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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 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, 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.

On March 31, June 13, June 20, and August 22, 2003, Duke received additional questions from the NRC related to this License Amendment Request (LAR). Attachment 1 documents Duke's response to the questions.

Attachment 2 and 3 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.

A001

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

A 90-day implementation period for the Technical Specification change is requested. If there are any questions regarding this submittal, please contact Boyd Shingleton at (864) 885-4716.

Very truly yours,

R. A. Jones, Vice President
Oconee Nuclear Site

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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 12th day of September, 2003

Sheila A Smith
Notary Public

My Commission Expires:

6/12/2013

Attachment 1
Duke Response to Request for Additional Information (RAI)
Oconee Nuclear Station License Amendment Request
for Temporary Extensions to the Completion Times
for One or Two Keowee Hydro Units Inoperable

A. Duke Response to March 31, 2003 RAI - First set of Questions

RAI-A1

Since this proposed licensing basis change offers risk-informed arguments, the following information needs to be submitted to the staff:

(a) The effects of the change on the dominant sequences (sequences that contribute more than 5% to the risk) in order to show that the licensing basis changes do not create risk outliers.

(b) Information related to assessment of the total plant CDF. The information could include quantitative (e.g. IPE or PRA results for internal initiating events and external event PRA results if available) and qualitative or semi-qualitative (e.g. results of margins analyses, outage configuration studies).

(c) Following completion of the Keowee PRA in 1995 and its integration with the Oconee AC Power Model, please submit the impact of all plant changes that have been submitted to the NRC for review and approval.

Duke Response to RAI-A1(a)

The Oconee PRA results are not obtained and categorized by the usual sequence designations (e.g., TQsU). For the purpose of identifying dominant sequences, we have reviewed our results by the assigned plant damage state. This provides a basis for grouping together sequences that are similar in their behavior and consequences. A description of the plant damage states that contribute >5% to the non-seismic CDF and the discussion of the impact of the Keowee Hydro Unit (KHU) unavailability are given below.

Transient induced Reactor Coolant Pump (RCP) Seal LOCA sequences that are dominated by external events such as tornados, floods, and fires, account for approximately 41% of the non-seismic CDF. Typically, for these sequences, AC power is lost on site due to physical damage and equipment failure on the on site AC power system from the external event itself. Thus the KHUs are prevented from supplying power to the station. Therefore, the unavailability of the KHUs as outlined in the proposed licensing basis change has no impact on the dominant cut sets, creates no unique sequences and has a limited impact on the frequency of these sequences.

Reactor Coolant Pump Seal LOCA sequences that are dominated by internal turbine building flooding initiators account for approximately 8% of the non-seismic CDF. There is no impact from unavailability of the KHUs on these types of sequences.

Small LOCA initiated sequences account for approximately 7% of the non-seismic CDF. There is no impact from unavailability of the KHUs on these types of sequences.

As noted in the License Amendment Request (LAR), submitted under Duke cover letter dated August 22, 2002, Oconee has recently replaced the RCP seal packages on the Unit 1 RCPs with seals that exhibit better performance following loss of cooling to the seals. The contribution to CDF from RCP seal LOCAs is expected to drop significantly with the incorporation of the new seal model in the updated Oconee PRA.

Duke Response to RAI-A1(b)

The Oconee PRA is a full scope, level 3 PRA. The Oconee plant baseline CDF used in the LAR analysis is 5.61E-05/reactor year. This value includes internal and external events (fire, tornadoes, and external floods) but excludes seismic.

Duke Response to RAI-A1(c)

A listing of the impact of the risk informed LARs submitted by Oconee for NRC review and approval since 1995 is presented in the table below.

Date of Submittal	Description of Change	Risk Impact of Change
12/16/1998 8/5/1999	TS 3.5.2 Corrects non conservatisms in the High Pressure Injection (HPI) system.	Condition B: dCDF increase of 2.8E-07/yr Condition C: dCDF increase of 3.3E-07/yr
3/5/2001 9/4/2001	One Time Deferral of Integrated Containment Leak Rate Testing (Extend SR 31 months)	CDF: No Impact Person-rem risk: increase of 2.29E-02 person-rem/yr (small change in the public health risk.) dLERF: Increase of 5.51 E-08/yr
8/14/2001	Extend Engineering Safeguards SR 3.3.5.2 to 92 day frequency from 31 days.	dCDF increase negligible based on BAW-10182A.
6/7/2002	Revises the Licensing Basis (LB) to eliminate Spent Fuel Pool source to High Pressure Injection pump during a tornado and credits the Standby Shutdown Facility (SSF) as the assured means of achieving safe shutdown following a tornado.	Results in a net tornado dCDF risk **reduction** of 3.9E-06, 1.1E-06, and 8E-07/yr for Units 1, 2, 3 respectively considering implemented plant modifications.
8/22/2002	Temporary extension of TS 3.8.1 for Keowee Hydro Units (KHU) Refurbishment Project.	1 KHU inoperable: dCDF **reduction** of 1.97E-09/rx hr 2 KHUs inoperable: dCDF increase of 3.38E-08/rx hr Cumulative dCDP increase of 3.45E-06 for duration of work.
10/24/2002 2/19/2003	TS 3.5.3 Establishes a 7 day CT for one LPI train vs 72 hours.	dCDF increase of 4E-07/yr dLERF increase of 5E-10/yr
11/1/2002	Revises the licensing basis for flood design to allow High Pressure Service Water (HPSW) piping and some Low Pressure Service Water (LPSW) piping to remain non-Category I	dCDF increase of 3E-07/yr

RAI-A2

As reported in the Keowee PRA dated June 1995 and its integration with the Oconee AC Power Model, the staff noted that the second dominant cutset (in Table 74-1) involves:

> (A Severe Weather LOOP)* (Both Keowee units unavailable due to maintenance)* (Operators fail to align SSF RCM system for operation)* (Modifier since Keowee Maintenance is scheduled for mild weather)* (Offsite power not recovered given start failures with SSHR)
>
> The modifier reference in the cutsets was given a value of 1. The staff noted that in the Keowee outage extension request, Duke reduced the initiating event frequency for a severe weather LOOP by factors ranging from 2-4 to account for performing the upgrades when weather is favorable. The staff believes that the combined use of the modifier and the reduced initiating event frequencies is "double counting" the reduction in risk by performing the maintenance during mild weather. Duke should eliminate either the use of the modifier or the reduced initiating event frequencies.

Duke Response to RAI-A2

Duke agrees that the combined use of the modifier and the reduced initiating event frequencies is "double counting" the reduction in risk by performing the maintenance during mild weather. However, the quantitative analysis performed in support of this LAR, specifically excluded the modifier from the results based on the assessment that there is little or no opportunity to effectively use the weather forecast for planning this work. Therefore, no "double counting" occurred in this analysis.

RAI-A3

On page 6, in Attachment 3 of the Duke extension request, Duke stated that, "..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 staff disagrees with this statement. The Oconee units during shutdown could be placed in configurations such as midloop operation with an open RCS and an open containment that could yield risk levels higher than full power. The Oconee units during shutdown could be placed in configurations that could yield risk levels lower than full power such as a reactor with the refueling cavity flooded. To consider the extension request, the staff needs an estimate of the total CDF including shutdown. This assessment of shutdown should include any restrictions that the licensee may consider during the period of dual unit KHU unavailability (such as limiting draining of the RCS, maintaining SG availability, maintaining containment closure, etc.).

Duke Response to Question RAI-A3 – The intent of the statement referenced was to say that if a plant shutdown is required, the compensatory actions discussed in the LAR would remain in place to control the risk. Since out of service KHUs are important risk contributors at power as well as during shutdown conditions, the same compensatory actions in place at power would keep the shutdown and transition risks low.

RAI-A4

The staff noted that proposed Technical Specification revisions do not contain any information concerning that the upgrades should be performed during favorable weather. Therefore, there are no Technical Specifications that justify the risk reductions in severe weather LOOP frequency based planning dual unit KHU maintenance during favorable weather periods. As reported by the National Oceanic Atmospheric Administration on their website, http://www.noaa.gov/tornadoes.html, the peak season for tornadoes in the southern states occurs during March through May. Restriction of the proposed dual unit KHU upgrade during the months of March through May was discussed with the licensee, but was not documented in their submittal.

Duke Response to RAI-A4 – The quantitative PRA analysis that supports this change is based on the restriction that the KHU(s) will not be made unavailable for Keowee Refurbishment Outage activities during the peak tornado months of March, April, or May. Therefore, use of the temporary TS change would require Duke to impose this restriction and the other compensatory measures assumed by the PRA analysis as noted in the August 22, 2002 LAR. The site work control group will manage the work activities to ensure this restriction and the other compensatory measures are met. Management oversight is required since this work will be controlled by a critical evolution plan, which requires Plant Operations Review Committee approval.

RAI-A5

The staff noted that the licensee requested to temporarily extend the completion time for restoring one KHU when both are inoperable from 60 to 144 hours until April 30, 2005. The staff noted that the licensee did not propose any restrictions to how frequently this extension can be exercised which could yield very high unavailability for the Keowee units and significant increases in risk. The licensee should propose restrictions to how frequently this extension can be exercised to prevent significant increases in plant risk.

Duke Response to RA-A5 – As stated in the August 22, 2002 LAR, there will be a total of two Keowee Refurbishment Outages, one for each KHU. Oconee will use the extension twice during each of the two Keowee Refurbishment Outages. At the start of a

Keowee Refurbishment Outage both KHUs will be made inoperable for a maximum of 144 hours to isolate the KHUs, then one KHU will be inoperable for a maximum of 62 days (from the start of the outage), and then both will be made inoperable for approximately 96 hours to reverse the isolation. The note to the Completion Time for TS 3.8.1, Required Action H.2, allows an additional 84 hours only when the Condition is entered to perform Keowee Refurbishment Upgrades prior to April 30, 2005. Since the extended dual KHU outage is only needed to allow an extended single KHU outage and the Completion Time for TS 3.8.1 Required Action C.2.2.5 only allows the extended single KHU outage to be used once in a 3 year period, the CT for RA H.2 will only be used twice for each Keowee outage. As such, Duke does not believe a specific TS restriction is necessary.

B. Duke Response to March 31, 2003 RAI – Second set of Questions

RAI-B1

The amendment request commits to a number of compensatory measures beyond those already a part of the existing Oconee TS. These additional compensatory measures should be included in the temporary TS change.

Duke Response to RAI-B1

This work will be controlled by a critical evolution plan, which requires Plant Operations Review Committee approval. Duke acknowledges that the compensatory measures committed to in the amendment request will be required to be implemented to permit use of the temporary change and will ensure that these compensatory measures are captured in the critical evolution plan for each Keowee Refurbishment Outage. Duke does not believe it is necessary to capture the compensatory measures in the Technical Specifications.

RAI-B2

The amendment request indicates that the upgrades will be performed during periods when the expected frequency of LOOP events due to severe weather is less than the annual average. In its meeting with the staff on August 27, 2002, Duke stated that the severe weather is due to tornadoes; and the months to be avoided are March, April, and May. This leaves periods of the year when the surrounded grid could be under stress due to peak seasonal customer load demand. What is the risk to Oconee due to Keowee inoperability and LOOP during these periods?

Duke Response to RAI- B2

Electrical Grid related Loss of Offsite Power (LOOP) events are not risk significant in the Oconee PRA. Additionally, as stated in the August 22, 2002 LAR, Oconee has a backup dedicated overhead 100 kV transmission line from the Lee Steam Station which can be supplied from any one of three combustion turbines located at Lee. This line will be electrically separated from the system grid and offsite loads when the KHU Refurbishment Outages are underway thus minimizing any concern regarding the surrounding grid being under stress due to peak seasonal customer load demand- or any other gird related issues. Severe weather LOOP(s) are risk significant since these are assumed to "take out" the overhead transmission lines.

RAI-B3

In response to the Station Blackout issue Duke committed to a Keowee reliability of 0.975. How will the requested Keowee outage times affect this number?

Duke Response to RAI-B3

NUMARC 87-00 revision 1 Appendix D addresses the EDG Reliability Program. This document discusses the component reliability as being the number of start demands, the number of start failures, the number of load-run demands and the number of load-run failures. There is no mention of the amount of time the unit is unavailable.

During a Keowee refurbishment outage, one KHU will not be available to start for a maximum of 62 days. However, the operation of each of the Keowee units typically provides for about 200 starts per year. Considering this number is much greater than 12 starts (1 per month), not having one unit available to start for a maximum of 62 days is not considered significant.

NUMARC 87-00, Revision 1, Section 6, which addresses Emergency AC Power Availability, says that Station Blackout Initiative 4 requires emergency power availability to be monitored. The INPO Plant Performance Indicator monitors the availability and allows comparison to the industry average.

Appendix B of NUMARC 87-00 addresses the alternate AC power sources. It is explicit with regard to availability being at least 95% of the time the reactor is operating. In fact, the questions and answers in Appendix I (#122) practically address this directly. The answer to the question about a three month unavailability for a hydro unit as an AAC is that it will not meet the criteria.

Regulatory Guide 1.155 concludes that as long as unavailability is not excessive, the reliability based on failure rates alone is acceptable. The Keowee units will experience undesired unavailability that conflicts with the intent of the Station Blackout Initiative. However, this occurrence is planned to be a single event on each Keowee unit for the remainder of the Oconee license. The need for extensive outages is recognized in the Technical Specifications and in the Technical Evaluation Report for ONS prepared for the NRC by Science Applications International Corporation on December 20, 1991. This document discussed the extended outage and the requirement for a Lee Combustion Turbine (LCT) to energize the independent 100 kV path to the standby busses. Since constant back-up emergency AC power is being provided by a LCT, the unavailability of one KHU during an extended outage is considered acceptable.

Unavailability of the emergency power system is also tracked by the Maintenance Rule. The KHU unavailability for this evolution will not be counted with regard to Station Blackout. The Maintenance Rule has provisions for this type of activity and this program is being adjusted for this outage.

RAI-B4

Has Duke Energy considered the additional safety margin benefits that would be afforded by bringing on site temporary emergency generator(s) to support Oconee emergency loads during the periods of Keowee inoperability? Have any other additional compensatory measures been considered beyond those already identified in the amendment request?

Duke Response to RAI-B4

Duke evaluated installing temporary emergency generators to support Oconee emergency loads during the Keowee Refurbishment outages and determined this not be a practical option. The time required to install and remove the temporary generators would mean that they would be available only part of the time both emergency power paths were out of service. The time both emergency power paths are out of service at the end of the outage might be shorter than the time required to install and remove the temporary emergency generators, thus making them effective only for the time both emergency power paths were out of service during the first part of the outage. Also, the complexity of design and installation for the modification required to connect temporary emergency generators to the emergency power system would create a risk of damage to the emergency power system.

Based on the above, Duke determined that the greatest reduction in risk during the Keowee refurbishment outages could be achieved by maximizing the reliability of available power sources.

The auxiliary power system for the Oconee Units is very flexible. There are six power sources available to each Oconee Unit:

1. The Unit generator
2. Offsite power
3. KHU power via the Overhead Emergency Power path
4. KHU power via the Underground Emergency Power path
5. Lee Combustion Turbine (LCT)
6. Another Oconee Unit startup transformer through the 4kv emergency bus.

The removal from service of a KHU and associated Overhead Emergency Power path for 45 days has been evaluated, determined to be an acceptable risk and is included as an allowed condition in the existing Technical Specifications. No compensatory actions other than those detailed in the Technical Specification are necessary in this configuration.

The removal from service of both emergency power paths for 60 hours has been evaluated, determined to be an acceptable risk and is included as an allowed condition in the existing Technical Specifications.

However, during the Keowee Refurbishment Outage, both emergency power paths will be out of service for longer than the allowed 60 hours. The compensatory actions for the extended time that both emergency power paths are out of service has been directed toward making the other four remaining power sources more reliable. A Lee Combustion Turbine will be started, separated from the Duke grid, and aligned to energize the standby bus before the emergency power paths are removed from service. Since the Lee Combustion Turbine will be started and aligned to the standby bus before the emergency power paths are removed from service, combustion turbine start failures would not cause the loss of this power source. This includes the operation of breakers and circuit switchers which isolate the transmission line from the Duke grid.

Two LCTs have been disassembled and inspected to assure proper operation during the Keowee outages. Components were repaired or replaced as necessary. The remaining LCTs will be disassembled and inspected in September 2003. Again, components will be repaired and replaced as necessary. To assure continuous operation of a LCT, as required for the Keowee outage, an endurance run was performed. A LCT was operated isolated from the Duke grid for 30 days during April 2003. This 30 day run did not identify any abnormal operating parameters. During the KHU outage, the other two LCTs can be

started to provide power to Oconee if necessary. During periods when both KHUs are inoperable, one of the two standby units will be running.

Duke system operating personnel have been notified of the outage schedule. Maintenance on the Duke system for that time period is being evaluated for its impact on the Oconee Switchyard. Those activities which affect the Oconee switchyard are being rescheduled outside the Keowee outage time frame. Also, this outage is being planned when the expected loss of offsite power or the transmission line to Lee as a result of severe weather is less than the annual average. The Standby Shutdown Facility will be available during the outage to mitigate a station blackout if it should occur.

Regarding the second part of RAI-B4, no other additional compensatory measures beyond those already identified in the amendment request are being considered.

C. Duke Response to June 13, 2003 RAI

NRC RAI-C1

Since this licensing basis change is justified based on risk-informed arguments, the following information needs to be submitted to the Staff. Based on Rev 2 (dated 8/4/97), the Oconee Nuclear Station PSA total CDF was reported as 9E-5 per year. Seismic Events represented forty five percent of the risk. Tornadoes (F2-F5) represented 15 percent of the total risk. (F1 tornadoes are considered a subset of severe weather LOOPs).

Please report the basic event values, Fussell- Vesely Values, Risk Achievement Worth (RAW) values for the following basic events for two conditions: (1) as reported in the current version of the PRA and (2) given dual unit Keowee maintenance:

NACSFDGDGR,	SSF Diesel Generator Fails to Run
NACSFDGDGS	SSF Diesel Generator Fails to Start
NSF3PU1DPR,	Unit 3 SSF RCM Pump Fails to Run
NSF3PU1DPS,	Unit 3 SSF RCM Pump Fails to Start
FEFTDFPTPS	Turbine driven EFW pump fails to start on demand
BSFFAILDEX	Failure to provide SSF RCM Seal Injection in time to prevent RCS Seal LOCA
NSF0ASWDHE	Operators Fails to align the SSF ASW System For Operation
NSF0RCMDHE	Operators Fails to align the SSF RCM System For Operation
NSFPU02APS	SSF ASW Pump Fails to Start On Demand
NSFTIMEDHE	Operators Fail to Deploy to the SSF in Time
KK1BOTHHYM	Both Keowee Units unavailable Due to Common Maintenance

Duke Response to RAI-C1

Condition 1: Base Case Version of The PRA

Base Case data shown below include internal and external events, no seismic. The corresponding CDF = 5.61E-05/reactor-year. (Note: Baseline seismic CDF is an additional 4.33E-05/reactor-year making the total CDF = 9E-5 per year = 9.9E-5/reactor year at a capacity factor of 90%.)

Basic Event	Basic Event Value	Fussell-Vesely Value (FV)	Risk Achievement Worth (RAW)
NACSFDGDGR	1.11E-01	1.28E-02	1.10E+00
NACSFDGDGS	3.78E-03	1.13E-03	1.30E+00
NSF3PU1DPR	9.48E-04	8.58E-04	1.90E+00
NSF3PU1DPS	7.86E-03	1.25E-02	2.58E+00
FEFTDFPTPS	5.20E-03	2.16E-04	1.04E+00
BSFFAILDEX	2.50E-01	1.31E-01	1.39E+00
NSF0ASWDHE	3.10E-02	3.22E-02	2.01E+00
NSF0RCMDHE	1.00E-01	1.25E-01	2.12E+00
NSFPU02APS	4.47E-03	6.26E-03	2.39E+00
NSFTIMEDHE	6.00E-03	5.58E-03	1.92E+00
KK1BOTHHYM	5.23E-03	3.63E-03	1.69E+00

Condition 2: Dual Unit Keowee Maintenance

Condition 2 data shown below include internal and external events, no seismic. The corresponding CDF = 3.52E-04/reactor-year. The results reflect reduction in tornado basic event probabilities to "off-season" values.

Basic Event	Basic Event Value	Fussell- Vesely Value (FV)	Risk Achievement Worth (RAW)
NACSFDGDGR	1.11E-01	8.18E-02	1.65E+00
NACSFDGDGS	3.78E-03	6.60E-03	2.74E+00
NSF3PU1DPR	9.48E-04	8.71E-04	1.92E+00
NSF3PU1DPS	7.86E-03	1.57E-02	2.98E+00
FEFTDFPTPS	5.20E-03	8.91E-03	2.71E+00
BSFFAILDEX	2.50E-01	3.48E-02	1.10E+00
NSF0ASWDHE	3.10E-02	1.28E-01	4.99E+00
NSF0RCMDHE	1.00E-01	1.97E-01	2.77E+00
NSFPU02APS	4.47E-03	1.84E-02	5.11E+00
NSFTIMEDHE	6.00E-03	1.12E-02	2.85E+00
KK1BOTHHYM	1.00E+00	8.63E-01	1.00E+00

NRC RAI-C2

On page 6, in Attachment 3 of the Duke extension request, Duke stated that," 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 staff disagrees with this statement. The Oconee units during shutdown could be placed in configurations such as midloop operation with an open RCS and an open containment that could yield risk levels higher than full power. The Oconee units during shutdown could be placed in configurations that could yield risk levels lower than full power such as a reactor with the refueling cavity flooded.

To confirm that Oconee's total CDF does not exceed 1E-4 per year, Duke needs to document how shutdown risk will be minimized during the period of dual unit Keowee Hydroelectric Unit (KHU) maintenance. This assessment of shutdown should include any restrictions that the licensee may consider during the period of dual unit KHU unavailability (such as limiting draining of the RCS, maintaining SG availability, maintaining containment closure, etc.).

Duke Response to RAI-C2

The KHU Refurbishment Upgrade is scheduled during an Innage (all three units operating). Therefore, the restrictions suggested would only apply if a unit were forced down during dual unit KHU maintenance. Duke has evaluated the shutdown risks associated with this configuration. The additional compensatory measures proposed apply to shut down units as well as operating units. Site Directive (SD) 1.3.5, Shutdown Protection Plan, provides an assessment of shutdown activities and includes any restrictions that need to be considered during the period of dual unit KHU unavailability (such as limiting draining of the RCS, maintaining SG availability, maintaining containment closure, etc.).

The management of shutdown risks is controlled by SD 1.3.5. While the shutdown unit is in Mode 4, Technical Specifications govern the electrical requirements. When a unit is in Mode 5, 6, or No Mode, SD 1.3.5 specifies standards that apply. For example, during conditions of reduced inventory (RCS < 50" on LT-5) with fuel in the core, both main feeder buses shall be energized from the backcharged main step-up and unit auxiliary transformer as the required offsite source, two emergency power sources shall be available from the control room, and the two required emergency power sources shall be an OPERABLE overhead KHU and underground KHU. Therefore, reduced inventory would not be allowed during a single or dual unit KHU outage.

SD 1.3.5 identifies plant configurations or conditions during shutdown where the plant is more susceptible to an event causing the loss of a key safety function. High risk evolutions include:

A. Draining to reduced inventory when reactor coolant level is at or below the reactor vessel flange.

B. Reactor coolant system at or below reduced inventory.

C. Midloop operation

D. Any specific evolution determined by Station Management.

During shutdown, the key safety functions are decay heat removal, inventory control, power availability, reactivity control, containment and spent fuel cooling. SD 1.3.5 provides requirements for key functions during different plant configurations during shutdown. Any deviation from SD 1.3.5 requires evaluation and approval by the Plant Operations Review Committee (PORC).

NRC RAI-C3

There are no Technical Specifications restrictions that justify the risk reductions in severe weather LOOP frequency based planning dual unit KHU maintenance during favorable weather. As reported by the National Oceanic Atmospheric Administration on their website, the peak season for tornadoes in South Carolina per Annual Cycle occurs from the beginning of March to the end of June (http://www.nssl.noaa.gov/hazard/hazardmap.html). Restriction of the upgrade during the months of March through May was discussed with the licensee, but was not documented in their submittal. To ensure that Oconee's total CDF does not exceed 1E-4 per year by performing the KHU upgrades, the staff is requesting Duke to add in their Technical Specifications a restriction such that this upgrade is not performed during the months of March, April, May and June.

Duke Response to RAI-C3

Duke has revised the proposed TS change to add a specific restriction for the months March, April, May and June. Refer to Attachments 2 and 3 of this submittal for the specific wording of the change.

NRC RAI-C4

The staff noted that the licensee requested to temporarily extend the completion time for restoring one KHU when both are inoperable from 60 to 144 hours until April 30, 2005.

The staff noted that the licensee did not propose any restrictions to how frequently this extension can be exercised which could yield very high unavailability for the Keowee units and significant increases in risk. To ensure that the licensee's annual CDF risk does not exceed 1E-4 per year, the staff is requesting Duke to add a restriction in their Technical Specifications such that this extension can be exercised only twice during each of the two Keowee Refurbishment Outages - 144 hours to isolate the KHUs and 96 hours to un-isolate the KHUs.

Duke Response to RAI-C4

Duke has revised the proposed TS change to specify that this 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 has been added to specify that the Completion Time can only be extended twice during each Keowee Refurbishment Outage. This will allow Duke the flexibility of allocating any hours not needed to isolate the KHUs to the period needed to perform testing while both KHUs are dewatered and to un-isolate the KHU. Refer to Attachments 2 and 3 of this submittal for the specific wording of the change.

NRC RAI-C5

Given the postulated occurrence of a severe weather LOOP or a tornado during dual unit Keowee maintenance, availability of the SSF and the turbine driven EFW pump become risk significant. To ensure that the licensee's annual CDF risk estimates do not exceed 1E-4 per year, the staff is requesting Duke to add a compensatory measure in their Technical Specifications such that the SSF, EFW System, and the Lee Combustion Gas Turbines are operable prior to entering in the LCO condition for two inoperable KHUs.

Duke Response RAI-C5

Duke has revised the proposed TS change to specify that the SSF, EFW System, and the Lee Combustion Gas Turbines be verified operable prior to entering the LCO condition for two inoperable KHUs. Refer to Attachments 2 and 3 of this submittal for the specific wording of the change.

NRC RAI-C6

Given the postulated occurrence of a severe weather LOOP or a tornado during dual unit Keowee maintenance, availability of the SSF becomes risk significant. The staff then reviewed the dominant Tornado Cutsets as reported in "The Oconee Nuclear Station -

IPEEE Submittal Report" dated December 21, 1995 and the top cut sets from the ONS Keowee Core Damage Model from the "Keowee PRA" dated June 1995. The staff identified key failure contributors to the SSF include (1) failure of the operator to deploy the SSF in time and (2) failure of the operator to provide SSF RCM Seal Injection in time to prevent RCS Seal LOCA. To ensure that the licensee's annual CDF risk estimates do not exceed 1E-4 per year, the staff is requesting Duke to commit to having an operator at the SSF during periods of dual unit KHU maintenance.

Duke Response RAI-C6

Oconee Abnormal Procedures require an operator be dispatched to the SSF when a Tornado/High Wind Warning is issued. This is done to minimize the two key failure contributors mentioned above. Also, Oconee operators drill and are evaluated for manning the SSF within the required time period. Therefore, Duke does not see any value added in full time manning of the SSF during the dual unit KHU outage.

D. Duke Response to June 20, 2003 RAI

NRC RAI-D1

In its meeting with the staff on August 27, 2002, Duke stated that the upgrades will be performed during periods when the expected frequency of LOOP events, as a result of severe weather, is low. They indicated that they will avoid the months of March, April, and May because they are peak tornado months. The overhead lines at Oconee (including the 100 kV line to the LEE CTs) can likely be taken out by weather that is less severe and potentially more frequent than tornadoes. Such weather events could include severe thunderstorms (including their associated wind downbursts) and severe ice storms, which would not necessarily occur during March, April, or May. The NOAA website at http://www.erh.noaa.gov/er/cae/svrwx/downburst.htm states that: "Downbursts are much more frequent than tornadoes - in fact, for every 1 tornado there are approximately 10 downburst damage reports!" Please provide the maximum wind and ice loading that the Oconee overhead lines are designed for and discuss how these compare to historical weather events in the Oconee area. Describe any weather events in the Oconee area that took out an overhead line. Relate how the credit taken for tornado avoidance during March, April, and May compares to the remaining severe weather risk during the other months of the year. The risks due to downbursts and ice storms should be included in your discussion.

Duke Response to RAI-D1

Duke Power believes that the risk associated with non-tornadic storm systems is appropriately accounted for in the risk analysis and that the proposed compensatory measures are appropriate given the design features of the Oconee offsite power system and the expected low probability of extreme conditions during this time period.

The potential for severe storm systems to impact the availability of offsite power sources is reflected in the risk analysis in the weather-related loss of offsite power (LOOP) initiating event. This frequency is based on industry operating experience regarding the fraction of LOOP events due to weather-related causes which include lightning, high winds, and snow/ice storms. Oconee Nuclear Station has never experienced a weather-related loss of offsite power event. The risk analysis conservatively assumes the simultaneous loss of the alternate 100kV power supply, although industry experience suggests that similar alternate power sources are often available (especially if hurricanes and large coastal storms are excluded). This data also supports the offsite power recovery probabilities applied in the PRA model based on the demonstrated response time to recover offsite power in these actual events. Therefore, this risk is properly accounted for in the analysis.

Duke has not been able to obtain any information that clearly indicates a significant seasonal variation such that additional scheduling restrictions would provide a measurable risk benefit. The current state of knowledge of the frequency and severity of these weather systems is not sufficiently developed to extrapolate directly to the likelihood of failure of a complex transmission system. While industry operational data provide a clear indication of the overall average frequency of LOOP events, it does not present a clear picture of the seasonal distribution of weather-related LOOP events as it would apply to Oconee. In particular, the event data represent a wide variety of climatic conditions from nuclear plants all over the country. Furthermore, there appears to be some counter-balancing between spring and summer thunderstorms (wind/lightning), fall hurricanes (wind/lightning), and winter storms (wind/snow/ice).

The transmission and switchyard equipment used to supply Oconee power are very rugged against severe weather events. The overhead transmission lines at Oconee are designed to a minimum of;

NESC (National Electric Safety Code) Extreme Wind (16 psf x 1.0 OLF)	80 mph
NESC Heavy Wind on Ice (0.5" radial ice x 1.5 OLF (overload factor) with a simultaneous 4 psf x 2.5 OLF)	63 mph wind

The higher voltage lines have been designed to standards well in excess of these minimum design requirements.

Duke has performed a meteorological study using historical weather data from Greenville, SC (as well as Charlotte, NC and Greensboro, NC) that determined the extreme wind for a 100 year return period to be 64 mph and the extreme ice for a 100 year return period to be 0.5". Industry practice targets a 50 year return period loading for the design of these facilities.

Over the past 30 years Duke's transmission lines have experienced less than a dozen instances of failure on the entire two state system due to meteorological loads and those were almost exclusively tornados. To the best of our knowledge, there have been no failures related to downbursts.

In addition to robust equipment and construction, Oconee has several other important features that reduce the potential for severe weather to impact offsite power availability. The first feature is simply that the 230kV lines feeding the switchyard come from diverse directions. In particular, the Jocasse line from the North-Northwest is highly separated from all other lines as is the 100kV line from the Central Switchyard approaching from West and South. The second feature is the physical separation of CT-5 and the Oconee Auxiliary and Startup Transformers which provide normal offsite power from the 230kV switchyard. Located approximately 600 feet west of the Unit 2 Reactor Building, Transformer CT-5 supplies 4160V power to the standby buses in the blockhouse via a cable trench through the parking lot into the plant (no overhead line). Overhead lines bring power from the switchyard to the Auxiliary and Startup Transformers in the east side of the plant yard where non-segregated bus ducts connect power to the main feeder buses located in the blockhouse. There is approximately 1000 feet separating the 100kV overhead lines to CT-5 and the 230kV lines bringing in normal power from the switchyard.

During the Keowee Refurbishment Outages, CT-5 will be energized via a dedicated line directly from Lee CTs providing an additional defensive measure against the effects of a severe weather event. Electrical separation of the Lee/Central 100kV line from the grid during the proposed activities ensures that any electrical disturbances incurred on the power grid due to a severe storm event cannot cascade down to the 100kV system and affect the availability of power to CT-5.

In conclusion, while less intense non-tornadic storms are more frequent than tornadic storms, their lower intensity reduces the likelihood and severity of damage on the electric power systems, and increases the likelihood that alternate offsite power sources are available or that normal offsite power sources can be restored in a timely manner. Duke

has not identified any evidence of seasonal variation of weather events that suggests that additional scheduling restriction could provide additional risk benefit.

References
(1) EPRI TR-106306 - Losses of Off-Site Power at US Nuclear Power Plants – Through 1995.
(2) EPRI TR-1002987 - Losses of Off-Site Power at US Nuclear Power Plants Through 2001.

NRC RAI-D2

In a letter dated February 17, 2003, Duke requested a change to the Oconee Technical Specifications that was necessitated by a modification that would add additional pressurizer heater capacity to the SSF DG. The modification is necessary because the existing 126 kW of heating capacity available from the SSF DG is not sufficient to overcome ambient losses. The Duke letter indicated that the completion of this modification is presently scheduled for August 1, 2003. Is this schedule still current, and will the modification be made prior to the Keowee upgrades?

Duke Response to RAI-D2

The modification is now scheduled to be completed by December 31, 2003, on all three Oconee units concurrent with the Oconee Unit 1 fall 2003 refueling outage. Duke will complete the modification prior to the Keowee upgrades.

E. Duke Response to August 22, 2003 RAI

NRC RAI-E1

Given a SBO, the SSF is not very reliable for RCS injection based on data submitted by Duke in their RAI responses. In their Shutdown Site Directive, Duke states that during conditions of reduced inventory, the Keowee Underground and Overhead path must be available. In their RAI response, Duke states that reduced inventory would not be allowed during a single or dual unit KHU outage. Due to the additional risk of Severe Weather LOOPs during drained RCS conditions, Duke should add a restriction in their Technical Specifications such that reduced inventory may not be entered during dual unit Keowee Unit Maintenance during the two Keowee Refurbishment Upgrades.

Duke Response to RAI-E1

Duke has revised the proposed TS change to indicate that the Completion Time may not be extended during periods of reduced RCS inventory during dual unit Keowee Maintenance. Refer to Attachments 2 and 3 of this submittal for the specific wording of the change

ATTACHMENT 2

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.	1 hour from discovery of deenergized standby bus
	AND	
	H.2 Restore one KHU and its required emergency power path to OPERABLE status.	----------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 except during March, April, May or June provided the SSF, EFW System and LCTs are verified OPERABLE prior to entering Condition. The Completion Time shall only be extended twice during each KHU Refurbishment Outage. The Completion Time may not be extended during periods of reduced RCS inventory. ---------- 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 ≥ 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 except during March, April, May or June provided the SSF, EFW System and LCTs (4C, 5C, and 6C) are verified OPERABLE prior to entering the Condition. If one of these systems/components becomes inoperable after entering the condition, immediate action should be taken to restore the equipment to OPERABLE status. 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. The Completion Time may not be extended during periods of reduced RCS inventory (RCS < 50" on LT-5). 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. 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 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

BASES

ACTIONS

H.1 and H.2 (continued)

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 3
September 12, 2003

ATTACHMENT 3

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.	1 hour from discovery of deenergized standby bus
	AND	
	H.2 Restore one KHU and its required emergency power path to OPERABLE status.	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 except during March, April, May or June provided the SSF, EFW System and LCTs are verified OPERABLE prior to entering Condition. The Completion Time shall only be extended twice during each KHU Refurbishment Outage. The Completion Time may not be extended during periods of reduced RCS inventory.

(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 Keowee 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.

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.

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 except during March, April, May or June provided the SSF, EFW System and LCTs (4C,. 5C, and 6C) are verified OPERABLE prior to entering the Condition. If one of these systems/components becomes inoperable after entering the condition, immediate action should be taken to restore the equipment to OPERABLE status. 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. The Completion Time may not be extended during periods of reduced RCS inventory (RCS < 50" on LT-5). 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.

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 or the modified Completion Time allowed by the note 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:

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."