WOLF CREEK
NUCLEAR OPERATING CORPORATION

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RA 19-0041

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

Subject: Docket No. 50-482: Wolf Creek Generating Station Biennial 50.59 Evaluation Report

To Whom It May Concern:

This letter transmits the Biennial 50.59 Evaluation Report for Wolf Creek Generating Station (WCGS), which is being submitted pursuant to 10 CFR 50.59(d)(2). The attachment provides the WCGS Biennial 50.59 Evaluation Report including a summary of the evaluation results.

This report covers the period from January 1, 2017, to December 31, 2018, and contains a summary of 50.59 evaluations implemented during this period that were approved by the WCGS onsite review committee.

This letter contains no commitments. If you have any questions concerning this matter, please contact me at (620) 364-4204.

Sincerely,

Ron Benham

RDB/rlt

Attachment

cc: S. A. Morris (NRC), w/a
B. K. Singal (NRC), w/a
N. H. Taylor (NRC), w/a
Senior Resident Inspector (NRC), w/a

IE47
NRR

WOLF CREEK NUCLEAR OPERATING CORPORATION

Wolf Creek Generating Station

Docket No.: 50-482
Facility Operating License No.: NPF-42

BIENNIAL 50.59 EVALUATION REPORT

Report No.: 26

Reporting Period: January 1, 2017 through December 31, 2018

SUMMARY

This report provides a brief description of changes, tests, and experiments implemented at Wolf Creek Generating Station (WCGS) and evaluated pursuant to 10 CFR 50.59(c)(1). This report includes summaries of the associated 50.59 evaluations that were reviewed and found to be acceptable by the Plant Safety Review Committee (PSRC) for the period beginning January 1, 2017 and ending December 31, 2018. This report is submitted in accordance with the requirements of 10 CFR 50.59(d)(2).

On the basis of these evaluations of changes:

- There is no more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the Updated Final Safety Analysis Report (USAR).
- There is no more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety previously evaluated in the USAR.
- There is no more than a minimal increase in the consequences of an accident previously evaluated in the USAR.
- There is no more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the USAR.
- There is no possibility for an accident of a different type than any previously evaluated in the USAR being created.
- There is no possibility for a malfunction of an SSC important to safety with a different result that any previously evaluated in the USAR being created.
- There is no result in a design basis limit for a fission product barrier as described in the USAR being exceeded or altered.
- There is no result in a departure from a method of evaluation described in the USAR used in establishing the design bases or in the safety analyses.

Therefore, all items contained within this report have been determined not to require a license amendment.

Evaluation Number: 59 2017-0001 Revision 0

Title: Install Open Phase Detection (OPD) on Startup Transformer and OPD Trip Function for No. 7 Transformer

Activity Description:

Engineering design change package (DCP) 14570 installs a new Open Phase Detection System (OPDS) on the startup transformer (XMR01). The startup transformer OPDS is manufactured by Power Systems Sentinel Technologies (PSStech). The startup transformer OPDS function is to:

- Monitor and detect an open phase condition on the startup transformer
- Notify (alarm) Control Room personnel when an Open Phase Condition (OPC) is detected
- Initiate an automatic trip (isolation) of the startup transformer when an OPC is detected

DCP 14570 also documents the activation of the tripping function of the OPDS installed on the #7 transformer. The #7 transformer OPDS was installed under DCP 14936; however, the OPDS trip function was not analyzed because, at the time, the trip function was not activated. For this analysis, the #7 transformer OPDS function is to:

- Monitor and detect an open phase condition on the #7 transformer
- Notify (alarm) Control Room personnel when an Open Phase Condition (OPC) is detected
- Initiate an automatic trip (isolation) of the #7 transformer when an OPC is detected

50.59 Evaluation:

The accidents listed in the Updated Final Safety Analysis Report (USAR) Chapter 15 were reviewed and it was determined that there were four accidents where the loss of offsite power was identified as a contributing factor, they are:

- "Loss of External Electrical Load" (15.2.2)
- "Loss of Non-Emergency AC Power To the Station Auxiliaries" (15.2.6)
- "Loss of Normal Feedwater Flow" (15.2.7)
- "Anticipated Transient Without Scram" (15.8)

The design and testing of the PSStech OPD devices are sufficient to produce a reliable design such that there is not more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the USAR or in the likelihood of malfunction of an SSC important to safety (the offsite power circuits). The OPD devices are normally configured in a 2-out of-2 coincidence logic to protect against inadvertent trips. No failures can cause the firmware portion of the devices to cause a trip of both offsite power circuits.

The Question 1 analysis determined that the OPDS did not result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated.

Additionally, the evaluation of Question 2 determined that the use of diverse hardware and software in two independent channels arranged in a 2/2 trip logic created a robust system that would result in less than a minimal likelihood of an occurrence of a malfunction of the #7 or

startup transformer. The OPDS equipment supplied by PSStech meets all applicable design and functional requirements including applicable codes and standards. Additionally, PSStech has certified through software Verification, Validation, and Test documentation that the OPDS controller program meets IEEE Std. 1012 SIL-3.

The evaluation of Questions 3 through 7 determined that there was no impact due to the proposed installation of the OPDS on the startup transformer or activation of the tripping function on the #7 transformer.

The proposed activity does not alter a method of evaluation used in establishing the design bases; therefore, Question 8 did not require evaluation.

Therefore, the evaluation concludes that there is no more than a minimal increase in the consequences of an accident or consequences of a malfunction; no possibility of an accident of a different type or for a malfunction with a different result; and no Design Basis Limit for a Fission Product Barrier is exceeded or altered. There is no change to any evaluation methodologies described in the USAR.

Evaluation Number: 59 2017-0002 Revision 0

Title: Wolf Creek Generating Station (WCGS) Simplified Head Assembly (SHA) Drop Analysis Revision

Activity Description:

Calculation 0720517.01-C-001 Revision 1 was performed to analyze the effects of a "Heavy Load" drop of the Simplified Head Assembly (SHA) during refueling outages. This reanalysis was performed because of changes to the Reactor Vessel (RV) stiffness, RV support stiffness, SHA weights to address increased SHA weight to 366,000 pounds from adding canopy seal clamp assemblies (CSCAs) to the SHA, and discrepancies identified within previous analysis. Also, a change in the maximum lift height allowed to 32 feet above the RV flange from 28.5 feet with air being the medium of which the SHA is dropped was analyzed.

This analysis is required because the WCGS polar crane was not procured as a "Single Failure Proof" crane. The analysis must meet the technical intent of (a) NRC Regulatory Issue Summary (RIS) 2005-25, "Clarification of NRC Guidelines for Control of Heavy Loads," (b) NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," and (c) NUREG-554 "Single Failure Proof Cranes for Nuclear Power Plants." Design basis calculation BB-FW-011 considered a weight of 375,000 lbs. and stiffness values from Westinghouse WCAP-9198 revision 0. 0720517.01-C-01 Revision 0 considered a weight of 357,000 lbs. and a stiffness value of 58,000 kip/in as the support stiffness for determining bending stress in the RV nozzles. The load drop height of 32 ft. was analyzed in 0720517.01-C-01 Revision 0 and in Evaluation 59 2008-006. A load drop height of 32 ft. is analyzed again in Revision 1 with the increased weight and different stiffness values and consistent energy dissipation factors for evaluating the maximum bending stress and RV displacement.

50.59 Evaluation:

The changes do not introduce any increase in the possibility of a change in the frequency of an accident nor of a malfunction of an SSC important to safety because these changes are not initiators of accidents and no new failure modes are introduced.

The analysis performed demonstrated that the changes do no result in a more than minimal increase in the consequences of an accident or a malfunction of an SSC important to safety.

The analysis also demonstrates that there was no effect on a Design Basis Limit for a Fission Product Barrier. The changes in the calculation all represented changes to design inputs; therefore, these changes do not result in a departure from any method of evaluation described in the USAR used in establishing the design basis or in the safety analysis.

Evaluation Number: 59 2017-0003 Revision 0

Title: Temporarily Secure Cavity Cooling Fans to Support NI-31 Degraded Cooling Issue

Activity Description:

The cavity cooling fans (CGN02A and CGN02B), components of the cavity cooling system, will be secured for less than one hour to record temperature data in the excore nuclear instrument detector wells. Additionally, temperatures (both excore nuclear instrument detector well and cavity concrete) will be continuously monitored during the evolution. If at any time either of the monitored temperatures approaches 5°F of their USFAR described limits then one of the cavity cooling fans will be started. The cavity cooling fans are a part of the cavity cooling system, a subsystem of the containment HVAC system (GN). The cavity cooling fans' design basis function is "... to limit the normal ambient temperature to acceptable limits around the [excore] neutron detectors. The cavity concrete temperature is limited to 150°F, except for the area directly below the seal ring support, by air cooling of the reactor vessel supports and reactor coolant pipe whip restraints ..."

The USAR (Section 9.4.6.2.1 – the general descriptions of the containment HVAC systems, page 9.4-66) states that "Normally, one fan is in operation to provide the necessary airflow." "Fan" in this instance is referring to cavity cooling fan.

This temperature data will be collected to support DCP 020060, which is being implemented to resolve the NI-31 degraded cooling issue.

50.59 Evaluation:

The function of the cavity cooling system will be unaffected by securing the fans for less than one hour; therefore, the consequences of any accidents or malfunctions of SSCs important to safety previously evaluated in the USAR will not increase. Because the cavity cooling fans are not the initiators of any accident, the frequency of an accident or malfunction of an SSC important to safety previously evaluated in the USAR will not increase. Since no new components, or processes are being added, and the design and the function of the cavity cooling system will be unchanged, no new accidents or malfunctions of SSCs important to safety will be created.

The proposed activity does not alter a method of evaluation used in establishing the design bases.

Evaluation Number: 59 2018-0001 Revision 0

Title: Radiological Consequences of a Fuel Handling Accident in the Fuel Building During Can Sipping

Activity Description:

Indications of a failed fuel assembly have been observed during Cycle 22 operation. As such, a task that must be performed during the outage is to identify the leaking fuel assembly. The primary method to be used is in-mast sipping during core offload; if the leaking fuel assembly is not identified then the backup plan is to use canister sipping (can sipping) for the offloaded assemblies in the spent fuel pool.

In order to reduce the amount of time sipping the assemblies during outage, the can sipping machine is designed with two separate sipping chambers and a lid that slides to cover one chamber at a time. The intent is to load one assembly into the device while another assembly is being sipped. This allows for the movement of assemblies into and out of the device to coincide with the actual can sipping.

Using the equipment in this manner results in two fuel assemblies removed from the spent fuel pool racks at the same time instead of one. However, the current Chapter 15 Fuel Handling Accident (FHA) in the fuel building assumes the breakage of one entire assembly, as only one assembly is moved outside of the spent fuel pool grid at a time. Therefore, this activity requires a 50.59 evaluation. While unlikely that the can sipping equipment will fail in such a way that results in the complete failure of two fuel assemblies, in order to support the proposed can sipping activities, it was confirmed that the radiological consequences of a FHA in the fuel building involving two assemblies remain within the WCGS accident dose limits. As can sipping would not begin until offload is complete, a longer decay time (200 hours vs. 76 hours) is modeled for the two fuel assemblies. The decay time is a limitation that will be imposed on when can sipping can load two assemblies at the same time.

Additionally, this activity is to support a specific maintenance activity to support restoring an SSC (damaged fuel assembly) to its original design condition.

50.59 Evaluation:

The proposed activity of can sipping with two fuel assemblies removed from the spent fuel pool racks at the same time instead of one was evaluated to validate that the consequences of a worst case event would result in a less than minimal increase in the consequences of an accident previously evaluated in the UFSAR. While the worst case postulated event would increase the dose consequences, as discussed in the response to Question 3 of this evaluation, the increase is less than minimal.

All of the eight evaluation questions have been addressed and answered No. The discussion for each question is provided in the evaluation. The conclusion of this evaluation is that no License Amendment is required. The changes may be made without prior NRC approval.

Evaluation Number: 59 2018-0002 Revision 0

Title: Change SR Detector Actuation from Automatic to Manual

Activity Description:

This activity will change the position of the nuclear instrumentation system source range detector's high voltage (HV) Manual ON/OFF handswitches when the plant is operating at power. The switches will be placed in the "HV OFF" position rather than the "Normal" position. This will result in a manual operator action being required to energize the source range detectors versus the current configuration in which the detectors are automatically energized by the P-6 interlock. A 50.59 evaluation is required to evaluate the change from an automatic action to a manual one for energizing the source range detectors.

The USAR (Section 7.2.1.1.6 Analog System, page 7.2-15) describes the nuclear instrumentation system's primary function as "to protect the reactor by monitoring the neutron flux and generating appropriate trips and alarms for various phases of reactor operating and shutdown conditions." The source range detectors, a component of the nuclear instrumentation system, have 2 functions: 1) monitor neutron flux at the lowest levels of neutron flux and 2) provide protective trips at the lowest levels of neutron flux.

The USAR (Section 7.2.1.1.3.a Reactor Trip System Interlocks, Power escalation permissives, page 7.2-12) describes one of the P-6 interlock's functions as automatically reactivating source range trips when both intermediate range channels fall below the permissive (P-6) setpoint. The function can be broken into 2 sub-functions: 1) automatically unblocking the source range trips when both intermediate range channels fall below the P-6 setpoint and 2) automatically restoring high voltage when both intermediate range channels fall below the P-6 setpoint. Sub-function 1 will be unaffected by this change. Sub-function 2 will be affected because an operator action will be relied on to ensure the source range design functions are available when required.

The first function of the source range detectors, monitoring at low neutron levels, is not affected by this change because the function is redundantly and independently provided by two Gamma-Metrics detectors (NI-60 and NI-61), which are required per TS 3.3.3. The Gamma-Metrics are located 180 degrees offset from the two NI detectors.

The second function of the source range detectors, the protective trip, is required in MODE 2 below P-6 and in MODEs 3, 4, and 5 with the control rods capable of withdrawal or all rods not fully inserted (TS 3.3.1 Function 5). The protective function can only be fulfilled by the Westinghouse source range detectors (NI-31 and NI-32), and is affected by this change. However, this change does not impact the Technical Specifications (TS) requirement to have NI-31 and NI-32 energized when control rods are capable of withdrawal or not fully inserted.

After this change is implemented, the source range detector's HV Manual ON/OFF handswitches will be operated in the 'HV Off' position rather than the 'Normal' position when the plant is operating at power. The P-6 interlock reset will no longer be solely relied upon to automatically energize the source range detectors. Instead, administrative controls will be used to ensure that the source range detectors are energized, as required, to provide their TS required trip function or low neutron level monitoring function. The administrative controls will be incorporated through procedure revisions to GEN 00-002: Cold Shutdown to Hot Standby, GEN

00-005: Minimum Load to Hot Standby, OFN MA-038: Rapid Plant Shutdown, OFN SB-008: Instrument Malfunction, and ALR 00-077E: SR Hi Volt Fail. The revision will include a step to place the HV Manual ON/OFF to the 'Normal' position before the source range design functions become required.

50.59 Evaluation:

One of the functions of the P-6 permissive is to ensure that the functions of the source range detectors are available when required. This function will still be fulfilled after implementation of this change. Administrative controls will be implemented to ensure the source range detectors are energized such that their design basis functions are fulfilled when required.

Administrative controls will be added to GEN 00-002: Cold Shutdown to Hot Standby, GEN 00-005: Minimum Load to Hot Standby, OFN MA-038 Rapid Plant Shutdown, OFN SB-008: Instrument Malfunctions, and ALR 00-077E: SR Hi Volt Fail to ensure that the source range design functions are available when required (by switching the HV ON/OFF Handswitch to the "Normal" position).

All of the eight evaluation questions have been addressed and answered No. The discussion for each question is provided in the evaluation. The conclusion of this evaluation is that no License Amendment is required. The change may be made without prior NRC approval.

Evaluation Number: 59 2018-0003 Revision 0

Title: Operation of Class 1E Compensatory Cooling During Post-Modification Testing

Activity Description:

Currently temporary procedure, TMP 18-001 Rev 0 is written to allow post maintenance testing of DCP 14269, SGK05 PERMANENT COMPENSATORY MODIFICATIONS, which requires placing in standby the Functional train of the Class 1E A/C unit, when testing the compensatory fans for the opposite (Nonfunctional) train. Rev 0 was written to allow testing when the unit is defueled and irradiated fuel movement is NOT in progress (i.e., not in a mode of applicability). This revision will allow this activity during Modes 5 and 6.

Basic Engineering Disposition (BED) WO # 16-414781-317 was performed by Engineering to support Operability of Class 1E electrical equipment during post-modification testing of SGK05 compensatory system, the BED evaluated the condition and required actions for maintaining Operability of at least one train of Class 1E electrical equipment during post modification testing.

Because the A/C systems are support systems for TS equipment (the Class 1E electrical equipment), shutting down the support system requires, in most cases, that the supported TS equipment be declared inoperable. Under normal conditions, the temporary compensatory fan system would be implemented via procedure SYS GK-200 to maintain Operability of both trains of Class 1E equipment. Placing the temporary cooling systems in service per SYS GK-200 would invalidate the system alignment requirements needed to accomplish the Post Modification Testing for DCP 14269. During the refueling outage with various equipment out of service (i.e. the emergency diesel generators, etc.) means that the opposite train Class 1E A/C system may not be considered Functional, thus Operability would not be maintained with one SGK05A/B unit shut down and the other SGK05A/B unit non-functional (but running and available) without appropriate actions.

In order to allow testing of one or both trains of the SGK05 PERMANENT COMPENSATORY MODIFICATION while in the mode of applicability, the use of a dedicated operator to replace the automatic start function for the "Functional" SGK05A/B unit during the time the component is secured will need to be implemented. This is to maintain one Class 1E train operable during testing of the opposite train's permanent compensatory cooling subsystem.

It should also be noted that the auto start of the SGK05A/B unit will function, except for the short period of time that it takes to secure the unit and to realign it to "Auto". The auto start would actuate on a load shed/sequencer (as a result of Safety Injection Signal (SIS), or Loss of Offsite Power (LOOP)), or on a Control Room Ventilation Isolation Signal (CRVIS), as long as one of the fire protection lockout signals has not been received. The only time the credited "Functional" SGK05 unit will not be available to auto start upon receipt of the appropriate signal is during the actual shutdown sequence, prior to realignment for auto start. Dedicated individuals will be stationed to align the "Functional" SGK05 unit to auto start, or to manually start the unit under the following conditions:

1. SGK05A/B unit that is being tested trips and cannot be restarted, OR

2. SGK05A/B unit that is being tested stops cooling, OR

3. Temperatures in the rooms that are being monitored reach or exceed the 80°F limit (the 80°F limit is chosen to maintain margin between the temperatures of the rooms, and the initial condition starting temperature for rooms during accident conditions in calculation GK-M-016).

50.59 Evaluation:

The use of a dedicated operator action to replace the automatic start function for the "Functional" SGK05A/B unit in support of post maintenance testing will affect the likelihood of occurrence of a malfunction of an SSC important to safety by replacing an automatic function with a manual action. However, the impact on the likelihood of occurrence of a malfunction of an SSC important to safety is not more than minimal as discussed in Question 2 of this evaluation. There was no impact identified in any of the other questions.

All of the eight evaluation questions have been addressed and answered No. The discussion for each question is provided in the evaluation. The conclusion of this evaluation is that no License Amendment is required. The changes may be made without prior NRC approval.