UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 106 TO FACILITY OPERATING LICENSE NO. DPR-28

VERMONT YANKEE NUCLEAR POWER STATION

DOCKET NO. 50-271

1.0 INTRODUCTION

By letter dated November 30, 1987 with modifications and clarification submitted on January 20, and April 13, 1988, the Vermont Yankee Nuclear Power Corporation (Vermont Yankee, the licensee) requested changes to the Vermont Yankee Technical Specifications (TS) as incorporated in Facility Operating License DPR-28. The proposed change is concerned with increasing the Logic System Functional Testing and Calibration intervals from every six months to once per operating cycle. The following systems would be affected by this proposed change:

1) Core Spray System

2) Low Pressure Coolant Injection System

3) High Pressure Coolant Injection System

4) Automatic Depressurization System

5) Recirculation Pump Trip Actuation System

6) Primary Containment Isolation

7) High Pressure Coolant Injection System Isolation

8) Reactor Core Isolation Cooling System Isolation

9) Reactor Building Ventilation System Isolation and Standby Gas Treatment System Isolation

10) Off-Gas System Isolation

11) Control Rod Block System

This proposed change would add relays that were exempted from the six-month system logic testing and calibration.

The licensee based their proposed change on the following:

1. Plant safety and operational requirements dictate that many surveillance tests required by the Technical Specifications should be or must be performed during periods of planned plant shutdowns, such as refueling outages. The revised trip system logic testing methodology and procedures have resulted in an increased number of relays and contacts directly tested. A change in the requirements from performing these tests every six months to once per operating cycle allows for safer testing flexibility since many of the relays are not testable during power operations without creating an unnecessary risk to the plant, due to unnecessary challenges to systems and bypasses of portions of systems for testing.

2. The proposed logic surveillance test intervals meet the intent and purpose of the surveillance requirements for the system(s) and are consistent with those specified within the BWR Standard Technical Specifications (STS).

3. The proposed surveillance frequency allows greater flexibility in scheduling the surveillance of the systems and, as such, provides for performance at more opportune times when testing conditions are less challenging to operational safety.

Based upon the Vermont Yankee review of their technical specifications and the NRC interpretation of an acceptable Logic System Functional Test it was determined that enhancements could be made in the licensees technical specifications. The Vermont Yankee Technical Specification defines the Logic System Functional Test as "a test of all relays and contacts of a logic circuit from sensor to activated device to insure all components are operable per design intent. Where possible, action will go to completion, i.e., pumps will be started and valves opened."

2.0 EVALUATION

The staff has reviewed the Vermont Yankee Nuclear Power Corporation proposed TS changes in accordance with section 7 of the Standard Review Plan. As part of the staff's review a meeting was held between Vermont Yankee and NRC to discuss staff concerns, on March 15, 1988. Additional information was also provided by the licensee on April 13, 1988 in response to the staff's request.

As a result of the staff's review of Vermont Yankee's submittals and the meeting of March 15, 1988, the staff has noted the following:

1) The requested change meets the licensee's TS definition of Logic System Functional Testing in that the enhanced testing to be performed at once-per-operating cycle is a complete sensor to actuated device Logic System Functional Test, while the existing six-month test is not. The TS are presently written to exempt certain safety-related relays from the six-month Logic System Functional Testing. In the proposed TS the licensee did not request to exempt any relays therefore, all relays in the instrument string are tested. In the meeting with the licensee it was also noted the six-month test is performed by overlap testing. The overlap test (monthly and six-month) covers only the sensor relays.

   As part of the overlap test the sensor relays are cycled monthly to complete the individual channel functional testing. In the monthly testing the sensor relay cycling is verified; however, individual relay contacts continuity is not verified. During the six-month trip Logic System Functional Testing the same relay contacts are bypassed and are therefore not verified to be operational. The licensee takes credit for the monthly functional testing combined with their existing six-month trip Logic System Functional Testing as a complete Logic System Functional Test as defined by their TS. The staff generally agrees that overlap testing is acceptable; however, the staff does not believe there is adequate overlap in the Vermont Yankee present method of Logic System Functional Testing since the sensor contacts are not verified to be operational. The sensor relays are cycled during the monthly testing to verify mechanical operation; however, the specific contacts that would perform the required safety input to the Logic System are not verified. The enhanced Logic System Functional Test proposed by the licensee to be performed once-per-operating cycle is a complete sensor to actuated safety-related device test. The enhanced test will verify the operation of the sensor relay contacts. The staff considers the once-per-operating cycle test to be a complete Logic System Functional Test, which meets both the Licensee's and the Standard TS requirements. It is also noted that the once-per-operating cycle testing is consistent with the Standard TS testing interval requirements for Logic System Functional testing.

2. It has also been noted that during the existing six-month testing, the High Pressure Core Injection (HPCI), the Reactor Core Isolation Cooling (RCIC), Low Pressure Core Injection (LPCI) and Off Gas Systems are disabled during the specific Logic System Functional Testing. The period that the individual systems are out of service varies from two to six hours as relays associated with each system are tested. If an event occurred that required one of these systems to initiate while it was being tested, the system would not initiate automatically and would require manual actions from the operator. The staff does not believe it is desirable to either plant or public safety to make any safety-related system unavailable while the plant

is operating at power. The staff concludes that performing the Logic System Functional Testing once-per-operating cycle, when the plant is shutdown, is more desirable with respect to both plant and public safety.

3. The Vermont Yankee proposed TS change does not change setpoints, plant operations, protective functions, or the design basis of the plant. Therefore, these proposed changes do not create the possibility of a new or different kind of accident from any previously analyzed.

4. The potential of disabling safety equipment or challenging systems and components by lifting leads and using jumpers or incorrect system line up as a result of human error is reduced by requiring less frequent surveillance and conducting the testing during periods of plant shutdown.

The staff has reviewed the Vermont Yankee Power Corporation submittal and has concluded that changing the Logic System Functional Test Intervals from six-months to once-per-operating cycle for Vermont Yankee is acceptable based on the following:

1. The six-month testing is performed with the plant operating, which creates a situation for potential inadvertent scrams, actuations of equipment, and resultant transients with attendant unnecessary risks. Once-per-operating cycle testing is performed with the plant shutdown. Testing with the plant shutdown poses less operational challenges to the plant.

2. Existing six-month testing is incomplete due to exempt relays and sensor relay contacts not being properly tested and verified. The once-per-operating cycle test is a complete system test from sensor to actuator.

3. Six-month testing requires removing safety-related systems from service while the plant is operating, which is undesirable. The once-per-operating cycle test is only performed with the plant shutdown when the demand for safety systems is considerably reduced.

4. The proposed change does not change setpoints, plant operations, protective functions, or design basis of the plant. The change will not create the possibility of a new or different kind of accident from those previosuly analyzed.

5. In this case, the once-per-operating cycle test is more desirable since there will be less chance for human error that could inadvertently leave safety-related systems inoperable. Human errors are mistakes made by individuals, such as safety systems left with improper system line-ups, jumpers left installed or leads lifted which would adversely affect the proper initiation of a safety-related system. Increasing the test intervals decreases the chance for making human errors, thus reducing the chance of unknowingly making safety-related systems inoperable.

In summary the staff finds the once-per-operating cycle Logic System Functional Testing to be a more complete Logic System Functional Test than the existing six-month test. The content of the tests and test intervals are consistent with the STS, and are sufficient for monitoring the operability of system logic. In addition, since the testing will be performed when the plant is shutdown, there will be less system reconfiguration which will minimize human error. The staff believes that the new test requirement is a safety improvement over the old test requirement.

For the above reasons, the staff has concluded that the proposed TS is acceptable.

3.0 CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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Dated: August 9, 1988