

Docket No. 50-271

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Yankee Atomic Electric Company
ATTN: Mr. G. Carl Andognini
Assistant to the Vice President
20 Turnpike Road
Westboro, Massachusetts 01581

Gentlemen:

Enclosed is an "Order for Modification of License" by the Director of Regulation ordering a change in the Technical Specifications of Facility Operating License No. DPR-28 requiring inerting of the Vermont Yankee Nuclear Power Station containment atmosphere. To accomplish this, also enclosed is Amendment No. 7 to the license incorporating Change No. 18. The Regulatory staff finds that this action is required and that the public health, safety and interest require immediate implementation. Although the Order provides for the amendment to be effective immediately, it allows twenty days for the licensee to complete the inerting operation. Details relating to this matter are provided in the enclosed Safety Evaluation.

The Order is being filed with the Office of the Federal Register for publication.

Sincerely,

RS
for Roger S Boyd
for A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

*I notified Don Edwards
of NY of this order by
phone on 6/19/74
RS.*

Enclosures:

- 1. Order for Modification of License
- 2. Amendment No. 7 to License (Change 18)
- 3. Safety Evaluation

cc w/encls:
See attached

OK
EM 6/19

OFFICE >	L:ORB-2	L:ORB-2 for FDA	L:TR	OGC	L:AD/ORS	L:DD/RP
SURNAME >	RMDiggs:esp	FDAnderson DLZiemann	Schroeder	JGallo	KRGoller	AGiambusso
DATE >	6/19/74	6/19/74	6/19/74	6/19/74	6/19/74	6/19/74

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SURNAME

DATE >

June 19, 1974

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UNITED STATES OF AMERICA
ATOMIC ENERGY COMMISSION

In the Matter of)

VERMONT YANKEE NUCLEAR POWER)
CORPORATION)

(Vermont Yankee Nuclear Power)
Station))

Docket No. 50-271

ORDER FOR MODIFICATION OF LICENSE

I.

Vermont Yankee Nuclear Power Corporation, Turnpike Road, Route 9, Westboro, Massachusetts 01581 (the licensee) is the holder of License No. DPR-28, which authorizes full-power operation (1593 Mwt) of the Vermont Yankee Nuclear Power Station (the facility) located on the Connecticut River near Vernon, Vermont. The operating license was amended on October 12, 1972, to authorize full-power operation. ^{*/}

^{*/} On April 16, 1974, the Commission's Atomic Safety and Licensing Appeal Board issued a "Memorandum and Order" (ALAB-194), as a result of its review of the Atomic Safety and Licensing Board's Initial Decision dated February 27, 1973 (RAI-73-2) on the issue of inerting the facility containment atmosphere with nitrogen to protect against possible consequences of post-accident hydrogen combustion. This Memorandum and Order directed that the record be reopened for further consideration of the inerting question. In addition, the Order required that pending the outcome of further proceedings, the containment atmosphere should be deinerted unless staff was able to make a showing that there was justification for a stay from the deinerting requirement. On April 30, 1974, in response to the Memorandum and Order, staff submitted a brief with accompanying affidavits showing why the Board's Order with respect to deinerting should be stayed. On May 2, 1974, the Board issued another Memorandum and Order which, among other things, granted the stay for such time after May 17, 1974, as the Board may require to issue its decision on the request for a longer stay. The stay is still in effect.

II.

Section 3.7.A of the Technical Specifications, which are a part of License No. DPR-28, provides for the operation of Vermont Yankee in an inerted mode, i.e., the containment atmosphere during power operation is inerted with nitrogen gas. Subsection 3.7.A.7.a permits a limited exception to the inerting requirement. Specifically it states that: "After completion of the startup test program and demonstration of plant electrical output, the primary containment atmosphere shall be reduced to less than 4 percent oxygen with nitrogen gas during reactor power operation with reactor coolant pressure above 90 psig...".

[emphasis added]

The Regulatory staff (staff) has reviewed the basis for the above-quoted limited exception in the Technical Specifications from the requirement to operate Vermont Yankee in an inerted mode, and the staff has concluded that the protection of the health and safety of the public requires that further power operation of Vermont Yankee be permitted only with an inert containment atmosphere. The bases for this conclusion are set forth in the staff's safety evaluation in support of this Order entitled, "Safety Evaluation by the Directorate of Licensing Supporting Amendment No. 7 to License No. DPR-28," dated June 19, 1974. Said safety evaluation is hereby incorporated by reference and made a part of this Order.

The Commission's Advisory Committee on Reactor Safeguards (ACRS) has reviewed the general question of whether the Vermont Yankee Nuclear Power Station operating license should be amended to permit operation without inerting of the containment. The ACRS stated in its June 12, 1974, report to Dr. Ray that "at this time, the Committee believes that there is insufficient new information to warrant relaxation of its earlier recommendation that inerting be employed."

Although this Order becomes effective immediately upon issuance, the licensee has indicated that it does not have an adequate supply of nitrogen at the site to inert the containment atmosphere. The procurement of the necessary nitrogen by the licensee will take some time, and, therefore, the licensee will be allowed twenty (20) days to complete the inerting operation.

III.

In view of the foregoing, the Director of Regulation finds that an amendment to the Technical Specifications of Facility License No. DPR-28 by issuing Amendment No. 7 to the license incorporating Change No. 18 is required, and that the public health, safety and interest require that the amendment be immediately effective upon issuance.

Accordingly, pursuant to the Atomic Energy Act of 1954, as amended, the Commission's Rules and Regulations of 10 CFR Parts 2 and 50, and the license, IT IS ORDERED THAT:

- A. The Technical Specifications of Facility License No. DPR-28 are amended by issuing Amendment No. 7 to the license incorporating Change No. 18 which revises subsection 3.7.A.7.a of Limiting Conditions for Operation to read as follows:

"a. The primary containment atmosphere shall be reduced to less than 4 percent oxygen with nitrogen gas during reactor power operation with reactor coolant pressure above 90 psig, except as specified in Specification 3.7.A.7.b."

- B. This Order shall become immediately effective upon issuance.
- C. The company will be allowed twenty (20) days from the date of issuance of this Order to complete the inerting operation.
- D. Within twenty (20) days of the date of issuance of this Order, the licensee may file a request for a hearing with respect to this Order. Within the same twenty (20) day period, any other person whose interest may be affected may file a request for a hearing with respect to this Order. If a request for a

hearing is filed within the time prescribed herein, the Commission will issue a notice of hearing or an appropriate order. A request for a hearing must be filed with the Secretary of the Commission, U. S. Atomic Energy Commission, Washington, D. C. 20545, Attention: Chief, Public Proceedings Staff. A copy of the request for a hearing should also be sent to the Chief Hearing Counsel, Office of the General Counsel, Regulation, U. S. Atomic Energy Commission, Washington, D. C. 20545.

For further details with respect to this ORDER, see (1) Facility Operating License No. DPR-28, as amended, and the Technical Specifications (Section 3.7 of the Limiting Conditions of Operation) contained in Appendix A thereto, (2) the change (No. 18) to the Technical Specifications as incorporated by Amendment No. 7 to the license, (3) the concurrently issued Safety Evaluation by the Regulatory staff, and (4) the report of the Advisory Committee on Reactor Safeguards dated June 12, 1974.

All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D. C., and at the Brooks Memorial Library at 224 Main Street, Brattleboro, Vermont 05301.

A single copy of each of items (2), (3), and (4) may be obtained upon request addressed to the U. S. Atomic Energy Commission, Washington, D. C. 20545, Attention: Deputy Director for Reactor Projects, Directorate of Licensing - Regulation.

Dated at Bethesda, Maryland, this 19 day of JUN , 1974.

FOR THE ATOMIC ENERGY COMMISSION



John F. O'Leary
Director of Licensing

VERMONT YANKEE NUCLEAR POWER CORPORATION

DOCKET NO. 50-271

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 7
License No. DPR-28

1. The Atomic Energy Commission (the Commission) has found that, pursuant to 10 CFR Parts 2 and 50 of the Commission's regulations, an amendment of the Technical Specifications of Facility Operating License No. DPR-28 by issuing Amendment No. 7 to the license incorporating Change No. 18 is required, and that the public health, safety and interest require that the amendment be immediately effective upon issuance. This amendment relates to the provision on inerting the containment atmosphere of the Vermont Yankee Nuclear Power Station set forth in Section 3.7.A.7.a of the Technical Specifications (Appendix A).
2. Accordingly, paragraph 3.B of Facility License No. DPR-28 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendices A and B attached to Facility Operating License No. DPR-28 are revised as indicated in the attachment to this license amendment. The Technical Specifications, as revised, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications, as revised.
3. This license amendment is effective as of its date of issuance, except that twenty days hence are provided to complete the inerting operation.

FOR THE ATOMIC ENERGY COMMISSION

A. Giambusso, Deputy Director
for Reactor Projects
Directorate of Licensing

Attachment:
Change No. 18 to Appendix A
Technical Specifications

OFF	Date of Issuance:	JUN 19 1974				
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DATE >						

ATTACHMENT TO LICENSE AMENDMENT NO. 7

CHANGE NO. 18 TO TECHNICAL SPECIFICATIONS (APPENDIX A)

FACILITY OPERATING LICENSE NO. DPR-28

Section 3.7.A.7.a (on page 129) of the Technical Specifications is hereby changed to read as follows and a revised page 129 incorporating this change is attached hereto to supersede the existing page 129:

- "a. The primary containment atmosphere shall be reduced to less than 4 percent oxygen with nitrogen gas during reactor power operation with reactor coolant pressure above 90 psig, except as specified in Specification 3.7.A.7.b."

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3.7 LIMITING CONDITIONS FOR OPERATION

- c. Reactor operation may continue for fifteen (15) days provided that at least one position alarm circuit for each vacuum breaker is operable and each suppression chamber - drywell vacuum breaker is physically verified to be closed immediately and daily thereafter.

7. Oxygen Concentration

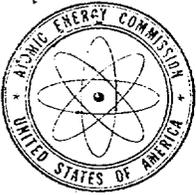
- a. The primary containment atmosphere shall be reduced to less than 4 percent oxygen with nitrogen gas during reactor power operation with reactor coolant pressure above 90 psig, except as specified in Specification 3.7.A.7.b.
 - b. Within the 24-hour period subsequent to placing the reactor in the Run mode following a shutdown, the containment atmosphere oxygen concentration shall be reduced to less than 4 percent and maintained in this condition. Deinerting may commence 24 hours prior to a shutdown.
8. If Specification 3.7.A cannot be met, an orderly shutdown shall be initiated immediately and the reactor shall be in a cold shutdown condition within 24 hours.

4.7 SURVEILLANCE REQUIREMENTS

- (4) A drywell to suppression chamber leak rate test shall demonstrate that with an initial differential pressure of not less than 1.0 psi, the differential pressure decay rate shall not exceed the equivalent of the leakage rate through a 1-inch orifice.

7. Oxygen Concentration

The primary containment oxygen concentration shall be measured and recorded on a weekly basis.



UNITED STATES
ATOMIC ENERGY COMMISSION

WASHINGTON, D.C. 20545

SAFETY EVALUATION BY THE DIRECTORATE OF LICENSING

SUPPORTING AMENDMENT NO. 7 TO LICENSE NO. DPR-28

(CHANGE NO. 18 TO APPENDIX A OF TECHNICAL SPECIFICATIONS)

VERMONT YANKEE NUCLEAR POWER CORPORATION

VERMONT YANKEE NUCLEAR POWER STATION

DOCKET NO. 50-271

Discussion

In the event of a postulated design basis loss-of-coolant accident (LOCA), hydrogen may accumulate within the containment as a result of (1) metal-water reaction between fuel cladding and reactor coolant, (2) radiolytic decomposition of the emergency cooling water, and (3) corrosion of metals by solutions used for core cooling or containment sprays. Hydrogen is a highly flammable gas and could burn or detonate if present in sufficient quantities and in combination with suitable concentrations of oxygen. The result of such burning or detonation might be loss of the leak-tightness of the containment in the event of a LOCA, with a consequent possible excessive leakage of fission products. Consequently, suitable means must be provided to assure that the amounts of hydrogen and/or oxygen in the containment following a LOCA are limited to prevent rapid burning or detonation.

The Regulatory staff has determined that, based on existing information, an initial metal-water reaction of 5% should be assumed. The hydrogen that could be released in a few seconds from the assumed initial metal-water reaction of 5% of the fuel cladding during a LOCA would result in a hydrogen concentration in the containment of Vermont Yankee of 10 to 15% by volume. The lower flammability limit for hydrogen in air has been established by the U. S. Bureau of Mines at 4 volume percent. Because it is not feasible to design hydrogen control systems to operate instantaneously to cope with such a large volume of hydrogen, the staff considers that it is necessary for Vermont Yankee to be operated with an inert containment atmosphere (i.e., the oxygen concentration should be initially depleted by the addition of nitrogen gas to prevent hydrogen from burning or detonating) to provide reasonable assurance that the station can be operated without undue risk to the health and safety of the public. For the above reasons, Section 3.7.A of the Technical Specifications that are a part of License No. DPR-28 for the operation of Vermont Yankee limits the permissible oxygen concentration in the containment during power operation by inerting the containment atmosphere.

Subsection 3.7.A.7.a of the Technical Specifications grants a limited exception of the inerting requirement. This exception allows deferment of inerting until "after completion of the startup test program and demonstration of plant electrical output." It was contemplated that the period of time required for startup testing and demonstration of plant electrical output at Vermont Yankee would not exceed the time period needed for most nuclear plants, namely three or four months. It should be emphasized that during the usual three or four month startup period much of the reactor operation is at low power levels and the fission product inventory in the fuel is less than the usual equilibrium level attained after significant periods of operation at a substantial power level. For these reasons, the Regulatory staff determined it was appropriate to permit this exception to the Technical Specifications to facilitate access into containment during the normal startup and testing period. More frequent access is usually necessary during the initial plant startup program when various plant systems and components undergo their first operational checkouts.

The operational history of the Vermont Yankee Nuclear Power Station^{*/} clearly indicates that the startup testing program was not performed over the usual time frame, but that, nevertheless, the startup testing program has been substantially completed at this time, and that plant electrical output was demonstrated by November 30, 1972. Most high power testing was performed during February and March of 1974 when restrictions on power level were removed and the plant operated at 100% of its rated capacity. Since the exception from the inerting requirement was not intended to be used as a basis for extended operation and since startup testing has been substantially completed, no basis currently exists to continue the exception. Moreover, since the Company has operated the reactor at power levels in the range of 63 to 100% of

^{*/} The operational history of the Vermont Yankee Nuclear Power Station has not been typical for nuclear power reactors, largely as a result of fuel performance problems. The plant was declared commercial by the Company directors on November 30, 1972. During the month of December 1972, steady-state operation at approximately 63 percent of rated power was maintained during which time startup tests were not performed. On January 17, 1973, the reactor was shutdown to replace defective fuel rods. Operation was resumed on March 2, 1973. The plant operated in the range of 68 to 75 percent of rated power from

rated power over a time frame in excess of that originally contemplated to complete startup testing, the amount of fission product inventory in the fuel now approaches equilibrium levels. Consequently, health and safety considerations require that the reactor be operated henceforth in an inerted mode.

Conclusion

Our review of the Vermont Yankee operational history indicates that (1) the public health and safety requires that the reactor be operated in an inerted mode because there has been sufficient operation at power levels in the range from 63 to 100% of rated power to produce a fission product inventory in the core approaching the equilibrium levels, and (2) electrical output has been demonstrated and most of the startup testing program has been performed and the anticipated need for frequent access to the containment in connection with the initial phases of plant startup no longer exists. Accordingly, the application of the above-mentioned exception to the Technical Specifications is no longer appropriate.

*/ CONTINUED FROM PREVIOUS PAGE

March through September 1973 until the reactor was shutdown on September 30, 1973. Following a planned six week outage, plant operation was continued on November 19, 1973, through December 1973 at approximately 70 percent of rated power. Startup tests were not performed during this extended period of operation. Power operation was restricted to 78 percent of rated power during January 1974. Restrictions on power level were removed for February and March 1974 operation. During this period of 100 percent rated power operation, most of the startup testing program for full-power operation was performed. Additional fuel performance problems required power reduction to 80 percent of rated power before the final full-power testing program could be completed in April 1974. This power restriction will remain until after the refueling outage scheduled for late September 1974.

In view of the foregoing, the staff has concluded that protection of the health and safety of the public requires that further power operation of Vermont Yankee be permitted only with an inert containment atmosphere, except for the 24-hour period preceding and following reactor shutdown, and that the Technical Specifications should be modified accordingly.

Fredric D. Anderson
Operating Reactors Branch #2
Directorate of Licensing

Dennis L. Ziemann, Chief
Operating Reactors Branch #2
Directorate of Licensing

Date: JUN 19 1974