

ATTACHMENT 2

TECHNICAL SPECIFICATION

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SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.8.1.16</p> <p>-----NOTE----- Only applicable when complying with Required Action C.2.2.4. -----</p> <p>Verify one KHU provides an alternate manual AC power source capability by manual or automatic KHU start with manual synchronize, or breaker closure, to energize its non-required emergency power path.</p>	<p>As specified by Required Action C.2.2.4</p>
<p>SR 3.8.1.17</p> <p>Verify each KHU's Voltage and Frequency out of tolerance logic trips and blocks closure of the appropriate overhead or underground power path breakers. The allowable values with a time delay of 12 seconds <math>\pm</math> 1 second shall be as follows:</p> <ul style="list-style-type: none"> <li>a. Undervoltage <math>\geq 12.42</math> kV and <math>\leq 12.63</math> kV</li> <li>b. Overvoltage <math>\geq 14.90</math> kV and <math>\leq 15.18</math> kV</li> <li>c. Underfrequency <math>\geq 53.992</math> hz and <math>\leq 54.008</math> hz</li> <li>d. Overfrequency <math>\geq 65.992</math> hz and <math>\leq 66.008</math> hz</li> </ul>	<p>18 months</p>

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BASES

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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

- 1A) Keowee Unit 1 generator,
- 2A) Keowee ACB 1 (enabled by one channel of Switchyard Isolate Complete),
- 3A) Keowee auxiliary transformer 1X, Keowee ACB 5, Keowee Load Center 1X,
- 4A) Keowee MCC 1XA,
- 5A) Keowee Battery #1, Charger #1 or Standby Charger, and Distribution Center 1DA,
- 6A) ACB-1 to ACB-3 interlock,
- 7A) Keowee Unit 1 Voltage and Frequency out of tolerance (OOT) logic
- 8) Keowee reservoir level  $\geq$  775 feet above sea level,

Keowee Hydro Unit

- 1B) Keowee Unit 2 generator,
- 2B) Keowee ACB 2 (enabled by one channel of Switchyard Isolate Complete),
- 3B) Keowee auxiliary transformer 2X, Keowee ACB 6, Keowee Load Center 2X,
- 4B) Keowee MCC 2XA,
- 5B) Keowee Battery #2, Charger #2 or Standby Charger, and Distribution Center 2DA,
- 6B) ACB-2 to ACB-4 interlock,
- 7B) Keowee Unit 2 Voltage and Frequency out of tolerance (OOT) logic

Overhead Emergency Power Path

- 9) Keowee main step-up transformer,
- 10) PCB 9 (enabled by one channel of Switchyard Isolate Complete),
- 11) The 230kV switchyard yellow bus capable of being isolated by one channel of Switchyard Isolate,
- 12) A unit startup transformer and associated yellow bus PCB (CT-1 / PCB 18, CT-2 / PCB 27, CT-3 / PCB 30), and
- 13) 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

- 1A) Keowee Unit 1 generator,
- 2A) Keowee ACB 3,
- 3A.1) Keowee auxiliary transformer CX, Keowee ACB 7, Keowee Load Center 1X,
- 3A.2) One Oconee Unit 1 S breaker capable of feeding switchgear 1TC,
- 3A.3) Switchgear 1TC capable of feeding Keowee auxiliary transformer CX,
- 4A) Keowee MCC 1XA,
- 5A) Keowee Battery #1, Charger #1 or Standby Charger, and Distribution Center 1DA,
- 6A) ACB-1 to ACB-3 interlock,
- 7A) Keowee Unit 1 Voltage and Frequency OOT logic
- 8) Keowee reservoir level  $\geq$  775 feet above sea level,

Keowee Hydro Unit

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

Underground Emergency Power Path

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

## BASES

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### SURVEILLANCE REQUIREMENTS

#### SR 3.8.1.16 (continued)

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.

#### SR 3.8.1.17

This SR verifies the Keowee Voltage and Frequency out of tolerance logic trips and blocks closure of the appropriate overhead or underground power path breakers on an out of tolerance trip signal. The 18 month Frequency is based on engineering judgement and provides reasonable assurance that the Voltage and Frequency out of tolerance logic trips and blocks closure of these breakers when required.

There are three over voltage relays, three under voltage relays, and three over/under frequency relays per KHU with each relay actuating an auxiliary relay used to provide two out of three logic. These relays monitor generator output voltage and if two phases are above/below setpoint, prevent the power path breakers from closing or if closed, provide a trip signal which is applied after a time delay, to open the power path breakers. Testing demonstrates that relays actuate at preset values, that timers time out and that two under voltage relays, two over voltage relays, or two over/under frequency relays will actuate the logic channel. This ensures that the power path breakers will not close and if closed, will trip after a preset time delay.

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### 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

BASES

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REFERENCES  
(continued)

8. IEEE-450-1980
  9. UFSAR, Section 6.3.3.3
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ATTACHMENT 3

TECHNICAL SPECIFICATION MARKUP

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.8.1.16      -----NOTE----- Only applicable when complying with Required Action C.2.2.4. -----</p> <p>Verify one KHU provides an alternate manual AC power source capability by manual or automatic KHU start with manual synchronize, or breaker closure, to energize its non- required emergency power path.</p>	<p>As specified by Required Action C.2.2.4</p>

Insert 3.8.1-17A



Insert 3.8.1-17A

SR 3.8.1.17	<p>Verify each KHU's Voltage and Frequency out of tolerance logic trips and blocks closure of the appropriate overhead or underground power path breakers. The allowable values with a time delay of 12 seconds <math>\pm</math> 1 second shall be as follows:</p> <ul style="list-style-type: none"><li>a. Undervoltage <math>\geq 12.42</math> kV and <math>\leq 12.63</math> kV</li><li>b. Overvoltage <math>\geq 14.90</math> kV and <math>\leq 15.18</math> kV</li><li>c. Underfrequency <math>\geq 53.992</math> hz and <math>\leq 54.008</math> hz</li><li>d. Overfrequency <math>\geq 65.992</math> hz and <math>\leq 66.008</math> hz</li></ul>	18 months
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## 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

- 1A) Keowee Unit 1 generator,
- 2A) Keowee ACB 1 (enabled by one channel of Switchyard Isolate Complete),
- 3A) Keowee auxiliary transformer 1X, Keowee ACB 5, Keowee Load Center 1X,
- 4A) Keowee MCC 1XA,
- 5A) Keowee Battery #1, Charger #1 or Standby Charger, and Distribution Center 1DA,
- 6A) ACB-1 to ACB-3 interlock,
- 6A) Keowee reservoir level  $\geq 775$  feet above sea level,

#### Keowee Hydro Unit

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

#### Overhead Emergency Power Path

- 9A) Keowee main step-up transformer,
- 9B) 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), and
- 12) Both E breakers.

7A) Keowee Unit 1  
Voltage and Frequency  
Out of Tolerance (OOT)  
logic.

7B) Keowee Unit 2  
Voltage and Frequency  
Out of Tolerance (OOT)  
logic.

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

- 1A) Keowee Unit 1 generator,
- 2A) Keowee ACB 3,
- 3A.1) Keowee auxiliary transformer CX, Keowee ACB 7, Keowee Load Center 1X,
- 3A.2) One Oconee Unit 1 S breaker capable of feeding switchgear 1TC,
- 3A.3) Switchgear 1TC capable of feeding Keowee auxiliary transformer CX,
- 4A) Keowee MCC 1XA,
- 5A) Keowee Battery #1, Charger #1 or Standby Charger, and Distribution Center 1DA,
- 6A) ACB-1 to ACB-3 interlock,
- 8 A) Keowee reservoir level  $\geq$  775 feet above sea level,

Keowee Hydro Unit

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

Underground Emergency Power Path

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

7A) Keowee Unit 1 Voltage and Frequency OOT logic.  
7B) Keowee Unit 2 Voltage and Frequency OOT logic.

BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.8.1.16 (continued)

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

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B 3.8.1-27A

INSERT B 3.8.1-27A

SR 3.8.1.17

This SR verifies the Keowee Voltage and Frequency out of tolerance logic trips and blocks closure of the appropriate overhead or underground power path breakers on an out of tolerance trip signal. The 18 month Frequency is based on engineering judgement and provides reasonable assurance that the Voltage and Frequency out of tolerance logic trips and blocks closure of these breakers when required.

There are three over voltage relays, three under voltage relays, and three over/under frequency relays per KHU with each relay actuating an auxiliary relay used to provide two out of three logic. These relays monitor generator output voltage and if two phases are above/below setpoint, prevent the power path breakers from closing or if closed, provide a trip signal which is applied after a time delay, to open the power path breakers. Testing demonstrates that relays actuate at preset values, that timers time out and that two under voltage relays, two over voltage relays, or two over/under frequency relays will actuate the logic channel. This ensures that the power path breakers will not close and if closed, will trip after a preset time delay.