UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

January 13, 2022

Mr. Ken Peters, Senior Vice President
and Chief Nuclear Officer
Vistra Operations Company LLC
P.O. Box 1002
Glen Rose, TX 76043,

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT – TI-194 REPORT 05000445/2021012 AND 05000446/2021012

Dear Mr. Peters:

On December 2, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Comanche Peak Nuclear Power Plant. On November 30, 2021, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

No findings or violations of more than minor significance were identified during this inspection.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at http://www.nrc.gov/reading-rm/adams.html and at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

Signed by Siwy, Andrew
on 01/12/22

Andrew D. Siwy, Acting Chief
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 05000445 and 05000446
License Nos. NPF-87 and NPF-89

Enclosure:
As stated

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SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT – TI-194 REPORT 05000445/2021012 AND 05000446/2021012 – DATED JANUARY 13, 2022

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers:	05000445 and 05000446
License Numbers:	NPF-87 and NPF-89
Report Numbers:	05000445/2021012 and 05000446/2021012
Enterprise Identifier:	I-2021-012-0032
Licensee:	Vistra Operations Company LLC
Facility:	Comanche Peak Nuclear Power Plant
Location:	Glen Rose, TX 76043
Inspection Dates:	May 24, 2021 to December 2, 2021
Inspectors:	R. Deese, Senior Reactor Analyst J. Drake, Senior Reactor Inspector
Approved By:	Andrew D. Siwy, Acting Chief Engineering Branch 2 Division of Reactor Safety

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a Temporary Instruction 2515/194 at Comanche Peak Nuclear Power Plant, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to https://www.nrc.gov/reactors/operating/oversight.html for more information.

List of Findings and Violations

No findings or violations of more than minor significance were identified.

Additional Tracking Items

None.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the Temporary Instruction (TI) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html. Samples were declared complete when the TI requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

OTHER ACTIVITIES – TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL

2515/194 - Inspection of the Licensee's Implementation of Industry Initiative Associated With the Open Phase Condition Design Vulnerabilities In Electric Power Systems (NRC Bulletin 2012-01)

The inspectors reviewed the licensee's implementation of Revision 3 to the "Nuclear Energy Institute Voluntary Industry Initiative," (ADAMS Accession No. ML19163A176) dated June 6, 2019. This review included the licensee's application of risk screening techniques to determine that the risk associated with an open phase condition (OPC) event is significantly reduced through the implementation of detection circuits and the use of operator manual actions in lieu of automatic trip functions.

Sections 03.01.a, "Detection, Alarms and General Criteria," and 03.01.b, "Protective Actions," were previously inspected and documented in Inspection Report 05000445/2018012 and 05000446/2018012 with noted exceptions. Because the licensee has chosen to demonstrate compliance with Revision 3 of the OPC initiative using the risk informed evaluation method in lieu of the designs automatic protective functions, section 03.01.c, "Use of Risk-Informed Evaluation Method" is inspected in this report. This included reviewing how the licensee updated their licensing basis to reflect the need to protect against OPCs.

Inspection of the Licensee's Implementation of Industry Initiative Associated With the OPC Design Vulnerabilities In Electric Power Systems (NRC Bulletin 2012-01) (1 Sample)

(1)	Vistra Operations Company, LLC selected the open phase detection system designed and manufactured by Power System Sentinel Technologies, LLC, as the design vendor for Comanche Peak Nuclear Power Plant. At the end of this inspection the licensee had installed complete systems on all four startup transformers, but at the time of the inspection none of the systems were fully functional. The licensee has repaired the active input signal and reset leads that had been lifted to clear locked in alarm conditions on three of the transformers. System installation on the XST2 transformer was still in progress at the end of this inspection, due to a high impedance condition on the transformer that prevents use of the open phase isolation system (OPIS). Exceptions 1. The XST2 transformer OPC equipment had not been placed in service due to a high impedance condition that is suspected to be with the transformer. The XST2 transformer is currently in service, but there is no automatic open phase monitoring of this power source to safety related loads.

Observations:

1. The voluntary industry initiative requires that, “Sufficient ‘robust’ calculational bases or tests must be provided to show that the OPC will not adversely affect important-to-safety equipment performance. Testing is preferred if this is possible without challenging online shutdown risk profiles.”

There is conflicting information on the licensee’s position relative to the OPC. The licensee initially provided information to the NRC that an OPC condition would impact the plant. During the on-site portion of the inspection, the engineering department provided the position that the transformers were so large that an OPC would not impact loads on the affected transformer.

The initial information provided to the NRC during the TI-194 inspection was that an OPC could impact the plant loads on the standby transformers. Comanche Peak contracted a vendor to perform an analysis of the electrical system. The vendor’s analysis report in section 5.1.3. states: “The fact that the scope of this study does not include protective relaying actions effectively neglects the possible occurrence of motors tripping after an open-phase event. If, in the extreme case, all motors are tripped before any open-phase protection occurs, the result would be, or close to, a no load situation. If such a situation occurred, and the open phase was not accompanied with a corresponding grounding of the conductor then this would be as difficult or more difficult to detect as the studied light load cases. Therefore, while it is highly unlikely that essentially all the load will be removed due to motor stalling / tripping before an open-phase detection scheme would activate, existing motor relaying behavior must be included in any scheme that is considered for open-phase protection.” The vendor indicated that without licensee information about protective relaying actions the analysis is incomplete. Existing motor relaying behavior must be included in any scheme that is considered for open-phase protection. The Engineering Department had not provided the protective relaying data to the vendor or the Training Department. While onsite to complete the inspection in September, the inspector was informed that Engineering staff held the position that the transformers were sized such that an OPC would not impact the performance of the loads on the transformers due to “light” loading conditions. A new/different Engineering position - that because the transformers are of sufficient capacity and that they are "lightly" loaded during normal and accident operations and can "easily" carry all their RCPs, means that they did not need to trip the transformers on an OPC. This new position was provided when the inspectors questioned the missing protective relaying information in the Sargent-Lundy Analysis. TR 2021-0005612 was written to support this position, but the TR does not appear to meet voluntary industry initiative requirements of “Sufficient” and “robust” calculational bases or tests that must be provided to show that the OPC will not adversely affect important-to-safety equipment performance. In addition, this position conflicts with Training and Operations strategies that were being used to training the operating crews.

2. Without protective relaying information, inspectors were unable to verify the adequacy of the training provided to operators or the fidelity of the simulator scenario. This was not considered a safety issue because the operators have the ability to reset any safety related loads that may trip due to the OPC directly from the hand switches in the control room, and there would be minimal impact to restoration time.

3. Neither offsite power nor alternate OPIS equipment were in the “monitoring mode” at the

	beginning of the inspection due to degraded equipment conditions. Three of the OPIS panels had “Abnormal injection Signal” alarms locked in, defeating the equipment’s ability to detect an OPC on a lightly loaded transformer. The licensee is still implementing the compensatory measures from TI-192 for Unit 2 while the XST2 transformer is in service. 4. Portions of the alarm circuitry previously connected had electrical connections lifted, removing the modifications previously implemented. The connections have since been reset. 5. During the simulator scenario, the training provided indications to the crew that large voltage differentials were apparent on the phase-to-phase voltage readings. The inspectors questioned these indications because of the different information provided about the revised engineering staff position. The Training and Operations Departments were using the data from the vendor’s report even though no protective relaying data had been provided to them and the Engineering Department had taken the position that it is not appropriate for Comanche Peak. 6. The open phase condition was not explicitly modeled in the current probabilistic risk assessment model. The licensee had included assessment of OPC into their continuous update database with the stated intent of incorporating the assessment into one or more of their probabilistic risk assessment model notebooks in the next revision of the model and stated it will be considered, as appropriate, during any future model revisions.

INSPECTION RESULTS

No findings were identified.

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On November 30, 2021, the inspectors presented the preliminary TI-194 results to Mr. K. Peters, Senior Vice President and Chief Nuclear Officer, and other members of the licensee staff.
- On December 2, 2021, the inspectors presented the TI-194 inspection results to Mr. A. Marzloff, Plant Manager, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
2515/194	Corrective Action Documents		AI-TR-2016-005840	
2515/194	Corrective Action Documents Resulting from Inspection		TR-2021-005612, TR-2020-006678	
2515/194	Engineering Changes	CPES-E-1138	OPEN PHASE PROTECTION SYSTEM	2
2515/194	Miscellaneous		Comanche Peak Open Phase Protection For Offsite Power Sources	0
2515/194	Miscellaneous	EV-TR-2019-006419-6	CPNPP Plant Response to an Open Phase Condition	0
2515/194	Miscellaneous	SL-011517	Luminant Generation Comanche Peak Nuclear Power Plant Open Phase Evaluation - Transformers XST1, XST2 and XST2A	0
2515/194	Procedures	ABN-601	RESPONSE TO A 138/345 KV SYSTEM MALFUNCTION	14
2515/194	Procedures	ABN-602	RESPONSE TO A 6900/480V SYSTEM MALFUNCTION	8
2515/194	Procedures	ALM-0140	ALARM PROCEDURE X-ALB-14	11
2515/194	Procedures	STA-421	CONTROL OF ISSUE REPORTS	21