine is tripped to prevent reverse power relay operation. Add a redundant Generator Backup Relay for tripping of the Generator to eliminate a single point failure of the Generator. Remove the Unit 1 Main Generator and Turbine trip initiations which are generated by the operation of the 64GF Generator Field Ground relay and add an additional alarm in the control room for operator action upon actuation of the relay to prevent unnecessary Generator trips. Install a blocking contact from Loss of Potential (Voltage Balance) Relay 160 into the Generator overcurrent trip circuit to prevent false tripping.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Miscellaneous DCN 50995 DCN 51012 DCN 51065 DCN 51066 DCN 51067 DCN 51068 DCN 51069 DCN 51254 DCN 51261 DCN 51263 DCN 51335 DCN 51336 DCN 51338 DCN 51339 DCN 51340 DCN 51341 DCN 51342 DCN 51343 DCN 51344 DCN 51345 DCN 51346 DCN 51347 DCN 51349 DCN 51351 DCN 51352 DCN 51353 DCN 51419 DCN 51420 DCN 51441	Evaluate piping supports and their configurations against applicable requirements from General Design Criteria, UFSAR Seismic Class I requirements, existing calculations, walkdown data, and NRC Bulletins IE 79-02 and 79-14. Perform piping support modifications as necessary to ensure piping and branch connections are qualified for deadweight, seismic, and thermal loads.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Miscellaneous DCN 51255 DCN 51256 DCN 51257 DCN 51258 DCN 51260 DCN 51262 DCN 51264 DCN 51334 DCN 51348 DCN 51408 DCN 51409 DCN 51410 DCN 51411 DCN 51412 DCN 51413 DCN 51414 DCN 51415 DCN 51416 DCN 51417 DCN 51418 DCN 51448 DCN 51449 DCN 51450 DCN 51452 DCN 51453	Evaluate piping, piping supports and their configurations against applicable requirements from General Design Criteria, UFSAR Seismic Class I requirements, existing calculations, and walkdown data, for all Seismic Class I piping/tubing less than 2.5-inch diameter. Perform piping and support modifications (including addition and deletion) as necessary to ensure piping and branch connections are qualified for deadweight, seismic, and thermal loads at EPU conditions.	Y

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Miscellaneous DCN 51091 DCN 51642 DCN 60073 DCN 60074	Replace safety related, quality related, and non-safety related fuses in the Unit 1 Control Bay, Reactor Building, and Turbine Building with like-for-like equivalent fuses. There are no changes to circuitry, no addition or deletion of any fuses, and no fuse-holder replacement, within the scope of this DCN. Unit 1 fuses, which are within the Operating Boundary of Units 2 or 3, are excluded from the scope of these DCNs. Fuses with common, Unit 2, or Unit 3 UNIDs, are excluded from the scope of these DCNs.	Y
Generator Cooling DCN 51140 (EPU)	Addition of flow and temperature switches (1-FS-35-65A, -B, -C and 1-TS/TW-35-71A, -B, & -C) to provide two out of three logic based turbine trip instrumentation. The new flow switches provide for a turbine trip on loss of cooling water flow to the generator. Provide for an increase in generator hydrogen pressure from 65 to 75 psig to support EPU conditions. Replace pressure switches (1-PS-35-18A, 18B, and -19) and revise setpoint (EPU). Recalibrate (1-PCV-35-5A, -5B, and -9) in support of EPU conditions. Eliminate Flow Integrator (1-FQ-35-8) to preclude potential hydrogen leakage. Add an excess flow check valve at the location where (1-FQ-35-8) was removed, to comply with fire protection code requirements. Replace obsolete Generator Seal Oil Vacuum Pump motor and gear box. Replace under-sized Generator Emergency Seal Oil Pump motor power cable to ensure minimum acceptable voltage. Replace Generator Exciter Flexible coupling per GE recommendation. Install Litten Veam Connectors/penetrations and Generator flux probe on generator housing. Add Foxboro I/A monitoring capability for generator stator and other related thermocouples.	N (EPU)
Condensate DCN 51401 (EPU)	Replace Condensate pump motors and impellers to accommodate increased flows required for EPU. Add an orifice plate downstream of FCV-2-29A to minimize pressure drop through the valve. Upsize associated motor power feed cables, replace switchgear ammeters with appropriately sized meters, and revise protective relay settings.	N (EPU)
Condensate DCN 51402 (EPU)	Replace Condensate Booster pumps and motors to accommodate increased flows required for EPU. New pump motors are water to air cooled and Raw Cooling Water heat exchangers are added. Upsized current transformers and power feed cables for the associated pump motors are provided. HVAC air flows are increased to the Condensate pumps/motors as due to the increased heat loads of larger motors being installed. HVAC air flows are reduced to the Condensate Booster pumps/motors due to the reduced heat load from the new water-cooled motors.	N (EPU)
Feedwater DCN 51403 (EPU)	Replace Unit 1 Reactor Feedwater (FW) Pumps (3), the FW pump/turbine couplings, and associated bearing temperature and vibration monitoring instrumentation to accommodate increased design flows required for EPU.	N (EPU)

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Main Steam DCN 51456 (EPU)	Retrofit the high pressure turbine with Advanced Design Steam Path (ADSP) to include a new rotor with new custom-designed diaphragms and buckets for EPU. Modify the size of the steam seal unloader valves and associated piping to accommodate the larger steam flow requirements.	N (EPU)
Main Steam DCN 51481 (EPU)	Provide GE designed and supplied turbine replacement components, including monoblock rotors and diaphragms for 3 LP turbines, in support of EPU.	N (EPU)
Condensate and Demineralized Water DCN 51457 (EPU)	Install a tenth Condensate Filter-Demineralizer and associated components such as, resin filter, holding pump, instrument panel/instruments, access platform, and demineralizer vessel shielding. Replace nine existing holding pumps with new, lower rpm pumps. These changes will maintain condensate flow below the 4000 gpm max flow rate for each Filter-Demin vessel at EPU conditions with one vessel out of service.	N (EPU)
Condensate and Demineralized Water DCN 51459 (EPU)	Replace the existing 16" line and 16" air-operated butterfly valve that provide for condensate to bypass the steam packing exhauster (SPE), with a 24" line and a 20" motor-operated butterfly valve. Permanently block the orifice contained within the SPE in the partition plate that separates the inlet and outlet of the waterbox.	N (EPU)
Condensate and Demineralized Water DCN 51462 (EPU)	Replace 71 Condensate demineralizer System valves and their associated pneumatic actuators with upgraded valve/actuator assemblies. Requires minor piping modifications to adjust face to face distances between flanges to accommodate the new valve bodies. Install new tube rack supports.	N (EPU)

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Heater Drains and Vents DCN 51464 (EPU)	Modify the shells, nozzles, and relief valves for Feedwater Heaters 1, 2, and 3 to be ASME Code compliant under EPU conditions. Provide the Feedwater Heaters 1, 2, 3, 4, and 5 pass partition plate modifications and manway stiffeners required for higher EPU pressures. Relocate the Extraction Steam nozzles on #3 Feedwater Heater and add a steam duct/impingement plate internal to the heater to protect the shell and to provide improved steam distribution within the heater. Modify the Extraction Steam piping to match the new nozzle locations.	N (EPU)
Main Steam DCN 51466 (EPU)	Make changes to the instruments identified in the BOP Instrument Study in support of EPU. Replace various local pressure gauges with new gauges and pulsation dampening snubbers. Re-calibrate various flow and pressure transmitters such that their ranges encompass new EPU operating conditions. Re-calibrate various pressure switches with new setpoints to account for new EPU operating conditions. Revise setpoint for pressure switches monitoring steam supply to Steam Jet Air Ejectors (SJAEs) from 180 to 187 psig.	N (EPU)
Main Generator DCN 51470 (EPU)	Upgrade Main Transformer system for plant operation at EPU conditions. The rating for each Main Transformer is increased from 400 to 500 MVA. Revise circuit for actuation of Lock-Out Relays (LORs) 186 & 186C to actuate on a signal from Qualitrol Multi Function Pressure Monitor (2 out of 3 logic) instead of from the sudden pressure relays. Add an interlock in the transformers cooling control circuit from LOR 186 & 186C. Delete interlocks from undervoltage relay 127T, to meet single failure criteria for loss of Relay 127T. Replace fire protection ring header for Unit 1 Main Transformer due to new transformers configuration and to comply with present code requirements. Relocation of existing heat detectors and addition of (3) detectors.	N[(2)] (EPU)
Condensate and Demineralized Water DCN 51477 (EPU)	Modify the Unit 1 condenser instrumentation to provide for improved performance monitoring under EPU conditions. Improve the accuracy of condenser pressure inputs to the Integrated Computer System (ICS). Provide additional Condenser Cooling Water (CCW) supply and return temperature data to the ICS and provide CCW flow input to ICS.	N (EPU)

2 Already installed on Unit 2.

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Feedwater DCN 51482 (EPU)	Replace rotors for each Unit 1 Feedwater Pump Turbine (FWPT) to include new stages 1 & 2 buckets per current design and newly designed stages 3-6 buckets to support EPU conditions. Included will be newly designed stage 6 diaphragms and (3) new mechanical overspeed trip governors, all furnished by GE.	N (EPU)
Feedwater DCN 62024	Revise thermal ratings of the Feedwater System for EPU.	N (EPU)
Feedwater PIC 63881 (EPU)	Upgrade seal injection for new Feedwater pumps.	N (EPU)
Gen Bus Duct Cooling DCN 60598 (EPU)	Replace Isolated Phase Bus (IPB) duct cooling coil (1-CLR-262-1) with the new coil sized for 200 gpm flow and 2.5 million BTU/hr cooling to support EPU. Replace existing IPB duct cooling air supply fan (1-FAN-262-1) and motor (1-MTR-262-1) with two new fan/motor assemblies (1-FAN-262-1A, & -1B; 1-MTR-262-1A, & -1B). Delete existing wiring, cables, and control switches and replace with new wiring, cables, and control switches to power the new fans/motors. Raw Cooling Water piping is modified to make the existing dual inlet and outlet piping to cooling coil, a single inlet and outlet configuration. Add Raw Cooling Water hydraulic calculations.	N (EPU)
Sampling and Water Quality DCN 51185	Install a scaled-down Post Accident Sampling System for Unit 1. See Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler TSTF-413. The modified system provides a means to sample reactor coolant, suppression pool, and containment atmosphere at a sample station (1-LPNL-925-365). Included are additions of RHR liquid sample line and H2/O2 monitoring gas sample line for the Post Accident Sampling System (PASS). Replace existing solenoid valve (1-FSV-43-14) with a Class 1E and EQ solenoid valve. New valve to be supplied with stem seal packing which meets EPRI guidelines.	N
Sampling and Water Quality DCN 51235	Replace selected RWCU related instruments as a result of design/programs, age, degradation, & obsolescence. Replace RWCU Sample panel & provide sampling capability from Drywell sump pumps discharge to aid in monitoring identified & unidentified leakage & investigations. Install qualified leak detectors for RWCU & related pipe rupture.	N

Description of Modifications Planned for BFN Unit 1 Restart

System and Design Change	Description of Change	U2/U3 Related DCN(Y/N)
Annunciators DCN 51107	Replace Unit 1 Annunciation System. New system to fit into existing panel spaces and has added capability to provide alarm status and sequences from Integrated Computer System (ICS) displays using Programmable Logic Controllers (PLCs). Remove existing annunciator hardware, circuit cards, lamp holders, and wiring, inside and outside the annunciator window boxes. Install a mounting plate with two PLCs, ladder logic programmed Input/Output (I/O) cards, relay cards, fuses, and terminal blocks with multi pin connectors mounted inside each original Annunciator Window Box facing the rear of each Main Control Room (MCR) panel. Existing field wiring will land on new terminal blocks and be jumpered to allow both PLCs to have identical auctioneered inputs. Modify MCR front panels, above each Annunciator Window box, to accommodate four Light Emitting Diode (LEDs), long-life bulbs. Existing 48V dc to 120V ac inverters are removed and replaced with two 48V dc to 24V dc power supplies per MCR panel. Replace the current annunciator power supply 48V dc distribution system and Automatic Bus Transfer (ABT) switch in Panel (1-9-9, CAB 1) with two fused distribution panels. Replacement of the Operations Recorder equipment will occur at one time using PLC based equipment Real Time Products (RTP) system and this installation will affect all 3 units. This system consists of two high density I/O racks and processors located in Bay 94 in the Communications Room. Existing light bulbs in the window box on panel (9-8) will be replaced with 24V LED bulbs on all three units. The 120V ac RTP will be powered from Unit 3 ICS distribution panel (25-525).	N
Temperature Monitoring DCN 51165	Provide for equivalent replacement of system 003, (Reactor Feedwater), system 056, (Temperature Monitoring), and system 068 (Reactor Water Recirculation) thermocouples, mounting hardware, and associated cables/conduits to satisfy component reliability due to age, time in harsh environment, and degradation.	N
Temperature Monitoring DCN 51232	Replace obsolete Control Room temperature recorders (1-TR-56-2, -3, -4, and -37) with digital paperless recorders.	N
Radiation Monitoring DCN 61999	Delete Off Gas monitor (1-RM-90-160) and both Torus Area Monitors (1-RM-90-272B, & -273B). Replace Off Gas monitor (1-RM-90-157) with a suitable drawer detector to detect early onset of fuel failure.	N
Radiation Monitoring DCN 62861	Turbine Building Radcon Continuous Air Monitors (CAMs) (1-RM-90-51, -53, -54, -56, & -59) will not communicate with the upgraded Control Room module.	N

UNIT 1 PROJECT SCOPE

COMMODITY	APPROXIMATE PROJECT TOTAL
Piping - Large Bore	16,366 feet
Hangers - Large Bore	1,745
Piping - Small Bore	27,630 feet
Hangers - Small Bore	6,132
Conduit	162,159 feet (31 miles)
Conduit Supports	19,299
Cable Terminations	102,788
Cable	844,319 feet (160 miles)
Large Pumps	21
Large Motors	19
Large Valves	1,066
Small Valves	~8,000

NDE EXAMINATIONS PERFORMED FOR ORIGINAL, NON-REPLACED PIPING (sheet 1 of 3)

SYSTEM	LR DRAWING	LOCATIONS	TYPE EXAM	COMMENTS
RHRSW (A&C loops in tunnels)	1-47E858-1-LR	8 piping areas	UT thickness	Scanned grid blocks at susceptible areas [1]
Drywell Liner		4 areas	UT thickness	Maintenance activity scheduled every 3 years during lay-up period
Fire Protection	1-47E850-5-LR	41 piping areas (~200 feet of pipe)	UT thickness	Scanned circumference of pipe at susceptible areas [2]
EECW[3]	1-47E859-1-LR	3 piping areas	UT thickness	Scanned grid blocks at susceptible areas [1]
		~30 feet of dead leg pipe	UT thickness	Scanned grid blocks at approximate 1 foot intervals [2]
RCW[3]	1-47E844-2 LR	~60 feet of dead leg pipe	UT thickness	Scanned grid blocks at approximate 1 foot intervals [2]
CRD	1-47E820-2-LR	6 welds	UT shear wave and surface exam	
	1-47E820-6-LR	6 welds	UT shear wave and surface exam	
CORE SPRAY	1-47E814-1-LR	14 welds	UT shear wave and surface exam	

NDE EXAMINATIONS PERFORMED FOR ORIGINAL, NON-REPLACED PIPING (sheet 2 of 3)

SYSTEM	LR DRAWING	LOCATIONS	TYPE EXAM	COMMENTS
FEEDWATER	1-47E803-1-LR	27 welds	UT shear wave and surface exam	
		17 piping areas	UT thickness	Scanned grid blocks at susceptible areas [1]
HPCI	1-47E812-1-LR	20 welds	UT shear wave and surface exam	
	1-47E813-1-LR	4 piping areas	UT thickness	Scanned grid blocks at susceptible areas[1]
MAIN STEAM	1-47E801-1-LR	58 welds	UT shear wave and surface exam	
		34 piping areas	UT thickness	Scanned grid blocks at susceptible areas[1]
RCIC	1-47E813-1-LR	8 welds	UT shear wave and surface exam	
		6 piping areas	UT thickness	Scanned grid blocks at susceptible areas[1]
RHR	1-47E811-1-LR	35 welds	UT shear wave and surface exam	
RBCCW[3]	1-47E822-1-LR	1 Weld	UT shear wave and surface exam	

NDE EXAMINATIONS PERFORMED FOR ORIGINAL, NON-REPLACED PIPING (sheet 3 of 3)

Notes:

1. The piping was laid out with 4" x 4" grid blocks around the circumference of the pipe. Thickness readings correspond to the lowest reading taken in each grid block.
2. The piping was scanned around the entire circumference. Thickness readings correspond to the lowest reading taken around the circumference. Readings taken at approximate 1 foot intervals.
3. The majority of this system was in service with water flow in the system during the layup period.

Table 1 - Browns Ferry Unit 1 Restart Project - Piping System Replacements				
System Name	**Location**	**Inspection Work Method**	**Method Used to Determine System Integrity**	**Description of the Piping System Refurbishment/Replacement**
Main Steam 001	Drywell	Maintenance Work Order	• System component integrity wall thickness measurements • Cleanliness Verification	• Satisfactory inspection. Piping system remains unchanged • Refurbishment of Containment Isolation valves • Replace drain line isolation valve
Main Steam 001	Reactor Building	Maintenance Work Order	• System component integrity wall thickness measurements • Cleanliness Verification	• Satisfactory inspection. Piping system remains unchanged • Refurbishment of Containment Isolation valves • Replace drain line isolation valve
Main Steam 001	Turbine Building	Maintenance Work Order	• System component integrity wall thickness measurements • Cleanliness Verification	• Satisfactory inspection. Piping system remains unchanged except for the cross-under/cross-over piping described below • Refurbishment of turbine control and stop valves
Main Steam Cross-Under / Cross-Over 001	Turbine Building	Maintenance Work Order	• Unit 1 operational history • Cleanliness Verification	• All of the Cross-Under piping (HP Turbine to Moisture Separators) replaced due to improper material in initial piping • Selected portions of the Cross-Over Piping (Moisture Separators to Combined Intermediate Valve) replaced • Replacement piping was 2-1/4% Cr. material
Condensate 002	Turbine Building	DCN 51401 & DCN 51402	• System component integrity wall thickness measurements • EPU impact on equipment requirements	• Piping system remains unchanged • Condensate pump impellers and motors replaced for extended power uprate operation • Condensate Booster pumps replaced for extended power uprate operation
Reactor Feedwater 003	Drywell	Maintenance Work Order	• System component integrity wall thickness measurements • Cleanliness Verification	• Satisfactory inspection. Piping system remains unchanged • Feedwater check valves replaced for Stellite reduction
Reactor Feedwater 003	Reactor Building	Maintenance Work Order	• System component integrity wall thickness measurements • Cleanliness Verification	• Satisfactory inspection. Piping system remains unchanged • Feedwater check valves replaced for Stellite reduction

Table 1 - Browns Ferry Unit 1 Restart Project - Piping System Replacements				
System Name	**Location**	**Inspection Work Method**	**Method Used to Determine System Integrity**	**Description of the Piping System Refurbishment/Replacement**
Reactor Feedwater 003	Turbine Building	Maintenance Work Order	• System component integrity wall thickness measurements • Cleanliness Verification	• Minimum flow valves replaced due to wear experience on Units 2 and 3 • Minimum flow piping to condenser replaced with stainless steel to prevent FAC • Remaining piping inspected satisfactorily and remains unchanged
Extraction Steam 005	Turbine Building	DCN 51116 & Maintenance Work Order	• Units 2&3 Restart Lessons Learned • Units 2&3 FAC program results • System component integrity wall thickness measurements • Cleanliness Verification	• Heater's 2, 3, 4 & 5 piping inside and outside of the condenser replaced with 2-1/4% Cr material to prevent FAC • Heater 1 piping remains unchanged
Heaters Drains & Vents 006	Turbine Building	DCN 51116 & Maintenance Work Order	• Units 2&3 Restart Lessons Learned • Units 2&3 FAC program results • System component integrity wall thickness measurements • Cleanliness Verification	• Pipe sizes typically 2" and smaller replaced with 2-1/4% Cr material to prevent FAC • Selected sections for inspections/replacements based on FAC experience from Units 2 and 3 • • Replaced Heater Drain and Moisture Separator Level Control valves for improved flow control and reliability
Residual Heat Removal Service Water 023	Reactor Building	DCN 51177	• Units 2&3 Restart Lessons Learned • System component integrity wall thickness measurements on Loops "A" & "C" • Loop "B" & "D" in operation supporting Units 2 & 3	• Complete like-for-like replacement of Loop I carbon steel piping • LoopII inspected with no replacement required (continuously operated in support of Unit 2/3 operation • Replacement of all four discharge flow control valves for improved flow control

Table 1 - Browns Ferry Unit 1 Restart Project - Piping System Replacements				
System Name	**Location**	**Inspection Work Method**	**Method Used to Determine System Integrity**	**Description of the Piping System Refurbishment/Replacement**
Raw Cooling Water 024	All Buildings	Maintenance Work Order	• Portions of system remained in operation to support operation of Units 2 and 3	• Satisfactory inspection of large bore piping. Large bore piping remains unchanged. • Approximately 3000 feet of small bore piping replaced like-for-like due to corrosion caused by improper layup • Selected dead legs removed from the plant due to piping no longer required due to equipment changes. • Other dead legs remain in place to support intermittent operations.
Fire Protection 026	Reactor Building	DCN 51180 & Maintenance Work Order	• System component integrity wall thickness measurements at selected locations of vertical main risers which were not replaced	• Replacement of the header and branch piping in reactor building with galvanized carbon steel to bring system into conformance with NFPA code
Condenser 027	Turbine Building	DCN 51113	• Replacement of tubes containing Copper • Cleanliness Verification	• Satisfactory inspection. Piping system and condenser structure remain unchanged • Replaced and upgraded condenser tube material to Sea Cure stainless steel to remove copper from the system.
Emergency Equipment Cooling Water 067	Reactor Building	DCN 51192	• Units 2&3 Restart Lessons Learned • System component integrity wall thickness measurements	• Replacement of 4" & smaller piping with material changed from carbon steel to stainless steel (316/316L)
Reactor Water Recirculation 068	Drywell	DCN 51045	• IGSCC Issues	• Complete large bore replacement with IGSCC resistant 316NG materials • 2" and smaller piping replaced with stainless steel (316/316L) • Pumps and large bore valves refurbished

Table 1 - Browns Ferry Unit 1 Restart Project - Piping System Replacements				
System Name	**Location**	**Inspection Work Method**	**Method Used to Determine System Integrity**	**Description of the Piping System Refurbishment/Replacement**
Reactor Water Cleanup 069	Drywell	DCN 51046	• IGSCC Issues	• Complete replacement of piping with IGSCC resistant 316NG materials • Complete replacement of valves with 316L material
Reactor Water Cleanup 069	Reactor Building	DCN 51194	• Units 2&3 Restart Lessons Learned • System component integrity wall thickness measurements	• Complete replacement of hot piping (316NG) and regenerative heat exchangers (316L) (3 heat exchangers) • Piping rerouted to cool water before water enters pumps to increase pump seal life • Complete replacement of valves with 316L material in hot segments of piping
Reactor Building Closed Cooling Water 070	Drywell	DCN 51148	• Units 2&3 Restart/Operational Lessons Learned • System component integrity wall thickness measurements	• Complete replacement with material changed from carbon steel to stainless steel (316/316L) to eliminate corrosion materials in the system and drywell. • All new valves installed
Reactor Building Closed Cooling Water 070	Reactor Building	DCN 51195	• Units 2&3 Restart/Operational Lessons Learned • System component integrity wall thickness measurements	• Replaced "A" & "B" Heat Exchangers with upgraded heat exchanger tube material. Entire heat exchanger replaced in lieu of retubing existing heat exchanger due to cost considerations
Reactor Core Isolation Cooling 071	Reactor Building	DCN 51196	• Units 2&3 Restart Lessons Learned • System component integrity wall thickness measurements	• Steam trap drain line replacement with 2-1/4% Cr. materials to prevent FAC • In lieu of refurbishment, replaced several large bore valves
High Pressure Coolant Injection 073	Reactor Building	DCN 51198	• Units 2&3 Restart Lessons Learned • System component integrity wall thickness measurements	• Steam trap drain line replacement with 2-1/4% Cr. materials to prevent FAC • In lieu of refurbishment, replaced several large bore valves

Table 1 - Browns Ferry Unit 1 Restart Project - Piping System Replacements				
System Name	**Location**	**Inspection Work Method**	**Method Used to Determine System Integrity**	**Description of the Piping System Refurbishment/Replacement**
Residual Heat Removal 074	Drywell	DCN 51151	• IGSCC Issues	• Complete replacement with IGSCC resistant 316NG materials • Large bore valves refurbished
Core Spray 075	Drywell	DCN 51152	• IGSCC Issues • System component integrity wall thickness measurements	• Complete replacement with IGSCC resistant materials • Stainless steel material (304) was replaced with a high toughness carbon steel material A333, Gr. 6 • Large bore valve materials are stainless steel
Core Spray 075	Reactor Building	DCN 51200	• IGSCC Issues • System component integrity wall thickness measurements	• Very short section of stainless steel material (304) was replaced with a high toughness carbon steel material A333, Gr. 6 to eliminate a weld overlay

Table 2 – Browns Ferry Unit 1 Restart Project - Piping System Inspections		
Program	**Inspection Classification**	**Inspection Scope**
Reactor Pressure Vessel (IVVI)	• Component Integrity Inspections will be performed • Partial IVVI examinations were conducted in 2001to determine any major conditions. • The visual examinations will be completed after vessel flood up and water clarity has been re-established.	• BWRVIP-18 - Core Spray • BWRVIP-25 - Core Plate • BWRVIP-26 - Top Guide • BWRVIP-27-A - Standby Liquid Control • BWRVIP-38 -Shroud Support • BWRVIP-41 - Jet Pump • BWRVIP -47 - Lower Plenum (CRD, Incore) • BWRVIP-48 Vessel Attachment Welds • BWRVIP-49-A Instrument Penetrations • BWR-74-A - Reactor Pressure Vessel (license renewal only) • BWRVIP-76 - Core Shroud
Section XI Re-Baseline Inspections	• IWB Class 1	• 25% of piping welds accessible without removal of supports or permanent features for those systems not being replaced. Selection basis: system distribution, welds that had not been examined in the 1st Interval • 100% of component supports • RPV vessel head and longitudinal shell welds • 100% bolting • 100% accessible RPV interior and interior attachments (VIP)
	• IWC - Class 2	• 7.5% sample of welds on each system • 100% component supports
	• IWD- Class 3	• 100% component supports including attachments

SEPT. 20, 2005

TO: MARIO BONACA, ACRS SUBCOMMITTEE CHAIRMAN
JACK SIEBER, ACRS SUBCOMMITTEE CHAIRMAN

FROM: JOHN BARTON, CONSULTANT TO ACRS

SUBJ: SEPTEMBER 21, JOINT SUBCOMMITTEE MEETING TO DISCUSS BROWNSFERRY, UNIT 1 RESTART AND LICENSE RENEWAL

UPON MY REVIEW OF THE MATERIAL I RECEIVED FROM THE ACRS STAFF FOR THIS MEETING, IT IS APPARENT THAT THE PROJECT BEING UNDERTAKEN TO RESTART UNIT 1 AT THE BROWNS FERRY NUCLEAR STATION IS SIGNIFICANTLY GREATER IN SCOPE FROM WHAT I WOULD EXPECT TO SEE FROM AN APPLICANT REQUESTING LICENSE RENEWAL.

IN ADDITION TO THE LIST OF QUESTIONS THE ACRS HAS REQUESTED OF THE APPLICANT TO ADDRESS, I HAVE THE FOLLOWING ISSUES / QUESTIONS THAT I WOULD LIKE ADDRESSED:

- SOME PLANT VALVES ARE TO RECEIVE LIVE-LOAD PACKING. HOW WAS IT DETERMINED WHICH VALVES WOULD RECEIVE THIS MODIFICATION?
- ARE ALL VALVES IN THE PLANT THAT ARE NOT BEING REPLACED GOING TO BE REPACKED, SINCE MANY HAVE NOT BEEN EXERCISED FOR SOME 20 YEARS?
- WHAT INSPECTIONS ARE PLANNED FOR THE CONTAINMENT AND TORUS?

- WHAT TYPE OF INSPECTIONS ARE BEING DONE ON FIRE PROTECTION SYSTEMS? WHAT ABOUT SPRINKLER HEADS?

- DESCRIBE QUALIFICATION/REQUALIFICATION PROGRAM FOR LICENSED AND UNLICENSED PERSONNEL ASSIGNED TO OPERATE AND MAINTAIN UNIT 1. WHAT SIMULATOR WILL BE USED IN TRAINING OPERATING CREWS?

- DESCRIBE YOUR RESTART TEST PROGRAM FOR COMPONENTS, SYSTEMS AND ANY TRANSIENT TEST PLANNED. WHO WILL BE PERFORMING/DOCUMENTING THE TEST PROGRAM?

- THE LIST OF MODIFICATIONS PLANNED FOR UNIT 1 LOOKS LIKE A MAJOR CONSTRUCTION PROGRAM. WHAT ORGANIZATION IS IN PLACE TO PERFORM THE WORK, INSPECT THE QUALITY, AND ~~INSPECT THE~~ REVIEW THE RESULTS OF THE TESTS PERFORMED?

- ONE OF THE UNIT 1 PROJECT GOALS YOU HAVE DOCUMENTED IS TO RETURN THE UNIT TO A BETTER CONDITION THAN WHEN ORIGINALLY LICENSED. HOW CAN THAT BE WHEN MUCH OF THE EQUIPMENT AND STRUCTURES WILL BE SOME 30 YEARS OLD?

IN CONCLUSION, FROM WHAT I HAVE LEARNED REGARDING UNIT 1 FROM THE INFORMATION AVAILABLE, I WOULD MAKE THE FOLLOWING RECOMMENDATION REGARDING LIFE EXTENSION.

"COMPLETE THE WORK TO RETURN UNIT 1 TO FULL ~~OPERATION~~ POWER OPERATION. THE PLANT SHOULD THEN HAVE TO DEMONSTRATE EXCELLENT OPERATION, AS DEFINED BY THE NRC, FOR TWO OPERATING/REFUELING CYCLES OR 4 YEARS, WHICHEVER IS THE SHORTER PERIOD".

I FIND IT IRRESPONSIBLE THAT THE ACRS WOULD CONSIDER GRANTING A LIFE EXTENSION TO A PLANT THAT HAS NOT OPERATED FOR THE PAST 20 YEARS. AT THIS TIME, LET PLANT PERFORMANCE AFTER RESTART SHOW THAT THE LICENSEE HAS EARNED ANOTHER 20 YEARS OF OPERATION.

Jack J. Barton

QUESTIONS REGARDING BROWNS FERRY UNIT 1
START-UP AND LICENSE RENEWAL

1. Which systems were replaced entirely? Why were they replaced? Which systems were left intact? Which systems were partially replaced? What was the logic/basis for only partially replacing these systems? What is the schedule for future replacements? How much has been completed? How much still needs to be done? Regarding system replacements or partial system replacements, are there firm commitments or just plans? What are the criteria for replacement?

2. Which components were replaced? Why were they replaced? What was the logic and basis for the component replacement? How much has been completed? How much still needs to be done? Are there firm commitments or just plans? What are the criteria for replacement?

3. Discuss maintenance of Unit 1 equipment during the shutdown period. Any unusual aging of systems, structures, and components (SSCs) during the shutdown period? What criteria were used for evaluation? What standards were used?

4. Which equipment was in lay-up? How was the lay-up performed? What standards were used? Were EPRI lay-up guidelines used? If so, what standards were used prior to the issuance of EPRI lay-up guidelines? What kind of inspection was performed on the laid-up equipment? What were the results? What criteria were used for evaluation?

5. What kinds of NDE were performed on equipment, cables, and piping that were not replaced? How did the equipment, cables, and piping fare since 1985? Is there a projection of when that equipment, cables, and piping would need to be replaced? Are the projections by analysis or engineering judgment?

6. Over the years since Unit 1 has been shut down, most of the BWR fleet has been modified in significant ways. Will Unit 1 be modified to incorporate these changes? (e.g., Materials? 316 L in recirc lines or MSIP or what? Core spray and RWCU system materials? Capping of CRD return line? Removal of LPCI loop selection logic? RWCU Pump and piping modifications? Will there be Hydrogen water chemistry? Noble metals?) Will there be Alternate rod injection? What work and/or inspections have been performed on the Shroud? Will Unit 1 implement the programs associated with the BWR Vessel and Internals Project (BWRVIP)? Explain the status of implementing BWRVIP programs.

7. How are the operators and other permanent staff being expanded to cover the additional requirements of a third unit (Unit 1)? How is the training for the additional crew members being provided? Is it a completely new crew or upgraded crew from Units 2 and 3? What are the major differences between Units 1, 2, and 3? EPGs are plant specific and were developed after Unit 1 was shut down. What EPGs are being used?

8. Is Unit 1 being modified in any significant way from Units 2 and 3? If so, will these modifications be incorporated into Units 2 and 3? When will the simulator be modified? Which unit will it replicate?

9. Is Unit 1 in a separate security/radiological area from 2 and 3? Do permanent plant

staff have free access to that area?

10. Explain the pre-operation and start up test program for Unit 1.

11. What is the logic behind the sequencing of power uprates, license renewal and restart of Unit 1?

12. Will the licensee perform large transient testing for Unit 1? If not, what testing is planned to support the extended power uprate?

13. Explain in specific detail how Unit 1 meets the requirements of Part 54 regarding 20 years of operating experience.

14. We would like to hear from the staff about what construction type inspections are planned during the modification period. Which inspection modules will they use? What is their estimate of man-hours to be expended in inspections? What tests will be performed? What has the staff asked for? What is the staff requiring, as far as construction information and component information. What is the staff asking for related to construction inspections, ISI and IST? What does the staff already have? This project is like building a new plant, so the inspection effort should be similar.

15. We would like to see lists of piping and equipment to be replaced. A set of marked-up P&IDs would be helpful (but not required).

16. TVA stated that they are not taking credit for lay up. Does this mean that a full set of inspections to piping, systems, and components to remain in place for use in the rebuilt plant will have to undergo extensive inspections to declare that these piping, systems, and components are ready for service and will perform as designed. The regular ISI and IST programs may not be sufficient unless they are expanded and supplemented.

July 22, 2005

MEMORANDUM TO: File

FROM: John G. Lamb, Senior Staff Engineer
Advisory Committee on Reactor Safeguards Staff

SUBJECT: MEETING SUMMARY FOR THE JULY 20, 2005, PUBLIC MEETING WITH TENNESSEE VALLEY AUTHORITY REGARDING THE BROWNS FERRY UNIT 1 RESTART STATUS

On July 20, 2005, the U.S. Nuclear Regulatory Commission (NRC) staff met with Tennessee Valley Authority (TVA) representatives at Region II Headquarters in Atlanta, Georgia. The purpose of the meeting was to discuss TVA's Browns Ferry Unit 1 restart status. The meeting announcement was made public on June 7, 2005 (ADAMS Accession No. ML051590140). The meeting was classified as a Category 1 meeting. One member of the public, a newspaper reporter, was in attendance. Attachment 1 is the list of meeting attendees. Attachment 2 is a copy of TVA's presentation slides, "Tennessee Valley Authority Browns Ferry Nuclear Plant Unit 1 Status." Attachment 3 is a copy of the NRC's presentation slides, "NRC Oversight of the Browns Ferry Unit 1 Recovery Effort."

ABSTRACT

TVA stated that Browns Ferry Unit 1 is on-schedule for start-up in May 2007. The current status is that 58-percent of the overall work is complete.

MEETING SUMMARY

TVA PRESENTATION

Dr. William Travers, the Regional Administrator for Region II, opened the meeting with introductory remarks. Dr. Travers introduced Mr. Bill Couch, TVA Browns Ferry Site Licensing Manager, for the TVA presentation.

Mr. Couch provided the introduction, described the agenda for the presentation, introduced the TVA presenters, then turned over the presentation to Mr. Jon Rupert of TVA.

Mr. Rupert explained the recent Unit 1 organizational changes (see Slide 4 of Attachment 2). Mr. Rupert stated that the project schedule for start-up was on-schedule for May 2007 and on-budget. He described the significant milestones: torus work is complete, torus is filled, plan to finish drywell work in October 2005, plan to complete bulk work period for modifications in March 2006, cable pulling has just started, and plan to turnover systems to Operations in Spring 2006.

Mr. Joe Valente of TVA explained that overall 83-percent of the engineering is complete. He described that the engineering input for programmatic submittals are completed. Mr. Valente stated that the following engineering activities remain to be completed: field support, system testing, surveillance instructions, post-maintenance testing, integrated testing, System Plant Acceptance Evaluations (SPAE), and System Pre-Operability Checklists (SPOCs). Mr. Valente

stated that there are 63 tests for recovery. Mr. Ed Hackett, Director of Project Directorate II in the Division of Licensing Project Management of the Office of Nuclear Reactor Regulation (NRR), explained that the staff has a challenging review of MELLA +, that the review may not be completed when TVA needs it, and wanted TVA to be aware of this challenge. TVA stated that they are aware of the MELLA + challenge. TVA explained that the design work is on-going and they are working with General Electric (GE) and plan to submit the reload report to NRR six months prior to restart.

Mr. Elvis Hollins of TVA described the modifications and maintenance accomplishments since the last meeting on September 9, 2004 (ADAMS Accession No. ML042880292). Mr. Hollins stated that the following were replaced: main bank transformer, large bore piping in the drywell, Reactor Water Cleanup (RWCU) piping, RWCU pumps, and fire protection piping on reactor building elevations 593, 621, and 639. He stated that TVA is currently working on the fire protection piping on the 565 elevation of the reactor building. Mr. Hollins stated that the main generator rewind and rotor balance are complete. He explained that the torus coating project is complete as well as the HPCI turbine overhaul. Mr. Hollins stated that work is completed on the torus fill, vessel flood-up, and fuel pool gate removal. He explained the following major work is in-progress: cable tray, conduit and support installation; large and small bore pipe replacement; pipe hanger installation; large pump and motor refurbishment; control room design review modifications; mechanical stress improvements of welds; GE in-vessel work. Mr. Hollins stated that the current status is 58-percent of the overall work is complete.

Mr. R.G. Jones of TVA explained the process for returning systems to service (see Slide 11 of Attachment 2). Mr. Jones explained that TVA has completed 16 SPAEs out of 61 SPAEs and 3 SPAEs are scheduled in the next six months. He explained that TVA has completed 8 Phase I SPOCs and 3 Phase I SPOCs are scheduled in the next six months. Mr. Jones stated that TVA has completed 3 Phase II SPOCs and 9 are scheduled in the next six months. Mr. Jones explained TVA's foreign material exclusion and vessel cleaning programs. He stated that TVA plans to perform the following as part of the Restart Test Program: component testing, post-maintenance testing, post-modification testing, system testing, and integrated system testing. NRC staff asked if TVA plans to perform large transient testing. TVA responded that they do not plan to perform large transient testing and TVA plans to perform the same test program as they used for Units 2 and 3. Mr. Jones stated that TVA plans to have the following plateaus for the power ascension over a 70-day period: 25%, 40%, 55%, 75%, and 100%. NRC staff asked if TVA plans to perform a Safe Shutdown test. TVA responded that they have no plan to perform a Safe Shutdown test.

Mr. Joe McCarthy of TVA described the regulatory status of the license amendments and relief requests. He stated that TVA identified 21 amendments that need to be completed prior to restart. Mr. McCarthy stated that TVA has submitted 16 amendments to date. He explained that 2 submittals are pending NRC issuance of topical report safety evaluations. Mr. McCarthy stated that 4 amendments have been approved by the NRC. He explained that 6 amendments are on-hold pending resolution of the Method 3 Setpoint Methodology. Mr. McCarthy stated that 5 reliefs requests were submitted and approved by the NRC. He explained that a risk-informed in-service inspection relief request is to be submitted for post-restart implementation. Mr. McCarthy stated that TVA identified 82 programmatic submittals; he explained that 29 have been submitted to date, 3 have been approved by the Office of Nuclear Reactor Regulation (NRR), and 9 have been closed by Inspection Reports.

Mr. Brian O'Grady of TVA described the Browns Ferry site staffing plan. He stated that TVA used Oconee and Palo Verde as a benchmark. Mr. O'Grady stated that there will be a 30% increase in staff at Browns Ferry. NRC asked about Operator Licensing at the three units. TVA responded that the Operators will be licensed for all three units. NRC asked about the simulators at Browns Ferry. TVA responded that they have two simulators and one simulator will replicate Browns Ferry Unit 1, which TVA will start using in August 2005.

Mr. Tom McGrath of TVA described the three programs that will address operational readiness: physical; people; and self-assessments and independent reviews. He explained that TVA will perform line self-assessments, site departmental readiness assessments, Quality Assurance assessments, nuclear safety review board reviews, Institute of Nuclear Power Operations assessment planned for Summer 2006, and independent operational readiness review. Mr. McGrath stated that the operational readiness will be essentially complete by Unit 1 fuel load except for specific post fuel load and power ascension testing activities. NRC asked if TVA can support license renewal inspection activities and TVA responded that they can.

Mr. Raul Baron of TVA explained the focus areas for Quality Assurance: welding, procedure change control, material control, coatings, fire protection, electrical installations, piping, pipe supports, control of work, and human performance. NRC asked about a violation in the area of piping supports. TVA stated that they have made process changes to prevent a recurrence. NRC asked about the type of employee concerns being raised. TVA stated that the employee concerns program have been raised in the following areas: painting in the torus, welding, coatings, and labor-relations. TVA stated that they have problems with labor-relations.

Mr. Couch stated that TVA has done this work twice before for Units 2 and 3 and have incorporated lessons learned from Units 2 and 3 into Unit 1. NRC asked about the TVA statement of Unit 1 being operationally the same a Units 2 and 3 and yet Unit 1 will be better that Units 2 and 3. TVA stated that Unit 1 will have an operational margin better than Units 2 and 3. TVA stated that the modifications are being performed on Unit 1 first, then those same modifications will be performed on Units 2 and 3. TVA stated that after the modifications that Units 1, 2, and 3 will be operationally the same.

NRC PRESENTATION

Dr. Travers presented the key messages: focus on safety in the ongoing review of restart activities, work closely with TVA, maintain open communications, and addressing emergent issues.

Mr. Steve Cahill, Chief of the Reactor Projects Branch 6 in Region II, stated that the initial inspections focused on Engineering Design Reviews, TVA Special Program scope and activities, and closure of NRC open items for Unit1 and now the inspection focus is shifting to address final closure of TVA Special Programs and closure of NRC generic open items (NRC Bulletins, Generic Letters, etc.). Mr. Cahill stated that the NRC has determined that the criteria for transitioning the following four cornerstones of safety have been met: Occupational Radiation Safety, Public Radiation Safety, Emergency Preparedness, and Physical Protection. He stated that the NRC sent TVA a letter dated December 29, 2004 (ADAMS Accession No. ML043650021) explaining the Reactor Oversight Process cornerstone transition. Mr. Cahill stated that the NRC Unit 1 Recovery Issues List will be attached to the Region II July 20, 2005, meeting summary and will be made public. He stated that the NRC is going to establish a Browns Ferry Restart Oversight Panel and will continue to follow the Unit 1 Safety Conscious Work Environment.

Mr. Ed Hackett described the status of the restart plan. He stated that the regulatory framework has been defined, an inspection framework is being established, and licensing actions are being worked. Mr. Hackett stated that the Unit 1 restart is scheduled for May 2007, the license renewal application approval is scheduled for May 2006, and the extended power uprate approval is scheduled for May 2007. Mr. Hackett stated that challenges exist for MELLA +, Method 3 Instrument Setpoint Methodology, and restart/large transient testing. He explained the next steps: ACRS visit and briefing on August 23 and September 21, establish a Restart Oversight Panel in October 2005, supply an informational SECY paper to the Commission in the Fall 2005, completion of license renewal review in May 2006, and completion of the extended power uprate review in Spring 2007. TVA stated that they are paying attention to the fuel analysis methodology challenge, they are working with the Nuclear Energy Institute to resolve the Method 3 Instrument Setpoint challenge, and TVA does not plan to perform large transient testing as stated in its April 25, 2005, letter (ADAMS Accession No. ML051170244).

Mr. Bill Kane, Deputy Executive Director for Reactor and Preparedness Programs of the Office of the Executive Director of Operations (EDO), provided closing remarks. Mr. Kane stated that Browns Ferry Unit 1 restart has the attention of the EDO and the Commission. Mr. Kane emphasized early identification of issues.

AFTER MEETING DISCUSSIONS

NRC asked TVA about the process that TVA will notify the NRC when they are ready to restart Browns Ferry Unit 1. TVA stated that they plan to call the Region II Regional Administrator when they are ready to restart Browns Ferry Unit 1 and do not plan to send a letter requesting approval.

MEETING ATTENDEES
REGARDING THE JULY 20, 2005, PUBLIC MEETING
FOR BROWNS FERRY UNIT 1 RESTART STATUS

Name	Organization and Title
Bill Couch	TVA, BFN Site Licensing Manager
Joe Valente	TVA, BFN Unit 1 Engineering Manager
R.G. Jones	TVA, BFN Unit 1 Restart Manager
Jon Rupert	TVA, BFN Unit 1 Vice President
Brian O'Grady	TVA, BFN Site Vice President
Tom McGrath	TVA, BFN Unit 1 Operational Readiness Manager
Earl Riley	TVA, Nuclear Fuel
Greg Storey	TVA, BWR Fuel Engineering Manager
Elvis Hollins	TVA, BFN Unit 1 Mods & Maintenance Manager
Joe McCarthy	TVA, BFN Unit 1 Licensing Manager
Mark Lesser	NRC, RII, DRS, Chief, Engineering Branch 3
Steve Cahill	NRC, RII, DRP, Chief, Reactor Projects Branch 6
Chris Christensen	NRC, RII, Deputy Director, DRS
Joe Shea	NRC, RII, Deputy Director, DRP
Mike Marshall	NRC, NRR, Section Chief, DLPM, PD-2
Margaret Chernoff	NRC, NRR, Project Manager, DLPM, PD-2
Ram Subaradum*	NRC, NRR, Project Manager, RLEP
John G. Lamb	NRC, ACRS Staff, Senior Staff Engineer
Eva Brown	NRC, NRR, Project Manager, DLPM, PD-2
Raul Brown	TVA, BFN Unit 1 Nuclear Assurance Manager
Ed Hackett	NRC, NRR, Project Directorate, DLPM, PD-2
Bill Borchardt	NRC, NRR, Deputy Director
Bill Kane	NRC, OEDO, Deputy Executive Director for Reactor and Preparedness Programs
Bill Travers	NRC, RII, Regional Administrator
Chuck Castro	NRC, RII, Director, DRP
Bill Bearden	NRC, RII, Senior Resident Inspector Browns Ferry
Brian Lauson	Huntsville Times
Craig Beasley	TVA Communications & Government Relations
Caudle Julian	NRC, RII, Inspector, DRS
Steve Vias	NRC, RII, Inspector, DRS
Greg Cameron	NRC, RII, Inspector, DRS
Barry Miller	NRC, RII, Inspector, DRS
Louis Lake	NRC, RII, Inspector, DRS

* via telephone

TVA = Tennessee Valley Authority
BFN = Browns Ferry Nuclear Plant
NRC = Nuclear Regulatory Commission
RII = Region II
DRS = Division of Reactor Safety
DRP = Division of Reactor Projects
PD = Project Directorate
NRR = Office of Nuclear Reactor Regulation
OEDO = Office of Executive Director of Operations
DLPM = Division of Licensing Project Management

ATTACHMENT 1

BROWNS FERRY UNIT 1
NUCLEAR PERFORMANCE PLAN SPECIAL PROGRAMS

The Browns Ferry Nuclear Plant (BFN) Nuclear Performance Plan Special Programs are subdivided into two categories: those that require completion prior to Unit 1 restart and those that were completed for all three BFN units before the start of the Unit 1 restart project. The Special Programs that require completion prior to Unit 1 restart were evaluated and designed for Extended Power Uprate and License Renewal requirements which were applicable to each structure, system or component.

Special Programs to be completed prior to Unit 1 restart:

- Component and Piece Part Qualification
- Configuration Management – Design Baseline and Essential Calculations *
- Containment Coatings
- Electrical Issues
- Environmental Qualification
- Fire Protection – Appendix R
- Flexible Conduit
- Fuse Program
- Instrument Sensing Lines
- Intergranular Stress Corrosion Cracking (IGSCC)
- Moderate Energy Line Break *
- Restart Test
- Seismic Design Program

* - TVA has notified NRC that the Unit 1 program has been completed.

Special Programs considered closed before the Unit 1 restart project started:

- Heat Code Traceability
- Secondary Containment Penetrations
- Thinning of Pipe Walls (Bulletin 87-01)
- Welding
- Probabilistic Safety Assessment (Generic Letter 88-20)

A summary of each special program that requires completion for Unit 1 restart is provided below.

COMPONENT AND PIECE PART QUALIFICATION

The objectives of this program are to:

- Verify that previously environmentally qualified equipment was not degraded on Unit 1 through the use of spare and replacement parts, and
- Have programs and practices in place to ensure that previously seismically and environmentally qualified equipment, and any equipment qualified by other programs in this restart effort, will not be degraded in the future through the use of spare and replacement items.

To accomplish these objectives for Unit 1, the following tasks will be performed for any EQ equipment not replaced during Unit 1 recovery:

- Review of maintenance history to identify activities that included replacement of safety related components,
- For any replacement item that has not been qualified as part of the EQ Program, an evaluation will be completed to determine qualification,
- Evaluation of inventoried commercial grade spare parts to assure their subsequent use will not degrade previously qualified equipment, and
- Unit 1 procedures and processes will include all of the work developed as part of the Unit 2 and 3 restart efforts to ensure current and future qualification of components and piece parts.

CONFIGURATION MANAGEMENT – DESIGN BASELINE AND ESSENTIAL CALCULATIONS

The Browns Ferry Design Baseline Verification Program (DBVP) was established with the objective of reestablishing the plant design basis and to evaluate the plant configuration. This DBVP reestablishes the plant design basis. The system boundaries were selected by determining systems and portion of systems used to mitigate design basis events, as described in Chapter 14 of the Updated Final Safety Analysis Report (UFSAR), provide for safe shutdown and any other safety related function. Design basis changes resulting from later programs such as extended power uprate, Generic Letter 89-10, 10 CFR 50.49 Environmental Qualification of Electrical Equipment and the license renewal program have been addressed under separate programs. The DBVP evaluations ensure:

1. Plant configuration satisfies the design basis.
2. Configuration of systems and components within the scope of the DBVP is supported by engineering analysis and documentation.

3. Plant configuration is in conformance with TVA's licensing commitments.

This was accomplished by four major tasks, as follows:

1. Establish Design Basis Input

   This task consisted of developing a series of key products, which ultimately formed the design bases of the plant. These items are:

   - Databases containing licensing commitments made throughout the life of the plant and design requirements necessary to achieve safe shutdown.
   - Design Criteria Documents developed from the above database and input from senior engineers were used to establish the required configuration.
   - A Safe Shutdown Analysis (SSA) of the FSAR requirements for identification of accidents, abnormal operational transients, and special events from which the plant must be able to achieve safe shutdown.
   - Essential calculations needed to verify the adequacy of the design within the safe shutdown boundary.
   - Test requirements which verify system capability using Baseline Test Requirements Documents.

   Much of the data gathered in the Unit 2 and 3 efforts was applicable to Unit 1 and, in fact, most of the products identified above were built largely by revising Unit 2 and 3 documents to be Unit 1 specific.

2. Establish Configuration

   This task was accomplished by implementing the following activities:

   - Walkdown of systems within the DBVP boundary to verify functional configuration. Flow diagrams were evaluated and corrected as required based on the walkdown results. Review of input from walkdowns for other programs not related to DBVP, such as EQ and Appendix R was used to verify the correctness of associated drawings.
   - Verification of control/single line/elementary/schematic diagrams has been partially accomplished through a review of existing documents and walkdowns. Where walkdowns were not performed, the diagrams were modified via the Design Change Notice (DCN) process. Implementation of the Unit 1 Restarte DCNs will provide configuration control prior to restart of Unit 1. Final verification will be accomplished by the restart test program.

- Testing performed during the Restart Test Program to ensure specifications verify required functions.

3. Evaluate Configuration

This task consisted of the following activities:

- Develop as-built drawings based on field walkdowns. These are known as the Configuration Control Drawings (CCD). Review of CCDs to ensure they accurately depicted system functions, and differences dispositioned.

- Review of Corrective Action Program documents to ensure adequate corrective actions were taken.

- Evaluation of other programs to ensure the appropriate corrective actions are incorporated into the applicable DCNs from the programmatic reviews such as EQ, Appendix R, and Generic Letter 89-10. This effort is not a part of the DBVP scope but is performed in conjunction with it.

- Evaluation of unimplemented or partially implemented changes for significance with respect to design basis.

- Units 2/3 DCNs were used as a basis to formulate the scope of effort required to return Unit 1 to service. The Units 2/3 DCNs were used as a representation of the current status of an operating BFN unit. It was the intent of the Unit 1 restart effort to make Unit 1 functionally identical to the operating units so that they would have a common design basis. This effort is not a part of the DBVP scope but is performed in conjunction with it.

- Evaluation of components to ensure they perform their design basis function.

- Evaluation of test specifications to ensure that tests adequately verify specified characteristics.

4. Issue Design Output

This task included issuing the following documents:

- Configuration Control Drawings.
- Calculations.

As in Unit 3, the DBVP for Unit 1 utilized a consolidated approach which was completed prior to restart. NRC was notified of the Unit 1 program completion on May 19, 2005.

CONTAINMENT COATINGS

This program will establish the condition of the qualified protective coating on the surfaces of the drywell and torus and quantify the amount of unqualified coatings on equipment or structures inside primary containment.

The presence of unqualified coatings is established through a combination of walkdowns, testing and review of contracts, vendor manuals and work orders. All applicable coated equipment and structures will be evaluated. Existing coatings that do not qualify must be either removed, reduced in film thickness to less than 3 mils or accounted for in the Uncontrolled Coating Log.

The condition of qualified coatings inside primary containment is established through walkdowns by qualified inspectors. The condition is recorded and unacceptable areas are repaired.

Torus coatings below the immersion area were sandblasted to clean metal and a new qualified coating system applied. Torus coatings above the immersion area have been repaired.

ELECTRICAL ISSUES

The Electrical Issues Program consists of seven individual programs. These programs are:

- Cable Ampacity
- Cable Installation
- Cable Separation
- Cable Splices
- Flexible Conduit
- Fuse Program
- Thermal Overloads

Each of these is described below.

Cable Ampacity

In 1986 an audit revealed inadequacies in TVA's electrical design standards, creating the potential for undersizing of safety related cables at Browns Ferry. TVA developed a new standard, "Ampacity Tables for Auxiliary and Control Power Cables", which corrected all inadequacies. This standard addressed all ampacity requirements of Appendix R. TVA used this standard to determine the extent of non-conformance and to implement corrective action for any non-conformance on Units 2 and 3. This program ultimately assured that cables at Browns Ferry Units 2 and 3 are not utilized above their rated temperatures and will be capable of performing their intended safety functions under normal, abnormal and accident conditions.

The replacement of V4 (480V power cable) and V5 (4160V) cables on Units 2 and 3 was minimized and the use of original cable maximized through sampling and statistical analysis, aging analysis, and ampacity calculations utilizing tray loading profiles. Assumptions were made that Unit 1 cables included in trays containing primarily Unit 2 and/or Unit 3 cables will not be energized. Approximately 3500 V3 (120VAC or 250VDC) cables were reviewed during Unit 2 restart, with none requiring ampacity evaluations. For Unit 1, the intent is to abandon in place all V4 and V5 cable installed in tray and install new cable end to end. V4 and V5 cables in conduit will be evaluated and replaced, as determined by evaluation. Unit 1 cables previously evaluated in support of Units 2 and 3 restart will be excluded from these considerations.

Based on the results of the Unit 2 evaluation, Unit 1 V3 cables will not be evaluated.

Cable Installation

Based on concerns that had previously been identified at the Sequoyah Plant, TVA identified several potential installation issues that would be evaluated on Unit 2 to assure the adequacy of cable installations. These included sidewall pressure, jamming, pullbys, vertical conduit, cable bend radius and pulling cable through flexible conduit and condulets. Since the program established at Sequoyah demonstrated the adequacy of TVA installation practices in maintaining the integrity of cables during installation, it was used as a baseline for the Unit 2 evaluation. This evaluation included the following activities:

- Comparison of the cable installation requirements at Browns Ferry with those throughout the industry, including Sequoyah, during the period of Browns Ferry's construction,

- Comparison of the safety-related cable and conduit materials used at Sequoyah and Browns Ferry, and

- Plant walkdown inspections to assure the cable installation practices and quality of installed cables.

Three additional issues were identified during the Unit 2 recovery effort. There were use of conduits as pull points for large 600 volt cables, missing conduit bushings, and Brand Rex cables. The Unit 2 tests and inspections resulted in limited replacement and concluded that Unit 2 was successfully enveloped by the Sequoyah program, with two exceptions; bend radius and vertical supports. These two installation issues were evaluated separately, largely found acceptable and limited corrective actions taken.

The Unit 3 program included a review of issues evaluated for Unit 2, application of lessons learned, confirmatory walkdowns in lieu of the evaluation program identified above, and focused evaluations based on Unit 2 results. The Unit 1 program will be the same as the Unit 3 program.

Cable Separation

Cable separation problems were first identified in 1988 and TVA subsequently established a program to determine the extent of separation non-conformance, and to take the necessary corrective action. Discrepancies were grouped in the following categories:

- Non-divisional circuits associated with more than one safety division,
- Cables with an IE or IES suffix, or Q-List cables that were designated as either divisional or nondivisional and with questionable raceway routing, and
- Inaccuracies in cable and conduit schedules.

For Unit 2, TVA first validated the cable and conduit schedule, then identified populations of cables with one of the above discrepancies. Cable separation criteria were developed and the populations were evaluated against the criteria. Corrective actions were implemented as required.

The Unit 3 program applied lessons learned from the Unit 2 program in the following manner:

- Applied an integrated walkdown approach,
- Used Unit 2 programs which evaluated Units 1 and 3 cables, and
- Evaluations were performed concurrent with Q-List development.

The Unit 1 separation scope will be performed in accordance with the Unit 3 criteria and implementation precedent.

Cable Splices

Based on concerns about improper installation of heat-shrinkable tubing over electrical splices and terminations, TVA initiated a program consisting of two elements:

- Revision of the General Construction Specification G - 38 and standard drawings to address installation problems.
- Walkdowns to identify and inspect all 1E cable splices and terminations located in harsh environments. Splices which did not conform to standards were replaced.

For Unit 1, the scope of the splice program includes all 10 CFR 50.49 cables and all safety related cables below flood elevation. These will be identified via the EQ program and walkdowns. The total cable population will be walked down to locate splices; all of which will be replaced.

Flexible Conduit

Original construction specifications at Browns Ferry did not adequately address the requirements for minimum and maximum flexible conduit lengths to allow for thermal and seismic movement. The current Construction Specification, G-40, defines the minimum conduit length for accommodating thermal and seismic movement.

For Units 2 and 3 TVA inspected all flexible conduits attached to electrical equipment covered by 10 CFR 50.49 to verify that the lengths of flexible conduit satisfy G-40 requirements for accommodating thermal and seismic movement. Conduits not satisfying G-40 were documented and technically justified as acceptable, or reworked to satisfy requirements. For unit 1, conduits will be inspected during the walkdown of 10 CFR 50.49 cables. The results will be documented and evaluated, with the disposition documented.

Fuse Program

The Browns Ferry fuse substitution list in place prior to Unit 2 recovery conflicted with the fuse substitution list contained in the Design Standards revised just prior to the recovery effort. Thus, there was insufficient evidence that installed fuses would provide adequate overload protection for Unit 2. TVA's program to address this issue included the following steps:

1. Revise the Browns Ferry fuse substitution program control document to reflect the appropriate standard.

2. Perform calculations to the revised standards to specify and tabulate correct fuses for each application.

3. Perform walkdowns to determine and document installed fuses and compare with tabulations.

4. Resolve and document inadequate fuses based on comparison.

5. Replace fuse ratings on design drawings with fuse identifications.

For Unit 1, the fuse tabulation will be developed from existing common Unit 1, Unit 2 and Unit 3 tabulations. Unit 1 fuses will not be included in the walkdown. Instead, DCNs will be issued to identify required fuses and replace applicable Unit 1 fuses, as required, based on calculations.

Thermal Overloads

TVA identified the fact that design drawings for 480V ac and 250V dc motor control centers (MCC) did not specify thermal overload ratings for the heaters which provide electrical protection for the motors. The Thermal Overload (TOL) Program for Units 2 and 3 consisted of the following activities:

- Developed criteria for sizing the TOL heaters for MCC circuits.
- Performed walkdowns of the MCCs to determine and document the installed TOL heater element sizes and nameplate data for each load.
- Prepared calculations using revised design standards (criteria) to specify the appropriate heaters for each application.
- Reconciled walkdowns with calculations.
- Replaced or adjusted improperly sized heater elements.
- Updated drawings to reflect current heater elements.

The Unit 1 program will use the same approach, utilizing existing Unit 2 and 3 calculations and worksheets. All Unit 1 TOLs will be replaced based on calculations.

ENVIRONMENTAL QUALIFICATION

The Code of Federal Regulations requires that equipment used to perform a necessary safety function is capable of maintaining functional operability under all service conditions postulated to occur during its installed life for the time it is required to operate. TVA determined that there was a systematic lack of qualification documentation for a significant part of the required equipment. TVA also determined that the significance of the problems and the programmatic nature of the root causes required not only a program that demonstrated compliance to 10 CR 50.49 for all required equipment, but the development of an EQ program infrastructure.

To demonstrate compliance, TVA committed to subjecting all equipment within the scope of 10 CFR 50.49 at BFN to new review, which was independent of previous EQ efforts. TVA will use the infrastructure developed for the Units 2 and 3 restart efforts to perform these reviews for Unit 1. The following items or actions will support this effort as well as the long-term qualification of equipment for Unit 1:

- Existing EQ program procedures provide the basis for maintaining EQ over the operating life of the plant.

- Consistent documentation requirements, including the list of all electrical equipment located in harsh environments and required to function after an accident, and the EQ Documentation Package provide documented evidence of the qualification of equipment for its specific application and environment.

- Incorporation of EQ maintenance elements into ongoing maintenance activities for equipment.

- Training of EQ personnel on specific EQ related subjects.

The elements of the EQ review effort for Unit 1 include the following:

1. The 50.49 List

   This list will include electrical equipment located in harsh environments and required to function after an accident. This list is developed through the following steps:

   a. A systems analysis to determine for each Design Basis Accident (DBA) those equipment items ("end devices"), which must either operate or "stay-as-is", to ensure completion of a safety related function.

   b. For each end-device, a review of drawings is conducted to identify those ancillary devices and cables required to operate or maintain electrical integrity to ensure completion of the end-device's safety related function. The end-device and the items added by this review comprise the Component Master List (CML).

   c. The CML is reduced by performing a failure analysis which eliminates those components whose failure would not prevent achievement of the required safety action.

   d. The elimination of equipment from the list that is located in a mild environment.

   e. An evaluation to determine if any components on the CML are located in a harsh environment, but do not experience it when they are required to function, and thus can be eliminated.

2. The EQ Documentation Packages (EQDPs)

   TVA has a documented process, including a detailed checklist, to direct the completion of documented evidence of qualification of equipment for its specific application and environment. A package will be developed for each Unit 1 equipment type.

The package will include:

- Items comprising the equipment type,
- Checklist for evaluation of qualification,
- Analysis and justification of qualification,
- Qualification documents,
- Field verification data, and
- Qualification Maintenance Data sheets.

These packages will be subjected to a systematic verification process.

3. Collection of all data necessary to support EQ activities including design drawings, purchase contracts, vendor information, test reports and field verification checklists.

4. Long-term support of equipment qualification via maintenance, training, warehouse inventory / spare parts and modifications / installations.

The implementation of the Unit 1 EQ program will be performed in accordance with the Units 2 and 3 criteria and implementation precedents.

FIRE PROTECTION – APPENDIX R

The Fire Protection Improvement Program for Unit 2 included the following elements:

- Compliance to 10 CFR 50 Appendix R, and
- Plant Fire Protection Program, which addressed:
  - Organization and staffing
  - Fire protection procedures and administrative controls
  - Evaluation of compliance with regulatory and industry standards and corrective actions to address deviations

A report on improvements to the Browns Ferry Fire Protection Program to satisfy Appendix R requirements was submitted by TVA in April 1988. The report contained the "Fire Protection Plan for the BFN", the "10 CFR 50 Appendix R Safe Shutdown Analysis", and the Fire Hazards Analysis for Fire Areas and Zones in the BFN". During the restart effort, TVA proceeded with implementation of the modifications for compliance, based on the submittal. The modifications included items in the following areas:

- Fire detection,
- Fire suppression,
- Compartmentation,
- Circuit modifications,
- Cable modifications,

- Breaker and fuse upgrades,
- Addition of main steam relief valve backup air supply,
- Battery backup power supply for communications, and
- Emergency lighting

The Unit 1 scope will focus on these evaluations and the modifications necessary to gain compliance with Appendix R and NFPA standards. The major tasks that make up this scope are:

- Preparation of a Fire Hazards Analysis for Unit 1,
- Preparation of a Unit 1 Baseline Appendix R Analysis,
- Performing modifications necessary to be in compliance with regulations and standards,
- Preparation of Safe Shutdown procedures utilizing existing procedures already in-place for Units 2 and 3, and
- Preparation of a Site Fire Protection Report to include Unit 1.

The intent of these activities is to achieve compliance with Appendix R while maintaining commonality between the units.

INTERGRANULAR STRESS CORROSION CRACKING (IGSCC)

The objective of the IGSCC Program is to address all of the instances of Intergranular Stress Corrosion Cracking with long term resolutions. The scope of IGSCC susceptible piping and components was established by the guidelines of GL 88-01 and includes:

- Reactor Recirculation from the recirculation inlet and outlet nozzles to the connections with residual heat removal,
- Residual Heat Removal (RHR) from the recirculation system to the first isolation valve outside of the drywell penetration,
- Reactor Water Cleanup (RWCU) from its connection to the RHR system to first isolation valve outside of the drywell penetration,
- Core Spray from the core spray inlet nozzles to the drywell penetration, including the core spray inlet safe ends,
- Recirculation Inlet Safe Ends, and
- Jet Pump Instrumentation Safe Ends.

The head spray systems are not included, because they will be removed from Unit 1 before plant startup. The Unit 1 program is implementing the following mitigating actions:

- Full replacement of all IGSCC susceptible piping, safe ends and penetrations with resistant material,
- Stress improvements applied to new weldments, and
- Implementation of hydrogen water chemistry

Additionally, TVA has already replaced all jet pump beams on Unit 1 and will inspect shroud head bolts, which have shown evidence of cracking at Browns Ferry and other BWRs, and replace them, as required.

INSTRUMENT SENSING LINES

The program to qualify Unit 2 and common instrument sensing lines was developed to address concerns with regard to slope, physical separation and quality classification relating to material control. The Unit 2 approach involved scoping out instruments and their associated sensing lines based on System Requirements Calculations, FSAR Chapter 14, Emergency Operating Instructions, equipment related parameters and maintenance history. Safety significance and equipment vulnerability screening criteria were developed using this information. The lines selected based on these criteria were walked down and evaluated using established acceptance criteria. Lines not satisfying these criteria were evaluated via calculations, and those not qualifying were modified. Reviews and assessments identified no specific cases of inadequate physical separation and this was supported by all Unit 2 reviews performed. Additionally, there were no specific cases of inadequate quality classification identified and the reviews supported this as well. Based on these results and on the review of physical plant, criteria documents and design specifications for Unit 3, the Unit 3 program reviewed instrument sensing lines only for slope problems. The Unit 1 restart program will use the same approach.

MODERATE ENERGY LINE BREAK

Moderate Energy Line Breaks (MELB) are those breaks in liquid systems that are not high energy lines, but if they break could cause damage to safety related structures, systems or components due to the effects of flooding. A MELB evaluation has been performed for Unit 1 using the same methodology used for the Units 2 and 3 MELB evaluations. The Unit 1 MELB evaluation also considered design changes made for the planned Extended Power Uprate. The conclusions of the MELB evaluation were that

BFN Unit 1 conforms to the original licensing basis and the existing flooding studies and protective measures are adequate.

TVA notified NRC on June 25, 2004, that the Unit 1 MELB program had been completed.

RESTART TEST

The Restart Test Program is conducted to ensure that plant systems are capable of meeting their safe shutdown requirements. The elements of the program are:

1. Review of documentation relating to operating, maintenance and modification history, as well as vendor recommendations to provide key input to development of system test requirements.

2. Development of baseline test requirements (BTRDs) for each required plant system to define scope of testing required, identify additional testing requirements beyond routine testing, and to identify requirements for tracking testing and evaluating test results.

3. Development of Test Instructions for each required system to identify specific testing to verify system performance consistent with specification requirements, and to track and verify completion of each test and evaluate results. These instructions, as well as the specifications, will work within the framework of existing procedures.

For Unit 1, administrative controls will be used to ensure that the status of operating units is considered during planning and scheduling of restart tests, as was done for the Unit 3 restart tests.

SEISMIC DESIGN PROGRAM

Two of the issues that comprise the seismic design program were closed for all three BFN units as part of the Unit 2 restart effort. These were secondary containment penetrations, whose physical work was completed due to its common nature, and miscellaneous civil issue, which was combined with other programs. The remaining programs that must be completed to support Unit 1 restart are:

1. Torus Modifications includes a re-inspection of torus attached piping and modifications to torus and torus internal structural components to verify that design drawings reflect the as-installed configuration. Discrepant items are identified, evaluated, and modifications performed as required.

2. Large Bore Piping and Supports (Bulletins 79-02 and79-14) involves completing the verification of as-built versus as-designed piping and supports. It includes field walkdowns of existing piping configurations, analysis to the current design criteria, and the required modifications to existing piping and supports to establish compliance with the design criteria.

3. Cable Tray, Conduit Supports, and the Seismic II Over I / Water Spray programs address seismic qualification of the supports using the Generic Implementation Procedure developed by the Seismic Qualification Utility Group (SQUG).

4. HVAC Ductwork involves inspection of ductwork for attributes important to seismic qualification and analyzing them against design criteria to ensure as-built versus as-designed discrepancies are reconciled.

5. Small Bore Piping and Instrument Tubing programs are required to address concerns about design criteria, incomplete support details and missing calculations for piping, and the need to consider thermal stresses for tubing. The resolution methodology for both piping and tubing on Units 2 and 3 included identifying generic attributes, performing rigorous analysis of 10 - 15% of the piping within the safe shutdown boundary to verify the attributes, and performing walkdowns based on these attributes. Outliers were identified, evaluated and modified when design criteria were not met. The criteria and implementation precedent used for Unit 3 will be used for Unit 1.

6. Control Rod Drive (CRD) Hydraulic Piping program addresses a concern raised about the adequacy of CRD insert and withdrawal piping and piping supports to carry design basis loads. Units 2 and 3 tubing were qualified via conservative bounding calculations to current design criteria, supported by confirmatory evaluations. Unit 1 tubing are being qualified using the same bounding calculations.

7. Drywell Steel Platform - Concerns addressed by this program were:

    - As-built versus as-designed discrepancies,
    - Structural behavior not completely evaluated or documented, and
    - Steel had not been evaluated for loads added since original design.

    The Unit 1 drywell program will use the methodology and design criteria developed for Units 2 and 3.

8. Miscellaneous Steel program addresses configuration problems on miscellaneous framing installed throughout the Reactor Building during construction. The framing supports large bore piping and other commodities. The Unit 1 program will utilize the same design criteria, methodology and analysis tools used on Units 2 and 3.

ADAMS DOCUMENT PROFILE
FOR SUBCOMMITTEE MEETING MINUTES

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