Dominion Energy Kewaunee, Inc.
5000 Dominion Boulevard, Glen Allen, VA 23060

Dominion

October 2, 2007

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

Serial No. 07-0404
KPS/LIC/KP: R4:
Docket No. 50-305
License No. DPR-43

DOMINION ENERGY KEWAUNEE, INC.
KEWAUNEE POWER STATION
LICENSE AMENDMENT REQUEST - 232
OPERABILITY TESTING OF EMERGENCY DIESEL GENERATORS

Pursuant to 10 CFR 50.90, Dominion Energy Kewaunee, Inc. (DEK) requests an amendment to Facility Operating License Number DPR-43 for Kewaunee Power Station (KPS). The proposed amendment would revise the current KPS Technical Specification (TS) testing requirements for ensuring the operability of the remaining operable Emergency Diesel Generator (EDG) when the opposite train EDG is inoperable. In addition, the proposed amendment would change the following KPS TS sections:

1. TS 3.7, "Auxiliary Electrical Systems," Section b and TS 4.6, "Periodic Testing of Emergency Power System," Section a, "Diesel Generators," to clearly state the actions required when one EDG is made or found to be inoperable.

2. TS 3.7 to add a new specification to allow two EDGs to be inoperable for up two hours, consistent with improved standard technical specifications.

Attachment 1 to this letter contains a description, a safety evaluation, a significant hazards determination, and environmental considerations for the proposed amendment. Attachment 2 contains the marked-up KPS Technical Specification pages. Attachment 3 contains marked-up KPS Technical Specification Bases pages and is provided for information only.

The KPS Plant Operations Review Committee has approved the proposed amendment and a copy of this submittal has been provided to the State of Wisconsin in accordance with 10 CFR 50.91(b).

DEK requests approval of the proposed amendment by March 31, 2008. This approval date is requested based on discussions with the NRC staff. Approval of this amendment will improve the risk profile of the station. Once approved, the amendment shall be implemented within 60 days.

If you have any questions or require additional information, please contact Mr. Craig Sly at (804) 273-2784.

Very truly yours,

Gerald T. Bischof
Vice President – Nuclear Engineering

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Gerald T. Bischof, who is Vice President – Nuclear Engineering of Dominion Energy Kewaunee, Inc. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of that Company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 2nd day of October, 2007.

My Commission Expires: May 31, 2010.

Vicki L. Hull
Notary Public

VICKI L. HULL
Notary Public
Commonwealth of Virginia
140542
My Commission Expires May 31, 2010

Attachments:

1. Discussion of Change, Safety Evaluation, Significant Hazards Determination and Environmental Considerations
2. Marked-up Technical Specifications Pages
3. Marked-up Technical Specifications Bases Pages

Commitments made in this letter: None

cc:

Administrator, Region III
U. S. Nuclear Regulatory Commission
Region III
2443 Warrenville Road
Suite 210
Lisle, Illinois 60532-4352

Mr. P. D. Milano
Senior Project Manager
U.S. Nuclear Regulatory Commission
Mail Stop O8-H-4A
Washington, D. C. 20555

NRC Senior Resident Inspector
Kewaunee Power Station

Public Service Commission of Wisconsin
Electric Division
P.O. Box 7854
Madison, WI 53707

ATTACHMENT 1

LICENSE AMENDMENT REQUEST - 232
OPERABILITY TESTING OF EMERGENCY DIESEL GENERATORS

DISCUSSION OF CHANGE, SAFETY EVALUATION, SIGNIFICANT HAZARDS DETERMINATION AND ENVIRONMENTAL CONSIDERATIONS

KEWAUNEE POWER STATION

DOMINION ENERGY KEWAUNEE, INC.

OPERABILITY TESTING OF EMERGENCY DIESEL GENERATORS

DISCUSSION OF CHANGE, SAFETY EVALUATION, SIGNIFICANT HAZARDS DETERMINATION AND ENVIRONMENTAL CONSIDERATIONS

INTRODUCTION

Pursuant to 10 CFR 50.90, Dominion Energy Kewaunee, Inc. (DEK) requests an amendment to the Kewaunee Power Station (KPS) Facility Operating License DPR-43. The proposed amendment would revise the current KPS Technical Specification (TS) testing requirements for ensuring the operability of the remaining operable Emergency Diesel Generator (EDG) when the opposite train EDG is inoperable. The proposed amendment would also provide a new specification for the condition when two EDGs are inoperable and revise a surveillance testing requirement to align the KPS TS with NUREG-1431, "Standard Technical Specifications-Westinghouse Plants," Revision 3.

The proposed amendment is consistent with American National Standards Institute/Institute of Electrical and Electronics Engineering (IEEE) Std. 387-1977 (IEEE 387-1977), Section 6.6.2.1 and NUREG-1431, Revision 3, Sections 3.8.1.b.3.1, 3.8.1.b.3.2 and 3.8.1.e.1.

The proposed amendment qualifies for a no significant hazards consideration under the standards set forth in 10 CFR 50.92(c) and meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment. Approval of the proposed amendment is requested prior to March 31, 2008. The requested approval date is based on discussions with the NRC staff. Approval of this amendment will improve the risk profile of the station.

1.0 DESCRIPTION

The proposed amendment would revise the KPS TS to more clearly specify the testing requirements for ensuring the operability of the remaining EDG when the opposite train EDG is inoperable. The proposed amendment would also add a new TS, which specifies a time limit for two EDGs being inoperable, and improves overall EDG reliability by eliminating unnecessary testing of the remaining operable EDG when the cause of the inoperable EDG has been determined not to exist on the operable EDG. Specifically, the proposed amendment would revise the following sections of the KPS TS:

1. KPS TS 3.7, "Auxiliary Electrical Systems," Section b and TS 4.6, "Periodic Testing of Emergency Power System," Section a, "Diesel Generators," to clearly state the actions required when one EDG is made or found to be inoperable.

2. TS 3.7.b.7 to add a new specification allowing two EDGs to be inoperable for up two hours, consistent with improved standard technical specifications.

2.0 PROPOSED CHANGE

The proposed amendment would modify KPS Technical Specification 3.7 and 4.6 as follows:

2.1 Revision of TS 3.7.b.2

KPS TS 3.7.b.2 currently states the following:

"2. One diesel generator may be inoperable for a period not exceeding 7 days provided the other diesel generator is tested daily to ensure OPERABILITY and the engineered safety features associated with this diesel generator are OPERABLE."

The proposed amendment would change the current wording of TS 3.7.b.2 to the following:

"2. One diesel generator may be inoperable for a period not exceeding 7 days provided within 24 hours, either:

A. Determine the OPERABLE diesel generator is not inoperable due to common cause failure, or

B. Perform surveillance requirement TS 4.6.a.1.A on the OPERABLE diesel generator."

2.2 Insertion of new TS 3.7.b.7

A new TS, TS 3.7.b.7, would be inserted as follows:

"7. Two diesel generators may be inoperable for 2 hours."

2.3 Revision of TS 4.6.a

KPS TS 4.6.a currently states the following:

"a. Diesel Generators

1. Manually-initiated start of each diesel generator, and assumption of load by the diesel generator. This test shall be conducted monthly, loading the diesel generator to at least 2600 KW (nominal) for a period of at least 1 hour."

The proposed amendment would change the current wording of TS 4.6.a. to the following:

"a. Diesel Generators

Note 1: All diesel generator starts may be preceded by an engine pre-lube period and followed by a warm-up period before required loading.

Note 2: A modified diesel generator start involving idling and gradual acceleration to synchronous speed may be used as recommended by the manufacturer for TS 4.6.a.1.A.

Note 3: Momentary transients outside the diesel generator load range do not invalidate these tests.

1. Monthly each diesel generator shall be tested by:

   A. Manually starting each diesel generator from a standby condition verifying that each diesel generator achieves steady state voltage and frequency.

   B. Loading the diesel generator to at least 2600 KW (nominal) for a period of at least 1 hour."

3.0 BACKGROUND

3.1 KPS EDG System Description

At KPS, independent alternate power systems are provided with adequate capacity and testability to supply the required engineered safety features and protection systems. KPS is supplied with normal, standby and emergency power sources as follows:

1. The main source of auxiliary power during plant operation is the plant's generator. Power is supplied via the main auxiliary transformer for 4160-volt non-safety related buses 1-1 through 1-4, which is connected to the main leads of the generator. Safeguard buses 1-5 and 1-6 are normally powered from the substation.

2. Standby power required during startup, shutdown and after reactor trip is supplied from the American Transmission Company's 138 kV and 345 kV

transmission systems. The reserve auxiliary and tertiary auxiliary transformers can both be powered from either transmission system through the interconnecting auto-transformer.

3. Two diesel generators are connected to the engineered safety features buses to supply emergency shutdown power in the event of loss of all other ac auxiliary power.

4. Emergency power for vital instruments and for control is supplied from two safeguard 125V dc station batteries.

The KPS diesel generators are located in the Class I section of the Administration Building and are connected to separate 4160V auxiliary system buses. This Class I area is divided into two rooms with an EDG in each room. Each diesel generator starts automatically on a safety injection signal or upon the occurrence of an undervoltage condition on its corresponding 4160V auxiliary buses. Each diesel generator has adequate capacity to supply one set of the engineered safety features for the Design Basis Accident.

The Emergency Diesel Generator (EDG) System provides a reliable source of emergency electric power to engineered safety features and other essential loads in the event of a Loss of Offsite Power (LOOP). The EDG System consists of two Emergency Diesel Generators (EDG A and EDG B). Each EDG is capable of automatically starting and sequentially supplying the power requirements of one complete set of engineered safety features equipment, thereby providing redundancy in the event of loss of one EDG. The EDGs are capable of picking up electrical load within ten seconds following a start signal. Each EDG can be started automatically or manually and consists of the following subsystems: Diesel Generator Mechanical System (DGM) and Diesel Generator Electrical System (DGE). The DGM consists of a diesel engine, starting air, fuel oil, scavenging air and exhaust, lubricating oil, governor, and jacket cooling. The DGE consists of a generator with excitation system and controls.

3.2 Related Industry Guidance

3.2.1 Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability"

In July 1984, the NRC issued Generic Letter (GL) 84-15, "Proposed Actions to Improve and Maintain Diesel Generator Reliability," (reference 1). The purpose of GL 84-15 was to propose actions that would improve the reliability of EDGs. An example of a performance technical specification to support desired EDG reliability goals was provided in Enclosure 3 to the generic letter. This generic letter provided two actions associated with the condition of one inoperable diesel, which were: (1) verify correct breaker alignment and power availability of offsite power, and (2) verify the opposite train diesel starts from ambient conditions and achieves rated frequency and voltage.

According to GL 84-15, 24 hours was identified as a reasonable amount of time to confirm that the operable EDG was not affected by the same problem as the inoperable EDG.

3.2.2 NUREG-1366, "Improvements to Technical Specification Surveillance Requirements"

In May 1992, the NRC completed a comprehensive examination of TS surveillance requirements that require testing at power. An evaluation was documented in NUREG-1366 (reference 12), which was published in December 1992. In this guidance document, the staff recommended "...the requirements to test the remaining diesel generator(s) when one diesel generator is inoperable due to any cause other than preplanned preventative maintenance or testing be limited to those situations where the cause of inoperability has not been conclusively demonstrated to preclude the potential for a common mode failure. However, when such testing is required, it should be performed within 8 hours of having determined that the diesel generator is inoperable."

The draft version of NUREG-1431 (reference 9) distributed in the fall of 1992 contained the NUREG-1366 recommendation of an 8-hour completion time for testing the remaining diesel generator or demonstrating that a common mode failure does not exist on the remaining EDG. However, when NUREG-1431, Revision 0, was formally issued on September 28, 1992, the completion time for testing or demonstrating that a common mode failure does not exist on the remaining EDG was revised from 8 to 24 hours.

The proposed changes to the KPS TS would incorporate a 24-hour completion time for testing or demonstrating that a common mode failure does not exist on the remaining EDG as recommended in NUREG 1431.

3.2.3 NUREG-1431, "Standard Technical Specifications – Westinghouse Plants"

The specifications related to EDG testing have been further revised under the Improved Technical Specifications as stated in NUREG-1431, Revision 3. NUREG-1431 includes the following:

1. A specification to address required actions when one EDG is inoperable. The specification provides that either the opposite train EDG be determined to be not inoperable due to common cause failure or that the opposite train EDG be tested to verify it starts from a standby condition and achieves steady state voltage and frequency.

2. A performance-based surveillance test requirement that is designed to minimize EDG wear and maintain reliability while reasonably ensuring the operability by

testing the continued ability of the EDG to mitigate design basis accidents and transients and maintain the unit in a safe shutdown condition.

3. A specification for two EDGs being inoperable.

The proposed changes more closely align KPS TS with the NUREG 1431, Revision 3 specifications discussed above.

4.0 TECHNICAL ANALYSIS

4.1 Changes to TS 3.7.b.2 for One EDG Inoperable

The proposed amendment would revise KPS TS 3.7, "Auxiliary Electrical Systems," Section b, which prescribes actions for ensuring the operability of the remaining operable EDG when the opposite train EDG is inoperable.

Currently, KPS TS 3.7.b.2 specifies that at least one diesel generator may be inoperable for a period not exceeding seven days provided the remaining diesel generator is tested daily to ensure operability and the engineered safety features associated with the diesel generator are operable.

TS 3.7.b would be changed to clarify the actions to be performed when one EDG is inoperable. Currently, TS 3.7.b requires the operable EDG be tested daily to ensure operability if the opposite train EDG is inoperable for any reason. The proposed revision would allow 24 hours to determine if the operable EDG and inoperable EDG are subject to a common cause failure mode. According to Generic Letter 84-15, 24 hours is a reasonable amount of time to confirm that the operable EDG is not affected by the same problem which has affected the inoperable DG. The required test to be performed is specifically provided as TS 4.6.a.1.A, which consists of a manual start of the EDG from a standby condition and verifying that the EDG achieves steady state voltage and frequency. TS 4.6.a.1.A would not require that the EDG be loaded. These proposed TS revisions are consistent with the NRC guidance provided in Generic Letter 84-15, Generic Letter 93-05 (as modified in NUREG 1431, Revision 0) and the standard technical specifications in NUREG-1431, Revision 3.

The proposed changes would not require testing of the redundant EDG if a common cause failure is ruled out. If common failure can't be ruled out, the proposed change to TS 3.7.b.2 minimizes the time the two EDGs are inoperable by only requiring a start test. Also, the proposed change permits an engine pre-lube and warmup period as discussed in GL 84-15, to improve EDG reliability.

4.2 Addition of New TS 3.7.b.7 for Two EDGs Inoperable Concurrently for up to Two Hours

The proposed amendment revises TS 3.7.b to add a new specification allowing two EDGs to be inoperable for up to two hours. This time limit is consistent with Regulatory Guide 1.93, "Availability of Electric Power Sources," Position C.4 for plant conditions where two onsite AC sources electric supplies are not available. RG 1.93 states that:

> *"the risk associated with continued operation for a very short period of time could be less than that associated with immediate shutdown (immediate shutdown may result in grid instability which could result in loss of AC power)..."*

In addition, NUREG 1431 notes that the intent of the two-hour limit is:

> *"to avoid the risk associated with an immediate controlled shutdown and to minimize the risk associated with this level of degradation."*

Therefore, the proposed time limit of 2 hours is consistent with Regulatory Guide 1.93, Position C.4 and NUREG 1431, Revision 3.

4.3 Changes to TS 4.6.a for EDG Surveillance Testing

The proposed amendment would revise TS 4.6, "Periodic Testing of Emergency Power System," Section a, "Diesel Generators," to clarify the monthly EDG testing requirements. These proposed revisions are consistent with the periodic testing guidance in American National Standards Institute/Institute of Electrical and Electronics Engineering (IEEE) Std. 387-1977 (IEEE 387-1977), Generic Letter 84-15, and the Standard Technical Specifications in NUREG-1431. The proposed changes include the addition of three notes regarding EDG starting and loading. These notes are intended to minimize the wear on KPS EDGs as a result of testing. The proposed notes are consistent with the EDG manufacturer's recommendations, NUREG-1431, and guidance contained in Generic Letter 84-15.

The proposed amendment would divide the current monthly surveillance test (TS 4.6.a.1) into two parts. The first part includes a manual start from standby and verification that the EDG reaches steady state voltage and frequency. The second part includes a requirement to load the EDG to its rated load (2600 kW) for a period of at least one hour. Splitting this surveillance test into two parts and adding three notes in the proposed manner provides two advantages. First, the testing requirements become clearer and easier to understand. Second, the unloaded portion of the test can be specifically referenced in TS 3.7.b as the required test when one EDG is inoperable and proposed TS 3.7.b.2.A has not been satisfied for the operable EDG. In order to satisfy the new TS 3.7.b.2.B, it is necessary only to perform the unloaded portion of this surveillance test. Performing only the unloaded portion of the test will reduce unnecessary wear on the EDGs while minimizing the amount of time that two EDGs are

inoperable during the testing. This change is consistent with the guidance contained in Generic Letter 84-15, Generic Letter 93-05 and NUREG-1431.

4.4 Licensing Precedent

In a letter dated June 23, 2004, the Virginia Electric and Power Company (reference 2) submitted a license amendment request (LAR) for Surry Power Station Units 1 and 2 (Surry). The LAR revised the actions necessary for ensuring the operability of the remaining operable EDG when either unit's dedicated EDG or the shared backup EDG was inoperable. Surry TS 3.16.B.1.a.2 originally required that if either of the units dedicated or shared EDGs were inoperable for reasons other than planned maintenance, operability of the remaining EDG had to be demonstrated daily. The Surry license amendment request noted that unnecessary testing of the operable EDG created the potential for reduced equipment reliability and caused component wear. In addition, the Surry TS for surveillance testing required both of the affected unit's EDGs to be declared inoperable during the opposite train's EDG operability verification test, thus increasing safety equipment unavailability.

The Surry LAR proposed deleting the following wording in TS 3.16.B.1.a.2:

> *"If the diesel generator became inoperable due to any cause other than preplanned preventative maintenance or testing, demonstrate the operability of the remaining OPERABLE diesel generator daily."*

The TS above was replaced with a revised TS as follows:

> *"Within 24 hours, determine that the OPERABLE diesel generator is not inoperable due to common cause failure or demonstrate the operability of the remaining OPERABLE diesel generator by performing Surveillance Requirement 4.6.A.1.a."*

Similarly, KPS LAR 232 proposes, as noted in Attachment 1, Section 2, to insert the following wording in TS 3.7.b.2:

> *"2. One diesel generator may be inoperable for a period not exceeding 7 days provided within 24 hours, either:*
>
> *A. Determine the OPERABLE diesel generator is not inoperable due to common cause failure, or*
>
> B. *Perform surveillance requirement TS 4.6.a.1.A on the OPERABLE diesel generator."*

Consistent with GL 84-15, GL 93-05, NUREG-1366, and NUREG-1431, the intent of the Surry LAR was to preclude unnecessary testing of the operable EDG and enhance

equipment reliability. By letter dated April 5, 2005, (reference 3), the Surry LAR was approved by NRC. The NRC staff concluded,

> *"Although VEPCO's proposed 24-hour timeframe differs from the 8-hour time period that is specified in NUREG-1366 and GL 93-05, the 24-hour timeframe is consistent with the guidance contained in GL 84-15. The NRC staff concludes that the proposed change is intended to reduce unnecessary testing of EDG(s) as recommended by GL 84-15. On the basis of the above review, the NRC staff finds that the proposed change maintains compliance with requirements governing the design and operation of the Electrical Power System, provides adequate assurance of system reliability, and is consistent with the recommendations contained in NUREG-1366, GL 93-05, GL 84-15, and NUREG-1431. Therefore, the NRC staff finds VEPCO's proposed change to be acceptable."*

5.0 REGULATORY SAFETY ANALYSIS

5.1. No Significant Hazards Consideration

The proposed amendment would change KPS TS 3.7, "Auxiliary Electrical Systems," and TS 4.6, "Periodic Testing of Emergency Power System," to provide:

1. Clearer actions and surveillance requirements when one EDG is inoperable, and
2. A specification allowing two EDGs to be inoperable for up to two hours.

Dominion Energy Kewaunee, Inc. has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. **Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?**

   No.

   The proposed amendment would clarify testing requirements for the operable EDG, when one EDG is inoperable, and limit testing to only the intended purpose of the requirement. The intended purpose of the testing requirement is to provide reasonable assurance that when an EDG is inoperable, the opposite EDG is operable. The proposed change does not affect the initiators of analyzed events or the assumed mitigation of accident or transient events. Specifically, testing of the remaining operable diesel will still occur unless evaluation of the inoperable EDG confirms that its failure is not attributable to a common cause failure mechanism. Furthermore, the proposed change clarifies the surveillance testing necessary to give reasonable assurance of operability and restricts the amount of time to

perform the testing (i.e. with two inoperable EDGs) to two hours. This ensures no significant increase in the probability of a loss-of-power during the period of the confirming surveillance concurrent with an opposite train inoperable EDG. Elimination of unnecessary testing by acceptable evaluation of the operable EDG reduces component wear and promotes overall EDG reliability and availability. Clarification of required testing and restriction in the amount of time to complete the surveillance to confirm operability, reduces the probability and significance of common mode failures.

The proposed amendment would also add a new specification allowing two EDGs to be inoperable for up to two hours. This change does not significantly increase the initiators of analyzed events or the assumed mitigation of any accidents or transients.

Therefore, the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. **Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?**

Response: No.

The proposed amendment does not involve a physical alteration of the plant or a change in the methods used to respond to any evaluated plant accident. No new or different equipment is being installed and no installed equipment is being removed or operated in a different manner. Only a surveillance test clarification and limited two-hour action statement have been added to permit testing of the opposite train, operable EDG. Although the diesel generators will be tested in a different manner, the proposed changes will improve the availability and reliability of the diesel generators without creating the possibility of a new or different kind of accident from any accident previously evaluated. Furthermore, there is no alteration to the parameters within which the plant is normally operated or in the setpoints, which initiate protective or mitigative actions. Since the diesel generators will continue to be operated in the same manner and the proposed test protocol will improve diesel generator availability and reliability, no new failure modes are introduced by the proposed amendment.

Therefore, the proposed amendment does not create the possibility of a new or different kind of accident from any previously evaluated.

3. **Does the proposed amendment involve a significant reduction in a margin of safety?**

Response: No.

The proposed amendment would add a TS allowing two EDGs to be inoperable for up to two hours before the plant must be shutdown in a controlled manner. Allowing two EDGs to be inoperable for this limited period of time, while the normal offsite power source remains available, is consistent with Regulatory Guide 1.93 and not considered to be a significant reduction in a margin of safety.

Station operations and EDG surveillance requirements are not adversely affected by the proposed change. Furthermore, the proposed amendment does not adversely impact the condition or performance of structures, systems or components relied upon for accident mitigation or any safety analysis assumptions. The proposed amendment adds provisions to reduce EDG wear and increase availability.

Therefore, the proposed amendment to the KPS TS does not involve a significant reduction in a margin of safety.

Based on the above, Dominion Energy Kewaunee, Inc. concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

5.2. Applicable Regulatory Requirements/Criteria

The US Atomic Energy Commission (AEC) issued their Safety Evaluation (SE) of the Kewaunee Power Station (KPS) on July 24, 1972 with supplements dated December 18, 1972 and May 10, 1973. The SE, Section 3.1, "Conformance with AEC General Design Criteria," described the conclusions the AEC reached associated with the General Design Criteria in effect at the time. The AEC stated:

"The Kewaunee plant was designed and constructed to meet the intent of the AEC's General Design Criteria, as originally proposed in July 1967. Construction of the plant was about 50% complete and the Final Safety Analysis Report (Amendment No. 7) had been filed with the Commission before publication of the revised General Design Criteria in February 1971 and the present version of the criteria in July 1971. As a result, we did not require the applicant to reanalyze the plant or resubmit the FSAR. However, our technical review did assess the plant against the General Design Criteria now in effect and we are satisfied that the plant design generally conforms to the intent of these criteria."

As such, the appropriate General Design Criteria (GDC), from the Final Safety Analysis (Amendment 7), as updated and included in the KPS USAR, is included below.

10CFR 50 GDC Criterion 17 - Electric Power Systems

An on-site electric power system and an off-site electric power system shall be provided to permit functioning of structures, systems, and components important to safety. The safety function for each system (assuming the other system is not functioning) shall be to provide sufficient capacity and capability to assure that:

1. Specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences, and

2. The core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents.

The on-site electric power supplies, including the batteries, and the on-site electric distribution system, shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure.

Electric power from the transmission network to the onsite electric distribution system shall be supplied by two physically independent circuits (not necessarily on separate rights-of-way) designed and located so as to minimize to the extent practical the likelihood of their simultaneous failure under operating and postulated accident and environmental conditions. A switchyard common to both circuits is acceptable. Each of these circuits shall be designed to be available in sufficient time following a loss of all on-site alternating current power supplies and the other off-site electric power circuit, to assure that specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded. One of these circuits shall be designed to be available within a few seconds following a loss-of-coolant accident to assure that core cooling, containment integrity, and other vital safety functions are maintained.

Provisions shall be included to minimize the probability of losing electric power from any of the remaining supplies as a result of, or coincident with, the loss-of-power generated by the nuclear power unit, the loss-of-power from the transmission network, or the loss-of-power from the on-site electric power supplies.

Evaluation

Independent alternate power systems are provided with adequate capacity and testability to supply the required ESF and protection systems.

The plant is supplied with normal, standby and emergency power sources as follows:

1. The main source of auxiliary power during plant operation is the plant's generator. Power is supplied via the Main Auxiliary Transformer, which is connected to the main leads of the generator.

2. Standby power required during startup, shutdown and after reactor trip is supplied from the American Transmission Company's 138-kV and 345-kV transmission systems. The Reserve Auxiliary and Tertiary Auxiliary Transformers can both be powered from either transmission system through the interconnecting auto-transformer.

3. Two diesel generators are connected to the engineered safety features buses to supply emergency shutdown power in the event of loss of all other AC auxiliary power.

4. Emergency power for vital instruments and for control is supplied from two safeguard 125-V DC station batteries.

The diesel generators are located in the Class I section of the administration building and are connected to separate 4160-V auxiliary system buses. Each diesel generator will be started automatically on a safety injection signal or upon the occurrence of undervoltage on either of its corresponding 4160-V auxiliary buses. Each diesel generator has adequate capacity to power one train of the ESF for the design basis accident.

Criterion 39 – Emergency Power For Engineered Safety Features

Alternate power systems shall be provided and designed with adequate independency, redundancy, capacity, and testability to permit the functioning required of the engineered safety features. As a minimum, the on-site power system and the off-site power system shall each, independently, provide this capacity assuming a failure of a single active component in each power system.

Evaluation

The above Criterion 39, as with others cited throughout this license application as a basis for design, is as suggested by AIF in its October 2, 1967 comments on the then-proposed AEC Criteria. As noted in KPS USAR Section 1.8 the design also meets the KPS staff's understanding of the intent of the Criteria as originally proposed by AEC in July 1967. In the case of Criterion 39, where a difference existed, the more stringent AEC criterion was followed. As a result, in our opinion the emergency power systems as designed also meet the intent of the General Design Criterion 17 adopted February 20, 1971, as amended July 7, 1971.

Criterion 24 – Emergency Power For Protection Systems

In the event of loss of all off-site power, sufficient alternate sources of power shall be provided to permit the required functioning of the protection systems.

Evaluation

The facility is supplied with normal, reserve and emergency power to provide for the required functioning of the protection systems.

In the event of a reactor and turbine trip, two diesel generators, as described in KPS USAR Section 8, are available to supply emergency power. Any one diesel generator is capable of supplying the emergency power requirements of the plant.

The instrumentation and controls portions of the protection systems are supplied from the 125-V station batteries during the diesel generator startup period, as detailed in KPS USAR, Section 8.

In conclusion, based on the considerations discussed above:

1. There is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner;

2. Such activities will be conducted in compliance with the Commission's regulations, and;

3. The issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 REFERENCES

1. Letter from Darrell G. Eisenhut (NRC) to Licensees, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability (Generic Letter 84-15)," dated July 2, 1984.
2. Letter from Leslie N. Hartz (VEPCO) to Document Control Desk (NRC), "Surry Power Station Units 1 and 2, Proposed Technical Specifications Change – Revision of Actions for Unplanned Emergency Diesel Generator Inoperability," dated June 23, 2004.
3. Letter from Stephen Monarque (NRC) to D. A. Christian (VEPCO), "Surry Power Station, Units 1 and 2 – Issuance of Amendments on Revision of Actions for Unplanned Emergency Diesel Generation Inoperability," dated April 5, 2005.
4. Letter from Morton B. Fairtile (NRC) to D.C. Hintz (WPSC), "Issuance of License Amendment 63," dated July 5, 1985.
5. Letter from D.C. Hintz (WPSC) to Director of Nuclear Reactor Regulation, "Diesel Generator Reliability," dated May 13, 1986.
6. Letter from James G. Parlow (NRC) to Licensees, "Line Item Technical Specifications Improvements to Reduce Surveillance Requirements for Testing During Power Operation (Generic Letter 93-05)," dated September 27, 1993.
7. Letter from W. L. Stewart (Virginia Electric Power Company) to U.S. Nuclear Regulatory Commission (Document Control Desk) "Virginia Electric and Power Company - Surry Power Station Units 1 And 2, Proposed Technical Specification Change, Opposite Train Surveillance Testing Requirements," dated September 20, 1991.
8. American National Standards Institute/Institute of Electrical and Electronics Engineering (IEEE) Std. 387-1977 (IEEE 387-1977), "IEEE Standard Criteria for Diesel-Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations."
9. NUREG-1431, Revision 3, "Standards Technical Specifications, Westinghouse Plants."
10. NRC Regulatory Guide 1.9-1979, "Selection, Design, and Qualification of Diesel-Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," dated December 1979.
11. Regulatory Guide 1.93, "Availability of Electric Power Sources," dated December 1974.
12. NUREG-1366, "Improvements to Technical Specification Surveillance Requirements," dated December 1992.

ATTACHMENT 2

LICENSE AMENDMENT REQUEST – 232
OPERABILITY TESTING OF EMERGENCY DIESEL GENERATORS

MARKED-UP TECHNICAL SPECIFICATIONS PAGES

MARKED-UP TS PAGES:

TS 3.7-2
TS 4.6-1

KEWAUNEE POWER STATION

DOMINION ENERGY KEWAUNEE, INC.

b. During power operation or recovery from inadvertent trip, any of the following conditions of inoperability may exist during the time intervals specified. If OPERABILITY is not restored within the time specified, then within 1 hour action shall be initiated to achieve HOT STANDBY within the next 6 hours.

1. Either auxiliary transformer may be out of service for a period not exceeding 7 days provided the other auxiliary transformer and both diesel generators are OPERABLE.

2. One diesel generator may be inoperable for a period not exceeding 7 days provided within 24 hours, either:

   A. Determine the OPERABLE diesel generator is not inoperable due to common cause failure, or

   B. Perform surveillance requirement TS 4.6.a.1.A on the OPERABLE ~~the other~~ diesel generator. ~~is tested daily to ensure OPERABILITY and the engineered safety features associated with this diesel generator are OPERABLE.~~

3. One battery may be inoperable for a period not exceeding 24 hours provided the other battery and two battery chargers remain OPERABLE with one charger carrying the d-c supply system.

4. If the conditions in TS 3.7.a.8 cannot be met, power operation may continue for up to 7 days provided at least two transmission lines serving the substation are OPERABLE.

5. Three off-site power supply transmission lines may be out of service for a period of 7 days provided reactor power is reduced to 50% of rated power and the two diesel generators shall be tested daily for OPERABILITY.

6. One 4160-V or 480-V engineered safety features bus may be out of service for 24 hours provided the redundant bus and its loads remain OPERABLE.

7. Two diesel generators may be inoperable for 2 hours.

c. When its normal or emergency power source is inoperable, a system, train or component may be considered OPERABLE for the purpose of satisfying the requirements of its applicable LIMITING CONDITION FOR OPERATION, provided:

1. Its corresponding normal or emergency power source is OPERABLE; and

2. Its redundant system, train, or component is OPERABLE.

4.6 PERIODIC TESTING OF EMERGENCY POWER SYSTEM

APPLICABILITY

Applies to periodic testing and surveillance requirements of the emergency power system.

OBJECTIVE

To verify that the emergency power sources and equipment are OPERABLE.

SPECIFICATION

The following tests and surveillance shall be performed:

a. Diesel Generators

Note 1: All diesel generator starts may be preceded by an engine pre-lube period and followed by a warm-up period before required loading.

Note 2: A modified diesel generator start involving idling and gradual acceleration to synchronous speed may be used as recommended by the manufacturer for TS 4.6.a.1.A.

Note 3: Momentary transients outside the diesel generator load range do not invalidate these tests.

~~1.Manually-initiated start of each diesel generator, and assumption of load by the diesel generator. This test shall be conducted monthly, loading the diesel generator to at least 2600 KW (nominal) for a period of at least 1 hour.~~

1. Monthly each diesel generator shall be tested by:

   A. Manually starting each diesel generator from a standby condition verifying that each diesel generator achieves steady state voltage and frequency.

   B. Loading the diesel generator to at least 2600 KW (nominal) for a period of at least 1 hour.

2. Automatic start of each diesel generator, load shedding, and restoration to operation of particular vital equipment, all initiated by a simulated loss of all normal a-c station service power supplies together with a simulated safety injection signal. This test will be conducted at each REFUELING interval to assure that each diesel generator will start and assume required loads to the extent possible within 1 minute, and operate for ≥ 5 minutes while loaded with the emergency loads.

3. Each diesel generator shall be inspected at each major REFUELING outage.

4. Diesel generator load rejection test in accordance with IEEE 387-1977, Section 6.4.5, shall be performed at least once per 18 months.

ATTACHMENT 3

LICENSE AMENDMENT REQUEST – 232
OPERABILITY TESTING OF EMERGENCY DIESEL GENERATORS

MARKED-UP TECHNICAL SPECIFICATIONS BASES PAGES

MARKED-UP TS BASIS PAGES:

TS B3.7-1
TS B3.7-2
TS B4.6-1
TS B4.6-2
TS B4.6-3
TS B4.6-4

KEWAUNEE POWER STATION

DOMINION ENERGY KEWAUNEE, INC.

BASIS – Auxiliary Electrical Systems (TS 3.7)

The intent of this TS is to provide assurance that at least one external source and one standby source of electrical power is always available to accomplish safe shutdown and containment isolation and to operate required engineered safety features equipment following an accident.

Plant safeguards auxiliary power is normally supplied by two separate external power sources which have multiple off-site network connections [1]: the reserve auxiliary transformer from the 138-Kv portion of the plant substation, and a tertiary winding on the substation auto transformer. Either source is sufficient to supply all necessary accident and post-accident load requirements from any one of four available transmission lines.

Each diesel generator is connected to one 4160-V safety features bus and has sufficient capacity to start sequentially and operate the engineered safety features equipment supplied by that bus. The set of safety features equipment items supplied by each bus is, alone, sufficient to maintain adequate cooling of the fuel and to maintain containment pressure within the design value in the event of a loss-of-coolant accident.

Each diesel generator starts automatically upon low voltage on its associated bus, and both diesel generators start in the event of a safety injection signal.[2] A minimum of 7 days fuel supply for one diesel generator is maintained by requiring 36,000 gallons of fuel oil, thus assuring adequate time to restore off-site power or to replenish fuel. The diesel fuel oil storage capacity requirements are consistent with those specified in ANSI N195-1976/ANS-59.51, Sections 5.2, 5.4, and 6.1.

The plant safeguards 125-V d-c power is normally supplied by two batteries each of which will have a battery charger in service to maintain full charge and to assure adequate power for starting the diesel generators and supplying other emergency loads. A third charger is available to supply either battery.[3]

The arrangement of the auxiliary power sources and equipment and this TS ensure that no single fault condition will deactivate more than one redundant set of safety features equipment items and will therefore not result in failure of the plant protection systems to respond adequately to a loss-of-coolant accident.

DG Operability Testing With One Inoperable DG - (TS 3.7.b.2)

TS 3.7.b.2.A provides an allowance to avoid unnecessary testing of the OPERABLE DG. If it can be determined that the cause of the inoperable DG does not exist on the OPERABLE DG, SR 4.6.a.1.A is not required to be performed. If the cause of the inoperability exists on the OPERABLE DG, the other DG would be declared inoperable upon discovery and TS 3.7.b.7 would be entered. Once the common cause failure is repaired on both DG's, the common cause failure no longer exists, and TS 3.7.b.2 is satisfied. If the cause of the initial inoperable DG cannot be confirmed not to exist on the remaining DG, or it is decided not to pursue a common cause evaluation, performance of SR 4.6.a.1.A suffices to provide assurance of continued OPERABILITY of the OPERABLE DG. In the event the inoperable DG is restored to OPERABLE status prior to completing either 3.7.b.2.A or 3.7.b.2.B, the corrective action program will continue to evaluate the common cause possibility. This continued evaluation, however, is no longer under the 24-hour constraint imposed while in TS

---

[1] USAR Figure 8.2-1 and 8.2-2
[2] USAR Section 8.2.3
[3] USAR Section 8.2.2 and 8.2.3

3.7.b.2. According to Generic Letter 84-15, 24-hours is a reasonable time frame to confirm that the OPERABLE DG(s) is not affected by the same problem as the inoperable DG.

Operation may continue in TS 3.7.b.2 for a period to not exceed 7 days. In TS 3.7.b.2, the remaining OPERABLE DG and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. The 7-day completion time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

Two DGs Inoperable Concurrently For Up To Two Hours – (TS 3.7.b.7)

With Train A and Train B DGs inoperable, there are no remaining standby AC sources. Thus, with an assumed loss of offsite electrical power, insufficient standby AC sources are available to power the minimum required ESF functions. Since the offsite electrical power system is the only source of AC power for this level of degradation, the risk associated with continued operation for a very short time could be less than that associated with an immediate controlled shutdown. Since any inadvertent generator trip could also result in a total loss of offsite AC power, the time allowed for continued operation is severely restricted. The intent here is to avoid the risk associated with an immediate controlled shutdown and to minimize the risk associated with this level of degradation.

According to Regulatory 1.93, with both DGs inoperable, operation may continue for a period that should not exceed 2 hours.

BASIS – Periodic Testing of Emergency Power Systems (TS 4.6)

Each diesel generator can start and be ready to accept full load within 10 seconds, and will sequentially start and supply the power requirements for one complete set of engineered safety features equipment in approximately one minute.[1] This test will be conducted during each REFUELING outage to ensure that the diesel generator will start and assume required loads in accordance with the timing sequence listed in USAR Table 8.2-1 after the initial starting sequence.

The specified test frequencies provide reasonable assurance that any mechanical or electrical deficiency will be detected and corrected before it can result in failure of one emergency power supply to respond when called upon to function. Its possible failure to respond is, of course, anticipated by providing two diesel generators, each supplying through an independent bus, a complete and adequate set of engineered safety features equipment. Further, both diesel generators are provided as backup to multiple sources of external power, and this multiplicity of sources should be considered with regard to adequacy of test frequency.

Notes, TS 4.6.a.1.A and TS 4.6.a.2

These SRs are intended to confirm continued availability of standby electrical power supplies, which may be used to mitigate DBAs and transients and to maintain the unit in a safe shutdown condition. To minimize the wear on moving parts that do not get lubricated when the DG is not running, these SRs are modified by a Note to indicate that all DG starts for these Surveillances may be preceded by an engine prelube period and followed by a warmup period prior to loading. For the purposes of SR 4.6.a.1.A and SR 4.6.a.2 testing, the DGs are started from standby conditions. Standby conditions for a DG mean that the diesel engine coolant and oil are being continuously circulated and temperature is being maintained consistent with manufacturer recommendations.

In order to reduce stress and wear on diesel engines, the manufacturer of KPS DGs recommend a modified start in which the starting speed of DGs is limited, warmup is limited to this lower speed, and the DGs are gradually accelerated to synchronous speed prior to loading. These start procedures are the intent of Note 2, which is only applicable when such modified start procedures are recommended by the manufacturer.

Monthly Diesel Generator Surveillance (TS 4.6.a.1)

The monthly tests specified for the diesel generators will demonstrate their continued capability to start and carry rated load. The fuel supplies and starting circuits and controls are continuously monitored, and abnormal conditions in these systems would be indicated by an alarm without need for test startup. Monthly tests are performed in

---

[1] USAR Section 8.2

accordance with the intent of IEEE 387-1977, paragraph 6.6.1. The steady state bands of ≥ 4000 and ≤ 4400 for voltage and ≥ 60 and ≤ 61 for frequency are based on calculations involved with electrical auxiliary system study and safeguards diesel generator loading adjustment for operations other than 60 Hz.

REFUELING Interval Diesel Generator Surveillance (TS 4.6.a.2)

The REFUELING interval diesel generator surveillance demonstrates that the Emergency Power System, and its control system, will function automatically to provide engineered safety equipment power in the event of loss of off-site power coincident with a safety injection signal. This test demonstrates proper tripping of motor feeder breakers, main supply and tie breakers on the affected bus, and sequential starting of essential equipment to demonstrate OPERABILITY of the diesel generators. This test is initiated by simultaneously unblocking safety injection and simulating a loss-of-voltage signal. ~~This surveillance is performed to meet the intent of IEEE 387-1977 paragraph 6.6.2.~~ (Note also that Reg. Guide 1.108 addresses diesel generator surveillance.)

REFUELING Interval Diesel Generator Inspection, TS 4.6.a.3

Inspections are performed at REFUELING outage intervals in order to maintain the diesel generators in accordance with the manufacturers' recommendations. The inspection procedure is periodically updated to reflect experience gained from past inspections and new information as it is available from the manufacturer.

18-Month Load Rejection Test, TS 4.6.a.4

The load rejection test demonstrates the capability of rejecting the maximum rated load without overspeeding or attaining voltages which would cause the diesel generator to trip, mechanical damage, or harmful overstresses.

Operating Cycle Short-Term Load Test, TS 4.6.a.5

Loading the diesel generators to their short-term rating will demonstrate their capability to provide a continuous source of emergency AC power during a load perturbation of up to 110% of the diesel generator's continuous rating.

IEEE 387-1977 paragraph 3.7.2, defines a diesel generators short time rating. Paragraph 6.4.3 defines the rated load test for diesel generators, item 2 states to load the diesel generator to the short time rating for 2 hours. Paragraph 6.6.2 describes the operational testing to be performed for the diesel generators. Although the rated load test is not listed in paragraph 6.6.2, item 2 of paragraph 6.4.3 has been determined to be necessary to be performed on the emergency diesel generators.

NRC Regulatory Guide 1.9, Revision 2, Regulatory Position 14, describes the method in which this test should be performed. This test follows Position 14 except that instead

of the continuous rating load being applied for 22 hours the KPS emergency diesel generators shall be loaded to 2700 kW for 22 hours. Loading the emergency diesel generators to 2700 kW is acceptable because it will bound the post-accident emergency diesel generator loads without increasing the frequency of the 18-month diesel inspection surveillance. The diesel generator starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelubricating, warmup, and for gradual loading are applicable to this surveillance requirement.

The "once per operating cycle" frequency is consistent with the recommendations of IEEE Std. 387-1977, paragraph 6.6.2, and takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

Three notes modify this Surveillance. Note 1 states that momentary transients due to changing busloads do not invalidate this test. Similarly, momentary power factor transients above the power factor operation will not invalidate the test. The reason for Note 2 is that during operation with the reactor critical, performance of this Surveillance could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. This restriction from normally performing the Surveillance in the OPERATING or HOT STANDBY MODE is further amplified to allow the Surveillance to be performed for reestablishing OPERABILITY (e.g., post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in the OPERATING or HOT STANDBY MODE. Risk insights or deterministic methods may be used for this assessment. Credit may be taken for unplanned events that satisfy this surveillance requirement.

Note 3 ensures that the DG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of ≤ 0.89. This power factor is representative of the actual inductive loading a DG would see under design basis accident conditions. Under certain conditions, however, Note 3 allows the Surveillance to be conducted as a power factor other than ≤ 0.89. These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to ≤ 0.89 results in voltages on the emergency busses that are too high. Under these conditions, the power factor should be maintained as close as practicable to 0.89 while still maintaining acceptable voltage limits on the emergency busses. In other circumstances, the grid voltage may be such that the DG excitation levels needed to obtain a power factor of ≤ 0.89 may not

cause unacceptable voltages on the emergency busses, but the excitation levels are in excess of those recommended for the diesel generator. In such cases, the power factor shall be maintained close as practicable to 0.89 without exceeding the diesel generator excitation limits. When conditions exist where the testing is performed at a power factor greater than 0.89, the circumstances surrounding the conditions need be documented. The tests documented in TS Bases 4.6.a.2, 4.6.a.4, and 4.6.a.5 meet the intent of IEEE 387-1977 paragraph 6.6.2.

Station Batteries, TS 4.6.b

Station batteries will deteriorate with time, but precipitous failure is extremely unlikely. The surveillance specified is that which has been demonstrated over the years to provide indication of a cell becoming unserviceable long before it fails.

If a battery cell has deteriorated, or if a connection is loose, the voltage under load will drop excessively, indicating need for replacement or maintenance.