

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

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FACILITY NAME (1) WOLF CREEK GENERATING STATION		DOCKET NUMBER (2) 05000482	PAGE (3) 1 OF 8
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TITLE (4)
Action Statement #19 Of Technical Specification 3.3.2 Was Violated, Due To Inadequate Work Practices.

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV. NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	19	1999	1999	007	00	06	18	99	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)											
MODE 1	100 percent	20 402(b)	20 405(c)	50 73(a)(2)(iv)	73 71(b)	20 405(a)(1)(i)	50 36(c)(1)	50 73(a)(2)(v)	73 71(c)	20 405(a)(1)(ii)	50 36(c)(2)	50 73(a)(2)(vii)	OTHER
		20 405(a)(1)(iii)	X	50 73(a)(2)(i)	50 73(a)(2)(viii)(A)	20 405(a)(1)(iv)	50 73(a)(2)(ii)	50 73(a)(2)(viii)(B)		20 405(a)(1)(v)	50 73(a)(2)(iii)	50 73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME Michael J. Angus Manager, Licensing and Corrective Action	TELEPHONE NUMBER (include Area Code) 316-364-4077
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES	X	NO					

ABSTRACT (16):
On May 19, 1999, Wolf Creek Generating Station (WCGS) personnel identified a failure to correctly assess the effect of de-energizing of the NBO1 Channel 1 Grid Degraded and Under-voltage Instrumentation power supply on the status of the NBO1 4 KV under-voltage channel. Because de-energizing of the power supply did not result in tripping the under-voltage channel, WCGS Technical Specification 3.3.2, Table 3.3-3, Action Statement #19 for Functional Units 6.f.1 and 8.a, was not met. The causes of this event were identified as inadequate work practices, including a lack of knowledge of the effect of the work activities on the component and a failure to adequately perform verification and validation of the system circuitry. Corrective actions include procedure revision, discussion of expectations with Maintenance and Operations personnel, and review of potential generic aspects. There was no impact to the health and safety of the public or to plant equipment as a result of this event.

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Plant Conditions Prior to the Event:

Mode 1
100 percent power

Basis for Reportability:

WCGS Technical Specification 3.3.2, Table 3.3-3, Action Statement #19 for Functional Units 6.f.1 and 8.a, was not met. Action Statement #19 requires that the "... inoperable channel be placed in the tripped condition within one hour." When replacing the power supply described below, the under-voltage channel was not in the tripped condition during the approximate three hour time frame the power supply was de-energized. WCGS personnel did not identify this condition and did not enter Limiting Condition for Operation (LCO) 3.0.3, as required. The violation of Action Statement #19 of Technical Specification 3.3.2 is therefore being reported under 10 CFR 50.73(a)(2)(i)(B), as a condition prohibited by the WCGS Technical Specifications. The last occurrence of this event was on May 19, 1999. Investigation determined that similar noncompliances also occurred on other dates in the past.

Event Description:

On May 19, 1999, it was discovered that WCGS violated Technical Specification 3.3.2 and had failed to enter LCO 3.0.3. While performing work to replace the 15/48 VDC power supply module for NB01 Channel 1 Degraded and Under Voltage (UV) circuitry in the Load Shed and Emergency Load Sequencing (LSELS) Under Voltage Compartment, technicians de-energized the power supply that affected the 4KV degraded voltage function and the under-voltage function. Action Statement #19 of Technical Specification 3.3.2, Table 3.3-3, Functional Units 6.f.1 and 8.a, requires that an inoperable channel be placed in the tripped condition within one hour. The Instrumentation and Controls (I&C) Technician involved believed that de-energizing the power supply would place the channels in the tripped condition. Thus Control Room personnel were told by the technician, prior to commencing the job and through subsequent conversations with the I&C Master Technician and I&C Support Group personnel, that de-energizing the power supply for replacement would place the inoperable channel in a tripped condition. This condition would have satisfied the one hour requirement of Action Statement #19.

When the power supply was de-energized the I&C Technician noted that there was trip indication for the degraded channel, but no trip indication for the under-voltage channel associated with the power supply. The Supervising Operator was informed of the indication, and the indication was accepted based on previous assurance that de-energizing the power supply would trip the channel. With work nearing completion, the Shift Supervisor, in discussions with the technician and supervisor, questioned why the under-voltage channel trip indication had not been received. This lack of indication also raised a question that perhaps the under-voltage function of the Technical Specification did not apply. This condition was discussed and, with the mind set that the circuitry was fail safe, it was reasoned that the channel could be in the tripped condition without the

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indication due to de-energizing the power supply. The end result of the discussions was that, without review of the drawings, the reason for the under-voltage trip indication not being received was not validated. The work continued while drawings were reviewed to verify circuitry operation. The power supply replacement was completed and appropriate log entries were made.

Subsequent to work completion, the review of the 4KV under-voltage circuitry identified that de-energizing the 15/48 volt power supply did not place the associated under-voltage channel in the tripped condition. Normal design for Reactor Protection System (RPS) and Engineered Safety Features Actuation System (ESFAS) circuitry is fail safe, meaning that on a loss of power the circuit will fail in a tripped condition. This was the case for the degraded voltage circuitry, but not for the under-voltage circuitry.

Based on this understanding, a late entry was made into the SS log identifying that "At 1330 hours we entered TS 3.3.2 to allow I&C to replace the power supply for the NB01 Channel 1 4KV degraded voltage and under-voltage circuitry. Because of incorrect information provided prior to the start of the job, some of the actions required by Technical Specification 3.3.2, Table 3.3-3, Functional Units 6.f.1 and 8.a were not met."

The reportable condition described in this LER was not the only occurrence. There are eight identical power supplies, four in each LSELS cabinet. Power supply output and ripple voltages are monitored on a six month frequency to identify degrading conditions and allow replacement before failure. The replacement performed May 19, 1999, was a result of this type of preventive maintenance activity. Review of equipment history indicates that fourteen power supplies have been replaced over the last fourteen years with a maximum time of three hours for each replacement activity.

In summary, Action #19 requires an inoperable channel be placed in the tripped condition within one hour. However, because the under-voltage channel was not in the tripped condition during the approximate three hour time frame that the power supply was de-energized, Action Statement #19 requirements were not met. Failure to meet Action Statement #19, was a violation of WCGS Technical Specifications. Investigation of this May 19, 1999, event revealed its historical character in that this same condition was a potentially repeated event each time the power supplies were de-energized.

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Root Cause:

This May 19, 1999 event occurred because of inadequate work practices by I&C personnel. Technical Specification 3.3.2 was not correctly implemented because the Instrumentation and Controls (I&C) Technicians lacked correct knowledge and understanding of how the system functioned and did not perform adequate verification and validation of the effect of the work activity on the components.

Technicians were in the mind-set that the circuitry was fail safe and reasoned that the channel could be in the tripped condition without the indication due to the power supply being de-energized. This was a missed opportunity to use STAR and stop work when a condition not expected was encountered; however, those involved were of the mind set that the circuitry was fail safe when power was removed.

The fact that Control Room personnel allowed work to continue, even after I&C personnel indicated uncertainty with respect to the expected response of the equipment contributed to this event. This lack of work control was caused by a belief that this evolution had been performed successfully in the past, and by the Control Room personnel's confidence in the skill and knowledge of the technicians involved.

Corrective Actions Taken:

Immediate Actions:

- I&C personnel reviewed drawings of the system and verified that the under-voltage channel was not designed to fail safe. This review revealed that removal of the power supply does not place the under-voltage channel into the tripped condition as previously thought.
- A late entry was made into the Shift Supervisor's (SS) Log identifying that "AT 1330 hours we entered TS 3.3.2 to allow I&C to replace the power supply for the NB01 Channel 1 4KV degraded voltage and under-voltage circuitry. It appears that, because of incorrect information provided prior to the start of the job, some of the actions required by Technical Specification 3.3.2, Table 3.3-3, Functional Units 6.f.1 and 8.a were not met."
- Information identifying the location of the jumper installations or lifted leads that were required to place the under-voltage or degraded voltage channels in the tripped condition was documented and provided to WCGS Maintenance and Operations rotating shift crew supervision and to WCGS Instrumentation and Controls (I&C) supervision.

Actions to Prevent Recurrence:

- WCGS Off-Normal Procedure OFN SB-008, "Instrument Malfunctions" will be revised to provide instructions for installing jumpers or lifting leads to simulate under-voltage

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or degraded voltage trip signals when required for circuitry failures. This action will be completed by December 10, 1999.

- Instrumentation and Electrical Group (I&E) management will discuss specific accountability with individuals involved. These discussions will be completed by July 12, 1999. Topics will include:
 1. The importance of understanding and communicating the effect of the work on the plant.
 2. Knowing and communicating the ability of the component to perform its design function during work performance. (Operable/Inoperable)
 3. The importance of heightened awareness required when working on Technical Specification related equipment.
 4. The use of STAR and having a questioning attitude when unexpected results are seen or there is uncertainty in the expected response.
 5. The importance of verification and validation to ensure that personnel involved are in agreement with and understand the expected results.
 6. The use of "Time Out" when uncertainty exists, to ensure that work is stopped while issues are resolved.

- I&E management will discuss, with individuals involved, the specific accountability of using verification and validation processes before starting a job. These discussions will be completed by July 12, 1999.

- Operations management will develop a briefing paper that will be distributed to Shift Supervisors, Supervising Operators and Supervising Engineers, and will be discussed with Control Room personnel. This corrective action will be completed by August 23, 1999.
 1. The importance of heightened awareness required when working on Technical Specification related equipment.
 2. The use of STAR and a questioning attitude when unexpected results are seen or there is uncertainty in the expected response.
 3. The importance of Verification and Validation to ensure that involved are in agreement with and understand the expected results.
 4. The use of "Time Out" when uncertainty exists, so that work is stopped while issues are resolved.

Corrective Actions To Potential Generic Issues:

- Maintenance and Operations management will prepare a briefing paper for their direct reports for use in briefing their personnel on the following related expectations of

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the Work Controls and Human Performance Programs as related to this event. This paper will be completed by August 23, 1999. Topics will include:

1. The importance of understanding and communicating the effect of the work on the plant.
 2. Knowing and communicating the ability of the component to perform its design function during work performance. (Operable/Inoperable)
 3. The importance of heightened awareness required when working on Technical Specification related equipment.
 4. The use of STAR and a questioning attitude when unexpected results are seen or there is uncertainty in the expected response.
 5. The importance of verification and validation to ensure that personnel involved in an activity are in agreement with and understand the expected results.
 6. The use of "Time Out" when uncertainty exists, so that work is stopped while issues are resolved.
- WCGS personnel will review circuitry of Reactor Trip System (RTS) and Engineered Safety Features Actuation System (ESFAS) Functional Units associated with short duration Technical Specification Action response times of 4 hours or less to determine if the channels would "fail safe" (i.e. fail in the Technical Specification desired state) or provide Control Board annunciation on power supply failure. For those Functional Units that would not "fail safe", or do not have designed circuitry for placing the channel in a tripped condition, personnel will identify the actions required to place the channels in tripped condition in WCGS Off-Normal Procedure SB-008, "Instrument Malfunctions". The specific areas of concern are instrumentation channels that use power supplies to provide contact potential or isolation coupling. This review will identify and provide corrective actions for potential problem areas, and will be completed by October 30, 1999.
 - Prior to June 22, 1999, in order to provide interim corrective actions, a letter of expectation will be sent to Maintenance and Operations rotating shift crew supervision and to I&C supervision identifying additional review requirements to be conducted prior to performance of Corrective Maintenance on any power supply associated with RTS or ESFAS instrumentation. As a minimum this review will include Maintenance Supervision and Operations personnel. Completion of this review will provide concurrence that:
 1. The appropriate Technical Specification Action requirement has been identified based on equipment operability associated with the work. This will be accomplished by review of Technical Specifications.

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2. The condition of the Technical Specification required channels associated with the Action Statement will be identified before, during, and after work activity. (Operable/Inoperable). This will be accomplished by review of drawings and Control Board indications.
3. Appropriate steps are incorporated in the work package to place the channel in the Technical Specification Action requirement condition before work performance. This will be done using designed Test Switches, jumpers or lifted leads, and will be accomplished by review of drawings, use of associated surveillance procedure, or by OFN SB-008.
4. The Technical Specifications. Action requirements for inoperable channels are satisfied, normally by ensuring the channel is in the tripped condition, prior to work performance. This may be accomplished by Control Board indication and/or review of drawings.

Safety Significance:

The subject power supply change out did not affect the normal Technical Specification function for the degraded voltage relay input, only the under-voltage relay inputs were affected. There was no impact to personnel or plant safety in this event. As stated, all four channels on the affected train are taken from the same bus (at different physical points) and all use the same type of monitoring equipment that is calibrated to the same range. By calibrating these channels to the same range it helps ensure that each channel will function the same, whether there are three or four channels available.

Each of the four channels on each train is electrically and physically isolated or separated from the other channels. The identified condition changed the bus voltage protection from a two out of four (2/4) logic scheme to a two out of three (2/3) logic scheme. In the event of a single failure this could affect one of the three remaining channels of the affected bus and possibly one of the channels on the other train, but the proper under-voltage relay signal still would be provided; in this case to both trains. The worst case single failure can only take out one channel per train. Therefore, the safety function of energizing the applicable safety related bus from the emergency diesel generator upon a loss of power would not be lost. The 2/3 configuration was, however, a reduction in the redundancy of the system, and was not in accordance with the allowable design of the plant.

The 2/3 logic would still have actuated all the proper degraded and under-voltage signals with the actuation of any two channels of the remaining three active channels. This is true whether the actuation is due to an equipment failure or as a result of an actual bus voltage failure. Therefore although the condition identified did result in the violation of the WCGS Technical Specifications, the condition did not eliminate bus protection, and did not prevent the system from performing its intended function.

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Other Previous Occurrences:

No other previous similar occurrences that resulted in a reported event were identified; however, this event was historical in nature, and, since 1985, fourteen instances of power supply de-energization and removal have occurred. Several of these events could have resulted in a similar failure to correctly identify the un-tripped status of the under-voltage channel and the applicability of Action Statement #19 of WCGS Technical Specification 3.3.2, Table 3.3-3, Functional Units 6.f.1 and 8.a. Thus, depending on plant mode and condition, WCGS may have failed to identify and report this event for previous occurrences. WCGS Performance Improvement Request 99-1968 provides details of the times and plant status for these potentially reportable events.

LIST OF COMMITMENTS

The following table identifies those actions committed to by Wolf Creek Nuclear Operating Corporation (WCNOC) in this document. Any other statements in this submittal are provided for information purposes and are not considered to be commitments. Please notify the Manager Licensing & Corrective Action at Wolf Creek Nuclear Generating Station of any questions regarding this document or any associated commitments.

COMMITMENT	Date/Event
WCGS Off-Normal Procedure OFN SB-008, "Instrument Malfunctions" will be revised to provide instructions for installing jumpers or lifting leads to simulate under-voltage or degraded voltage trip signals when required for circuitry failures.	December 10, 1999.
Instrumentation and Electrical Group (I&E) management will discuss specific accountability with individuals involved. These discussions will be completed by July 12, 1999. Topics will include: <ol style="list-style-type: none"> 1. The importance of understanding and communicating the effect of the work on the plant. 2. Knowing and communicating the ability of the component to perform its design function during work performance. (Operable/Inoperable) 3. The importance of heightened awareness required when working on Technical Specification related equipment. 4. The use of STAR and having a questioning attitude when unexpected results are seen or there is uncertainty in the expected response. 5. The importance of verification and validation to ensure that personnel involved are in agreement with and understand the expected results. 6. The use of "Time Out" when uncertainty exists, to ensure that work is stopped while issues are resolved. 	July 12, 1999
I&E management will discuss with individuals involved the specific accountability of using verification and validation processes before starting a job. These discussions will be completed by July 12, 1999.	July 12, 1999
WCGS personnel will review circuitry of RTS and ESFAS Functional Units associated with short duration Technical Specification Action response times of 4 hours or less to determine if the channels would "fail safe" (i.e. fail in the Technical Specification desired state) or provide Control Board annunciation on power supply failure. For those Functional Units that would not "fail safe", or do not have designed circuitry for placing the channel in a tripped condition, personnel will identify the actions required to place the channels in tripped condition in WCGS Off-Normal Procedure OFN SB-008, "Instrument Malfunctions". The specific areas of concern are instrumentation channels that use power supplies to provide contact potential or isolation coupling. This review will identify and provide corrective actions for potential problem areas, and will be completed by October 30, 1999.	October 30, 1999

<p>Operations management will develop a briefing paper that will be distributed to Shift Supervisors, Supervising Operators, and Supervising Engineers, and will be discussed with Control Room personnel. This corrective action will be completed by August 23, 1999.</p> <ol style="list-style-type: none"> 1. The importance of heightened awareness required when working on Technical Specification related equipment. 2. The use of STAR and a questioning attitude when unexpected results are seen or there is uncertainty in the expected response. 3. The importance of Verification and Validation to ensure that personnel involved are in agreement with and understand the expected results. 4. The use of "Time Out" when uncertainty exists, so that work is stopped while issues are resolved. 	August 23, 1999
<p>Maintenance and Operations management will prepare a briefing paper for their direct reports for use in briefing their personnel on the following related expectations of the Work Controls and Human Performance Programs as related to this event. This paper will be completed by August 23, 1999. Topics will include:</p> <ol style="list-style-type: none"> 1. The importance of understanding and communicating the effect of the work on the plant. 2. Knowing and communicating the ability of the component to perform its design function during work performance. (Operable/Inoperable) 3. The importance of heightened awareness required when working on Technical Specification related equipment. 4. The use of STAR and a questioning attitude when unexpected results are seen or there is uncertainty in the expected response. 5. The importance of verification and validation to ensure that personnel involved in an activity are in agreement with and understand the expected results. 6. The use of "Time Out" when uncertainty exists, so that work is stopped while issues are resolved. 	August 23, 1999

<p>Prior to June 22, 1999, in order to provide interim corrective actions, a letter of expectation will be sent to Maintenance and Operations rotating shift crew supervision and to I&C supervision identifying additional review requirements to be conducted prior to performance of Corrective Maintenance on any power supply associated with Reactor Trip System (RTS) or Engineered Safety Features Actuation System (ESFAS) instrumentation. As a minimum this review will include Maintenance Supervision and Operations personnel. Completion of this review will provide concurrence that:</p> <ol style="list-style-type: none">1. The appropriate Technical Specification Action requirement has been identified based on equipment operability associated with the work. This will be accomplished by review of Technical Specifications.2. The condition of the Technical Specification required channels associated with the Action Statement will be identified before, during, and after work activity. (Operable/Inoperable). This will be accomplished by review of drawings and Control Board indications.3. Appropriate steps are incorporated in the work package to place the channel in the Technical Specification Action requirement condition before work performance. This will be done using designed Test Switches, jumpers or lifted leads, and will be accomplished by review of drawings, use of associated surveillance procedure, or by OFN SB-008.4. The Technical Specifications. Action requirements for inoperable channels are satisfied, normally by ensuring the channel is in the tripped condition, prior to work performance. This may be accomplished by Control Board indication and/or review of drawings.	June 21, 1999
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