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Filed: December 1, 1988.

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

before the

ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	
VERMONT YANKEE NUCLEAR POWER CORPORATION	Docket No. 50-271-OLA (Spent Fuel Pool Expansion)
(Vermont Yankee Nuclear Power Station)	

VERMONT YANKEE'S ANSWERS TO
NECNP'S ENVIRONMENTAL INTERROGATORIES

Pursuant to 10 C.F.R. § 2.740b and this Board's orders, Vermont Yankee Nuclear Power Corporation submits its answers to "NECNP's First Set of Interrogatories and Request for Production of Documents to Vermont Yankee on the NRC Environmental Assessment and Finding of No Significant Impact, Spent Fuel Pool Expansion, (TAC No. 65253)," served by Express Mail on November 10, 1988.[1]

General Objection:

Insofar as the directives contained under the caption "Instructions" purports to vary the obligations of Vermont

[1]By agreement between counsel for NECNP and Vermont Yankee, the time within which these answers might be filed and served was enlarged through December 1, 1988, to account for working days lost to holidays intervening between service and the date (November 28, 1988) when these answers would otherwise have been due.

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Yankee Nuclear Power Corporation ("Vermont Yankee") from those prescribed in the Commission's Rules of Practice, Vermont Yankee objects to, and has ignored, those "instructions."

Interrogatory No. 1

Question:

Please identify all persons who participated in the preparation of answers to these interrogatories, and identify the portions of your response to which each person contributed.

Response:

Donald A. Reid, all.

G. Dean Weyman, 5-14.

J. Timothy McCarthy, 5-12.

Michael J. Marian, 3.

Rudolph M. Grube, 3.

Richard P. Pizzuti, 3.

Interrogatory No. 2

Question:

Identify and provide copies of all environmental reports or other information furnished to the NRC for purposes of the proposed action including but not limited to environmental reports submitted under 10 C.F.R. §§ 51.41 or 51.60.

Objection:

This request, as stated, requires the production of "all . . . information furnished to the NRC for purposes of the proposed action . . . ." As stated, references to "environmental reports" and "including but not limited to environmental reports submitted under 10 C.F.R. § 51.41 or

51.60," are without any effect to define or constrain the scope of the requested production. So framed, the request transcends the scope of Contentions 2 and 3, and Vermont Yankee therefore objects to it on the ground that it is beyond the scope of the admitted contentions, and on the further ground that the request is overly broad and fails to define the documents of which production is sought with the specificity required by the Rules of Practice.

Response:

Without waiving its objection stated above, but rather expressly relying upon the same, Vermont Yankee believes that all of the written information submitted by it to the NRC Staff in connection with the pending license amendment has already been served upon the parties to this proceeding. Vermont Yankee will provide for inspection and copying, at its offices at Ferry Road, Brattleboro, Vermont, at a date and time mutually convenient to counsel, any document that NECNP specifically identifies.

Interrogatory No. 3

Question:

> In its evaluation of alternative five (5) to the proposed action, construction of a new independent spent fuel storage installation (ISFSI), identifying dry cask storage installation, the Environmental Assessment concluded that dry cask storage installation is not feasible as an alternative to the proposed license amendment because "this alternative could not be implemented in time to meet the need for additional capacity for the Vermont Yankee Plant" (EA, page 4, 5). The following questions relate thereto:

a. State or provide an estimate of how much time (months and years) it would take for VY to develop new site specific design and construction of a dry cask storage facility, starting from the date a new license amendment application is filed with the NRC, to the date (projected) such license amendment will be approved by the NRC.

b. State or provide an estimate of how much time (months and years) it will take for VY to implement the proposed action, starting from the date the license amendment application was filed with the NRC (i.e. April 25, 1986), to the date the enhanced spent fuel pool cooling system will be designed, installed, and tested to demonstrate operability.

c. Did VY or its contractors prepare or use any analysis, study or other document that compares the time it would take to develop new site specific design and construction of a dry cask storage facility with the time it would take to develop and install all equipment necessary to implement the proposed action, including the time necessary to design and install a spent fuel pool cooling system that meets current NRC regulatory requirements. If yes, please provide a copy of any documents containing such analysis. If not, please explain the basis for the EA's conclusion that dry cask storage installation could not be designed and constructed in time to meet VY's need for additional capacity.

d. Describe, by task, the economic costs (projected) to Vermont Yankee of designing and installing a dry cask storage facility, including but not limited to the purchase of equipment and payments to outside con.

e. Describe, by task, the economic costs (projected) to Vermont Yankee of the proposed action, including but not limited to the costs of designing and installing the enhanced spent fuel pool cooling system, and the costs of participating in the instant, contested license amendment proceeding.

Response:

a. Vermont Yankee has prepared no detailed schedules or estimates of the time required to implement a dry cask storage proposal at the VYNPS site. Vermont Yankee believes,

however, that it would take a minimum of one year to develop a new, site specific design and to prepare a license application for such a dry cask storage facility. Vermont Yankee has no estimate of the time required to license such a proposal, inasmuch as that duration would be controlled in the main by events and conditions beyond Vermont Yankee's control. Vermont Yankee notes, however, that it took Virginia Power Company approximately four years to license its Independent Spent Fuel Storage Facility at the Surry site in southern Virginia (from license application submitted October 8, 1982 to license issuance on July 2, 1986), in an uncontested proceeding. Once licensing had been accomplished, Vermont Yankee believes that it would take at least one year to complete the construction of the facility, assuming that the site specific calculation did not reveal the need for either the construction of a shielded structure or the need for additional land acquisition. In addition, approximately six months to one year would be required to prepare and obtain Staff review and approval, as required, of the required associated changes in the VYNPS Emergency Plan and procedures, Station Administrative Procedures, Station Health Physics Procedures and an ISFSI Training and Certification Program, all of which requirements were imposed upon Surry following the issuance of its license but prior to authority to render the facility operational.

b. Vermont Yankee cannot provide such an estimate, for the reason that implementation of the proposed emergency standby spent fuel pool cooling subsystem is not anticipated to occur until these proceedings have been concluded, and Vermont Yankee cannot determine how long that will take. However, Vermont Yankee can supply the following information:

With respect to the time required for the installation of the new spent fuel racks in the pool, 7 of the racks have been installed as of the date of these answers, and the remaining 3 racks will be installed following the 1989 refueling outage. With respect to the time required (duration, as opposed to schedule) to design, install and test the proposed enhanced spent fuel pool cooling subsystem, Vermont Yankee can be no more specific than as set forth in its presentation to the Staff in February, 1988. However, that assessment represents a feasibility (or "worst case") analysis; Vermont Yankee believes that the duration to accomplish these activities could be shortened if necessary.

Vermont Yankee points out, however, that the enhanced spent fuel pool cooling sub-system was not proposed for the purpose of meeting technical or regulatory requirements. Rather, it was proposed and committed to by Vermont Yankee for the purpose of expediting the licensing of the spent fuel pool expansion. Consequently, it is not proper to take either the costs or the time-to-install associated with the

enhanced sub-system into account for purposes of comparison to any alternative.

c. Vermont Yankee cannot respond to this interrogatory categorically, because the term "analysis" as employed therein is vague and ambiguous, and Vermont Yankee is, as a consequence, unable to determine with sufficient precision what information is being requested. However, Vermont Yankee can supply the following information: Vermont Yankee did not, in reaching the conclusion that the implementation of the spent fuel pool expansion would most likely be quicker to implement, rely upon any formal, written analysis of the lead times for the two scenarios. Rather, Vermont Yankee relied upon the judgment of its management, based on information available to Vermont Yankee and to Yankee Atomic Electric Company, to the effect that the nature of the activities required to implement the spent fuel pool expansion was reasonably well known, based upon industry experience and the absence of any genuine technical issues or uncertainties, while the activities required to implement the dry cask storage scenario were (and are still) largely unknown. At the time Vermont Yankee made its decision, reracking was the only available fuel storage option that had been previously licensed, and it was the only option that involved no new technology and, therefore, qualified for "no significant hazards" treatment. Vermont Yankee's decision to rerack was made during a meeting held on November 1, 1984, and publicly

announced on February 19, 1985, at which time a letter of intent was issued for the purchase of new spent fuel storage racks. Dry cask storage was first licensed for domestic spent fuel storage in July, 1986 (Surry).

d. Vermont Yankee has not prepared a detailed, site specific study of the cost of a dry cask storage facility. However, a recently published study prepared by the United States Department of Energy ("DOE") entitled "Initial Version, Dry Cask Storage Study," August, 1988, provides some generic cost estimates to which we have added preliminary estimates of site-specific costs. It is estimated that 17 metal dry storage casks would be required to provide the same incremental increase in storage capacity of 870 bundles represented by the proposed reracking. These casks are reported to cost about $1 million each. According to the DOE report, a cask transporter to move the large casks to a storage pad or building would cost about $0.3 million. Additionally, the DOE report estimates that a concrete storage pad for 17 casks would cost about $1.2 million.

If site-specific calculations made during the design process indicated that a shielded structure surrounding the pad is required to meet site boundary dose rates, such a structure would cost about $4.2 million. According to the DOE study, the cost of loading and handling each cask would be $20-40 thousand per cask, or about $0.5 million for the 17 casks. Should it be determined during the design process

that additional land acquisition would be required to locate a dry cask storage facility near the VYNPS site, an indeterminate additional cost would be incurred. It is assumed that licensing costs (exclusive of the incremental cost of contested hearings and associated proceedings) for a dry cask storage facility would be equal to or greater than those for the proposed reracking. Therefore, the cost of a metal dry cask storage facility equivalent in expansion capacity to the proposed reracking would range from approximately $19.0 million to $22+ million, exclusive of hearing costs. Please note that, because neither detailed costs estimates nor the detailed engineering necessary to prepare such estimates have been made, it is likely that the foregoing summary fails to take into account additional requirements and their costs.

e. Projected aggregate costs, based on "to date" actual expenditures, and excluding Vermont Yankee direct costs (Vermont Yankee employees) and hearing costs (legal fees and hearing-related additional engineering), are as follows:

Engineering	$1,500,000
Materials	2,700,000
Installation	3,300,000
Sub-Total	7,500,000
Enhanced SFPC Sub-system	3,000,000
Total	10,500,000.

Interrogatory No. 4

Question:

In its evaluation of alternative five (5) to the proposed action, construction of a new independent spent fuel storage installation (ISFSI), identifying dry cask storage installation, the EA concluded that dry cask storage installation is not feasible as an alternative to the proposed license amendment because, inter alia, "the expansion of the existing pool is a resource that should be used". The following questions relate thereto:

a. Identifying and describe the "expansion" capacity for the existing pool, and state whether this expansion capacity assumes the use of high density racks, the installation of additional racks of the existing design, and/or the storage of an increased number of spent fuel rod assemblies beyond that authorized under Vermont Yankee's current technical specifications.

b. Describe what the "expansion" capacity of the existing pool would be if no changes are made to the number of spent fuel rod assemblies authorized under Vermont Yankee's current technical specifications.

c. Is this statement based on an assessment of the economic costs of implementing the dry cask storage alternative, as compared to the costs of using the "resource" of the existing pool? If yes, please identify what those economic costs are.

Response:

a. Vermont Yankee cannot answer this interrogatory as written, because the term "expansion capacity" as used in the interrogatory is not defined. In general, the expansion capacity of a spent fuel pool is the result of comparing the number of assemblies, or their constituent fuel elements, that could be stored in the pool given an hypothesized storage technique (including any Technical Specification limit associated therewith) (the "new" capacity), to the

lesser of: (i) the number of assemblies that can be stored in the same pool given the storage technique presently employed (physical limitation) or (ii) the number of assemblies for which storage is presently authorized by the facility's Technical Specifications (regulatory limit) (the "old" capacity). The existing capacity of the pool is 2,000 assemblies (regulatory limit). The capacity of the pool given employment of the particular racks for which authorization has been sought and obtained is 2,870 assemblies (physical limit). Consequently, the "expansion capacity" under those conditions would appear to be 870 spent fuel assemblies. The "expansion capacity" given other scenarios cannot be determined until the scenario is identified.

b. Given the definition of "expansion capacity" set forth in our answer to the previous sub-part, under the conditions hypothesized in this sub-part the "expansion capacity" would be, by definition, zero.

c. Since this sub-part inquires as to the subjective intent of the author(s) of a document authored by others than Vermont Yankee, Vermont Yankee cannot answer. However, from the context of the item referred to, it would appear that the statement in question is not based upon an economic analysis, but rather upon a conclusion that expansion of the capacity of an existing spent fuel pool by such techniques as the one for which authorization is sought by the pending license

amendment achieves additional storage capacity without the dedication of additional finite resources, such as land area.

Interrogatory No. 5

Question:

The EA (page 8) states that "By telephone conversations on July 7, 1988 the licensee informed the staff that the dose for installation of the enhanced spent fuel pool cooling system has been estimated very conservatively to add less than 10 person-rem to the original dose goal." The following questions relate thereto:

a. Describe in detail what activities necessary or incident to the installation of the enhanced spent fuel pool cooling system added to this 10 person-rem addition to the dose goal.

b. Identify and provide copies of all documents used or generated by the NRC or its contractors, including environmental reports and other information provided by Vermont Yankee, to assess, or review the radiological impact attributable to installation of the enhanced spent fuel pool cooling system.

Response:

a. Vermont Yankee cannot answer this sub-part as propounded, since the question is unintelligible. Assuming what was intended to be asked is, "What are the activities that result in the 10 person-rem incremental exposure," our response is as follows: Job dose estimation is an iterative process. As a job becomes better defined, exposure estimates become more detailed and more precise. Since, at this time, the enhanced spent fuel pool cooling job is not completely defined, the dose estimate was conservatively projected to be 10 man-rem based on the engineering judgment of the time required for the job and the area dose rates. The types of

activities to be involved include: mobilization, decontamination, obstruction removal, shielding, tie-in installation, equipment installation, clean-up and shielding removal, QA/QC and testing.

b. Vermont Yankee is unable to identify "all documents used or generated by the NRC or its contractors . . . ."

Interrogatory No. 6

Question:

The EA's assessment of public radiation exposure (EA, pages 8-9), based on the Licensee's dose goal for the proposed action, including the installation of the enhanced spent fuel pool cooling system, will result in a radiation dose goal of 33 person-rem. The following questions relate thereto:

a. Please state the total number of persons who will be exposed as a result of the proposed action taken into consideration in projecting a radiation dose goal of 33 person-rem from the proposed action.

b. State the surface dose from the water, in millirems per hour, that each worker will be exposed to as a result of the proposed action.

Response:

a. This question cannot be answered as framed, for it appears to assume that the estimate of the aggregate person-rem of exposure is dependent upon a quantification of the number of workers exposed (to any degree). In fact, an operator of a facility can (within certain practical limits) control the individual worker exposure resulting from a given project by varying the number of workers involved. Obviously, no one worker will receive an exposure of 33 person-rem.

In addition, Vermont Yankee points out that the bulk of the worker exposure to be expected from the spent fuel pool expansion, namely that attributable to the rack swap, has already been incurred. With respect to that exposure, the aggregate worker exposure was 10.1 man-rem as of 10/19/88. At that time the job was approximately 65% complete (based on labor hours). The total number of workers involved in the job is approximately 30 persons.

b. This question cannot be answered as stated, since the "surface dose from the water" is not the dose "that each worker will be exposed to . . . ." The effective dose rate in the area of the spent fuel pool is 1.9 mRem/hr. On November 18, 1988, a reading was taken of the surface dose rate for purposes of answering this interrogatory: measured approximately one-half the distance along the long dimension of the spent fuel pool on the side opposite the reactor cavity (south side), the measured surface dose rate was 5 mRem/hr.

Interrogatory No. 7

Question:

> The EA (page 8) states that "The 33-person rem dose goal includes all activities (sic) necessary for the reracking operation including vacuum cleaning of SFP walls and floor; shuffling fuel, installation of the new racks; removal of the old racks; cleaning decontamination, and any necessary cutting of old racks; and disposal of waste resulting from the reracking (sic) operation, including the old racks. The following questions relate thereto:
>
> a. Provide a break-down of the projected radiation

dose goals attributable to each of the above-described activities.

b. State how many persons will be required or used to perform each of the above-described activities.

c. Describe the length of time (in hours) each such person identified in response to Interrogatory No. 7(b) will be exposed and what the millirem dose per hour will be to perform each of the above-described activities.

d. Are there any other activities that may be performed during the reracking operation other than those identified above? If yes, please identify each such activity, provide the projected radiation dose resulting from each such activity, the number of persons who will be used or required to perform each such activity, the length of time each such person will be exposed, and the millirem dose per hour to perform each such activity. Identify and produce copies of all relevant documents.

Response:

a. Projected exposures of Vermont Yankee workers by categories of work are as follows:

Mobilization	1.3 man-Rem
Interference removal	3.2 man-Rem
Fuel transfer	2.7 man-rem
Removal of old racks	2.6 man-Rem
Installation of new racks	5.4 man-Rem
Decon	1.0 man-Rem
Package old racks	1.0 man-Rem
Demobilize	0.7 man-Rem
Quality Control	0.2 man-Rem
Enhanced SFPC subsystem	10 man-Rem
Phase I (1987 work) (actual)	3.8 man-Rem

Note that actual exposures for this work are running below projected exposures.

b. Please see our response to Interrogatory No. 6(a).

c. No answer based on hours per worker can be given for the reasons set forth in our response to Interrogatory No. 6(a). However, the aggregate estimated hours of labor

associated with the exposure projections set forth in our response to Interrogatory No. 7(a) are as follows:

Mobilization	672 man-hours
Interference removal	1674 man-hours
Fuel transfer	1433 man-hours
Removal of old racks	1383 man-hours
Installation of new racks	2839 man-hours
Decon racks	205 man-hours
Package old racks	513 man-hours
Demobilize	364 man-hours
Quality Control	130 man-hours
Enhanced SFPC subsystem	2600 man-hours
Phase I (1987 work) (actual)	1808 man-hours

All activities are conducted in an effective field of 1.9 mRem/hr. except for decon of racks (5 mRem/hr) and installation of the enhanced SFPC subsystem (3.8 mRem/hr).

d. The breakdown set forth in our response to Interrogatory No. 7(a) encompasses all work expected to lead to worker exposure.

Interrogatory No. 8

Question:

If the number of persons identified in response to Interrogatory No. 6(a) and Interrogatory No. 7(b) are different, explain the reasons for this difference.

Response:

Please see our responses to Interrogatories Nos. 6(a) and 7(b). No such comparison can be made.

Interrogatory No. 9

Question:

In estimating that the proposed action, including the installation of the enhanced spent fuel pool cooling system, will result in a radiation dose goal of 33 person-rem, please state whether VY considered any of the following occurrences:

a. The possible radiation dose exposure which might result if a worker breaches his or her protective garments during the installation of new racks.

b. The possible radiation dose exposure which might result if a worker breaches his or her protective clothing during the installation of the enhanced spent fuel pool cooling system.

c. The possible radiation dose exposure which might result if a worker drops a rack during the installation of the new racks.

d. The possible radiation dose exposure which might result if a worker drops a spent fuel assembly during the installation of the new racks.

e. The possible worker exposure to radioactive gamma rays released to the spent fuel pool if the purification filter does not work.

f. The possible worker exposure to cesium or iodine resulting from leaking spent fuel rods.

Response:

a+b. This question cannot be answered as framed, because the question is premised on the notion that workers involved in this activity wear protective garments the function of which is to act as a whole body gamma radiation shield, which is not the case. (Gamma radiation is the predominant contributor to man-rem of worker exposure. Some workers may be issued items of protective equipment (e.g., plastic eyeglasses) intended to interdict beta particles. A "breach" of such equipment would not lead to a meaningful increase in worker exposure.) Since the "possible radiation exposure" hypothesized due to the breach of protective equipment does not exist, it was not assessed by Vermont Yankee as making a contribution to the aggregate worker exposure.

c. No such "possible radiation exposure" was assessed by Vermont Yankee as making a contribution to the aggregate worker exposure, for the reason that the criteria applicable to the lifting of racks (NUREG-0612) requires a determination that no single failure of the lifting device would lead to a drop of the rack and because the procedures employed for this task prohibit moving fuel racks above spent fuel assemblies. In addition, Vermont Yankee points out that the majority of the activities involved in the rack swap, and consequently the majority of the aggregate worker exposure to occur in connection therewith, has already occurred, and the hypothesized event did not occur.

d. The dropping of a spent fuel assembly is considered to be an event of remote probability, and any significant incremental exposure to workers on account thereof is even more remote. The former is the result of the number of procedural and mechanical protections against dropping a fuel bundle, and the latter is a result of the fact that, should the unlikely event occur, the refueling operation would be shut down. Consequently, no amount of worker exposure on account of the hypothesized event was taken into account.

e. Failure of the spent fuel pool clean-up system would not, as set forth in this question, lead to the "release[] to the spent fuel pool" of "radioactive gamma rays . . . ." The spent fuel pool clean-up system, rather, is intended to remove suspended or floating particulates that

interfere with the operators' ability to see objects in the pool. Because some of these particulates are radioactive, their removal contributes to lowering the dose rate in the area of the pool. The situation hypothesized in the question, namely that a shut-down of the clean-up system would lead to a meaningful increase in pool area dose rates, is unrealistic for the following reasons: (i) the clean-up system is fully redundant, such that no single failure will cause the system to shut-down; (ii) the surface skimmer system is independent of the main clean-up system, and it would continue to remove those particulates least shielded by water; (iii) particulates distributed in the water volume would remain distributed in the water volume even if the clean-up system shut down, with the resultant shielding to persons at the refueling floor; and (iv) as a practical matter, any shut-down of the clean-up system would require a shut-down of operations in the pool on account of loss of in-water visibility long before any significant (and perhaps before any measurable) increase in pool area dose rates could be detected.

f. The source considered in this sub-part does not make a meaningful contribution to worker exposure, for the following reasons: Once a "leaker" spent fuel assembly has been removed from the reactor core, the driving force for the release of cesium and iodine from the fuel element is greatly reduced. Any small amount of these products released from

the fuel will be suspended or dissolved in the pool water, and will be removed by the fuel pool demineralizer system. Nonetheless, to the extent that this source contributes to the effective pool area dose rates used for projecting worker exposure, it was necessarily taken into account since it would have affected the measurements of dose levels on the basis of which effective dose rate has been determined.

Interrogatory No. 10

Question:

If your answer is yes to any of the occurrences described in Interrogatory 9(a) through (f), state the projected radiation dose attributable to each such occurrence, the number of persons who will be exposed to such radiation, and the length of exposure, in millirems per hour, attributable to each such occurrence. Provide copies of all relevant documents.

Response:

Please see our responses to sub-parts (a) through (f) of Interrogatory 9.

Interrogatory No. 11

Question:

The EA (page 8) states that "the dose for installation of the enhanced spent fuel pool cooling system has been estimated very conservatively to add less than 10 person-rem to the original dose goal." The following questions relate thereto:

a. Describe in detail what activities necessary or incident to the installation of the enhanced spent fuel pool cooling system contributed to this 10 person-rem addition to the dose goal.

b. Identify and provide copies of all documents used or generated by the NRC or its contractors, including environmental reports and other information provided by Vermont Yankee, to assess, evaluate, or review the radiological impact

attributable to installation of the enhanced spent fuel pool cooling system.

Response:

Please see our response to Interrogatory No. 5.

Interrogatory No. 12

Question:

The EA (page 8) states that the Licensee's projected dose goal for the proposed spent fuel pool modification project before committing to add an enhanced fuel pool cooling system "is based on information gained by reviews of the experience gained with similar projects at other plants." The following questions relate thereto:

a. Identify each of these plants and the applicable proceeding or context in which such reviews occurred (i.e. license amendment, review under 10 C.F.R. § 50.59), and precise nature of the project. Identify and produce copies of any documents containing such evaluation or analysis.

b. For each plant, state whether VY has performed, or otherwise acquired, an analysis, evaluation, review, or measurement of actual occupational dose exposure resulting from replacement of original fuel racks and the installation of new fuel racks in the spent fuel pool, and made a comparison between actual dose exposure and projected dose exposure. If yes, for each plant, describe the results of such comparisons, and provide copies of any documents containing such comparisons.

c. In any of these similar projects was the anticipated, estimated, or projected radiation dose exposure different from the actual dose exposure? If yes, identify the plants, and explain why the projected dose exposure was inaccurate.

Response:

a. Vermont Yankee does not understand whether this interrogatory refers to information gained (or supposedly gained) by Vermont Yankee, by the NRC Staff or by someone else. Vermont Yankee contacted the following facilities:

Peach Bottom, Salem, Connecticut Yankee, Indian Point, Nine Mile Point, Rancho Seco, and Surry, but in each case the information sought (and obtained) related to procedures and controls, not to specific dose or exposure information. No specific "applicable proceeding or context" in connection with which information was obtained existed (or is known). Any documents received or generated as a result of these contacts will be produced for inspection and copying at the offices of Vermont Yankee Nuclear Power Corporation, Ferry Road, Brattleboro, Vermont, at a date and time mutually convenient to counsel.

b. No.

c. Unknown.

Interrogatory No. 13

Question:

The EA (page 9) states one potential source of radiation to workers during the rerack operation is crud released to the pool water because of fuel movement during the proposed spent fuel pool modification. The following questions relate thereto:

a. Did VY consider the possibility that crud would be released from the old racks as a result of the movement or shuffling of the racks during the reracking operation? If yes, state how much of the 33-rem dose goal is attributable to the release of crud from the old racks. If no, explain why you did not consider this possibility.

b. Did VY consider the possibility that crud would be released from the spent fuel assemblies stored in the old racks as a result of the shuffling of fuel during the reracking operation? If yes, state how much of the 33-rem dose goal is attributable to the release of crud from spent fuel assemblies. If no, explain why you did not consider this possibility.

c. How much crud will be released from the old racks as a result of the movement or shuffling of the racks during the reracking operation? Describe your method for making or estimating this amount, and identify and provide copies of all documents generated or relied on by VY in estimating this amount.

d. How much crud will be released from the spent fuel assemblies stored in the old racks as a result of the shuffling of fuel during the reracking operation? Describe your method for making or estimating this amount, and provide copies of all documents generated or relied on by VY in estimating this amount.

e. What is the delay time (in minutes, hours, or days) for the purification system to completely filter out crud from the spent fuel pool after the crud is disturbed and released into the spent fuel pool coolant.

Response:

a. Vermont Yankee did consider the possibility that crud would be released from the old racks as a result of the movement or shuffling of the racks when estimating the exposure for the job. Any amount of crud released would be shielded by the spent fuel pool water and would be removed by the demineralizer system, and thus would not contribute significantly to worker exposure. Vermont Yankee also considered the potential that crud present on the racks could present an exposure source, not from release during shuffling, but during removal and preparation of the old racks for shipment. For this reason, the racks were scrubbed and vacuumed prior to removal. The dose from crud release is not disaggregated from the dose projection for rack removal.

b. Yes, Vermont Yankee did consider the possibility that crud would be released from the spent fuel assemblies stored in the old racks as a result of the shuffling of fuel during the reracking operation, when estimating exposures for this project. Because of the type of purification demineralizers Vermont Yankee uses during operation, the crud remaining on the spent fuel assemblies is mostly tightly adhering. The small amount of crud that might be released during fuel transfer would be shielded by the spent fuel pool water and would be readily removed by the fuel pool demineralizer system, and thus would not be expected to be a significant contributor to worker exposure. The dose from crud release is not disaggregated from the dose projection for fuel transfer.

c. At this time, the reracking project is approximately 65% completed. Crud release from the old racks has not been found to be a problem. In fact, to remove the crud prior to shipment, abrasive cleaning was necessary to loosen the crud and permit it's removal by vacuum cleaning. No estimate of the amount of crud released during shuffling has been made.

d. Please see our answer to Interrogatory 13(b). No estimate of the amount of crud release has been made.

e. This question does not supply enough information to permit it to be answered. As a general proposition, if one assumed the instantaneous injection of a given amount of crud

in the pool, uniformly distributed in the volume of water in the pool at all times, then removal of the crud in the pool follows a logarithmic curve, that is to say, approximately 75% of the initial amount of crud would be removed after one day, approximately 90% of the initial amount of crud would be removed after two days, and so forth. In real life, removal rates are affected by such things as non-uniformity in the distribution of suspended particulates and the effect of the surface skimmer system. Moreover, experience indicates that the spent fuel pool clean-up systems are very effective at maintaining pool water clarity, and experience demonstrates that suspended particulates in the pool water present a visibility problem long before they present a noticeable increase in pool area dose rates.

Interrogatory No. 14

Question:

Has VY ever stored or placed irradiated nonfuel reactor components in the spent fuel pool? If the answer is yes, please respond to the following questions:

a. Did you consider the possibility of worker exposure to radiation from these components in the event of a leak in the spent fuel pool which exposes these components? If yes, state how much of the 33-rem dose goal is attributable to such exposures. If no, explain why you did not consider this possibility.

Response:

Vermont Yankee has stored irradiated non-fuel items in the spent fuel pool. However, administrative controls prevent the lowering of the water level in the pool suffi-

cient to expose these items. Consequently, the dose contribution of these items is limited to their effect upon the effective dose rate in the spent fuel pool area (see our response to Interrogatory No. 6(b)).

Interrogatories Nos. 15 & 16

Question:

> Please identify all persons on whose factual knowledge, opinions, or technical expertise you rely or intend to rely for your position on NECNP's environmental contentions.
>
> Please identify all persons you may call as witnesses on NECNP's environmental contentions. Please describe the substance of their testimony; and identify and describe any documents and the portions thereof that they may rely on for their testimony.

Response:

Vermont Yankee has not made the determinations that this interrogatory requests the results of. To the extent required by 10 C.F.R. § 2.740(e)(1)(ii), Vermont Yankee will supplement this interrogatory as soon as the question of expert witnesses for evidentiary hearings has been determined.

TO: Bob Gad

SIGNATURES

Donald A. Reid, being first duly sworn, states that the foregoing answers are true, except insofar as they are based on information that is available to Vermont Yankee but not within his personal knowledge, as to which he, based on such information, believes them to be true, this 1st day of December, 1988.

Donald A. Reid

Then personally appeared Donald A. Reid, before and personally known to me, who, being first duly sworn, made oath that the foregoing statement is true this 1st day of December 1988.

DIANE M. McCUE NOTARY PUBLIC WINDHAM COUNTY, VERMONT

Notary Public
My Commission expires: 2/10/90

As to objections:

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Ropes & Gray
225 Franklin Street
Boston, MA 02110
(617)423-6100

VYN-123
ASLB - Reg. Mail
'88 DEC 5 P3:10 RRGCSR3.VY

CERTIFICATE OF SERVICE

I, R. K. Gad III, hereby certify that on December 1, 1988, I made service of the within document in accordance with the rules of the Commission by mailing a copy thereof postage prepaid to the following:

Charles Bechhoefer, Esquire,
Chairman
Administrative Judge
Atomic Safety and Licensing
Board Panel
U.S. Nuclear Regulatory
Commission
Washington, DC 20555

Mr. Glenn O. Bright
Administrative Judge
Atomic Safety and Licensing
Board Panel
U.S. Nuclear Regulatory
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Washington, DC 20555

Mr. James H. Carpenter
Administrative Judge
Atomic Safety and Licensing
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Adjudicatory File
Atomic Safety and Licensing
Board Panel Docket (2 copies)
U.S. Nuclear Regulatory Commission
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R. K. Gad III