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February 4, 2004

U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Document Control Desk

Subject: Oconee Nuclear Station
Docket Numbers 50-269, 270, and 287
Supplement 2 to the License Amendment Request for Temporary Extensions to the Completion Times for One or Two Keowee Hydro Units Inoperable
Technical Specification Change (TSC) Number 2002-05

In a submittal dated August 22, 2002, and supplemented by letter dated September 12, 2003, Duke proposed to amend Appendix A, Technical Specifications, for Facility Operating Licenses DPR-38, DPR-47 and DPR-55 for Oconee Nuclear Station, Units 1, 2, and 3. The proposed amendment temporarily extends TS 3.8.1 Required Action (RA) Completion Times when in the Conditions for one or two Keowee Hydro Units (KHU) inoperable. This temporary change is needed to allow significant maintenance and upgrades to be performed. Duke agreed to supplement the License Amendment Request (LAR) during a December 16, 2003 meeting with NRC Staff and in a subsequent letter dated December 18, 2003, to include additional risk reduction measures, revised cumulative core damage probability numbers, and defense in depth measures discussed during the meeting. Attachment 1 provides this information. In subsequent conference calls on February 2, 2004, NRC requested additional information be included in the supplement to provide more details regarding the PRA performed for each Keowee Refurbishment Outage and the Oconee study performed to evaluate the feasibility of providing temporary backup power during the outages. This information is included in Attachment 2.

A001

Attachment 3 and 4 provide revised Technical Specification retyped pages and markup pages that reflect the changes agreed to in Attachment 1.

The additional proposed changes do not affect the conclusions of the No Significant Hazards Consideration included in the August 22, 2002 LAR.

Pursuant to 10 CFR 50.91, a copy of this proposed license amendment is being sent to the State of South Carolina.

If there are any questions regarding this submittal, please contact Boyd Shingleton at (864) 885-4716.

Very truly yours,

R. A. Jones, Vice President
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R. A. Jones, being duly sworn, states that he is Vice President, Oconee Nuclear Site, Duke Energy Corporation, that he is authorized on the part of said Company to sign and file with the U. S. Nuclear Regulatory Commission this revision to the Renewed Facility Operating License Nos. DPR-38, DPR-47, DPR-55; and that all the statements and matters set forth herein are true and correct to the best of his knowledge.

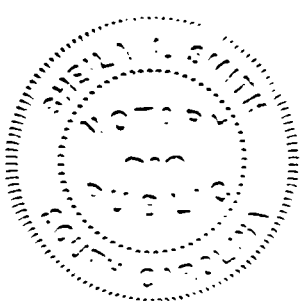
R. A. Jones, Vice President
Oconee Nuclear Site

Subscribed and sworn to before me this 4th day of February, 2004

Notary Public

My Commission Expires:

6/12/2013



Attachment 1

**Additional Justification for
Oconee Nuclear Station License Amendment Request
to Temporarily Extend the Required Action Completion Times
for One or Two Keowee Hydro Units Inoperable**

BACKGROUND

In a submittal dated August 22, 2002, and supplemented by letter dated September 12, 2003, Duke proposed to amend Appendix A, Technical Specifications, for Facility Operating Licenses DPR-38, DPR-47 and DPR-55 for Oconee Nuclear Station, Units 1, 2, and 3 to temporarily extend TS 3.8.1 Required Action (RA) Completion Times when in the Conditions for one or two Keowee Hydro Units (KHU) inoperable. This temporary change is needed to allow significant maintenance and upgrades to be performed. Duke agreed to supplement the License Amendment Request (LAR) during a December 16, 2003 meeting with NRC Staff and in a subsequent letter dated December 18, 2003, to include additional risk reduction measures, revised cumulative core damage probability numbers, and defense in depth measures discussed during the meeting.

PROBABILISTIC RISK ASSESSMENT

Duke has revised the probabilistic risk assessment (PRA) to assess the impact of the proposed temporary change provided in the August 22, 2002 LAR. The revised assessment uses the recently approved new RCP Seal LOCA Model which significantly improves the cumulative risk impact of the planned Keowee Refurbishment Outages. This assessment was performed using the measures defined in the EPRI PSA Applications Guide (Reference 1) as referenced in NUMARC 93-01, Section 11 (Reference 2). Regulatory Guide 1.182 (Reference 3) endorses Section 11 to NUMARC 93-01. The risk impacts of the proposed changes to extend the Required Action Completion Times related to single KHU and dual KHU inoperabilities are calculated and compared against the acceptance guidelines as stated in Reference 1.

Duke evaluated the risk significance of remaining at power in excess of the current TS Completion Times (CT) for an extended outage to upgrade each KHU. There will be an extended outage for each Keowee unit. This involved extensions of the current CT for TS LCO 3.8.1, (AC Sources- Operating), Required Action C.2.2.5 (one inoperable KHU) from 45 days to 62 days (Case 1) and TS 3.8.1 (AC Sources- Operating) Required Action H.2 (Both KHUs inoperable) from 60 hours to 144 hours (Case 2). Duke performed the

evaluation using an Internal and External Events Probabilistic Risk Assessment (PRA) with average maintenance unavailabilites.

The quantitative analysis for both Case 1 and 2 in the original analysis included the first three specific conditions listed below. The revised analysis factors in these and the additional specific conditions are listed below.

- No discretionary maintenance or testing will be performed on the Standby Shutdown Facility.
- No discretionary maintenance or testing will be performed on the Emergency Feedwater System.
- No discretionary maintenance or testing will be performed on the AC power system.
- Manning of the Standby Shutdown Facility during the dual KHU outages.
- Jocassee Hydro Unit available to provide backup power during the dual KHU outages.
- SSF Diesel Generator two hour operability test prior to the start of the first dual KHU outage.

Duke has elected to perform the needed upgrades during periods (excludes the months of March, April, May and June) when the expected frequency of Loss of Offsite Power (LOOP) events as a result of severe weather is less than the annual average. To account for this, the initiating event frequencies have been reduced by factors ranging from 2 to 4 from the base case values.

By limiting the performance of discretionary maintenance or testing, there is improved defense-in-depth. This results in a reduction in risk with one KHU out of service.

A qualitative assessment of the risks that were not considered in the quantitative analysis resulted in the development of compensatory measures. These will be implemented during the period of non-compliance with the TS LCO as indicated below. To the extent practical, maintenance and testing in the switchyard is to be scheduled outside the time period of the upgrade. Additionally, required offsite circuits are required to be maintained operable at all times. Limiting the performance of maintenance or testing on the offsite power system and maintaining offsite circuits operable reduces the likelihood of losing off site power and represents a reduction in risk.

Additional qualitative considerations resulted in the following observations.

- Should one or more of the Oconee units require shutdown or transition via MODE changes during the planned maintenance evolution, the compensatory actions in place (previously described) are expected to keep the overall transition and shutdown risk impact neutral over the risk of remaining at power.

- The impact of a station blackout is deemed to be the same at shutdown conditions as it is for at power conditions therefore the risk is neutral for remaining at power.

- Should one or more of the Oconee units require shutdown or transition via MODE changes during the planned maintenance evolution, reduced RCS Inventory will not be permitted (during dual KHU outage).

Cumulative Risk Impact

The planned maintenance activity to upgrade each KHU can be considered a configuration. Even though one KHU is being upgraded at a time, the tasks of isolating and un-isolating the unit being upgraded makes both KHUs inoperable. During the time period when both KHUs are inoperable, both TS 3.8.1 Required Actions C.2.2.5 and H.2 will be entered.

The proposed maintenance time line for activities is shown below:

Activity	Components	Expected Duration
Isolate	2 units inoperable	6 days
Overhaul	1 unit inoperable	45 days
Un-isolate	2 units inoperable	4 days
Testing	1 unit inoperable	7 days
Total Duration		**62 days***
	1 unit inoperable by itself	**52 days**
	2 units inoperable	**10 days**

*Includes a total of 17 days contingency for the TS Condition where one KHU is inoperable.

Applying the ΔCDF results from Case 1 and 2 over the maintenance time line duration provides the cumulative risk impact. Case 1 ΔCDF = -3.54E-09/reactor hour (reduction in risk). Case 2 ΔCDF = 1.28E-08/reactor hour during the initial period of 2 KHUs inoperable (risk increase) and 1.30E-08/reactor hour during the second period of 2 KHUs inoperable (risk increase).

The total CDP or cumulative risk may be calculated as the sum of the CDP changes for each segment of the maintenance activity or:

Cumulative CDP = $\sum$ (ΔCDF x duration of maintenance activity) for each KHU inoperable during a specific maintenance activity.

The table below shows the integrated risk over the entire maintenance duration.

Maintenance Activity Time Period, days	Number of KHUs inoperable	Time Period (in excess of nominal TS), hours	Maintenance Activity Time Period CDP	Cumulative CDP
1- 6	2	84	1.08E-06	1.08E-06
7-51	1	144	-5.09E-07	5.69E-07
52-55	2	36	4.69E-06	1.04E-06
56-62	1	168	-5.94E-07	4.44E-07

The cumulative CDP for each proposed 62 day Keowee Refurbishment Outage period is 4.44E-07. Therefore, based on the previously mentioned specific conditions of the analysis and the additional qualitative assessment of non-quantifiable factors, the requested TS changes are deemed to be acceptable, justifiable, and non-risk significant.

DEFENSE IN DEPTH MEASURES

During Duke's December 16, 2003, meeting with NRC, the Staff indicated that even though the revised cumulative CDP was in the E-07 range, their guidelines required defense-in-depth measures to be considered in order to approve the LAR. Duke presented defense-in-depth measures credited to offset the additional risks associated with the dual KHU outages during that meeting and in a December 18, 2003 letter. These defense-in-depth measures, which address grid-related events, switchyard-centered events, and weather-related events, are as follows:

For grid-related events

- A 100 kV line separated from the switchyard
- A Lee Combustion Turbine (LCT) already running and energizing the standby buses
- Two additional LCTs, either of which can provide the necessary power
- One of the two additional LCTs running and available during the dual KHU outage
- A Jocassee Hydro Unit capable of providing power via a dedicated line separated from the grid
- Up to three additional Jocassee hydro units, any of which can provide necessary power
- Standby Shutdown Facility (SSF) remains available as an alternate shutdown method

For switchyard centered events

- 100 kV line not connected to switchyard
- Power from Jocassee can be recovered quickly
- SSF remains available as an alternate shutdown method

For weather-related events that take out switchyard or power lines coming into switchyard – from a qualitative standpoint:

- Power lines come in from different directions so it is not likely that Oconee would lose power from all the lines at the same time
- The likelihood of having a weather event that takes out all power lines is low
- SSF remains available as an alternate shutdown method

DESCRIPTION OF TECHNICAL SPECIFICATION CHANGE

In the August 22, 2002, LAR, Duke proposed to add a Note to the Completion Time (CT) for TS 3.8.1 Required Action (RA) H.2 that will allow an additional 84 hours (144 hours total) to restore one KHU to operable status for Keowee refurbishment upgrades performed prior to April 30, 2005. Duke also proposes to add a Note to the 45 day CT for TS 3.8.1 RA C.2.2.5 that will allow an additional 17 days (62 days total) to restore the KHU associated with the overhead emergency power path for Keowee refurbishment upgrades performed prior to April 30, 2005. Duke committed to certain compensatory measure while in the Conditions for one and two KHUs inoperable.

In the September 12, 2003, LAR supplement, Duke proposed to modify the Note to the Completion Time (CT) for TS 3.8.1 Required Action (RA) H.2 to specify that the extension can only be exercised to isolate, test, and un-isolate the KHUs during each of

the two Keowee Refurbishment Outages not to exceed a cumulative extension of 120 hours. Further clarification was added to specify the Completion Time can only be extended twice during each Keowee Refurbishment Outage. Additional restrictions were added to the Completion Time Note to specify that the extension can not be exercised during March, April, May or June or during periods of reduced RCS inventory and that the SSF, EFW System and LCTs must be verified operable prior to entering the Condition.

In the September 12, 2003, LAR supplement, Duke also proposed to modify the Note to the Completion Time (CT) for TS 3.8.1 Required Action (RA) C.2.2.5 to specify that the 17 day extension can not be used during March, April, May or June.

Duke proposes to further modify the Note to the Completion Time (CT) for TS 3.8.1 Required Action (RA) H.2 to specify that the extension can only be exercised if the SSF is manned, a Jocassee Hydro Unit is verified available to provide power prior to entering the Condition, and a 2 hour SSF DG operability test is performed prior to the start of the first dual unit outage.

SUMMARY

Duke believes that considering the defense-in-depth measures for grid-related events, weather-related events, and switchyard-centered events and the previously mentioned specific conditions of the revised analysis and the additional qualitative assessment of non-quantifiable factors, the requested TS changes are acceptable, justifiable, and non-risk significant.

REFERENCES

1. EPRI TR-105396, "PSA Applications Guide," Prepared for EPRI by ERIN Engineering & Research, Inc., August 1995.

2. NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Section 11, March 2000.

3. Regulatory Guide 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants," May 2000.

Attachment 2

**Duke Response to February 2, 2004,
NRC Request for Additional Information**

RAI 1: Provide a discussion of the use of the revised SSF D/G failure probabilities used in the updated analysis.

Response: In September 2003 all available SSF diesel generator data used to calculate demand and run failures were reviewed. This resulted in the use of the following updated data in the KHU analysis and in Revision 3 of the Oconee PRA:

Fail to Start:	
Generic Data: SSF D/G	Fails to Start: 1.8E-02/demand
Oconee Data: 1991-2002	67 demands, 2 failures
Bayesian Update	*Fails to Start: 2.2E-02/demand*

(Note: PRA Revision 2 value: Fails to Start: 3.78E-03/demand)

Fail to Run:	
Generic Data: SSF D/G	Fails to Run: 2.3E-03/hr x 24 hours = 5.5E-02
Oconee Data: 1991-2002	102.9 load run hours, 0 failures
Bayesian Update:	*Fails to Run: 1.6E-03/hr x 24 hours = 3.84E-02*

(Note: PRA Revision 2 value: Fails to Run: 4.63E-03/hr x 24 hours = 1.11E-01)

RAI 2: Discuss the calculation for the credit for the one time SSF DG Operability test prior to the first dual KHU outage.

Response: To take credit for a one time SSF DG Operability Test, the cut set file for the Conditional Case with two Keowee Hydro Units out of service was examined.

All applicable SSF DG basic events that had an exposure time of greater than 24 hours would be reduced to 24 hours. Additionally the cut sets would be reviewed for any latent human events for the SSF DG. These would be set to zero. These actions would represent the equivalent of performing the SSF DG operability run just prior to taking both KHUs OOS.

Upon examination of the cut set file it was not readily apparent if any of the events related to the SSF would be verified during the SSF DG testing. The actual SSF DG

procedures were not verified against the PRA basic events due to a time constraint. Therefore a conservative assumption was made that none of these events with exposure times greater than 24 hours would be verified and therefore none were adjusted. A review of the latent human events resulted in one change to the cut set file. Only the latent human error, *SSF Diesel Generator Is Left Unavailable After Test Or Maintenance*, was set to FALSE in the cut set file from its nominal probability of 3.0E-03.

This change results in an insignificant 2.0E-10/reactor hour improvement in the overall CDP during the period for the first dual KHU outage.

RAI 3: Discuss the calculation for the credit for manning the SSF during the time period of the dual KHU outages.

Response: To take credit for manning the SSF during the period of dual Keowee Hydro Unit outages the cut set file for the Conditional Case with two Keowee Hydro Units out of service was examined.

The human reliability analysis (HRA) basic events for only those cut sets that contained basic event, *Both Keowee Units Unavailable Due To Common Maintenance*, and either, *Operators Fail To Align The SSF ASW System For Operation*, or, *Operators Fail To Align The SSF RCM System For Operation*, were adjusted to get the HRA impact with both KHUs out of service.

With an operator stationed in the SSF, the execution time for each of the HRAs listed above is decreased over that which is used in the original HRA calculation by approximately 5 minutes. The two HRA values were recalculated based on this reduction in execution time. Using the revised execution time, the estimated failure probability for these HRAs go from 3.1E-2 to 1.7E-2 and from 1.0E-1 to 3.1E-2 respectively.

RAI 4: Discuss the calculation for the credit for Jocassee during the time period of the dual KHU outages.

Response: To take credit for the availability of Jocassee during the period of dual Keowee Hydro Unit outages the cut set file for the Conditional Case with two Keowee Hydro Units out of service was examined.

In order to estimate the benefit of having Jocassee, the Operators would have to have the capability of connecting power from Jocassee to Oconee switchyard breakers on a grid related Loss of offsite power (LOOP). (Weather related LOOPs and switchyard LOOPs would be assumed to eliminate the ability of Jocassee to supply power to Oconee and

therefore no credit for these situations is given.) The Operators do have this capability via the Oconee/Jocassee Blackstart Alignment.

A "recovery" is applied to only those grid related LOOP cut sets during the time when both KHUs are out of service. A failure probability of 10% (1.0E-01) is assumed for this recovery which is a typical failure probability for an assumed operator high stress activity. (Note: Grid related LOOPs are not very important in the Oconee PRA.)

As before, this change also results in an insignificant 2.0E-10/reactor hour improvement in the overall CDP during the period when both KHUs are out of service.

RAI 5: Provide a discussion of how the WOG 2000 model was adapted for use in the Oconee PRA since Oconee uses Sultzer-Bigham type RCP seal packages.

Response: ONS has Sultzer-Bingham type RCP Seal packages on all three units. These type seal packages have multiple, redundant seals made with high temperature components. The CE Owners Group has developed a seal LOCA model that would predict very low failure probabilities for this type seal design, even without seal cooling (less than 1E-3). This model has been submitted to the NRC for review. However, as yet, the NRC has not approved this model for PRA use.

The NRC recently approved the WOG 2000 seal LOCA model for use with Westinghouse RCP seal packages (reference the Safety Evaluation of Topical Report WCAP-15603 (non-proprietary), Revision 1, "WOG 2000 Reactor Coolant Pump Seal Leakage Model for Westinghouse PWRs," May 20, 2003). This model uses an event tree that considers four possible outcomes for loss of seal cooling sequences. One outcome is that the seals will leak, but not fail and is assigned a probability of 0.79. The other three end-states are seal failures of various leakage rates. To simulate the impact of applying the WOG 2000 model, Duke assigned a 21% chance of core damage for sequences that result in a loss of seal cooling, but do not include a loss of steam generator cooling. This method of accounting for the improved seals has been used by the NRC in several Significance Determination Program (SDP) evaluations for ONS. Duke believes that this is a conservative method of accounting for the low probability of seal failure for the ONS Sultzer-Bingham type seal design.

RAI 6: Provide a high level discussion of the dominant cut sets during the dual KHU outage and the risk reduction methods made to reduce them.

Response: The basic scenario for the dominant cut sets consists of a weather related initiating event which leads to a loss of offsite power; both KHUs are in maintenance and

a failure of the Standby Shutdown Facility (SSF) occurs that either leads to a reactor coolant pump seal LOCA or a loss of secondary side heat removal.

Major failures of the SSF include Operators not aligning the equipment for operation and SSF DG failing to run or start. These impacts were minimized by stationing an Operator in the SSF during the period of the dual KHU outage and revising the SSF DG failure probabilities to the most recent data available. The loss of reactor coolant pump seal cooling was addressed by utilizing a model which credits the actually installed seal packages that have multiple, redundant seals made with high temperature components.

RAI 7: Provide a discussion of the DG feasibility study used to evaluate the feasibility of installing temporary DGs during the dual KHU outage portions of each Keowee Refurbishment Outage.

Response: During the December 16, 2003 meeting between NRC and Duke Energy Corporation, Duke presented a feasibility study that was performed to determine the potential benefits of providing backup power during the dual KHU outage portion of the Keowee Refurbishment Outage for each Keowee unit. Three mitigation strategies were considered using temporary diesel generators (DGs) to power: 1) normal plant safe shutdown loads, 2) the station Auxiliary Service Water (ASW) switchgear, or 3) the Standby Shutdown Facility (SSF). The feasibility study assumed Keowee was in a dual unit outage and the occurrence of a three unit Loss of Offsite Power (LOOP) caused by a weather related event resulting in a loss of the Oconee switchyard, loss of the Lee CT dedicated line, and a loss of the Jocassee dedicated line. The study assumes the temporary DGs would be required to supply power for 72 hours.

The feasibility of the mitigation strategies and implementation options were evaluated using the following evaluation criteria: 1) operator burden, 2) feasibility of implementation, 3) risk to plant equipment, 4) recovery capability, 5) cost, 6) security measures, 7) environmental impacts, and 8) overall risk/benefit.

Temporary DGs to power normal safe shutdown loads

This strategy involves powering safe shutdown loads for each unit through main feeder buses via a connection between transformer CT-5 and the SL breakers. Station LOOP (normal plant safe shutdown) loads would be approximately 10,000 kW requiring a minimum of six package DGs. These LOOP loads include High Pressure Injection (HPI), Low Pressure Service Water (LPSW), Emergency Feedwater (EFW), and Essential Siphon Vacuum (ESV) pumps, as well as non load shed load centers and motor control centers, and the Control Room (CR) chiller compressor. Several load sequencing

issues were identified: 1) Oconee units do not have sequencers, all emergency loads are block loaded at one time waiting for power to arrive, 2) package DGs cannot accept unit block loading as Duke's larger Keowee, Lee, and Jocassee units can, so manual stripping and sequencing of loads would be required, 3) each unit's Emergency Power Switching Logic (EPSL) logic breakers (S breakers) would have to be placed in manual to prevent/block automatic loading onto the standby bus once energized by the temporary DGs, 4) individual loads would have to be manually load shed and taken to manual to prevent automatically starting and overloading the temporary DGs when power is restored to a units main feeder bus, 5) each CR would be performing these activities locally in the CR and remotely in a "dark" plant, and 6) loads started from the temporary DGs would need to be coordinated between three CRs to prevent overloading and tripping the DGs. DG and fuel staging were a problem due to the number of diesels and the fuel supply required for a 72 hour run. Additionally, this strategy presented additional environmental concerns due to the additional fuel that would be on-site during the Keowee Refurbishment Outage. The operator actions described above that would be required to implement this strategy were considered complex when coordinated between three Control Rooms to prevent overloading and tripping the DGs. This option was deemed to be costly and complex. Duke's risk evaluation determined that this option would only provide a small risk benefit. As such, Duke concluded this option was not feasible.

Power the ASW Switchgear with Temporary DGs

This strategy involves powering the station ASW pump and one HPI pump for each unit through the ASW switchgear and vital battery charger via each unit's stripped main feeder bus breakers. Station load would be approximately 3000 kW requiring three package DGs. The DGs would be connected between CT-5 and the SL breakers. This option would require depressurizing the steam generators (SGs) since the ASW pump is a low pressure pump (after normal turbine driven emergency feedwater is exhausted). Steam and feedwater operations are manual, requiring multiple operator actions in each penetration room and at ASW switchgear for each unit. Each unit's EPSL S breakers would have to be placed in manual to prevent automatic loading of normal emergency loads on the temporary DGs when powering the standby bus and ASW switchgear. Load shedding or stripping the 4 kV buses and 600 V buses would be needed to align only one charger for each unit. This adds complexity due to the different places the operators would have to go to strip the buses to align the individual selected load. Implementing this strategy would require complex operations procedures and intricate, coordinated operator actions between three CRs. This design was not considered well suited for three unit mitigation. This strategy poses the same environmental concerns as the previous strategy. This option was slightly less expensive to implement. Duke's risk evaluation determined that this option would only provide a small risk benefit. Considering the cost

and complexity and the small risk benefit afforded by implementing the option, Duke concluded the option was not feasible.

Power the SSF with Temporary DGs

This mitigation strategy would involve replacing the generation that would normally be provided by the SSF DG. The SSF load is approximately 3500 kW requiring three package DGs. Two options were considered: 1) powering the SSF via DGs connected directly to SSF Switchgear OTS1, or 2) powering the SSF via DGs connected between CT-5 and SL breakers with power routed through the plant's normal SSF connection (4160 V standby bus and Unit 2 main feeder bus to SSF switchgear OTS1).

The first option would power the SSF via a direct connection to SSF switchgear OTS1. The package DGs would be located near transformer CT-5 and make use of the existing CT-5 cable trench to route power to the SSF. The SSF auxiliary distribution switchgear, OTS1, has no spare compartments available for this new incoming power feed. Thus, this option would require a modification to the safety related switchgear to implement. The modification would require approximately 72 hours of SSF unavailability to implement. This option would require purchase of a safety related breaker or disconnect switch for a switchgear safety/non-safety isolation. The lead time for new safety related equipment will not meet the current outage schedule. The space in the SSF equipment room is limited so the new breaker/disconnect switch would have to be located in the upstairs HVAC room.

The second option would power the SSF via DGs connected to the CT-5 switching station with routing via its normal power path (main feeder bus 2 on Unit 2). There are load shed issues to line up the electrical system breakers to selectively feed the SSF OTS1 Switchgear. Each unit(s) EPSL logic would have to be placed in manual to prevent automatically loading. Individual loads would have to be placed in manual to prevent automatically overloading the temporary DGs when power is applied to a unit(s) main feeder bus. The Unit 2 4 kV switchgear breaker on main feeder bus 2 would have to be manually tripped to keep from overloading the temporary DGs with normal 4 kV loads. Also, the interlocking logic on this normal SSF power feeder source breaker would have to be disabled to allow the breaker to close with a LOOP on Unit 2. Implementing this strategy is complex because of the operator actions required both in the plant and in the SSF, and the short period of time allowed for successful implementation due to the limited capacity of the SSF Reactor Coolant Makeup Pump.

This strategy poses the same environmental concerns as the previous two strategies. The option of directly connecting temporary DGs to the SSF was the most expensive option considered. The indirect connection was estimated at about half the cost of the direct

connection. However the additional complexity due to the time-constrained operator actions to align the plant and the SSF were very undesirable. Duke's risk evaluation determined that this option would only provide a small risk benefit. Considering the cost and complexity and the small risk benefit afforded by implementing either option, Duke concluded this mitigation strategy was not feasible.

Summary

During the December 16, 2003 meeting, Duke presented the risk benefits associated with each mitigation strategy. As shown in Attachment 1, the cumulative core damage probability (CCDP) for each proposed 62 day Keowee Refurbishment Outage is 4.4E-07. The first strategy (connect plant electrical distribution system to power unit safe shutdown loads) would change the CCDP to approximately -7E-07. The second strategy (connect to ASW Switchgear) resulted in a CCDP of approximately -5E-07, while the third strategy (directly or indirectly connect to the SSF) resulted in a CCDP of 3.8E-07. In summary, none of the strategies provided a significant risk benefit. Based on the cost and complexity of implementing the mitigation strategies and the slight risk benefit associated with implementing, Duke concluded that none were feasible. The NRC attendees agreed with this conclusion during the meeting. Duke documented this understanding in a letter dated December 18, 2003.

Attachment 3
February 4, 2004

ATTACHMENT 3

TECHNICAL SPECIFICATION

Remove Page	Insert Page
3.8.1-5	3.8.1-5
3.8.1-8	3.8.1-8
B 3.8.1-1 thru 25	B 3.8.1-1 thru 25

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	C.2.2.5 Restore KHU and its required overhead emergency power path to OPERABLE status.	28 days when Condition due to an inoperable Keowee main step-up transformer AND ----------NOTE---------- An additional 17 days is allowed when Condition entered to perform KHU Refurbishment Upgrades prior to April 30, 2005 except during March, April, May or June ---------- 45 days from discovery of initial inoperability when Condition due to an inoperable KHU if not used for that KHU in the previous 3 years

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. ----------NOTE---------- 1. Condition may be entered only when both required offsite sources are verified by administrative means to be OPERABLE and the requirements of LCO 3.8.3, "DC Sources-Operating;" LCO 3.8.6, "Vital Inverters-Operating;" LCO 3.8.8, "Distribution Systems-Operating;" LCO 3.3.17, "EPSL Automatic Transfer Function;" LCO 3.3.18, "EPSL Voltage Sensing Circuits;" LCO 3.3.19, "EPSL 230 kV Switchyard DGVP," are verified by administrative means to be met. ---------- Both KHUs or their required emergency power paths inoperable for planned maintenance or test with both standby buses energized from LCT via isolated power path.	H.1 Energize both standby buses from LCT via isolated power path. AND H.2 Restore one KHU and its required emergency power path to OPERABLE status.	1 hour from discovery of deenergized standby bus ----------NOTE---------- An additional cumulative 120 hours is allowed when Condition entered to isolate, test and un-isolate the KHUs during each of the two KHU Refurbishment Outages prior to April 30, 2005 provided the following conditions are met: 1) period of use not in March, April, May or June; 2) the SSF, EFW System and LCTs are verified OPERABLE prior to entering Condition, 3) RCS inventory is not reduced, 4) the SSF is manned, 5) a Jocassee Hydro Unit is verified available to provide power prior to entering Condition, 6) a 2 hour SSF DG operability test is performed prior to the start of the first dual unit outage, and 7) the Completion Time is only extended twice during each KHU Refurbishment Outage. ---------- 60 hours

(continued)

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.1 AC Sources – Operating

BASES

BACKGROUND

The AC Power System consists of the offsite power sources (preferred power) and the onsite standby power sources, Keowee Hydro Units (KHU). This system is designed to supply the required Engineered Safeguards (ES) loads of one unit and safe shutdown loads of the other two units and is so arranged that no single failure can disable enough loads to jeopardize plant safety. The design of the AC Power System provides independence and redundancy to ensure an available source of power to the ES systems (Ref. 1). The KHU turbine generators are powered through a common penstock by water taken from Lake Keowee. The use of a common penstock is justified on the basis of past hydro plant experience of the licensee (since 1919) which indicates that the cumulative need to dewater the penstock can be expected to be limited to about one day a year, principally for inspection, plus perhaps four days every tenth year.

The preferred power source is provided from offsite power to the red or yellow bus in the 230 kV switchyard to the units startup transformer and the E breakers. The 230 kV switchyard is electrically connected to the 525 kV switchyard via the autobank transformer. Emergency power is provided using two emergency power paths, an overhead path and an underground path. The underground emergency power path is from one KHU through the underground feeder circuit, transformer CT-4, the CT-4 incoming breakers (SK breakers), standby bus and the standby breakers (S breakers). The standby buses may also receive offsite power from the 100 kV transmission system through transformer CT-5 and the CT-5 incoming breakers (SL breakers). The overhead emergency power path is from the other KHU through the startup transformer and the startup incoming breakers (E breakers). In addition to supplying emergency power for Oconee, the KHUs provide peaking power to the generation system. During periods of commercial power generation, the KHUs are operated within the acceptable region of the KHU operating restrictions. This ensures that the KHUs are able to perform their emergency power functions from an initial condition of commercial power generation. The KHU operating restrictions for commercial power generation are contained in UFSAR Chapter 16, (Ref. 2). The standby buses can also

BASES

BACKGROUND (continued)

receive power from a combustion turbine generator at the Lee Steam Station through a dedicated 100 kV transmission line, transformer CT-5, and both SL breakers. The 100 kV transmission line can be supplied from a Lee combustion turbine (LCT) and electrically separated from the system grid and offsite loads. The minimum capacity available from any of the multiple sources of AC power is 22.4MVA (limited by CT-4 and CT-5 transformer capacities).

APPLICABLE SAFETY ANALYSIS

The initial conditions of design basis transient and accident analyses in the UFSAR Chapter 6 (Ref. 4) and Chapter 15 (Ref. 5) assume ES systems are OPERABLE. The AC power system is designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ES systems so that the fuel, reactor coolant system, and containment design limits are not exceeded.

Consistent with the accident analysis assumptions of a loss of offsite power (LOOP) and a single failure of one onsite emergency power path, two onsite emergency power sources are required to be OPERABLE.

AC Sources – Operating are part of the primary success path and function to mitigate an accident or transient that presents a challenge to the integrity of a fission product barrier. As such, AC Sources – Operating satisfies the requirements of Criterion 3 of 10 CFR 50.36 (Ref. 3).

LCO

Two sources on separate towers connected to the 230 kV switchyard to a unit startup transformer and one main feeder bus are required to be OPERABLE. Two KHUs with one capable of automatically providing power through the underground emergency power path to both main feeder buses and the other capable of automatically providing power through the overhead emergency power path to both main feeder buses are required to be OPERABLE. The Keowee Reservoir level is required to be $\geq$ 775 feet above sea level to support OPERABILITY of the KHUs. The zone overlap protection circuitry is required to be OPERABLE when the overhead electrical disconnects for the KHU associated with the underground power path are closed to provide single failure protection for the KHUs. The zone overlap protection circuitry includes the step-up transformer lockout, the underground KHU lockout, the Keowee emergency start signal, and the underground breaker for the overhead KHU to ensure the zone overlap protection circuitry logic is OPERABLE.

BASES

LCO (continued)

Operable offsite sources are required to be "physically independent" (separate towers) prior to entering the 230 kV switchyard. Once the 230 kV lines enter the switchyard, an electrical pathway must exist through OPERABLE power circuit breakers (PCBs) and disconnects such that both sources are available to energize the Unit's startup transformer either automatically or with operator action. Once within the boundary of the switchyard, the electrical pathway may be the same for both independent offsite sources. In addition, at least one E breaker must be available to automatically supply power to a main feeder bus from the energized startup transformer. The voltage provided to the startup transformer by the two independent offsite sources must be sufficient to ensure ES equipment will operate. Two of the following offsite sources are required:

1) Jocassee (from Jocassee) Black or White,
2) Dacus (from North Greenville) Black or White,
3) Oconee (from Central) Black or White,
4) Calhoun (from Central) Black or White,
5) Autobank transformer fed from either the Asbury (from Newport), Norcross (from Georgia Power), or Katoma (from Jocassee) 525 kV line.

An OPERABLE KHU and its required emergency power path are required to be able to provide sufficient power within specified limits of voltage and frequency within 23 seconds after an emergency start initiate signal and includes its required emergency power path, required instrumentation, controls, auxiliary and DC power, cooling and seal water, lubrication and other auxiliary equipment necessary to perform its safety function. Two emergency power paths are available. One emergency power path consists of an underground circuit while the other emergency power pathway uses an overhead circuit through the 230 kV switchyard.

BASES

LCO (continued)

An OPERABLE KHU and its required overhead emergency power path must be capable of automatically supplying power from the KHU through the KHU main step-up transformer, the 230 kV yellow bus, the Unit startup transformer and both E breakers to both main feeder buses. At least one channel of switchyard isolation (by actuation from degraded grid voltage protection) is required to be OPERABLE to isolate the 230 kV switchyard yellow bus. If closed, each N breaker must be capable of opening using either of its associated breaker trip circuits. Either of the following combinations provides an acceptable KHU and required overhead emergency power path:

Keowee Hydro Unit		Keowee Hydro Unit	
1A)	Keowee Unit 1 generator,	1B)	Keowee Unit 2 generator,
2A)	Keowee ACB 1 (enabled by one channel of Switchyard Isolate Complete),	2B)	Keowee ACB 2 (enabled by one channel of Switchyard Isolate Complete),
3A)	Keowee auxiliary transformer 1X, Keowee ACB 5, Keowee Load Center 1X,	3B)	Keowee auxiliary transformer 2X, Keowee ACB 6, Keowee Load Center 2X,
4A)	Keowee MCC 1XA,	4B)	Keowee MCC 2XA,
5A)	Keowee Battery #1, Charger #1 or Standby Charger, and Distribution Center 1DA,	5B)	Keowee Battery #2, Charger #2 or Standby Charger, and Distribution Center 2DA,
6A)	ACB-1 to ACB-3 interlock,	6B)	ACB-2 to ACB-4 interlock,

7) Keowee reservoir level ≥ 775 feet above sea level,

Overhead Emergency Power Path

8) Keowee main step-up transformer,
9) PCB 9 (enabled by one channel of Switchyard Isolate Complete),
10) The 230kV switchyard yellow bus capable of being isolated by one channel of Switchyard Isolate,
11) A unit startup transformer and associated yellow bus PCB (CT-1 / PCB 18, CT-2 / PCB 27, CT-3 / PCB 30),
12) Both E breakers.

BASES

LCO (continued)

An OPERABLE KHU and its required underground emergency power path must be capable of automatically supplying power from the KHU through the underground feeder, transformer CT-4, both standby buses, and both Unit S breakers to both main feeder buses. If closed, each N breaker and each SL breaker must be capable of opening using either of its associated breaker trip circuits. Either of the following combinations provides an acceptable KHU and required underground emergency power path:

Keowee Hydro Unit		Keowee Hydro Unit	
1A)	Keowee Unit 1 generator,	1B)	Keowee Unit 2 generator,
2A)	Keowee ACB 3,	2B)	Keowee ACB 4,
3A.1)	Keowee auxiliary transformer CX, Keowee ACB 7, Keowee Load Center 1X,	3B.1)	Keowee auxiliary transformer CX, Keowee ACB 8, Keowee Load Center 2X,
3A.2)	One Oconee Unit 1 S breaker capable of feeding switchgear 1TC,	3B.2)	One Oconee Unit 1 S breaker capable of feeding switchgear 1TC,
3A.3)	Switchgear 1TC capable of feeding Keowee auxiliary transformer CX,	3B.3)	Switchgear 1TC capable of feeding Keowee auxiliary transformer CX,
4A)	Keowee MCC 1XA,	4B)	Keowee MCC 2XA,
5A)	Keowee Battery #1, Charger #1 or Standby Charger, and Distribution Center 1DA,	5B)	Keowee Battery #2, Charger #2 or Standby Charger, and Distribution Center 2DA,
6A)	ACB-1 to ACB-3 interlock,	6A)	ACB-2 to ACB-4 interlock,

7) Keowee reservoir level ≥ 775 feet above sea level,

Underground Emergency Power Path

8) The underground feeder,
9) Transformer CT-4,
10) Both SK breakers,
11) Both standby buses,
12) Both S breakers, and
13) ACB-3 to ACB-4 interlock.

BASES

LCO (continued)

This LCO is modified by three Notes. Note 1 indicates that a unit startup transformer may be shared with a unit in MODES 5 and 6. Note 2 indicates that the requirements of Specification 5.5.18, "KHU Commercial Power Generation Testing Program," shall be met for commercial KHU power generation. Note 3 indicates that the requirements of Specification 5.5.19, "Lee Combustion Turbine Testing Program," shall be met when a Lee Combustion Turbine (LCT) is used to comply with Required Actions.

APPLICABILITY

The AC power sources are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of accidents and transients, and

b. Adequate core cooling is provided, and containment OPERABILITY and other vital functions are maintained in the event of a postulated accident.

AC source requirements during MODE 5 and 6 are covered in LCO 3.8.2, AC Sources-Shutdown.

ACTIONS

The ACTIONS are modified by a Note. The Note excludes the MODE change restriction of LCO 3.0.4 when both standby buses are energized from an LCT via an isolated power path to comply with Required Actions. This exception allow entry into an applicable MODE while relying on the ACTIONS even though the ACTIONS may eventually require a unit shutdown. This exception is acceptable due to the additional capabilities afforded when both standby buses are energized from an LCT via an isolated power path.

A.1, A.2, A.3.1, and A.3.2

In the event a startup transformer becomes inoperable, it effectively causes the emergency overhead power path and both of the offsite sources to be inoperable. A KHU and its required underground power path remain available to ensure safe shutdown of the unit in the event of a transient or accident without a single failure.

BASES

ACTIONS

A.1, A.2, A.3.1, and A.3.2 (continued)

Operation may continue provided the KHU and its required underground emergency power path are tested using SR 3.8.1.3 within one hour if not performed in the previous 12 hours. This Required Action provides assurance that no undetected failures have occurred in the KHU and its required underground emergency power path. Since Required Action A.1 only specifies "perform," a failure of SR 3.8.1.3 acceptance criteria does not result in a Required Action not met. However, if the KHU and its required underground emergency path fails SR 3.8.1.3, both emergency power paths and both required offsite circuits are inoperable, and Condition I for both KHUs and their required emergency power paths inoperable for reasons other than Condition G and H is entered concurrent with Condition A.

If available, another Unit's startup transformer should be aligned to supply power to the affected Unit's auxiliaries so that offsite power sources and the KHU and its required overhead emergency power path will also be available if needed. Although this alignment restores the availability of the offsite sources and the KHU and its required overhead emergency power path, the shared startup transformer's capacity and voltage adequacy could be challenged under certain DBA conditions. The shared alignment is acceptable because the preferred mode of Unit shutdown is with reactor coolant pumps providing forced circulation and due to the low likelihood of an event challenging the capacity of the shared transformer during a 72 hour period to bring a Unit to MODE 5. Required Action A.3.1 requires that the unit startup transformer be restored to OPERABLE status and normal startup bus alignment in 36 hours or Required Action 3.2 requires designating one unit sharing the startup transformer, to be shutdown. For example, if Unit 1 and 2 are operating and CT-2 becomes inoperable, Unit 2 may align CT-1 to be available to the Unit 2 main feeder buses and continue operating for up to 36 hours. At that time, if CT-2 has not been restored to OPERABLE status, one Unit must be "designated" to be shutdown. The designated Unit must be shut down per ACTION B. Note that with one Unit in MODES 1, 2, 3 or 4 and another Unit in a condition other than MODES 1, 2, 3, or 4, the units may share a startup transformer indefinitely provided that the loads on the unit not in MODES 1, 2, 3 or 4 are maintained within acceptable limits. For example, if Unit 1 is in MODE 5 and CT-2 becomes inoperable, Unit 2 may align CT-1 to the Unit 2 main feeder buses and continue operation indefinitely.

BASES

ACTIONS (continued)

B.1 and B.2

When a unit is designated to be shutdown due to sharing a unit startup transformer per Required Action A.3.2, the unit must be brought to a MODE in which the LCO does not apply, since the shared unit startup transformer's capacity could be challenged under certain DBA conditions. To achieve this status, the unit must be brought to at least MODE 3 within 12 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

C.1, C.2.1, C.2.2.1, C.2.2.2, C.2.2.3, C.2.2.4, and C.2.2.5

With the KHU or its required overhead emergency power path inoperable due to reasons other than an inoperable startup transformer (Condition A), sufficient AC power sources remain available to ensure safe shutdown of the unit in the event of a transient or accident. Operation may continue if the OPERABILITY of the remaining KHU and its required underground emergency power path is determined by performing SR 3.8.1.3 within 1 hour if not performed in the previous 12 hours and once every 7 days thereafter. This demonstration assures the remaining emergency power path is not inoperable due to a common cause or other failure. Testing on a 7 day Frequency is acceptable since both standby buses must be energized from an LCT via an isolated power path when in Condition C for > 72 hours. When the standby buses are energized by an LCT via an isolated power path, the likelihood that the OPERABLE KHU and its required underground emergency power path will be required is decreased. Since Required Action C.1 only specifies "perform," a failure of SR 3.8.1.3 acceptance criteria does not result in a Required Action not met. SR 3.8.1.3 is only required to be performed when the KHU associated with the underground emergency power path is OPERABLE.

If the KHU and its required underground emergency path fails SR 3.8.1.3, both KHUs and their required emergency power paths are inoperable, and Condition I (Both KHUs or their required emergency power paths inoperable for reasons other than Condition G or H) is entered concurrent with Condition C.

BASES

ACTIONS

C.1, C.2.1, C.2.2.1, C.2.2.2, C.2.2.3, C.2.2.4, and C.2.2.5 (continued)

If the inoperable KHU or its required overhead emergency power path are not restored to OPERABLE status within 72 hours as required by Required Action C.2.1, a controlled shutdown must be initiated as required by the Required Actions for Condition M unless the extended Completion Times of Required Action C.2.2.5 are applicable. The second Completion Time for Required Action C.2.1 establishes a limit on the maximum time allowed for a KHU to be inoperable during any single contiguous occurrence of having a KHU inoperable. If Condition C is entered as a result of switching an inoperable KHU from the underground to the overhead emergency power path, it may have been inoperable for up to 72 hours. This could lead to a total of 144 hours since the initial failure of the KHU. The second Completion Time allows for an exception to the normal "time zero" for beginning the allowed time "clock." This will result in establishing the "time zero" at the time the KHU become inoperable, instead of at the time Condition C was entered.

The extended Completion Times of Required Action C.2.2.5 apply when the KHU or its required overhead emergency power path is inoperable due to an inoperable Keowee main step-up transformer or an inoperable KHU (if not used for that KHU in the previous 3 years). In order to use the extended Completion Times, within 72 hours of entering Condition C both standby buses must be energized from an LCT (Required Action C.2.2.1), KHU generation to the grid except for testing must be suspended (Required Action C.2.2.2), the remaining KHU and its required underground emergency power path and both required offsite sources must be verified OPERABLE, the LCOs indicated in Required Action C.2.2.3 must be verified to be met, and alternate power source capability must be verified by performing SR 3.8.1.16.

Required Action C.2.2.5 permits maintenance and repair of a Keowee main step-up transformer which requires longer than 72 hours. Transformer replacement is rare but is time extensive. A 28 day Completion Time is permitted by Required Action C.2.2.5 to restore the KHU and its overhead power path to OPERABLE status when inoperable due to an inoperable Keowee main step-up transformer. This allows a reasonable period of time for transformer replacement.

Required Action C.2.2.5 also permits maintenance and repair of a KHU which requires longer than 72 hours. The primary long term maintenance items are expected to be hydro turbine runner and discharge ring welding

BASES

ACTIONS

C.1, C.2.1, C.2.2.1, C.2.2.2, C.2.2.3, C.2.2.4, and C.2.2.5 (continued)

repairs which are estimated to be necessary every six to eight years. Also, generator thrust and guide bearing replacements are necessary. Other items which manifest as failures are expected to be rare and may be performed during the permitted maintenance periods. As such, the 45 day restoration time of Required Action C.2.2.5 is allowed only once in a three year period for each KHU. This Completion Time is 45 days from discovery of initial inoperability of the KHU. This effectively limits the time the KHU can be inoperable to 45 days from discovery of initial inoperability rather than 45 days from entry into Condition C and precludes any additional time that may be gained as a result of switching an inoperable KHU from the underground to the overhead emergency power path. The 45 day Completion Time is modified by a note indicating that an additional 17 days is allowed when Condition C is entered to perform KHU Refurbishment Upgrades prior to April 30, 2005, except during March, April, May, or June. These upgrades include, but are not limited to, hydro turbine runner and discharge ring weld repair, governor, exciter and battery replacement, and an out-of-tolerance logic circuit modification. The additional 17 days is allowed to be used once for each KHU for upgrade work performed prior to April 30, 2005.

Required Actions C.2.2.1, C.2.2.2, C.2.2.3, and C.2.2.4 must be met in order to allow the longer restoration times of Required Action C.2.2.5. Required Action C.2.2.1 requires that both standby buses be energized using an LCT through the 100 kV transmission circuit. With this arrangement (100 kV transmission circuit electrically separated from the system grid and all offsite loads), a high degree of reliability for the emergency power system is provided. In this configuration, the LCT is serving as a second emergency power source, however, since the 100 kV transmission circuit is vulnerable to severe weather a time limit is imposed. The second Completion Time of Required Action C.2.2.1 permits the standby buses to be re-energized by an LCT within 1 hour in the event this source is subsequently lost. Required Action C.2.2.2 requires suspension of KHU generation to the grid except for testing. The restriction reduces the number of possible failures which could cause loss of the underground emergency power path. Required Action C.2.2.3 requires verifying by administrative means that the remaining KHU and its required underground emergency power path and both required offsite sources are OPERABLE. This provides additional assurance that offsite power will be available. In addition, this assures that the KHU and its required underground emergency power path are available. Required Action C.2.2.3 also requires verifying by administrative means that the requirements of the following LCOs are met:

BASES

ACTIONS

C.1, C.2.1, C.2.2.1, C.2.2.2, C.2.2.3, C.2.2.4, and C.2.2.5 (continued)

LCO 3.8.3, "DC Sources – Operating;"

LCO 3.8.6, "Vital Inverters – Operating;"

LCO 3.8.8, "Distribution Systems – Operating;"

LCO 3.3.17, "EPSL Automatic Transfer Function;"

LCO 3.3.18, "EPSL Voltage Sensing Circuits;"

LCO 3.3.19, "EPSL 230 kV Switchyard DGVP;" and

LCO 3.3.21, "EPSL Keowee Emergency Start Function."

This increases the probability, even in the unlikely event of an additional failure, that the DC power system and the 120 VAC Vital Instrumentation power panelboards will function as required to support EPSL, power will not be lost to ES equipment, and EPSL will function as required.

Verifying by administrative means allows a check of logs or other information to determine the OPERABILITY status of required equipment in place of requiring unique performance of Surveillance Requirements. If the AC Source is subsequently determined inoperable, or an LCO stated in Required Action C.2.2.3 is subsequently determined not met, continued operation up to a maximum of four hours is allowed by ACTION L.

Required Action C.2.2.4 requires verifying alternate power source capability by performing SR 3.8.1.16. This confirms that entry into Condition C is due only to an inoperable main step-up transformer or an inoperable KHU, as applicable. If SR 3.8.1.16 is subsequently determined not met, continued operation up to a maximum of four hours is allowed by ACTION L.

D.1, D.2 and D.3

With the KHU or its required underground emergency power path inoperable, sufficient AC power sources remain available to ensure safe shutdown of the unit in the event of a transient or accident. Operation may continue for 72 hours if the remaining KHU and its required overhead emergency power path are tested using SR 3.8.1.4 within one hour if not performed in the previous 12 hours. SR 3.8.1.4 is only required to be performed when the KHU associated with the overhead

BASES

ACTIONS

D.1, D.2 and D.3 (continued)

emergency power path is OPERABLE. This Required Action provides assurance that no undetected failures have occurred in the overhead emergency power path. Since Required Action D.1 only specifies "perform," a failure of SR 3.8.1.4 acceptance criteria does not result in a Required Action not met. However, if the KHU and its required overhead emergency path fails SR 3.8.1.4, both KHUs and their required emergency power paths are inoperable, and Condition I for both KHUs and their emergency power paths inoperable for reasons other than Condition G or H is entered concurrent with Condition D. This demonstration is to assure that the remaining emergency power path is not inoperable due to a common cause or due to an undetected failure. For outages of the KHU and its required underground emergency power path in excess of 24 hours, an LCT (using the 100 kV transmission circuit electrically separated from the grid and offsite loads) must energize a standby bus prior to the outage exceeding 24 hours. This ensures the availability of a power source on the standby buses when the KHU and its required underground emergency power path are out of service in excess of 24 hours. The second Completion Time of Required Action D.2 permits the standby buses to be re-energized by an LCT within 1 hour in the event this source is subsequently lost.

The second Completion Time for Required Action D.3 establishes a limit on the maximum time allowed for a KHU to be inoperable during any single contiguous occurrence of having a KHU inoperable. If Condition D is entered as a result of switching an inoperable KHU from the overhead to the underground emergency power path, it may have been inoperable for up to 72 hours. This could lead to a total of 144 hours since the initial failure of the KHU. The second Completion Time allows for an exception to the normal "time zero" for beginning the allowed time "clock." This will result in establishing the "time zero" at the time the KHU become inoperable, instead of at the time Condition D was entered.

E.1 and E.2

If the Required Action and associated Completion Time for Required Action D.2 are not met, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 12 hours for one Oconee unit and 24 hours for other Oconee unit(s) and to MODE 5 within 84 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

BASES

ACTIONS (continued)

F.1 and F.2

With the zone overlap protection circuitry inoperable when the overhead electrical disconnects for the KHU associated with the underground power path are closed, the zone overlap protection circuitry must be restored to OPERABLE status or the overhead electrical disconnects must be opened within 72 hours. In this Condition, both KHUs and their required emergency power paths are OPERABLE, however a single failure could result in the loss of both KHUs.

G.1

With both emergency power paths inoperable due to an E breaker and S breaker inoperable on the same main feeder bus, one breaker must be restored to OPERABLE status. In this Condition, both emergency power paths can still provide power to the remaining main feeder bus.

H.1 and H.2

With both KHUs or their required emergency power paths inoperable for planned maintenance or test with both standby buses energized from an LCT via an isolated power path, the KHU must be restored to OPERABLE status within 60 hours. The 60 hour Completion Time is modified by a Note indicating that an additional cumulative 120 hours is allowed when Condition entered to isolate, test and un-isolate the KHUs during each of the two KHU Refurbishment Upgrades prior to April 30, 2005 provided the following conditions are met: 1) period of use not in March, April, May or June; 2) the SSF, EFW System and LCTs (4C, 5C, and 6C) are verified OPERABLE prior to entering Condition, 3) RCS inventory is not reduced (RCS < 50" on LT-5), 4) the SSF is manned, 5) a Jocassee Hydro Unit is verified available to provide power prior to entering Condition, 6) a 2 hour SSF DG operability test is performed prior to the start of the first dual unit outage, and 7) the Completion Time shall only be extended twice during each KHU Refurbishment Outage. For example, if 140 hours (an additional 80 hours) is required to isolate the KHUs then 100 hours (an additional 40 hours) is allowed to unisolate and test the KHU. If one of the systems/components in Item 2 (SSF, EFW System and LCTs) above becomes inoperable or in Item 5 above becomes unavailable after entering the condition, immediate action should be taken to restore the equipment to OPERABLE/available status. The Keowee Refurbishment Upgrades include, but are not limited to, hydro turbine runner and discharge ring weld repair, governor, exciter and battery replacement, and an out-of-tolerance logic circuit modification. Operation with both KHUs and their required power paths inoperable is permitted for 60 hours or the modified Completion Time allowed by the note provided that both standby buses are energized

BASES

ACTIONS

H.1 and H.2 (continued)

using an LCT through the 100 kV transmission circuit and the requirements of the Note to the Condition are met. The Note to the Condition indicates that it may only be entered when both offsite sources are verified by administrative means to be OPERABLE and the requirements of the following LCOs are verified by administrative means to be met:

LCO 3.8.3, "DC Sources – Operating;"

LCO 3.8.6, "Vital Inverters – Operating;"

LCO 3.8.8, "Distribution Systems – Operating;"

LCO 3.3.17, "EPSL Automatic Transfer Function;"

LCO 3.3.18, "EPSL Voltage Sensing Circuits;" and

LCO 3.3.19, "EPSL 230 kV Switchyard DGVP."

This increases the probability, even in the unlikely event of an additional failure, that the DC power system and the 120 VAC Vital Instrumentation power panelboards will function as required to support EPSL, power will not be lost to ES equipment, and EPSL will function as required.

Verifying by administrative means allows a check of logs or other information to determine the OPERABILITY status of required equipment in place of requiring unique performance of Surveillance Requirements. If the AC Source is subsequently determined inoperable, or an LCO stated in the Note to Condition H is subsequently determined not met, continued operation up to a maximum of four hours is allowed by ACTION L.

With both standby buses energized from an LCT via an isolated power path (100 kV transmission circuit electrically separated from the system grid and all offsite loads), a high degree of reliability for the emergency power system is provided. In this configuration, the LCT is serving as a second emergency power source, however, since the Oconee Units are vulnerable to a single failure of the 100 kV transmission circuit a time limit of 60 hours is imposed. Required Action H.1 permits the standby buses to be re-energized by an LCT within 1 hour in the event this source is subsequently lost.

If both emergency power paths are restored, unrestricted operation may continue. If only one power path is restored, operation may continue per ACTIONS C or D.

BASES

ACTIONS (continued)

I.1, I.2, and I.3

With both KHUs or their required emergency power paths inoperable for reasons other than Conditions G and H, insufficient standby AC power sources are available to supply the minimum required ES functions. In this Condition, the offsite power system is the only source of AC power available for this level of degradation. The risk associated with continued operation for one hour without an emergency power source is considered acceptable due to the low likelihood of a LOOP during this time period, and because of the potential for grid instability caused by the simultaneous shutdown of all three units. This instability would increase the probability of a total loss of AC power. Operation with both KHUs or their required power paths inoperable is permitted for 12 hours provided that Required Actions I.1 and I.2 are met. Required Action I.1 requires that both standby buses be energized using an LCT via an isolated power path. With this arrangement (100 kV transmission circuit electrically separated from the system grid and all offsite loads), a high degree of reliability for the emergency power system is provided. In this configuration, the LCT is serving as a second emergency power source, however, since the Oconee Units are vulnerable to a single failure of the 100 kV transmission circuit a time limit of 12 hours is imposed. The second Completion Time of Required Action I.1 permits the standby buses to be re-energized by an LCT within 1 hour in the event this source is subsequently lost. Required Action I.2 requires that the OPERABILITY status of both offsite sources be determined by administrative means and that the OPERABILITY status of equipment required by the following LCOs be determined by administrative means:

LCO 3.8.3, "DC Sources – Operating;"

LCO 3.8.6, "Vital Inverters – Operating;"

LCO 3.8.8, "Distribution Systems – Operating;"

LCO 3.3.17, "EPSL Automatic Transfer Function;"

LCO 3.3.18, "EPSL Voltage Sensing Circuits;" and

LCO 3.3.19, "EPSL 230 kV Switchyard DGVP."

This increases the probability, even in the unlikely event of an additional failure, that the DC power system and the 120 VAC Vital Instrumentation power panelboards will function as required to support EPSL, power will not be lost to ES equipment, and EPSL will function as required.

BASES

ACTIONS

I.1, I.2, and I.3 (continued)

Determining by administrative means allows a check of logs or other information to determine the OPERABILITY status of required equipment in place of requiring unique performance of Surveillance Requirements. If the AC Source is initially or subsequently determined inoperable, or an LCO stated in Required Action I.2 is initially or subsequently determined not met, continued operation up to a maximum of four hours is allowed by ACTION L.

If both emergency power paths are restored, unrestricted operation may continue. If only one power path is restored, operation may continue per ACTIONS C or D.

J.1, J.2, and J.3

With one or both required offsite sources inoperable for reasons other than Condition A, sufficient AC power sources are available to supply necessary loads in the event of a DBA. However, since the AC power system is degraded below the Technical Specification requirements, a time limit on continued operation is imposed. With only one of the required offsite sources OPERABLE, the likelihood of a LOOP is increased such that the Required Actions for all required offsite circuits inoperable are conservatively followed. The risk associated with continued operation for one hour without a required offsite AC source is considered acceptable due to the low likelihood of a LOOP during this time period, and because of the potential for grid instability caused by the simultaneous shutdown of all three units.

Operation with one or both required offsite sources inoperable is permitted for 24 hours provided that Required Actions J.1 and J.2 are met. Required Action J.1 requires that both standby buses be energized using an LCT via an isolated power path. With this arrangement (100 kV transmission circuit electrically separated from the system grid and all offsite loads), a high degree of reliability for the emergency power system is provided. In this configuration, the LCT is serving as an emergency power source, however, since the Oconee units are vulnerable to a single failure of the 100 kV transmission circuit a time limit is imposed. The second Completion Time of Required Action J.1 permits the standby buses to be re-energized by an LCT within 1 hour in the event this source is subsequently lost. Required Action J.2 requires that the OPERABILITY status of both KHUs and their required emergency power paths be determined by administrative means and that the OPERABILITY status of equipment required by the following LCOs be determined by administrative means:

BASES

ACTIONS J.1, J.2, and J.3 (continued)

LCO 3.8.3, "DC Sources – Operating;"

LCO 3.8.6, "Vital Inverters – Operating;"

LCO 3.8.8, "Distribution Systems – Operating;"

LCO 3.3.17, "EPSL Automatic Transfer Function;"

LCO 3.3.18, "EPSL Voltage Sensing Circuits;"

LCO 3.3.19, "EPSL 230 kV Switchyard DGVP," and

LCO 3.3.21, "EPSL Keowee Emergency Start Function."

This increases the probability, even in the unlikely event of an additional failure, that the DC power system and the 120 VAC Vital Instrumentation power panelboards will function as required to support EPSL, power will not be lost to ES equipment, and EPSL will function as required.

Determining by administrative means allows a check of logs or other information to determine the OPERABILITY status of required equipment in place of requiring unique performance of Surveillance Requirements. If the AC Source is initially or subsequently determined inoperable, or an LCO stated in Required Action J.2 is initially or subsequently determined not met, continued operation up to a maximum of four hours is allowed by ACTION L.

K.1

The two trip circuits for each closed N and SL breakers are required to ensure both breakers will open. An N breaker trip circuit encompasses those portions of the breaker control circuits necessary to trip the associated N breaker from the output of the 2 out of 3 logic matrix formed by the auxiliary transformer's undervoltage sensing circuits up to and including an individual trip coil for the associated N breaker. The undervoltage sensing channels for the auxiliary transformer are addressed in LCO 3.3.18, "Emergency Power Switching Logic (EPSL) Voltage Sensing Circuits." An SL breaker trip circuit encompasses those portions of the breaker control circuits necessary to trip the SL breaker from the output of both 2 out of 3 logic matrices formed by each standby bus's undervoltage sensing circuits up to and including an individual trip coil for the associated SL breaker. The undervoltage sensing channels for the CT- 5 transformer are addressed in LCO 3.3.18, "Emergency

BASES (continued)

ACTIONS

K.1 (continued)

Power Switching Logic (EPSL) Voltage Sensing Circuits." With one trip circuit inoperable a single failure could cause an N or SL breaker to not open. This could prevent the transfer to other available sources. Therefore, 24 hours is allowed to repair the trip circuit or open the breaker (opening the breaker results in exiting the Condition). The Completion Time is based on engineering judgement taking into consideration the time required to complete the required action and the availability of the remaining trip circuit.

A Note modifies the Condition, indicating that separate Condition Entry is permitted for each breaker. Thus, Completion Times are tracked separately for the N1, N2, SL1, and SL2 breaker.

L.1, L.2, and L.3

With an AC Source inoperable or LCO not met, as stated in Note for Condition H entry; or with an AC Source inoperable or LCO not met, as stated in Required Action C.2.2.3 when in Condition C for > 72 hours; or with an AC Source inoperable or LCO not met, as stated in Required Action I.2 or J.2 when in Conditions I or J for > 1 hour; or with SR 3.8.1.16 not met, Required Action L.1, L.2 and L.3 requires restoration within four hours. Condition L is modified by a Note indicating that separate Condition entry is permitted for each inoperable AC Source, and LCO or SR not met. The Required Action is modified by a Note that allows the remaining OPERABLE KHU and its required emergency power path to be made inoperable for up to 12 hours if required to restore both KHUs and their required emergency power paths to OPERABLE status. This note is necessary since certain actions such as dewatering the penstock may be necessary to restore the inoperable KHU although these actions would also cause both KHUs to be inoperable.

The purpose of this Required Action is to restrict the allowed outage time for an inoperable AC Source or equipment required by an LCO when in Conditions C, H, I or J. For Conditions I and J when the LCOs stated are initially not met, the maximum Completion Time is four hours or the remaining Completion Time allowed by the stated LCO, whichever is shorter.

M.1 and M.2

If a Required Action and associated Completion Time for Condition C, F, G, H, I, J, K or L are not met; or if a Required Action and associated

BASES (continued)

ACTIONS

M.1 and M.2 (continued)

Completion Time are not met for Required Action D.1 or D.3, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 12 hours and to MODE 5 within 84 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.8.1.1

This SR ensures proper circuit continuity for the offsite AC electrical power supply to the onsite distribution network and availability of offsite AC electrical power. The breaker alignment verifies that each breaker is in its correct position to ensure that distribution buses and loads are connected to their power source, and that appropriate separation of offsite sources is maintained. The 7 day Frequency is adequate since breaker position is not likely to change without the operator being aware of it and because its status is displayed in the control room.

SR 3.8.1.2

This SR verifies adequate battery voltage when the KHU batteries are on float charge. This SR is performed to verify KHU battery OPERABILITY. The Frequency of once per 7 days is consistent with manufacturers recommendations and IEEE-450 (Ref. 8).

SR 3.8.1.3

This SR verifies the availability of the KHU associated with the underground emergency power path to start automatically and energize the underground power path. Utilization of either the auto-start or emergency start sequence assures the control function OPERABILITY by verifying proper speed control and voltage. Power path verification is included to demonstrate breaker OPERABILITY from the KHU onto the standby buses. This is accomplished by closing the Keowee Feeder Breakers (SK) to energize each deenergized standby bus. The 31 day Frequency is adequate based on operating experience to provide reliability verification without excessive equipment cycling for testing.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.4

This surveillance verifies the availability of the KHU associated with the overhead emergency power path. Utilization of either the auto-start or emergency start sequence assures the control function OPERABILITY by verifying proper speed control and voltage. The ability to supply the overhead emergency power path is satisfied by demonstrating the ability to synchronize (automatically or manually) the KHU with the grid system. The SR also requires that the underground power path be energized after removing the KHU from the overhead emergency power path. This surveillance can be satisfied by first demonstrating the ability of the KHU associated with the underground emergency path to energize the underground path then synchronizing the KHU to the overhead emergency power path. The SR is modified by a Note indicating that the requirement to energize the underground emergency power path is not applicable when the overhead disconnects are open for the KHU associated with the underground emergency power path or 2) when complying with Required Action D.1. The latter exception is necessary since Required Action D.1 continues to be applicable when both KHUs are inoperable.

The 31 day Frequency for this Surveillance was determined to be adequate based on operating experience to provide reliability verification without excessive equipment cycling for testing.

SR 3.8.1.5

This surveillance verifies OPERABILITY of the trip functions of each closed SL and each closed N breaker. Neither of these breakers have any automatic close functions; therefore, only the trip coils require verification. Cycling of each breaker demonstrates functional OPERABILITY and the coil monitor circuits verify the integrity of each trip coil. The 31 day frequency is based on operating experience.

This SR modified by a Note that states it is not required to be performed for an SL breaker when its standby bus is energized from a LCT via an isolated power path. This is necessary since the standby buses are required to be energized from a LCT by several Required Actions of Specification 3.8.1 and the breakers must remain closed to energize the standby buses from a LCT.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.6

Infrequently used source breakers are cycled to ensure OPERABILITY. The Standby breakers are to be cycled one breaker at a time to prevent inadvertent interconnection of two units through the standby bus breakers. Cycling the startup breakers verifies OPERABILITY of the breakers and associated interlock circuitry between the normal and startup breakers. This circuitry provides an automatic, smooth, and safe transfer of auxiliaries in both directions between sources. The 31 day Frequency for this Surveillance was determined to be adequate based on operating experience to provide reliability verification without excessive equipment cycling for testing.

This SR is modified by a Note which states the SR is not required to be performed for an S breaker when its standby bus is energized from a LCT via an isolated power path. This is necessary since the standby buses are required to be energized from a LCT by several Required Actions of Specification 3.8.1 and cycling the S breakers connects the standby buses with the main feeder buses which are energized from another source.

SR 3.8.1.7

The KHU tie breakers to the underground path, ACB3 and ACB4, are interlocked to prevent cross-connection of the KHU generators. The safety analysis utilizes two independent power paths for accommodating single failures in applicable accidents. Connection of both generators to the underground path compromises the redundancy of the emergency power paths. Installed test logic is used to verify a circuit to the close coil on one underground ACB does not exist with the other underground ACB closed. The 12 month Frequency for this surveillance is adequate based on operating experience to provide reliability verification without excessive equipment cycling for testing.

SR 3.8.1.8

Each KHU tie breaker to the underground emergency power path and tie breaker to the overhead emergency path, are interlocked to prevent the unit associated with the underground circuit from automatically connecting to the overhead emergency power path. The safety analysis utilizes two independent power paths for accommodating single failures in applicable accidents. Connection of both generators to the overhead emergency power path compromises the redundancy of the emergency

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.8 (continued)

power paths. Temporary test instrumentation is used to verify a circuit to the close coil on the overhead ACB does not exist with the Underground ACB closed. The 12 month Frequency for this Surveillance was determined to be adequate based on operating experience to provide reliability verification without excessive equipment cycling for testing.

SR 3.8.1.9

This surveillance verifies the KHUs' response time to an Emergency Start signal (normally performed using a pushbutton in the control room) to ensure ES equipment will have adequate power for accident mitigation. UFSAR Section 6.3.3.3 (Ref. 9) establishes the 23 second time requirement for each KHU to achieve rated frequency and voltage. Since the only available loads of adequate magnitude for simulating a accident is the grid, subsequent loading on the grid is required to verify the KHU's ability to assume rapid loading under accident conditions. Sequential block loads are not available to fully test this feature. This is the reason for the requirement to load the KHUs at the maximum practical rate. The 12 month Frequency for this SR is adequate based on operating experience to provide reliability verification without excessive equipment cycling for testing.

This SR is modified by a Note that allows the upper limits on KHU frequency and voltage to not be met until the NRC issues an amendment which removes this Note, with the license amendment request to be submitted no later than April 5, 2001.delays the implementation of the surveillance requirement until the KHU digital governor modification is implemented. The acceptance testing for the modification will verify that the limits in the SR are met.

SR 3.8.1.10

A battery service test is a special test of the battery capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length should correspond to the design duty cycle requirements as specified in Reference 4.

The Surveillance Frequency of 12 months is consistent with the recommendations of Regulatory Guide 1.32 (Ref. 6) and Regulatory Guide 1.129 (Ref. 7), which state that the battery service test should be performed with intervals between tests not to exceed 18 months.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.11

Visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. The 12 month Frequency for this SR is consistent with manufacturers recommendations and IEEE-450 (Ref. 8), which recommends detailed visual inspection of cell condition and rack integrity on a yearly basis.

SR 3.8.1.12

Verification of cell to cell connection cleanliness, tightness, and proper coating with anti-corrosion grease provides an indication of any abnormal condition, and assures continued OPERABILITY of the battery. The 12 month frequency is based on engineering judgement and operational experience and is sufficient to detect cell connection degradation when it is properly coupled with other surveillances more frequently performed to detect abnormalities.

SR 3.8.1.13

The KHU underground ACBs have a control feature which will automatically close the KHU, that is pre-selected to the overhead path, into the underground path upon an electrical fault in the zone overlap region of the protective relaying. This circuitry prevents an electrical fault in the zone overlap region of the protective relaying from locking out both emergency power paths during dual KHU grid generation. In order to ensure this circuitry is OPERABLE, an electrical fault is simulated in the zone overlap region and the associated underground ACBs are verified to operate correctly. This surveillance is required on a 12 month Frequency. The 12 month Frequency is based on engineering judgement and provides reasonable assurance that the zone overlap protection circuitry is operating properly.

This SR is modified by a Note indicating the SR is only applicable when the overhead disconnects to the underground KHU are closed. When the overhead disconnects to the underground KHU are open, the circuitry preventing the zone overlap protective lockout of both KHUs is not needed.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.14

This surveillance verifies OPERABILITY of the trip functions of the SL and N breakers. This SR verifies each trip circuit of each breaker independently opens each breaker. Neither of these breakers have any automatic close functions; therefore, only the trip circuits require verification. The 18 month Frequency is based on engineering judgement and provides reasonable assurance that the SL and N breakers will trip when required.

The SR is modified by a Note indicating that the SR is not required for an SL breaker when its standby bus is energized by a LCT via an isolated power path. This is necessary since the standby buses are required to be energized from a LCT by several Required Actions of Specification 3.8.1 and the breakers must remain closed to energize the standby buses from a LCT.

SR 3.8.1.15

This surveillance verifies proper operation of the 230 kV switchyard circuit breakers upon an actual or simulated actuation of the Switchyard Isolation circuitry. This test causes an actual switchyard isolation (by actuation of degraded grid voltage protection) and alignment of KHUs to the overhead and underground emergency power paths. An 18 month Frequency minimizes the impact to the Station and the operating Units which are connected to the 230 kV switchyard. The effect of this SR is not significant because the generator red bus tie breakers and feeders from the Oconee 230 kV switchyard red bus to the system grid remain closed. Either Switchyard Isolation Channel causes full system realignment, which involves a complete switchyard realignment. To avoid excessive switchyard circuit breaker cycling, realignment and KHU emergency start functions, this SR need be performed only once each SR interval.

This SR is modified by a Note. This Note states the redundant breaker trip coils shall be verified on a STAGGERED TEST BASIS. Verifying the trip coils on a STAGGERED TEST BASIS precludes unnecessary breaker operation and minimizes the impact to the Station and the operating Units which are connected to the 230 kV switchyard.

SR 3.8.1.16

This SR verifies by administrative means that one KHU provides an alternate manual AC power source capability by manual or automatic

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.16 (continued)

KHU start with manual synchronize, or breaker closure, to energize its non-required emergency power path. That is, when the KHU to the overhead emergency power path is inoperable, the SR verifies by administrative means that the overhead emergency power path is OPERABLE. When the overhead emergency power path is inoperable, the SR verifies by administrative means that the KHU associated with the overhead emergency power path is OPERABLE.

This SR is modified by a Note indicating that the SR is only applicable when complying with Required Action C.2.2.4.

REFERENCES

1. UFSAR, Section 3.1.39
2. UFSAR, Chapter 16
3. 10 CFR 50.36
4. UFSAR, Chapter 6
5. UFSAR, Chapter 15
6. Regulatory Guide 1.32
7. Regulatory Guide 1.129
8. IEEE-450-1980
9. UFSAR, Section 6.3.3.3

Attachment 4
February 4, 2004

ATTACHMENT 4

MARKUP OF TECHNICAL SPECIFICATION

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	C.2.2.5 Restore KHU and its required overhead emergency power path to OPERABLE status.	28 days when Condition due to an inoperable Keowee main step-up transformer AND 45 days from discovery of initial inoperability when Condition due to an inoperable KHU if not used for that KHU in the previous 3 years

(continued)

----------NOTE----------
An additional 17 days is allowed when Condition entered to perform KHU Refurbishment Upgrades prior to April 30, 2005 except during March, April, May or June
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ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
H. ----------NOTE---------- Condition may be entered only when both required offsite sources are verified by administrative means to be OPERABLE and the requirements of LCO 3.8.3, "DC Sources-Operating;" LCO 3.8.6, "Vital Inverters-Operating;" LCO 3.8.8, "Distribution Systems-Operating;" LCO 3.3.17, "EPSL Automatic Transfer Function;" LCO 3.3.18, "EPSL Voltage Sensing Circuits;" LCO 3.3.19, "EPSL 230 kV Switchyard DGVP," are verified by administrative means to be met. ---------- Both KHUs or their required emergency power paths inoperable for planned maintenance or test with both standby buses energized from LCT via isolated power path.	H.1 Energize both standby buses from LCT via isolated power path. AND H.2 Restore one KHU and its required emergency power path to OPERABLE status.	1 hour from discovery of deenergized standby bus 60 hours

----------NOTE----------
An additional cumulative 120 hours is allowed when Condition entered to isolate, test and un-isolate the KHUs during each of the two KHU Refurbishment Outages prior to April 30, 2005 provided the following conditions are met: 1) period of use not in March, April, May or June; 2) the SSF, EFW System and LCTs are verified OPERABLE prior to entering Condition, 3) RCS inventory is not reduced, 4) the SSF is manned, 5) a Jocassee Hydro Unit is verified available to provide power prior to entering Condition, 6) a 2 hour SSF DG operability test is performed prior to the start of the first dual unit outage, and 7) the Completion Time is only extended twice during each KHU Refurbishment Outage.

(continued)

The 45 day Completion Time is modified by a note indicating that an additional 17 days is allowed when Condition C is entered to perform KHU Refurbishment Upgrades prior to April 30, 2005, except during March, April, May, or June. These upgrades include, but are not limited to, hydro turbine runner and discharge ring weld repair, governor, exciter and battery replacement, and an out-of-tolerance logic circuit modification. The additional 17 days is allowed to be used once for each KHU for upgrade work performed prior to April 30, 2005.

ACTIONS

C.1, C.2.1, C.2.2.1, C.2.2.2, C.2.2.3, C.2.2.4, and C.2.2.5 (continued)

repairs which are estimated to be necessary every six to eight years. Also, generator thrust and guide bearing replacements are necessary. Other items which manifest as failures are expected to be rare and may be performed during the permitted maintenance periods. As such, the 45 day restoration time of Required Action C.2.2.5 is allowed only once in a three year period for each KHU. This Completion Time is 45 days from discovery of initial inoperability of the KHU. This effectively limits the time the KHU can be inoperable to 45 days from discovery of initial inoperability rather than 45 days from entry into Condition C and precludes any additional time that may be gained as a result of switching an inoperable KHU from the underground to the overhead emergency power path.

Required Actions C.2.2.1, C.2.2.2, C.2.2.3, and C.2.2.4 must be met in order to allow the longer restoration times of Required Action C.2.2.5. Required Action C.2.2.1 requires that both standby buses be energized using an LCT through the 100 kV transmission circuit. With this arrangement (100 kV transmission circuit electrically separated from the system grid and all offsite loads), a high degree of reliability for the emergency power system is provided. In this configuration, the LCT is serving as a second emergency power source, however, since the 100 kV transmission circuit is vulnerable to severe weather a time limit is imposed. The second Completion Time of Required Action C.2.2.1 permits the standby buses to be re-energized by an LCT within 1 hour in the event this source is subsequently lost. Required Action C.2.2.2 requires suspension of KHU generation to the grid except for testing. The restriction reduces the number of possible failures which could cause loss of the underground emergency power path. Required Action C.2.2.3 requires verifying by administrative means that the remaining KHU and its required underground emergency power path and both required offsite sources are OPERABLE. This provides additional assurance that offsite power will be available. In addition, this assures that the KHU and its required underground emergency power path are available. Required Action C.2.2.3 also requires verifying by administrative means that the requirements of the following LCOs are met:

LCO 3.8.3, "DC Sources – Operating;"

LCO 3.8.6, "Vital Inverters – Operating;"

LCO 3.8.8, "Distribution Systems – Operating;"

BASES

ACTIONS (continued)

The 60 hour Completion Time is modified by a Note indicating that an additional cumulative 120 hours is allowed when Condition entered to isolate, test and un-isolate the KHUs during each of the two KHU Refurbishment Upgrades prior to April 30, 2005 provided the following conditions are met: 1) period of use not in March, April, May or June; 2) the SSF, EFW System and LCTs (4C,. 5C, and 6C) are verified OPERABLE prior to entering Condition 3) RCS inventory is not reduced (RCS < 50" on LT-5), 4) the SSF is manned, 5) a Jocassee Hydro Unit is verified available to provide power prior to entering Condition, 6) a 2 hour SSF DG operability test is performed prior to the start of the first dual unit outage, and 7) the Completion Time is only extended twice during each KHU Refurbishment Outage. For example, if 140 hours (an additional 80 hours) is required to isolate the KHUs then 100 hours (an additional 40 hours) is allowed to unisolate and test the KHU. If one of the systems/components in Item 2 (SSF, EFW System and LCTs) above becomes inoperable or in Item 5 above becomes unavailable after entering the condition, immediate action should be taken to restore the equipment to OPERABLE/available status. The Keowee Refurbishment Upgrades include, but are not limited to, hydro turbine runner and discharge ring weld repair, governor, exciter and battery replacement, and an out-of-tolerance logic circuit modification.

F.1 and F.2

With the zone overlap protection circuitry inoperable when the overhead electrical disconnects for the KHU associated with the underground power path are closed, the zone overlap protection circuitry must be restored to OPERABLE status or the overhead electrical disconnects must be opened within 72 hours. In this Condition, both KHUs and their required emergency power paths are OPERABLE, however a single failure could result in the loss of both KHUs.

G.1

With both emergency power paths inoperable due to an E breaker and S breaker inoperable on the same main feeder bus, one breaker must be restored to OPERABLE status. In this Condition, both emergency power paths can still provide power to the remaining main feeder bus.

H.1 and H.2

With both KHUs or their required emergency power paths inoperable for planned maintenance or test with both standby buses energized from an LCT via an isolated power path, the KHU must be restored to OPERABLE status within 60 hours. Operation with both KHUs and their required power paths inoperable is permitted for 60 hours provided that both standby buses are energized using an LCT through the 100 kV transmission circuit and the requirements of the Note to the Condition are met. The Note to the Condition indicates that it may only be entered when both offsite sources are verified by administrative means to be OPERABLE and the requirements of the following LCOs are verified by administrative means to be met:

or the modified Completion Time allowed by the note

LCO 3.8.3, "DC Sources – Operating;"

LCO 3.8.6, "Vital Inverters – Operating;"

LCO 3.8.8, "Distribution Systems – Operating;"

LCO 3.3.17, "EPSL Automatic Transfer Function;"

LCO 3.3.18, "EPSL Voltage Sensing Circuits;" and

LCO 3.3.19, "EPSL 230 kV Switchyard DGVP."