WOLF CREEK
NUCLEAR OPERATING CORPORATION

Annette F. Stull
Vice President and Chief Administrative Officer

October 25, 2012

CO 12-0004

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Reference: NRC Bulletin 2012-01, "Design Vulnerability in Electric Power System," dated July 27, 2012

Subject: Docket No. 50-482: Wolf Creek Nuclear Operating Corporation 90-day Response to NRC Bulletin 2012-01, "Design Vulnerability in Electric Power System"

Gentlemen:

On July 27, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued NRC Bulletin 2012-01, "Design Vulnerability in Electric Power System," (Reference), requesting each licensee to address two issues related to its electric power systems. In accordance with 10 CFR 50.54(f), addressees were requested to submit a written response to the information requests within 90 days of the date of the Bulletin.

Wolf Creek Nuclear Operating Corporation's 90-day response is included in the attachment to this letter.

There are no new regulatory commitments contained in this letter. If you have any questions concerning this matter, please contact me at (620) 364-4004, or Mr. Gautam Sen at (620) 364-4175.

Sincerely,

Annette F. Stull

Annette F. Stull

AFS/rlt

Attachment: Wolf Creek Nuclear Operating Corporation (WCNOC) 90-Day Response to NRC Bulletin 2012-01, "Design Vulnerability in Electric Power System"

cc: E. E. Collins (NRC), w/a
C. F. Lyon (NRC), w/a
N. F. O'Keefe (NRC), w/a
Senior Resident Inspector (NRC), w/a

IE76
NRR

STATE OF KANSAS)
) SS
COUNTY OF COFFEY)

Annette F. Stull, of lawful age, being first duly sworn upon oath says that she is Vice President and Chief Administrative Officer of Wolf Creek Nuclear Operating Corporation; that she has read the foregoing document and knows the contents thereof; that she has executed the same for and on behalf of said Corporation with full power and authority to do so; and that the facts therein stated are true and correct to the best of her knowledge, information and belief.

By Annette F. Stull
Annette F. Stull
Vice President and Chief Administrative Officer

SUBSCRIBED and sworn to before me this 25th day of October, 2012.

Cindy Novinger
Notary Public

Expiration Date 7/8/14

NOTARY PUBLIC STATE OF KANSAS | CINDY NOVINGER My Appt. Exp. 7/8/14

Wolf Creek Nuclear Operating Corporation (WCNOC) 90-day Response to NRC Bulletin 2012-01, "Design Vulnerability in Electric Power System"

NRC REQUEST:

The NRC requests that licensees address the following two issues related to their electric power systems within 90 days of the date of this bulletin:

1. *Given the requirements above, describe how the protection scheme for ESF buses (Class 1E for current operating plants or non-Class 1E for passive plants) is designed to detect and automatically respond to a single-phase open circuit condition or high impedance ground fault condition on a credited off-site power circuit or another power sources. Also, include the following information:*

    a. *The sensitivity of protective devices to detect abnormal operating conditions and the basis for the protective device setpoint(s).*

    b. *The differences (if any) of the consequences of a loaded (i.e., ESF bus normally aligned to offsite power transformer) or unloaded (e.g., ESF buses normally aligned to unit auxiliary transformer) power source.*

    c. *If the design does not detect and automatically respond to a single-phase open circuit condition or high impedance ground fault condition on a credited offsite power circuit or another power sources, describe the consequences of such an event and the plant response.*

    d. *Describe the offsite power transformer (e.g., start-up, reserve, station auxiliary)winding and grounding configurations.*

2. *Briefly describe the operating configuration of the ESF buses (Class 1E for current operating plants or non-Class 1E for passive plants) at power (normal operating condition). Include the following details:*

    a. *Are the ESF buses powered by offsite power sources? If so, explain what major loads are connected to the buses including their ratings.*

    b. *If the ESF buses are not powered by offsite power sources, explain how the surveillance tests are performed to verify that a single-phase open circuit condition or high impedance ground fault condition on an off-site power circuit is detected.*

    c. *Confirm that the operating configuration of the ESF buses is consistent with the current licensing basis. Describe any changes in offsite power source alignment to the ESF buses from the original plant licensing.*

    d. *Do the plant operating procedures, including off-normal operating procedures, specifically call for verification of the voltages on all three phases of the ESF buses?*

    e. *If a common or single offsite circuit is used to supply redundant ESF buses, explain why a failure, such as a single-phase open circuit or high impedance ground fault condition, would not adversely affect redundant ESF buses.*

WCNOC RESPONSE:

Contents:

- System Description - Items 2., 1.d, 2.a, 2.c
- System Protection – Items 1., 1.a, 2.b, 2.d
- Consequences - Items 1.b, 1.c, 2.e
- Figure 1. Simplified One-Line Diagram of WCGS Electric Power System
- Table 1 - ESF Buses Continuously Powered From Offsite Power Source(s)
- Table 2 - ESF Buses Major Loads
- Table 3 - Offsite Power Transformers
- Table 4 - Protective Devices

System Description

Items 2, 1.d, 2.a, and 2.c request system information and are addressed in this section:

Item 2. Briefly describe the operating configuration of the ESF buses (Class 1E for current operating plants or non-Class 1E for passive plants) at power (normal operating condition).

See Figure 1 for a simplified one-line diagram of Wolf Creek Generating Station (WCGS) electric power system.

The engineered safety features (ESF) Class 1E 4.16kV buses (NB01 and NB02) at WCGS are powered by two independent offsite sources from the WCGS 345kV switchyard during both normal and accident conditions and do not automatically transfer between sources.

The NB01 bus is normally powered from the East 345kV switchyard bus through the 345kV-to-13.8kV No. 7 transformer and the 13.8kV-to-4.16kV ESF#1 transformer. The NB01 bus can also be powered from the East 345kV switchyard bus through an optional alternate lineup through the 345kV-to-69kV No.6 transformer and two 67kV-to-13.8kV (No. 4 and 5) transformers, and through the 13.8kV-to-4.16kV ESF#1 transformer. Aligning the NB01 bus to the alternate No. 4, 5, and 6 transformer lineup is not automatic and requires manual actions.

The NB02 bus is normally powered from the West 345kV switchyard bus through the 345kV-to-13.8kV startup transformer and the 13.8kV-to-4.16kV ESF#2 transformer. The NB02 bus has no alternate lineup capability.

The No. 7 transformer power source and the alternate lineup are physically independent from the unit startup transformer and do not have common protective equipment with the unit startup transformer.

<u>Item 1.d.</u> *Describe the offsite power transformer (e.g., start-up, reserve, station auxiliary) winding and grounding configurations.*

See Table 3 for offsite power transformer winding and grounding configurations.

<u>Item 2.a.</u> *Are the ESF buses powered by offsite power sources? If so, explain what major loads are connected to the buses including their ratings.*

For normal operating condition configurations, ESF buses are powered by separate and independent offsite sources. Two physically independent circuits are provided to supply offsite power to the onsite ESF buses. The offsite sources from the 345kV switchyard are each normally connected to their own individual ESF transformers, and are both immediately available following a Design Basis Accident to supply components important to safety.

Additionally, during normal operations, the offsite power sources do not carry non-safety related loads.

See Table 1 for ESF bus power sources. See Table 2 for ESF bus major loads energized during normal power operations, including their ratings.

<u>Item 2.c.</u> *Confirm that the operating configuration of the ESF buses is consistent with the current licensing basis. Describe any changes in offsite power source alignment to the ESF buses from the original plant licensing.*

The following normal operating condition configurations have been confirmed to be consistent with the current licensing basis, as described in the WCGS Updated Safety Analysis Report (USAR) section 8.2.1.3 and WCGS Technical Specifications (TS) Bases section B 3.8.1:

1. Circuit #1 – Power to ESF bus NB01 via 345kV Offsite Circuit #1 through 345kV/13.8kV transformer No. 7 and 13.8kV/4.16kV ESF#1 transformer.

2. Circuit #2 – Power to ESF bus NB02 via 345kV Offsite Circuit #2 through 345kV/13.8kV startup transformer and 13.8kV/4.16kV ESF# 2 transformer.

See Table 1 for any changes in the offsite power source alignment to the ESF buses from the original plant licensing.

System Protection

Items 1, 1.a, 2.b, and 2.d request information regarding electrical system protection and are addressed in this section:

Item 1. *Given the requirements above, describe how the protection scheme for ESF buses (Class 1E for current operating plants or non-Class 1E for passive plants) is designed to detect and automatically respond to a single-phase open circuit condition or high impedance ground fault condition on a credited off-site power circuit or another power sources. Also, include the following information:*

Consistent with the current licensing basis and GDC 17, existing protective circuitry will separate the ESF buses from a connected failed offsite source due to a loss of voltage or a sustained, balanced degraded grid voltage concurrent with certain design basis accidents. The relay systems were not specifically designed to detect an open single phase of a three-phase system. Detection of a single-open phase condition is beyond the approved design and licensing basis of the plant.

Open Phase and High Impedance Ground Fault Detection with Existing Schemes

WCGS has two levels of undervoltage relays that can detect open phase conditions and ground fault overcurrent/differential relays that can detect high impedance ground faults, regardless of the offsite power source. The first level undervoltage relays alarm on a 1 of 4 logic, trip on a 2 of 4 logic, and monitor A-B, A-C, B-C, and A-B phases. The second level undervoltage relays alarm on a 2 of 4 logic, trip on a 2 of 4 logic, and monitor A-B, A-C, B-C, and A-B phases. (Refer to Table 4 for setpoints) Both levels of undervoltage relaying receive their input voltage from potential transformers at the 4.16kV Class 1E safety buses NB01 and NB02. Upon actuation and after the corresponding time delay of either the first or second level undervoltage relays, the associated breaker supplying offsite power to the degraded 4.16kV Class 1E safety bus is tripped to isolate the bus from offsite power and the associated emergency diesel generator is started. The first and second level undervoltage protection schemes are not designed to detect and automatically respond to a single-phase open circuit condition on a credited offsite power circuit. However, preliminary analysis has shown that the second level of undervoltage detection will respond to this condition with or without a high impedance fault by separating from the affected offsite power circuit and starting the corresponding emergency diesel generator, with the exception of a single-phase condition on the 345kV primary side of the offsite power circuit transformers. In the case where the single-phase condition occurs on the 345kV primary side of the offsite power circuit transformers, preliminary analysis has shown that under normal plant conditions (lightly loaded), all equipment will continue to operate properly and no protective equipment will actuate. However, the affected offsite power circuit may not be capable of supporting accident loading, should an accident occur.

For high impedance ground faults with and without an open phase condition, WCGS has ground overcurrent relaying in the ESF#1, ESF#2, startup, No. 7, No. 4, and No. 5 transformer neutrals that can detect a range of high impedance ground faults. Additionally, the 345kV and 69kV bus/line sections supplying the startup, No. 7, No. 6, No. 4 and No. 5 transformers are protected with bus differential relays that can also detect a range of high impedance ground faults. Evaluation of the effectiveness of the relaying to detect high impedance ground faults is still in progress.

<u>Item 1.a.</u> *The sensitivity of protective devices to detect abnormal operating conditions and the basis for the protective device setpoint(s).*

Consistent with the current licensing basis and GDC 17, existing electrical protective devices are sufficiently sensitive to detect design basis conditions like a loss of voltage or a degraded voltage, but are not designed to detect a single-phase open circuit condition. See Table 4 for protective devices and the basis for the device setpoint(s).

Existing electrical protective devices are also sufficiently sensitive to detect a range of high impedance ground faults. Table 4 lists ground protection/alarms on the ESF buses and the basis for the device setpoint(s).

<u>Item 2.b.</u> *If the ESF buses are not powered by offsite power sources, explain how the surveillance tests are performed to verify that a single-phase open circuit condition or high impedance ground fault condition on an off-site power circuit is detected.*

This item is not applicable to Wolf Creek Nuclear Operating Corporation (WCNOC) because the ESF buses at WCGS are powered by separate offsite power sources.

<u>Item 2.d.</u> *Do the plant operating procedures, including off-normal operating procedures, specifically call for verification of the voltages on all three phases of the ESF buses?*

WCNOC monitors all three phases of the ESF buses per the first and second level undervoltage relays as previously described in Item 1 above. Upon receipt of a degraded voltage alarm, WCNOC's alarm response procedures specifically direct operators to verify the voltage on the ESF bus voltmeter (only the A-B phase voltage is available on the main control board for voltage verification). Additionally, alarm response procedures for motor trips are being reviewed to determine the benefit of adding verification of voltage on the ESF bus voltmeter to the response.

Consequences

Items 1.b, 1.c, and 2.e request information regarding the electrical consequences of an event and are addressed in this section:

Item 1.b. *The differences (if any) of the consequences of a loaded (i.e., ESF bus normally aligned to offsite power transformer) or unloaded (e.g., ESF buses normally aligned to unit auxiliary transformer) power source.*

Installed relays are not designed to detect single-phase open circuit conditions. However, preliminary analysis has shown that because WCGS always has the ESF buses powered from their associated offsite power source (lightly loaded), the second level of undervoltage detection will respond to the undervoltage condition with or without a high impedance fault by separating from the affected offsite power circuit and starting the corresponding emergency diesel generator, with the exception of an open single-phase condition on the 345kV primary side of the offsite power circuit transformers. In the case where the single-phase open circuit condition occurs on the 345kV primary side of the offsite power circuit transformers, preliminary analysis has shown that under normal plant conditions, with the ESF bus normally aligned to offsite power transformer (lightly loaded), all equipment will continue to operate properly and no protective equipment will actuate. However, the existing protection may not be capable of detecting the open phase condition at the 345kV level, either during lightly loaded normal operation or during accident loading. In addition the affected offsite power circuit may not be capable of supporting the accident loads, should an accident occur.

Regardless of the loading on both preferred offsite circuits (as shown in Figure 1), for a high impedance ground fault on the secondary side of the offsite power source transformers, preliminary results have shown that for a fault that yields a phase to ground current equal to the pickup of the transformer neutral ground overcurrent, the impact is minor and well within the NEMA MG-1 (Reference 1) allowable voltage imbalance for motors. This is due to the large capacity of the offsite power transformers and ESF transformers in relation to the loading imposed by the high impedance fault. Evaluation of the alternate preferred offsite circuit #1 (as shown in Figure 1) is still in progress. Evaluation of a high impedance fault on the 345kV primary side of the offsite power transformers is still in progress.

Item 1.c. *If the design does not detect and automatically respond to a single-phase open circuit condition or high impedance ground fault condition on a credited offsite power circuit or another power sources, describe the consequences of such an event and the plant response.*

1. WCNOC did not credit in the current licensing basis that the Class 1E protection scheme (for the ESF buses) was designed to detect and automatically respond to a single-phase open circuit condition on the credited offsite power source as described in the USAR and Technical Specifications.

   The offsite power circuits at WCGS consist of two independent circuits, as shown in Figure 1, and described in Technical Specifications (TS) Bases section B 3.8.1 and USAR Section 8.2.1.3.

   a. Power to ESF bus NB01 via 345kV Offsite Circuit #1 through 345kV/13.8kV transformer No. 7 and 13.8kV/4.16kV ESF#1 transformer.

b. ESF bus NB01 can also be powered via 345kV Alternate Offsite Circuit #1 through the 345kV/69kV No.6 transformer and two 67kV/13.8kV (No. 4 and 5) transformers, and through the 13.8kV/4.16kV ESF#1 transformer, provided the offsite 69 KV line is not connected to the 345 kV system. Aligning the NB01 bus to the alternate No. 4, 5, and 6 transformer lineup is not automatic and requires manual actions.

c. Power to ESF bus NB02 via 345kV Offsite Circuit #2 through 345kV/13.8kV startup transformer and 13.8kV/4.16kV ESF# 2 transformer.

2. Since WCNOC did not credit the ESF bus protection scheme as being capable of detecting and automatically responding to a single-phase open circuit condition, an open phase condition was not included in the design criteria for either the loss of voltage or the degraded voltage relay scheme. Since open phase detection was not credited in the WCGS design or licensing basis, no design basis calculations or design documents exist that previously considered this condition.

3. Without formalized engineering calculations or engineering evaluations, the electrical consequences of such an open phase event (including plant response), can only be evaluated to the extent of what has already been published by EPRI and Basler, which is a generic overview. The difficulty in applying these documents to the WCNOC specific response is that these are generic assessments and cannot be formally credited as a basis for an accurate response. The primary reason is that detailed plant specific models would need to be developed (e.g., transformer magnetic circuit models, electric distribution models, motor models; including positive, negative, and zero sequence impedances (voltage and currents)), and the models would need to be compiled and analyzed for the WCGS specific Class 1E electrical distribution system.

4. The consequence of an undetected high impedance ground fault is that the imbalance caused by the fault could decrease the capacity of the motors and potentially cause them to trip on overcurrent. WCNOC is continuing to work on analysis of the relaying sensitivity to high impedance faults. However, it is expected that the fault would very quickly evolve to a low impedance fault and be cleared by corresponding overcurrent / differential protection.

5. At WCGS, the two independent Class 1E safety buses (NB01 and NB02) are supplied from separate offsite transformer lineups which are located in the same 345kV switchyard but are located on two separate 345kV buses (Reference Figure 1). Therefore, an open phase condition will only affect one offsite power circuit. The unaffected offsite circuit will still be able to provide power for its associated safety bus and will not be degraded in any way.

6. Interim Compensatory Actions Taken:

a. Essential reading has been provided to the nuclear plant operators for daily visual inspection of the offsite power circuits to ensure their integrity and to identify any open phase conditions. INPO Event Report (IER) L2-12-14 evaluation results were discussed with Operations personnel for prompt diagnosis and response to single-phase open circuit conditions on offsite power circuits.

b. A study was performed of the bus components that could fail and cause an open circuit in the switchyard down to the plant to the point where the conductor transitions to cable. It also determined, if any of the critical components were susceptible to aging mechanisms that would warrant replacement, then at the next available opportunity they would be replaced. In addition, the components would be setup on a periodic replacement schedule. The study also looked at bus design to ensure that the design is robust with significant design margin.

c. Operator rounds checklists are being reviewed to consider inclusion of specific inspections of areas where open phase conditions are not detectible.

d. Operator training is being developed to help operators recognize possible open phase conditions.

e. Operator alarm response procedures are being reviewed to identify those procedures that need revision to include response to possible open phase conditions.

7. Long Term Corrective Actions:

WCNOC continues to work with industry peers to determine if a reliable design can be developed to automatically detect open single-phase conditions on the 345kV buses for lightly loaded conditions.

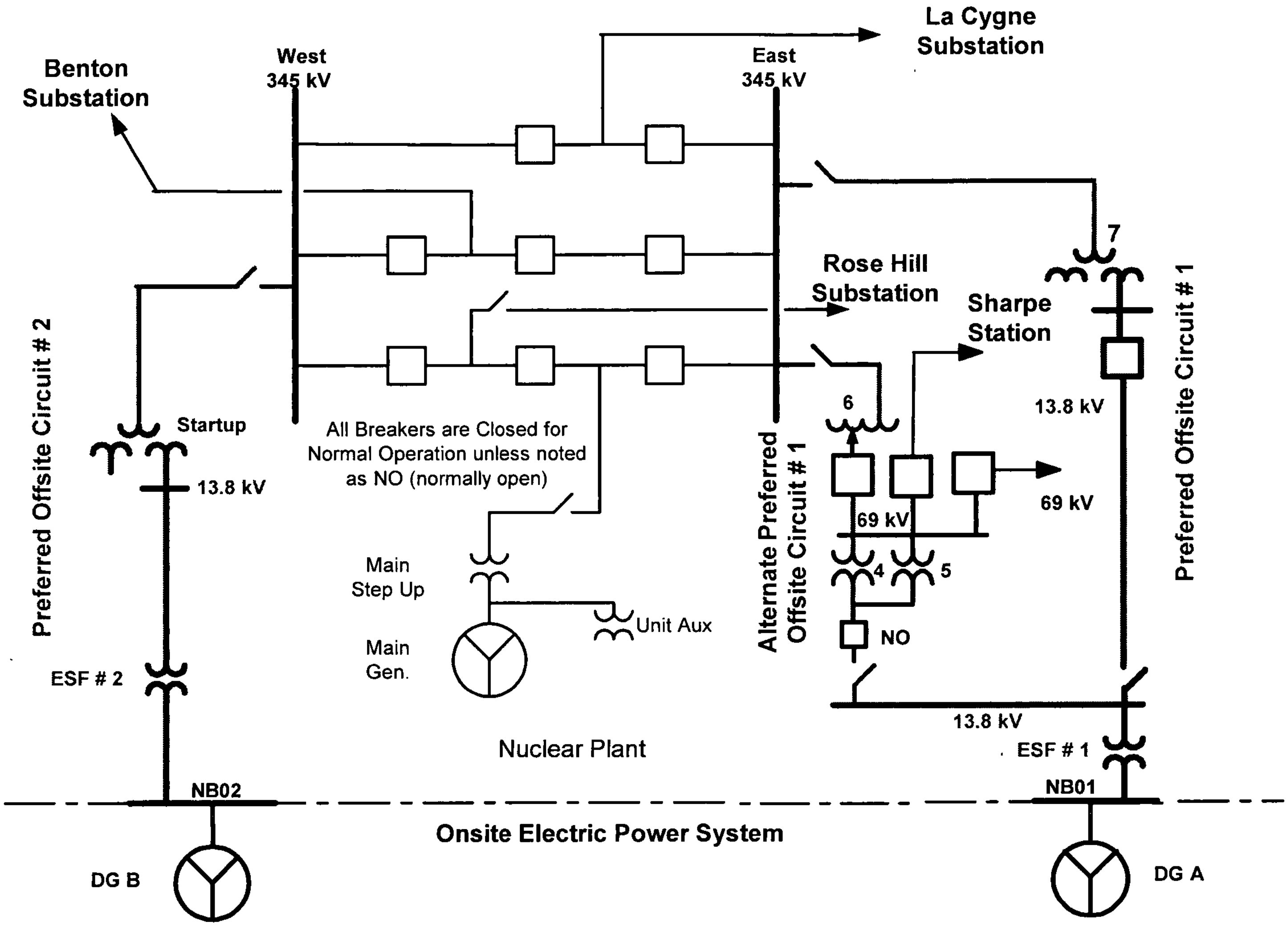
Item 2.e. *If a common or single offsite circuit is used to supply redundant ESF buses, explain why a failure, such as a single-phase open circuit or high impedance ground fault condition, would not adversely affect redundant ESF buses.*

Not applicable since WCGS does not use a common or single offsite circuit to supply redundant ESF busses.

REFERENCES:

1. NEMA Standards Publication MG-1-1998 (Revision 3, 2002) Interfiled, Motors and Generators, National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1874, Rosslyn, Virginia 22209

Figure 1. Simplified One-Line Diagram of WCGS Electric Power System



Note: The GDC-17 credited offsite circuits are: (1) Preferred offsite circuit # 2 from the West 345kV bus to NB02, and (2) Preferred offsite circuit # 1 from the East 345kV bus to NB01, and (3) Alternate preferred offsite circuit from the East 345kV bus via transfer switch to NB01.

Table 1 - ESF Buses Continuously Powered From Offsite Power Source(s)

Description of ESF Bus Power Source	ESF Bus Name (normal operating condition).	Original licensing basis configuration (Y/N)
Transformer ESF#1 (XNB01) via Transformer No. 7	NB01	N The original licensing basis configuration did not include Transformer No. 7.
Transformer ESF#1 (XNB01) via Transformers No. 4, 5, and 6 (Alternate Lineup)	NB01	N The original licensing basis included Transformers No. 4, 5, and 6 is the as the Preferred Offsite Circuit # 1. No changes were made to the configuration of the transformers.
Transformer ESF#2 (XNB02) via Startup Transformer	NB02	Y

Table 2 - ESF Buses Normally Energized Major Loads

ESF Bus (title)	Load	Voltage Level	Rating (HP)
NB01 (4.16kV Bus #1)	Component Cooling Water Pump (DPEG01A or C)	4160V	700Hp
NB01 (4.16kV Bus #1)	NG 480V Load Center (NG01)	4160V	1000kVA
NB01 (4.16kV Bus #1)	NG 480V Load Center (NG03)	4160V	1000kVA
NB01 (4.16kV Bus #1)	NG 480V Load Center (NG05E)	4160V	225kVA
NB02 (4.16kV Bus #2)	Component Cooling Water Pump (DPEG01B or D)	4160V	700Hp
NB02 (4.16kV Bus #2)	NG 480V Load Center (NG02)	4160V	1000kVA
NB02 (4.16kV Bus #2)	NG 480V Load Center (NG04)	4160V	1000kVA
NB02 (4.16kV Bus #2)	NG 480V Load Center (NG06E)	4160V	225kVA

Table 3 - Offsite Power Transformers

Transformer	Winding Configuration	MVA Size (AO/FA/FA)	Voltage Rating (Primary/Secondary)	Grounding Configuration
Startup Transformer XMR01	Wye-Wye-Wye (with embedded Delta stabilizing winding)	60/80/100	345kV/13.8kV/13.8kV	Secondary High Resistance Grounded
Transformer No. 7	Wye-Wye-Wye (with embedded Delta stabilizing winding	60/80/100	345kV/13.8kV/13.8kV	Secondary High Resistance Grounded
Transformer No. 6	Wye Auto	60/80/100	345kV/69kV	Solid Grounded Neutral
Transformer No. 5	Wye-Wye (with embedded Delta stabilizing winding	10/14	67kV/13.8kV	Solid Grounded Secondary
Transformer No. 4	Wye-Wye (with embedded Delta stabilizing winding	10/14	67kV/13.8kV	Solid Grounded Secondary
ESF #1 Transformer (XNB01)	Delta-Wye	12/16	13.8kV/4.16kV	Secondary High Resistance Grounded
ESF #2 Transformer (XNB02)	Delta-Wye	12/16	13.8kV/4.16kV	Secondary High Resistance Grounded

Table 4 - Protective Devices

Protection Zone	Protective Device	UV Logic	Setpoint (Nominal)	Basis for Setpoint
4kV ESF Buses	Loss of Voltage Relays (127-1/DG, 127-2/DG, 127-3/DG, and 127-4/DG)	1 of 4 alarm 2 of 4 trip	2905V (~70% of 4160V)	To actuate upon complete loss of ESF Bus voltage condition
4kV ESF Buses	Degraded Grid	2 of 4 alarm (25 sec) 2 of 4 trip (8 sec –Accident, 119 sec –Non-Accident)	3707V (~90% of 4160V)	To actuate prior to steady state equipment voltages dropping below equipment ratings
Startup Transformer to XNB01	Ground Fault Protection (251N-2/T)	N/A	~50 Amps	Provide Ground Fault Protection for Protected Zone and coordinate with downstream protection. The relay is expected to actuate prior to a ground large enough to affect plant equipment.
No. 7 Transformer to XNB01	Transformer Neutral Overcurrent	N/A	~30 Amps	Provide Ground Fault Protection for Protected Zone and coordinate with downstream protection. The relay is expected to actuate prior to a ground large enough to affect plant equipment.
XNB01 to NB01	Transformer Neutral Overcurrent (151N/T1)	N/A	~60 Amps	Provide Ground Fault Protection for Protected Zone and coordinate with downstream protection. The relay is expected to actuate prior to a ground large enough to affect plant equipment.
XNB02 to NB02	Transformer Neutral Overcurrent (151N/T2)	N/A	~60 Amps	Provide Ground Fault Protection for Protected Zone and coordinate with downstream protection. The relay is expected to actuate prior to a ground large enough to affect plant equipment.

Protection Zone	Protective Device	UV Logic	Setpoint (Nominal)	Basis for Setpoint
No. 4 and 5 Transformers to XNB01	Transformer Secondary Residual Ground Overcurrent	N/A	~360 Amps	Provide Ground Fault Protection for Protected Zone and coordinate with downstream protection. The current setting may allow the voltage imbalance to exceed the 1% level where motor capability could be reduced.
No. 6 Transformer to No. 4 and 5 Transformers	Bus Differential Relays	N/A	~61 Amps	Provide Bus Fault Protection for Protected Zone. The relay is expected to actuate prior to a ground large enough to affect plant equipment.
345kV Bus to Startup Transformer	Bus Differential Relays	N/A	~268 Amps	Provide Bus Fault Protection for Protected Zone. The relay is expected to actuate prior to a ground large enough to affect plant equipment.
345kV Bus to No. 7 Transformer	Bus Differential Relays	N/A	~308 Amps	Provide Bus Fault Protection for Protected Zone. The relay is expected to actuate prior to a ground large enough to affect plant equipment.
345kV Bus to No. 6 Transformer	Bus Differential Relays	N/A	~308 Amps	Provide Bus Fault Protection for Protected Zone. The relay is expected to actuate prior to a ground large enough to affect plant equipment.