VERMONT YANKEE NUCLEAR POWER CORPORATION

SEVENTY SEVEN GROVE STREET
RUTLAND, VERMONT 05701

WVY 79-104
B3.2.1

REPLY TO:
ENGINEERING OFFICE
TURNPIKE ROAD
WESTBORO, MASSACHUSETTS 01581
TELEPHONE 617-366-9011

September 14, 1979

United States Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Office of Nuclear Reactor Regulation
Thomas A. Ippolito, Chief
Operating Reactors Branch #3
Division of Operating Reactors

References: (a) License No. DPR-28 (Docket No. 50-271)
(b) VYNPC letter (WVY 78-11) to ONRR, dated January 30, 1978, Subject: Submittal of Additional Information on Fire Protection
(c) USNRC letter to R. Groce from K. R. Goller, dated January 13, 1978, Subject: Amendment 43 to Facility Operating License

Dear Sir:

Subject: Submittal of Additional Information on Fire Protection

Reference (b) above transmitted to you the results of various investigations and studies that Vermont Yankee committed to in Section 3.2 of the Fire Protection Safety Evaluation Report, part of Reference (c) above. In the time which has elapsed since the submittal of that information, Vermont Yankee has continued to evaluate their fire protection program. This has led to some modifications in the recommendations included in Reference (b). These modifications follow here. Some have been previously discussed with your staff, and are so noted in the discussion.

SER Section 3.2.1, Protection of Essential Power Sources

This has been discussed with your staff, and it is our understanding that the previous response satisfied the staff's concerns.

SER Section 3.2.2, Flame Retardent Coatings

This has been discussed with your staff. Vermont Yankee agrees to coat the cables for a minimum distance of 5 feet in cable trays and to provide a fire stop in any conduit connecting one safety train to the other in the Switchgear Room. In addition, where conduit containing safety related cable from one division crosses cable tray containing safety related cable from a redundant division in the Switchgear Room, Vermont Yankee will provide a shield. This shield will consist of a fire retardent coating on the cables in the tray. The coating will extend to a minimum of 2 1/2 feet beyond the conduit crossing.

SER Section 3.2.3, Fire Water Loop

The concern expressed by your staff has been readdressed by Vermont Yankee. Telephone conversations have been held between your staff and Vermont Yankee regarding the Fire Water Loop, its design, and the conservative calculations we have performed in response to staff concerns. The results of those calculations are as follows:

Several calculations have been done to estimate the amount of wash-out one of the parallel yard fire mains could bri and continue to function. As previously indicated to you, the yard piping consists of 12 inch diameter coated and wrapped carbon steel pipe, with a wall thickness of 3/8 inch. The most conservative calculation considered the pipe fixed at one end and pinned at the other, supporting two feet of heavy earth above it. This assumes that the broken pipe washes out the earth below the unbroken pipe and leaves two feet of earth still balanced on top of the unbroken pipe.

Using those assumptions, the unsupported length that the unbroken pipe will span without yielding is 93 feet. Even assuming that the break occurs at a 90 bend, the unsupported span can be 27.5 feet in each direction from the elbow. This represents a hole 55 feet in diameter exactly centered at the elbow. The probability of a void of this magnitude being eroded away under an inbedded pipe without being noticed by plant personnel is rather small, as has been discussed in Reference (b) above.

The more probable event in case of a pipe break would be that the water would immediately rise to the surface above the break, eroding a crater perhaps 10 feet in diameter and forming a large pool of water with a fountain, immediately alerting plant personnel to the problem. With this type of scenario the water surrounding the unbroken pipe would cancel out the weight of the water in the pipe and eliminate the earth assumed in the first calculation. The unsupported pipe would then be capable of spanning 140 feet. As the straight run of parallel pipe is approximately 100 feet long all the above calculations indicate that there is almost no probability of a break in one of these pipes inducing a failure in the other.

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Based on these calculations, Vermont Yankee does not intend to make any changes on the routing of these two pipes.

SER Section 3.2.4, Primary Containment Analysis

Discussion is presently going on within the NRC on the necessity of inerting the Vermont Yankee containment. Vermont Yankee feels that if the containment is inerted, present controls are adequate to provide fire protection, and we will not make any of the modifications listed below. Therefore, we do not intend to start any of the modifications until a decision on inerting has been made.

In anticipation that we will not be required to inert the containment, further investigation and analysis have been done in the area. This has led to some modification of the recommendations made for the area and provided to you in Reference (b).

The large part of the cable in the containment is control and instrumentation cable, with the instrumentation cable in solid cover trays. Tests have shown that self-ignition of such cable is highly unlikely. The main potential for damage to cable is an oil fire resulting from a Reactor Recirculation Pump motor leak. Therefore, we intend to provide for early detection and suppression of any oil fire, not of a cable fire.

Further investigation and analysis by Vermont Yankee indicates that there is no need to determine the quantity of oil leakage or the leakage rate more accurately than is presently done. Therefore, there is no need to provide direct oil level indication outside the containment. The provision of an oil leakage collection system and local suppression for an oil fire will adequately address the concern.

A system will be designed to collect small leaks from the Reactor Recirculation Pump motor oil system, directing it to a central, closed collection point. Oil leakage is assumed to occur at threaded fittings and at easily broken components such as level indication glasses. Failure of a solid pipe or of a welded fitting is assumed to be unlikely.

A water suppression system will be designed to cover the pumps and nearby piping. The conceptual design is for a system capable of providing a spray density of .3 gpm per square foot. The spray system will consist of two headers, one for each pump area, and will contain multiple open head spray nozzles, located to spray on the pump casing and adjacent piping. A normally closed manual valve will be used to actuate spray after indication to the operator of a fire in the containment. The water source will be the condensate transfer system, consisting of two redundent pumps, each with a capacity of 500 gpm at 250 feet TDH. Both pumps can be operated simultaneously to meet spray system demands if necessary.

SER Section 3.2.5, Gas Suppression Systems

In accordance with Vermont Yankee's Safety Evaluation Report for Amendment No. 43 to the station Technical Specifications, a new high pressure carbon dioxide suppression system will be installed to provide

protection for the Switchgear Room. This system will be designed and installed to meet all requirements of NFPA No. 12-1976 for a deep seated cable fire. In addition, this system will serve as manual backup (second shot) to the existing Cable Spreading Room carbon dioxide system.

The system will include CO_2 cylinders, valve assemblies discharge heads directional valves, alarms, and remote pull stations. The discharge rate will be in accordance with those specified in NFPA NO. 12. The system will provide a sufficient amount of carbon dioxide such that following the initial discharge at least a 50% concentration will be present. Thirty minutes following the initial discharge at least a 44% concentration will be present.

The system will also be directed to the existing Cable Spreading Room CO_2 distribution piping. Tripping of a directional valve via a remote pull station will admit a backup carbon dioxide supply to the Cable Spreading Room area. This second shot will also provide at least 50% concentration of CO_2 to this area.

Both the Switchgear Room and the Cable Vault systems will operate in a similar manner upon actuation of ionization detectors. Upon the receipt of each of three successive alarms, an output signal is sent from a counting module to initiate a preprogrammed, sequential response function. The first detector alarm will sound local bells and an alert signal at the main and local control panels. The second detector alarm will automatically close all associated fire dampers and shutdown room exhaust fans. The third detector alarm will automatically trip the CO_2 System and provide local and remote indication that the CO_2 System has been activated.

Both systems will have the necessary evacuation time delay and alarm for personnel safety. In addition, override abort switches will be provided to enable local fire fighting. Use of these switches will be strictly controlled via fire fighting training and procedures.

Both detection and trip systems are to be electrically supervised including the abort switches.

Backup suppression for the cable vault is actuated directly from a pull station and a directional valve.

SER Section 3.2.6, Radiological Consequences of Fires

This has been discussed with your staff, and it is our understanding that there are four additional modifications or commitments that your staff wants Vermont Yankee to make. They are:

1. To make the Radwaste Control Room a No Smoking Area

2. To add smoke detection to the AOG Building

3. To keep the amount of trash stored for drumming below the amount that would exceed 10CFR20 limits for off-site doses if it burned and the smoke was inadvertently released to atmosphere

4. To give the fire brigade special training on fire fighting in the Radwaste and AOG Buildings.

Vermont Yankee has reviewed and evaluated these four items. The results of the evaluation are as follows:

1. We see no reason to make the Radwaste Control room a No Smoking area. The balance of the Radwaste building is designated as a No Smoking area. The control room is well-separated from any area where large amounts of combustibles might be present. It is a control room rather than a control area, and the combustibles present in the room consist only of small amounts of paper in the form of logs, records, etc. We feel that to make such a room a No Smoking area would be of no advantage whatsoever, and would create an unnecessity hardship for personnel working in the room.

2. We see no reason to add smoke detection to the ADG building. There is no safety related equipment in the building, there is no trash stored there. The only uncontained combustible present in the building, with the exception of cables, is the Armorflex pipe insolation which we have already committed to remove. The systems and the building have been designed to control or contain any explosions and any radioactive releases. Therefore, we do not intend to provide smoke detection in the building.

3. An analysis has been done in accordance with 10CFR20 as required by your staff in telephone conversations on the subject of releases from the burning of combustible trash. The results of that analysis follow here. Vermont Yankee will commit to keep the amount of trash stored at an amount that would keep releases below the amount allowed by 10CFR20 according to our analysis.

   The NRC requested Vermont Yankee to keep the amount of trash (combustible waste) to be drummed in the Radwaste Building below the limit which might exceed the (MPC)a in 10CFR20 if it would have been burned. From estimates of the radioactivity content in trash and the (MPC)a in 10CFR20, Co-60 is the controlling radionuclide. It has an (MPC)a of 3×10^{-10} ci/m^3. Using an annual average dispersion parameter of 1.5×10^{-5} sec/m^3 to limit the air concentration at the restricted area boundary, the total amount of the radioactivity in trash that can be drummed in the Radwaste Building over one year is estimated to be 630 Ci. During the last four years, the annual combustible waste drummed in the Radwaste Building contained total radioactivity of 13 Ci or less. Therefore, it is unlikely that the amount of combustible waste to be drummed would exceed the (MPC)a if burned.

Vermont Yankee will provide training on fire fighting in the Radwaste and AOG Buildings.

SER Section 3.2.7, Administrative Controls

Vermont Yankee has submitted numerous letters addressing the area of Administrative Controls. They are still under review by your staff.

SER Section 3.2.8, Safe Shutdown Capabilities Analysis

The requested information was submitted in Reference (b) above. It is still under review by your staff. Vermont Yankee is ready to discuss this further with them if necessary.

We trust that the above information is acceptable. If you have any further question, please contact us.

Very truly yours,

D. E. Moody

D. E. Moody
Manager of Operations

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