UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

Mr. William K. Sherman
Vermont State Nuclear Advisory Panel Member
State of Vermont
Department of Public Service
120 State Street
Montpelier, VT 05620-2601

Dear Mr. Sherman:

By letter dated July 17, 1995, you requested the U.S. Nuclear Regulatory Commission (NRC) to provide the Vermont State Nuclear Advisory Panel (VSNAP) with information regarding inspections of various boiling water reactor (BWR) internal components that have been identified as being susceptible to age-related cracking. Furthermore, you asked the NRC staff to comment on the advisability and need for a mid-cycle inspection of the Vermont Yankee core shroud. More specifically, you requested the following information from the NRC:

1. The regulatory requirement(s) for inspections for the core components identified as age cracking susceptible in either NUREG/CR-5754 or the list of Oyster Creek items provided NIRS.

2. The safety implications for cracking in the core components identified as age cracking susceptible in either NUREG/CR-5754 or the list of Oyster Creek items provided by NIRS.

3. A comment on whether more accurate inspection methods are available than those which Vermont Yankee uses for these inspections, and the advisability of using more accurate techniques.

4. A comment of the advisability and need for a mid-cyc' ispection of the Vermont Yankee core shroud.

You also indicated that you had received letters from the Citizens Awareness Network and from Mr. Michael J. Daley. These letters provided a list of boiling water reactor (BWR) internal components which are considered to be susceptible to age-related cracking. You also stated that the Citizens Awareness Network and Mr. Daley continued to request both a mid-cycle inspection of these components, and an NRC public meeting for the purpose of discussing the status of the Vermont Yankee (VY) core shroud and other reactor internal components.

In regard to your first requested item, Section 50.55a to Title 10 of the Code of Federal Regulations (10 CFR 50.55a) requires that nuclear licensees, including VYNPC, implement in-service inspection programs in accordance with the guidelines of the American Society of Mechanical Engineers Boiler and Pressure Vessel (ASME) Code, Section XI. The scope regarding inservice inspection (ISI) programs for the reactor pressure vessel and its internal components are prescribed in the ASME Code, Section XI, Division 1

(Section XI), Subsections IWA, "General Requirements," and IWB, "Requirements for Class 1 Components of Light-Water Cooled Power Plants." ISI examinations of BWR core support structures (core shrouds) and safety-related interior attachments are required by ASME to be done in accordance with the Section XI rules for Category B-N-2 components. Furthermore, the Boiling Water Reactor Vessel and Internals Project (BWRVIP) has recommended that BWR licensees perform inspections of other BWR internal components, including visual examinations of top guides and core support structures, and perform more comprehensive inspections of the core support structure using either UT or enhanced VT-1 techniques. The BWRVIP submitted the "BWR Core Shroud Inspection and Evaluation Guidelines," Revs. 0 and 1, to the NRC on September 2, 1994 and April 21, 1995. The NRC reviewed and accepted these guidelines as the bases for conducting its reviews of plant-specific core shroud inspection programs. The NRC issued its SERs regarding these guidelines on December 28, 1994 and June 16, 1995. However, these examinations are beyond the requirements of 10 CFR 50.55a and Section XI.

Regarding your second item, the results of the core shroud examinations performed at VY during RFO #18 indicated the presence of extensive crack indications in the shroud's H5 weld. VYNPC performed a flaw evaluation of the core shroud in order to determine whether the shroud would be acceptable for further service in the "as found" condition. VYNPC's flaw evaluation of the shroud was submitted to the NRC for review prior to restart of the VY unit. The NRC staff reviewed VYNPC's evaluations of the VY shroud and performed an independent structural analysis of the VY shroud. The NRC staff's analysis of the remaining structural ligaments in the VY shroud indicated that the shroud would satisfy the Section XI safety margin requirements for the operating cycle following RFO #18. The NRC staff therefore concurred with VYNPC's evaluation of the VY core shroud, and concluded that the VY plant could be safely operated for one additional cycle. The NRC staff issued its safety evaluation (SE) regarding the "Core Shroud Inspection and Flaw Evaluation, Vermont Yankee Nuclear Power Station (TAC No. M92050)" on April 25, 1995.

During refueling outage (RFO) #18, VYNPC completed ISI examinations which covered the first period of the third ten year inservice inspection interval for the VY facility. These examinations included the examinations that are required for Section XI, Category B-N-2 components. VYNPC also indicated that the following additional ISI examinations were conducted during RFO #18 which relate to the list of twenty-five components in NUREG/CR-5754: control rod drive housing, core spray internal piping and spargers, feedwater spargers, and core shroud. With the exception of the VY core shroud, the inspection results from RFO #18 did not reveal any significant indications of age-related deterioration of the VY reactor internals. Therefore, based on the results of the flaw evaluation of the VY core shroud and on the results of inspections performed on the other reactor internal components during RFO #18, the NRC does not have any immdiate safety concerns with regard to the internal components at the VY plant.

Regarding your third item, on December 14, 1994, VYNPC provided the NRC with its scope for performing inspections of the VY core shroud. VYNPC informed the NRC that the VY core shroud inspection scope included a proposal for use

of a new ultrasonic testing (UT) inspection technology. In March 1995, VYNPC met with members of the NRC staff at the Electric Power Research Institute (EPRI) Non-destructive Examination (NDE) Center in order to demonstrate the factors which qualified this UT inspection technology as an appropriate method of performing core shroud inspections. The NRC staff concluded on April 17, 1995, that EPRI's demonstration of the technology's capabilities qualified the new UT technology as an appropriate method of performing the VY core shroud inspections, and that the new UT inspection technology was acceptable for use at VY during refueling outage #18. It should be noted that eddy current testing (ECT) has not yet been qualified or endorsed as an acceptable method of examining BWR internals, although EPRI is currently researching the use of ECT as an inspection technique for BWRs.

Regarding your fourth item, to reiterate what was stated previously, with the exception of the VY core shroud, the inspection results from RFO #18 did not reveal any significant indications of age-related deterioration of the VY reactor internals. Based on the results of the flaw evaluation of the VY core shroud, and on the results of inspections performed on the other reactor internal components during RFO #18, the NRC staff concludes that VYNPC has provided adequate assurance that these components will perform their safety functions during the remainder of the current operating cycle. The NRC has not received any additional information since re-start of the VY reactor which would cause the NRC to change its conclusions in the SE of April 25, 1995. Therefore, the NRC will not require a mid-cycle inspection of the VY core shroud during the current operating cycle. The NRC will continue to take regulatory action on a plant-specific or generic basis as may be appropriate when age related degradation issues are identified.

Sincerely,

Phillip F. McKee, Project Director
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