WOLF CREEK
NUCLEAR OPERATING CORPORATION

Stephen E. Hedges
Site Vice President

March 12, 2012

WO 12-0026

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

Subject: Docket No. 50-482: Licensee Event Report 2012-001-00, "Failure of 345 kV Switchyard Breaker Due to Internal Fault Resulting in Reactor Trip and Coincident Loss of Offsite Power"

Gentlemen,

The enclosed Licensee Event Report (LER) is being submitted in accordance with 10 CFR 50.73, "Licensee event report system," paragraph (a)(2)(i)(B), (a)(2)(iv)(A), and (a)(2)(v)(D). The LER involves a turbine trip/reactor trip and a coincidental loss of offsite power when a switchyard generator output breaker failed.

Regulatory commitments made by Wolf Creek Nuclear Operating Corporation in the enclosed LER are identified in the Attachment to this letter. If you have any questions concerning this matter, please contact me at (620) 364-4190 or Mr. Gautam Sen at (620) 364-4175.

Sincerely,

Stephen E. Hedges

SEH/rlt

Attachment
Enclosure

cc: E. E. Collins (NRC), w/a, w/e
J. R. Hall (NRC), w/a, w/e
N. F. O'Keefe (NRC), w/a, w/e
Senior Resident Inspector (NRC), w/a, w/e

IE22
NRR

LIST OF REGULATORY COMMITMENTS

The following table identifies those actions committed to by Wolf Creek Nuclear Operating Corporation in this document. Any other statements in this letter are provided for information purposes and are not considered regulatory commitments. Please direct questions regarding these commitments to Mr. Gautam Sen, Manager Regulatory Affairs at Wolf Creek Generating Station, (620) 364-4175.

REGULATORY COMMITMENT	DUE DATE
Procedure AP 24B-001, "Control of Site Contractor Services," will be revised to provide clear roles and responsibilities for the individual(s) assigned the task of oversight.	May 17, 2012
Work Control Process procedures will be revised to ensure verification requirements are applied to special scope or non-nuclear safety related functional importance determination (FID) 1 and 2 components.	May 17, 2012
The 345-50 and 345-60 generator output breakers will have internal borescope inspections conducted followed by Hi-Pot testing during Refueling Outage 19.	Refueling Outage 19

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION
(10-2010)

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

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

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4. TITLE

Failure of 345 kV Switchyard Breaker Due to Internal Fault Resulting in Reactor Trip and Coincident Loss of Offsite Power

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
01	13	2012	2012	001	00	03	12	2012	FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE

1

10. POWER LEVEL

100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☒ 50.73(a)(2)(i)(B)	☒ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME	TELEPHONE NUMBER (Include Area Code)
Gautam Sen, Manager Regulatory Affairs	(620) 364-4175

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	EL	BKR	HVB	Y	A	EA	XFMR	W351	Y

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On January 13, 2012, at approximately 1403 Central Standard Time (CST), the unit experienced an unplanned automatic shutdown from full power operations and a coincidental loss of offsite power. The 345-60 generator output breaker in the switchyard catastrophically failed (fault on 'C' phase) resulting in breaker operations and subsequent loss of the East 345 kV bus and a trip of the main turbine. Coincident with the loss of the East 345 kV bus, a rapid transfer of the non-safety buses from the Unit Auxiliary Transformer to the Startup Transformer occurred. After the rapid transfer, a 'B' phase differential relay trip on the Startup Transformer resulted in a loss of the West 345 kV bus and loss of offsite power.

The turbine trip initiated a reactor trip. All control rods inserted into the core. All reactor coolant pumps tripped. Both diesel generators started and supplied power to the 4.16 kV engineered safety features buses. Control room operators initiated action per procedure EMG E-0, "Reactor Trip or Safety Injection," and transitioned into EMG ES-02, "Reactor Trip Response." Subsequently, a natural circulation cooldown was performed to place the unit in Mode 5.

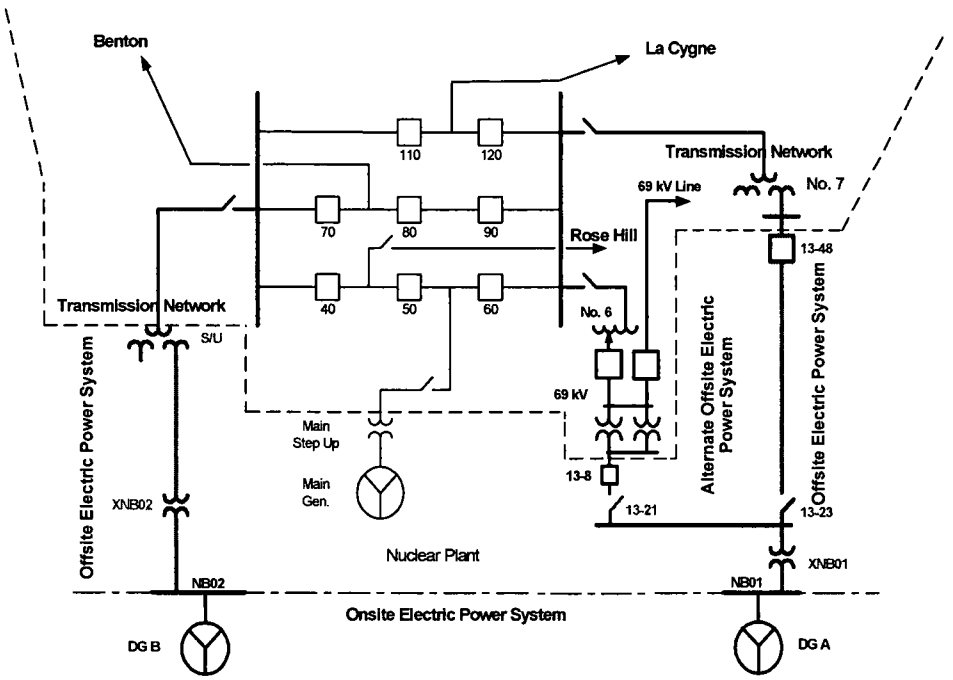
PLANT CONDITIONS AT THE TIME OF THE EVENT

Mode 1
Power Level - 100 %
Normal Operating Temperature and Pressure

One pressurizer power operated relief valve (PORV) [EIIS codes: PZR, RV] was inoperable due to leakage and was capable of being manually cycled. The PORV block valve was closed with power maintained to the valve.

BACKGROUND

The Kansas Gas and Electric and Kansas City Power and Light transmission network serves as the main outlet and source of offsite power for the Wolf Creek Generating Station (WCGS). There are three 345 kV lines connecting the WCGS switchyard [EIIS codes: FK] to the offsite transmission network. Offsite power is supplied to the WCGS switchyard from the offsite transmission network. From the switchyard, two electrically and physically separated circuits (offsite circuits) provide AC power, through the engineered safety features (ESF) transformers [EIIS codes: EK, XFMR], to the 4.16 kV ESF buses (NB01 and NB02) [EIIS codes: EK, BU]. See Figure 1 below.



Simplified Diagram of the WCGS Switchyard
Figure 1

DESCRIPTION OF THE EVENT

On January 13, 2012, at approximately 1403 Central Standard Time (CST), the unit experienced an unplanned automatic shutdown from full power operations and a coincidental loss of offsite power (LOOP). The Wolf Creek Generating Station (WCGS) site watch was dispatched to the switchyard and identified physical damage to the 345-60 generator output breaker [EIIS codes: EL, BKR] pole, 'C' phase, on the generator end of the breaker near the control cabinet. This faulted condition for the 345-60 breaker resulted in the actuation of protective relays for the "East Bus Primary Lockout," "East Bus Secondary Lockout," and "345-60 Breaker Failure." The actuation of these relays caused the opening of WCGS switchyard breakers to isolate the East 345 kV bus. The "345-60 Breaker Failure" also sends a signal into WCGS to generate a turbine trip signal (generator lockout) and another signal to trip the 345-50 generator output breaker. The turbine trip signal and opening of the 345-50 and 345-60 breakers interrupted power to the Unit Auxiliary Transformer (XMA02) [EIIS codes: EA, XFMR] which is the normal power supply to the site 13.8 kV non-safety buses PA01 and PA02. To counter this loss of power, a "fast bus transfer" occurred that realigns the power supply for the non-safety buses to the Startup Transformer (XMR01) [EIIS codes: EA, XFMR].

As soon as the fast bus transfer was complete, the 487/T1 'B' Phase Startup Transformer differential relay actuated. The 487/T1 relay inputs to the 286/T1 lockout relay, which initiates de-energization of the Startup Transformer. This protective sequence generates a signal to isolate the Startup Transformer power supply to ESF transformer XNB02. Additionally, this Startup Transformer 286/T1 lockout relay feeds protection circuitry in the WCGS switchyard to open switchyard breakers to isolate the West 345 kV bus and de-energize the Startup Transformer. This sequence of events, which isolated and de-energized the WCGS switchyard East 345 kV and West 345 kV buses, resulted in the loss of offsite AC electrical power to the unit.

The turbine trip initiated a reactor trip. All control rods inserted into the core. All reactor coolant pumps [EIIS codes: AB, P] tripped. The undervoltage relays on safety related 4.16 kV engineered safety features (ESF) buses NB01 and NB02 actuated. These relays initiated a loss of power diesel generator (DG) [EIIS codes: DG] start signal for the automatic start of both DGs. Both DGs started and supplied power to the 4.16 kV engineered safety features (ESF) buses with loads sequenced onto the buses. The Reactor Protection System and Engineered Safety Features Actuation System equipment actuated as expected. Control room operators initiated action per procedure EMG E-0, "Reactor Trip or Safety Injection," and transitioned into EMG ES-02, "Reactor Trip Response." At 1409 CST the main steam isolation valves [EIIS codes: SB, V] were closed.

An Unusual Event was declared at 1415 CST due to a LOOP to the ESF transformers expected to exist for greater than 15 minutes. Procedure OFN NB-35, "Loss of Off-site Power Restoration," was initiated for restoration of offsite power to the NB01 bus. At 1700 CST offsite power was restored to the East 345 kV bus, transformer XNB01, and the NB01 bus. With the restoration of an operable offsite circuit, the Unusual Event was terminated at 1709 CST. At 1721 CST the 'A' DG was placed in a standby condition.

At 1416 CST, both channels of source range neutron flux indication [EIIS codes: IG] energized as expected. At approximately 1500 CST, source range neutron flux monitor, SENI0032, started indicating increased counts, diverging from SENI0032 and the expected response. At 1714 CST, SENI0031 was indicating a higher count rate than SENI0032 and declared inoperable. The loss of non-safety buses PA01 and PA02 [EIIS codes: EA, BU] resulted in the de-energization of the containment cavity cooling fans [EIIS codes: VC, FAN]. The Cavity Cooling System maintains a suitable atmosphere within the reactor cavity during normal operation to protect the concrete, the excore neutron detectors, and the neutron streaming shield. The loss of cavity cooling to the source range excore nuclear instruments resulted in an increased count rate indication on SENI0031. SENI00031 indication recovered and acted as expected at approximately 0900 CST on January 14, 2012 due to cooldown of the Reactor Coolant System (RCS) [EIIS codes: AB]. The increased count rate indication on SENI0031 has previously occurred twice during a loss of power to the cavity cooling fans.

At approximately 1645 CST on January 13, 2012, containment normal sump level [EIIS codes: BD] was trending up indicating a potential leak inside containment. Upon further investigation, a through-wall Essential Service Water (ESW) System [EIIS codes: BI] leak of approximately 5 gallons per minute was identified on the supply piping header associated with the 'C' containment cooler [EIIS codes: BK, HX]. At approximately 1737 CST, the leak on the 'C' containment cooler was isolated.

At 1736 CST on January 13, 2012, control room operators commenced a natural circulation cooldown to Mode 5 utilizing procedure EMG ES-04, "Natural Circulation Cooldown," when it was determined that the Startup Transformer and non-safety buses PA01 and PA02 would not be restored in a reasonable time frame. Mode 4 was entered on January 14, 2012 at 0112 CST and Mode 5 was entered at 0750 CST.

At 0244 CST on January 14, 2012, shutdown of the turbine driven auxiliary feedwater (AFW) pump [EIIS codes: BA, P] was in progress in accordance with procedure SYS AL-120, "Motor Driven or Turbine Driven AFW Pump Operations." When the mechanical trip/throttle valve was closed, the turbine driven AFW pump overspeed trip linkage unexpectedly actuated.

At 1236 CST on January 14, 2012, a generator field ground alarm actuated on the 'B' DG. The 'B' DG remained in service until 0626 CST on January 15, 2012 when the NB02 bus was transferred to its alternate offsite power supply. At 1535 CST, after troubleshooting of the generator field ground it was determined that the ground relay was operating correctly. The 'B' DG was declared inoperable for troubleshooting the cause of the ground.

Technical Specification (TS) 3.4.15, "RCS Leakage Detection Instrumentation," requires the Containment Sump Level and Flow Monitoring System, one containment atmosphere particulate radioactivity monitor [EIIS codes: IK, M], and one Containment Air Cooler Condensate Monitoring System be operable in Modes 1, 2, 3, and 4. On a loss of power, the containment atmosphere particulate radioactivity monitors (GT RE-31 and GT RE-32) containment isolation valves fail closed isolating the monitors. The Containment Air Cooler Condensate Monitoring System dump valves [EIIS codes: BK, V] fail to the dump position such that the plant computer cannot calculate a leak rate. The leak rate from the Containment Air Cooler Condensate Monitoring System is utilized by the plant

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computer to determine the containment sump level leak rate. With the Containment Air Cooler Condensate Monitoring System inoperable, the Containment Sump Level and Flow Monitoring System was also inoperable. With the LOOP, all three monitoring methods were therefore inoperable. Condition F of TS 3.4.15 requires immediate entry into Limiting Condition for Operation (LCO) 3.0.3 if all required monitoring methods are inoperable. TS 3.4.15 Mode of Applicability was exited on January 14, 2012 at 0750 CST with the entry into Mode 5.

During the initial investigation within the WCGS switchyard, the site watch was tasked with activities from both the control room operators and System Operations-Transmission personnel. These activities were necessary to isolate the faulted conditions within the switchyard to enable re-energization of electrical power to the unit. These actions prevented the site watch from being available to address other equipment issues. During the event on January 13, 2012 the diesel engine-driven fire pump was not available, as it had experienced a catastrophic mechanical failure during operation on September 14, 2011. As a result of the September 2011 failure, a temporary diesel engine-driven fire pump was established with a contingency plan requiring local operator action to start and place it in service. Due to the extent of actions necessary to be performed locally in the WCGS switchyard, the site watch was not immediately available to place the temporary diesel driven fire pump in service. This, coupled with difficulties encountered in establishing an effective prime of the pump, ultimately resulted in the unavailability of the Fire Protection Water System for approximately nine hours.

On February 13, 2012, at 2008 CST, an attempt to start the 'A' RCP for troubleshooting was made. This start attempt resulted in the second loss of electrical power to the Startup Transformer. Investigation revealed that the Startup Transformer 487/T1 'B' phase differential relay and the 286/T1 lockout relay were tripped as well as the 94F West Bus secondary differential relay in the switchyard, which had initiated the automatic opening of switchyard breakers resulting in the de-energization of the switchyard West 345 kV bus. The 'B' DG was not available to restore electrical power to the NB02 bus due to the DG having been removed from service to repair the field ground experienced during the January 13, 2012 event. To mitigate this situation control room operators realigned the NB02 bus to transformer XNB01 through the alternate feeder breaker.

BASIS FOR REPORTABILITY

The reactor trip signal and actuation of ESFAS instrumentation [EIIS codes: JE] is reportable per 10 CFR 50.73(a)(2)(iv)(A), which requires reporting of "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section." Paragraph (B)(1) of 10 CFR 50.73(a)(2)(iv) includes "Reactor protection system (RPS) including: reactor scram or reactor trip." Paragraph (B)(6) of 10 CFR 50.73(a)(2)(iv) includes "PWR auxiliary or emergency feedwater." Paragraph (B)(8) of 10 CFR 50.73(a)(2)(iv) includes "Emergency ac electrical power systems, including emergency diesel generators (EDGs)."

This event resulted in the loss of both offsite circuits. NUREG-1022, Rev. 2, "Event Reporting Guidelines 10 CFR 50.72 and 50.73," Section 3.2.7, states, in part, "If either offsite power or onsite emergency power is unavailable to the plant, it is reportable regardless of whether the other system is available." Therefore, this event is reportable pursuant to 10 CFR 50.73(a)(2)(v)(D) as an event or condition that could have prevented the fulfillment of a safety function.

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TS 3.4.15, "RCS Leakage Detection Instrumentation," requires the Containment Sump Level and Flow Monitoring System, one containment atmosphere particulate radioactivity monitor, and one Containment Air Cooler Condensate Monitoring System be operable in Modes 1, 2, 3, and 4. With the LOOP, all three monitoring methods were therefore inoperable. Condition F of TS 3.4.15 requires immediate entry into LCO 3.0.3 if all required monitoring methods are inoperable. TS 3.4.15 Mode of Applicability was exited on January 14, 2012 at 0750 CST with the entry into Mode 5. NUREG 1022, Rev. 2, Section 3.2.2, "Operation or Condition Prohibited by Technical Specifications," indicates that entry into LCO 3.0.3 should be considered reportable under this criterion (10 CFR 50.73(a)(2)(i)(B)) if the condition is not corrected within an hour, such that it is necessary to initiate actions to cooldown. As actions were initiated to cooldown the plant, this event is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B) as an operation or condition which was prohibited by the plant's TSs.

ROOT CAUSE

The cause of the 345-60 generator output breaker failure was an internal flashover occurring across the insulator surface within 'C' phase of the breaker. The 'C' phase of the 345-60 breaker failed by experiencing a grounded fault. Internal particulate contamination caused the failure of the 345-60 breaker. The 345-60 breaker is a 3000 Amps Type: HHI362 HVB (High Voltage Breaker) 3 phase SF6 Pure Puffer Breaker (Hydraulic Mechanism) manufactured by HVB AE Power Systems, Inc.

The cause for the loss of the Startup Transformer was the transformer junction block high voltage side current transformer [EIIS codes: EA, XCT] wires on phase 'A' and 'B' being shorted. Troubleshooting after the February 13, 2012 loss of the Startup Transformer indicated a phase-to-phase short circuit between two unused high side current transformer taps (wire W2 on 'A' phase and W10 on 'B' phase). Subsequent field inspections found two missing insulation sleeves on these current transformer wires. Maintenance on the current transformer junction block was last performed during Refueling Outage 18 by a vendor and had previously tested satisfactorily at the completion of the work activity. The vendor failed to place insulating sleeves on the phase 'A' and 'B' wire terminations creating the potential for a false differential current to exist. Contributing causes associated to this maintenance activity included the vendor verification practices did not identify missing insulation sleeves and less than adequate oversight by WCGS personnel resulted in not identifying missing insulation sleeves. The Startup Transformer is a four winding 345 kV/13.8 kV transformer manufactured by Westinghouse.

CORRECTIVE ACTIONS

The failed 345-60 breaker was replaced on January 23, 2012. The replacement 345-60 breaker and the installed 345-50 breaker were Doble tested, SF6 gas tested and Hi-Pot tested with all results satisfactory. Based upon the hardware failure analysis performed on the failed 345-60 breaker, which indicated internal particulate contamination was present, corrective action was taken to re-inspect the newly replaced 345-60 breaker and replace the 345-50 breaker. The 345-50 breaker was replaced as newer breaker models are equipped with 3-inch inspection portals that a borescope could access to facilitate internal inspection of the breaker.

The 345-50 and 345-60 generator output breakers will have internal borescope inspections conducted followed by Hi-Pot testing during Refueling Outage 19.

Following identification of the missing insulating sleeves on the Startup Transformer, additional external inspections were performed on the remaining Startup Transformer current transformer junction blocks. Additional wiring workmanship issues were identified on the Startup Transformer. On February 22, 2012, WCNOC repaired the phase 'A' and 'B' wires by installing insulating sleeves. The additional wiring issues have been repaired and testing of the Startup Transformer completed.

Procedure AP 24B-001, "Control of Site Contractor Services," will be revised to provide clear roles and responsibilities for the individual(s) assigned the task of oversight. This action prescribes that knowledgeable individuals are monitoring, coaching and enforcing the requirements of the station and to provide assurance of quality (error free performance) of the work. It also adds training as a prerequisite to performing the task of WCNOC Representative as well as adding a responsibility to clearly assign roles and responsibilities to the oversight individual(s). This action will be completed by May 17, 2012.

Work Control Process procedures will be revised to ensure verification requirements are applied to special scope or non-nuclear safety related functional importance determination (FID) 1 and 2 components. This action will be completed by May 17, 2012.

ADDITIONAL ACTIONS

Troubleshooting of the Startup Transformer encompassed the 487/T1 differential relay that had an actuated flag (identified post event) for the 'B' phase. This actuated flag was present on both the January 13, 2012 and February 13, 2012 events. This component is a high-speed relay designed for the protection of power transformers. Troubleshooting and evaluation of the Startup Transformer did not reveal any damage and did not reveal the cause of the actuation of 'B' phase differential relay. WCNOC and vendor personnel developed, performed, and completed detailed computer modeling of the switchyard and electrical distribution system which demonstrated computer simulated response to various scenarios/cases. On February 13, 2012, simulator model testing was completed with the actual differential relays (15 percent and 7.5 percent harmonic restraint) connected to the simulator to determine their actual response(s) to the different scenarios/cases. The modeling analysis showed that there are specific events, like the January 13, 2012 event, where minimal margin exists in the Startup Transformer protection scheme. However, testing performed with a computer-generated model of the WCGS distribution system on the applicable relays did not show that the relays would trip except in a worst-case design condition, which did not exist on either the January 13, 2012 and February 13, 2012 event. The 7.5 percent harmonic are being installed prior to Mode 4 to provide additional protection scheme margin.

The increased count rate indication on SENI0031 observed on January 13, 2012 is the third occurrence in recent history that a loss of containment cavity cooling has occurred resulting in an increased count rate on SENI0031. SENI0031 most likely exceeded its maximum operating temperature of 180 degrees F. A basic engineering disposition determined that SENI0031 had not

been degraded by the elevated temperatures based primarily on Electrical Characterization and Diagnostics (ECAD) and Time Domain Reflectometry (TDR) testing, the detector response returned to original condition with no discernable difference, the limited time the detector was exposed to elevated temperatures, and consultation with the detector vendor. However, because SENI0031 responds differently than SENI0032 when cavity cooling is lost, SENI0031 is currently considered operable but degraded.

After the LOOP and the automatic actuation of the ESW pumps, a column-closure water hammer occurred which most likely enlarged the through-wall portion of the pit on the 'C' containment cooler. The affected supply piping header was replaced. Ultrasonic examinations were performed on the 6 inch and 8 inch supply and return piping headers for the four containment coolers. Indications/pits were identified on the 'A' and 'B' containment coolers that required replacing sections of the piping. During the forced outage, the remaining accessible ESW piping >/= 6 inches in diameter, which was not examined during the Cycle 18/Refueling Outage 18 structural integrity guided wave testing campaign, was examined on the 'A' and 'B' ESW trains. The examinations consisted of approximately 90 feet of ESW piping. Indications/pits not meeting the minimum wall thickness acceptance criteria were encapsulated, repaired, or evaluated for future repair with a specific deadline.

Investigation into the unexpected trip of the turbine driven AFW pump determined that when the mechanical trip/throttle valve was closed, the vibration actuated the mechanical overspeed trip linkage and an actual overspeed did not occur. The trip linkage was repaired. Additionally, the turbine driven AFW pump thrust bearing was conservatively replaced due to external operating experience documenting the potential for degradation when the pump is operated at low speeds.

Troubleshooting of the field ground on the 'B' DG identified a fault on a single lead cable connecting the collector rings to the pole pieces. The faulted cable and three other cables were replaced. Testing of the 'B' DG was completed on February 25, 2012 and restored to operable status. Following restoration of the 'B' DG, the field lead cables of the 'A' DG were also replaced although no indication of a fault was present.

SAFETY SIGNIFICANCE

The Reactor Protection System did actuate and cause a reactor trip. Both DGs started and functioned as designed. The required safety systems operated to mitigate the event. The required equipment to shutdown the reactor and maintain safe shutdown conditions, remove residual heat, control the release of radioactive material, or mitigate the consequences of an accident performed as designed. However, several equipment anomalies/failures occurred complicating the event.

A review of the January 13, 2012 event to the Loss of Nonemergency AC Power to the Station Auxiliaries (Updated Safety Analysis Report Section 15.2.6) analysis of record determined that the event behaved in a way similar to the analysis of record. Due to the conservative assumption in the analysis of record that feedwater is lost prior to the LOOP, the transient in the analysis of record is more severe than the January 13, 2012 event.

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OPERATING EXPERIENCE/PREVIOUS SIMILAR OCCURRENCES

Condition Report 00035122, "SE NI-31 affected by loss of cavity cooling," describes an event where the plant was in Mode 3 when a lightning strike occurred that resulted in the operating containment cavity cooling fan to stop and an automatic start of the second cooling fan did not occur. Control room operators did not recognize that both cooling fans were stopped. The source range neutron flux channel was declared non-functional due to an erratic count rate and the appropriate Required Actions of Technical Requirements Manual TR 3.3.15, "Source Range Neutron Flux," were taken.

LER 2010-004-00, "Positive Reactivity Addition in Mode 2 with One Source Range Neutron Flux Channel Inoperable," describes an event where SENI0031 was not considered inoperable when an increased count rate was observed following a loss of cavity cooling. The source range detector was replaced during Refueling Outage 17 in November 2009.

LER 2009-002-00, "Loss of Offsite Power due to Lightning," describes an event where a lightning strike on the LaCygne 345 kV transmission line caused the loss of the LaCygne line. The Rose Hill 345 kV transmission line was lost due to a loss of carrier function, causing line operation (opening of switchyard breakers), and subsequent loss of the Benton 345 kV line as a result of the unit heading toward instability. The turbine and reactor tripped due to a momentary loss of offsite power to the onsite buses.

Condition Report 19248, "A Train ESW Leaks to A Containment Spray Room Cooler," describes an event where an ESW leak was identified on the 'A' containment spray pump room cooler inlet piping. The ESW leak was potentially the result of the LOOP and the automatic actuation of ESW.

LER 2008-004-01, "Loss of Offsite Power Event When the Reactor Was De-fueled," describes an event when the plant was defueled during a refueling outage when a relay technician, performing transmission line transfer/breaker failure trip preventative maintenance testing on a 345 kV breaker, closed the wrong set of trip links. With the incorrect links in service and when the manual trip signal was generated as a part of the preventative maintenance activity, the remaining transmission network connections to the West 345 kV bus were de-energized by the opening of their associated breakers. This inadvertent action tripped the West 345 kV bus and caused the loss of offsite power.