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Docket (3

March 16, 1989

RELATED CORRESPONDENCE

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

NRC STAFF RESPONSE TO NECNP'S SECOND SET OF INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS TO THE NRC STAFF ON THE NRC ENVIRONMENTAL IMPACT-SPENT FUEL POOL EXPANSION

On November 10, 1988, the New England Coalition on Nuclear Pollution (NECNP) filed its Second Set of Interrogatories and Request for Production of Documents to the NRC Staff on the Environmental Assessment and Finding of No Significant Impact - Spent Fuel Pool Expansion (TAC. No. 65253) (occupational dose). The Staff notes that interrogatories to parties other than the Staff are governed by 10 C.F.R. § 2.740b. However, under 10 C.F.R. § 2.720(h)(2)(ii), answers to interrogatories directed to the Staff are required only on a finding by the presiding officer: 1) that answers to the interrogatories are necessary to a proper decision in the proceeding, and 2) that answers to the interrogatories are not reasonably obtainable from any other source. The Commission's regulation concerning production of NRC records and documents, 10 C.F.R. § 2.744, requires that a request to the Executive Director of Operations for the production of an NRC record or document not available pursuant to § 2.790 by a party to an initial licensing proceeding state, among other things, why the requested

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record or document is relevant to the proceeding. Notwithstanding the regulations in 10 C.F.R. §§ 2.744 and 2.720(h)(2)(ii), the Staff is voluntarily providing responses to NECNP's interrogatories.

INTERROGATORY 1

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

Michael A. Lamastra, of the Medical, Academic and Commercial Use Safety Branch of the Office of Nuclear Material Safety and Safeguards provided the responses to Interrogatories 1, 2, 3, 4, 5, 6a, 6b, 6c, 6d, 6e, 7a-e, 8, 9, 10, 11, 12, 13, 14, 16, 17c, 17d, 17e and 18. John L. Minns of the Radiation Protection Branch of the Office of Nuclear Reactor Regulation provided responses to Interrogatories 6f, 7f, 9, 10, 11, 12, 13, 14, 15, 16, 17a, 17b, 17c, 17d, 17e and 18. Morton B. Fairtile, Operating Reactor Project Manager in the Project Directorate I-3, who is Acting Project Manager for Vermont Yankee, prepared the response to Interrogatory 16. Patricia Jehle provided responses to Interrogatories 19, 20, 21, 22, 23 and 24.

INTERROGATORY 2

The following questions the Environmental Assessment's radiological impact assessment for the proposed action (Section 3):

INTERROGATORY 2a

Identify and provide copies of all documents used in or generated during your analysis, or evaluation of the radiological impacts of the proposed action, including but not limited to environmental reports or information furnished by Vermont Yankee. Identify by name, job title and address all persons (including contractors) who participated in or will participate in any such evaluation and describe their roles and tasks during that evaluation.

RESPONSE

Those documents used in the analysis are listed in the "Environmental Assessment and Finding No Signficant Impact," References, Section 8.0 (EA). Mr. Michael A. Lamastra, of the Medical Academic and Commercial Use Safety Branch at the NRC, was the principal participant in the radiological evaluation. He was assisted by the NRC staff members listed in the EA. EA at 13. The EA is available for public review in the Public Document Room.

INTERROGATORY 2b

Describe the process by which your evaluation of radiological impacts of the proposed action was undertaken and the time period involved; describe committees established, contractors hired, meetings or deliberations held.

RESPONSE

To the extent that committees were established, contractors were hired, and meetings or deliberations were held, these are listed in the Environmental Assessment.

INTERROGATORY 2c

Identify all rules, criteria, standards or guidance, whether or not formally promulgated, which the staff used or applied in analyzing or evaluating the anticipated radiological impacts of the proposed action.

RESPONSE

The Staff used 10 C.F.R. Parts 19, 20, 30, 50 and 51, Regulatory Guide 8.8 and 8.10, and all of the Standard Review Plan, NUREG-0800, especially Sections 11, 12 and 13 in its analysis.

INTERROGATORY 3

The EA's assessment of public radiation exposure (EA, pages 8-9) concluded 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. The following questions relate thereto:

INTERROGATORY 3a

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.

RESPONSE

In preparation of the Environmental Assessment the total dose to workers was analyzed in order to estimate the environmental impact on workers. The Staff did not break down the total projected dose of 33

person-rem into individual doses for specific workers. This level of exposure was found to have no significant environmental impact on workers. Therefore, the individual worker doses, which are required to be below those values listed in 10 C.F.R. Part 20, would not be significant either.

INTERROGATORY 3b

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

In the general area of the spent fuel pool the dose is approximately 2 mrem per hour. The specific dose received by an individual worker, which would be very small, was not calculated. The Licensee, to comply with 10 C.F.R. Part 20, is required to keep individual worker exposure as low as reasonably achievable (ALARA).

INTERROGATORY 4

The EA (page 8) states that "The 33-person rem dose goal includes all activites (sic) necessary for the reracking operation including vacuum cleaning of SFP walls and floor[s]; 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 rereacking (sic) operation, including the old racks. The following questions relate thereto:

INTERROGATORY 4a

Provide a break-down of the projected radiation dose goals attributable to each of the above-described activities.

RESPONSE

The Staff did not evaluate individual doses for each task in preparing the Environmental Assessment and the Licensee was not required to provide these breakdowns by task.

INTERROGATORY 4b

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

RESPONSE

Same as responses to Interrogatories 3a and 4a.

INTERROGATORY 4c

Describe the length of time (in hours) each such person identified in response to Interrogatory No. 4(b) will be exposed and what the millrem dose per hour will be to perform each of the above-described activities.

RESPONSE

Same as responses to Interrogatories 3a and 4a.

INTERROGATORY 4d

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

No, no other activities that would change the environmental assessment of the total dose are anticipated. It is assumed in any maintenance activity that unforeseen maintenance duties may be required to complete the task. The estimated total dose of 33 person-rem includes these additional, but minor, exposures that may occur during the maintenance activity.

INTERROGATORY 5

If the number of persons identified in response to Interrogatory No. 3(a) and Interrogatory No. 4(b) are different, explain the reasons for this difference.

RESPONSE

There is no difference. The Staff was not required to provide a breakdown of individual worker exposures in preparing the Environmental Assessment.

INTERROGATORY 6

In concluding 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 the NRC considered any of the following occurrences:

INTERROGATORY 6a

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

RESPONSE

Technical Specifications 6.5B "Plant Operating Procedures" requires in part that health physics procedures be prepared, approved and made available to all station personnel. The procedures must be consistent with the requirements of 10 C.F.R. Part 20. One of the procedures addresses actions taken when a worker's skin is contaminated. Use of the procedures would ensure that the dose is well below the Part 20 requirement and that it is ALARA.

INTERROGATORY 6b

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.

RESPONSE

See response to Interrogatory 6a.

INTERROGATORY 6c

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

RESPONSE

No. As part of the original review, Section 14, 6.4 Refueling Accident of FSAR, a bounding fueling rod accident is evaluated. Modification of the spent fuel pool does not change the evaluation.

INTERROGATORY 6d

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

RESPONSE

See response to Interrogatory 6c.

INTERROGATORY 6e

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

RESPONSE

The purpose of the purification filter is to minimize worker dose in the pool area in accordance with the ALARA concept. The failure of the filter to function is an event that could occur during rack replacement. The spent fuel pool has an Area Radiation Monitor (ARM) which will set off an alarm if the filter fails to work and the dose level in the spent fuel pool area increases to above the pre-set level.

INTERROGATORY 6f

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

RESPONSE

Yes. The spent fuel pool water normally contains trace amounts of cesium and iodine. For normal operations, exposure to cesium or iodine is of little significance. See Section 2.1 "Radioactive Material Released to the Atmosphere," "Environmental Assessment and Finding of No Significant Impact - Spent Fuel Pool Expansion, Vermont Yankee Nuclear Power Station," July 25, 1988.

INTERROGATORY 7

If your answer is yes to any of the occurrences described in Question 6(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

a-e. Normally, the radiation dose in the area is approximately 2 mrem per hour and this direct radiation exposure constitutes part of the estimated 33 rem occupational dose.

f. See responses to Interrogatories 7a-e and 6f above.

INTERROGATORY 8

Are you aware of any instances at any other nuclear power plant where worker protective garments have been breached or torn during the process of installing new racks in a spent fuel pool? If yes, identify each incident, and state whether and how much additional radiation exposure occurred as a result.

RESPONSE

NRC regulations do not require the reporting of such incidents. However, I am aware that workers performing routine maintenance occasionally do breach their garments. That is why NRC standard technical specifications require procedures for decontaminating workers who receive contamination.

INTERROGATORY 9

Are you aware of any instances at any other nuclear power plant where a worker dropped a rack during the process of installing new racks in a spent fuel pool? If yes, identify each incident, and state whether and how much additional radiation exposure occurred as a result.

RESPONSE

The Staff is not aware of such an incident.

INTERROGATORY 10

Are you aware of any instances at any other nuclear power plant where a worker dropped a spent fuel assembly during the process of installing new racks in a spent fuel pool? If yes, identify each incident, and state whether and how much additional radiation exposure occurred as a result.

RESPONSE

No, I am not aware of such instances at any nuclear power plant, including Vermont Yankee. However, on November 10, 1988, a fuel bundle was dropped while being transferred into a basin storage basket in the underwater storage facility at the General Electric Plant (Radioactive Waste Site) in Morris, Illinois (Docket No. 70-200001). The transfer was nearly complete when the grappling device disengaged and the bundle was released prematurely and fell 18 inches to the bottom of the basket. An investigation indicated a weakened tension spring had caused the grapple to disengage. There was no indication of a release of radioactivity. Measurements taken after the incident indicated the air sample levels,

water chemistry and basin exposure levels conformed to normal operating parameters. The NRC staff and the Licensee have reviewed the maintenance testing procedures to prevent reoccurrence.

INTERROGATORY 11

Are you aware of any instances at any other nuclear power plant where worker(s) were exposed to radioactive gamma rays released to the spent fuel pool during the process of installing new racks in a spent fuel pool because the spent fuel pool purification filter did not work? If yes, identify each incident, and state whether and how much additional radiation exposure occurred as a result.

RESPONSE

No. See generally response to Interrogatory 6e above.

INTERROGATORY 12

Are you aware of any instances in any other nuclear power plant where worker(s) were exposed to isotopes other than Krypton-85, such as cesium or iodine, during the process of installing new racks in a spent fuel pool, as a result of leaking or damaged spent fuel rods. If yes, identify each incident, and state whether and how much additional radiation exposure occurred as a result.

RESPONSE

Because cesium and iodine are usually present in small amounts in the spent fuel pool water, the potential for worker exposure exists wherever

work is undertaken in a spent fuel pool. The 33 person-rem occupational dose pool includes that exposure. See generally response to Interrogatory 6f.

INTERROGATORY 13

Are you aware of any occurrences at other nuclear power plants that resulted in increased public radiation exposure during the process of installing new racks in a spent fuel pool. If yes, identify the plant(s), described each occurrence, and state whether and how much additional radiation exposure (in millirems per hour per person) occurred as a result, and the number of persons who were exposed.

RESPONSE

No, the Staff is not aware of such occurrences at any plant including Vermont Yankee.

INTERROGATORY 14

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:

INTERROGATORY 14a

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.

INTERROGATORY 14b

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

a-b. This work is not different from maintenance procedures that are conducted on a regular basis. The Staff relied on the reasonable and conservative estimate provided by the Licensee and did not perform an independent, detailed analysis. The planned operations are usually conducted in low radiation areas.

INTERROGATORY 15

The EA (page 8) states that the 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:

INTERROGATORY 15a

Identify each of these plants and the applicable proceeding or context in which such reviews occurred (i.e., license amendment, review under 10 CFR § 50.59), and precise nature of the project.

INTERROGATORY 15b

For each plant, state whether the NRC 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 identify and provide copies of any documents containing such comparisons.

RESPONSE

a-b. Every Environmental Assessment prepared for an application to expand spent fuel pool capacity through reracking includes this information. Over 100 such reracking have been carried out to date; the information requested is available for review in the Public Document Room docketed by individual facility proceeding. The dose exposure associated with the action was measured, although specific tabulations of the projected as opposed to actual dose incurred are not available. Generally the projected dose exceeds the actual dose.

INTERROGATORY 16

Are you aware of any instances with respect to other nuclear power plants where the anticipated, estimated, or projected radiation dose exposure, in person-rems, resulting from replacement of original fuel racks and the installation of new fuel racks in a spent fuel pool was different from the actual dose exposure? If yes, identify the plants, and explain why the projected dose exposure was inaccurate.

RESPONSE

Yes. It is not contemplated that in every instance the estimated doses and actual dose will be the same. An actual dose is generally less than an expected dose. Licensees are not required to report actual person-rem exposure by specific task, unless specifically requested by the Staff to do so. The requested comparison is not readily available.

However, the Licensee in its response to NECNP Interrogatories, dated December 1, 1988, states that when the spent fuel pool modification was about 65% completed, the actual dose incurred was 10.1 person-rem. Based on a linear projection of estimated dose vs. percentage completion, the Staff estimates that the actual person-rem total dose when all the old racks are replaced, will be 15.54 person-rem vs. the Licensee's predicted dose of 23.0 person-rem.

INTERROGATORY 17

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:

INTERROGATORY 17a

Did you 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 person-rem dose goal is attributable to the release of crud from the old racks. If no, explain why you did not consider this possibility.

INTERROGATORY 17b

Did you 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 person-rem dose goal is attributable to the release of crud from spent fuel assemblies. If no, explain why you did not consider this possibility.

INTERROGATORY 17c

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 the NRC or its contractors in estimating this amount.

INTERROGATORY 17d

How much crud will be released from the spent fuel assemblies stored in 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 the NRC or its contractors in estimating this amount.

RESPONSE

a-d. Yes. See Section 3.4 "Spent Fuel Pool Expansion Safety Evaluation," October 14, 1988. The Staff did not break down the estimated dose in the detail requested here. We accepted the radiological protection program proposed by the Licensee. The Staff does not require

reporting of the amount of crud in the spent fuel pool, the racks, or the assemblies. However, Technical Specification 6.5B requires health physics procedures to be prepared, approved, maintained and made available to all station personnel to ensure worker protection.

INTERROGATORY 17e

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 distributed and released into the spent fuel pool coolant.

RESPONSE

The Staff does not require reporting of the amount of crud in the spent fuel pool, the racks, or the fuel assemblies, nor does the Staff require complete filtering of crud to zero level. Rather the NRC requires the filtering system to be operated to reduce radiation levels to meet the requirements of 10 C.F.R. Part 20 and the ALARA goals. Therefore, the time required for the purification system to completely filter out crud from the spent fuel pool cannot be readily calculated. However, significant releases of crud into the pool water during the rerack operation are not expected, since the new racks are clean prior to installation.

INTERROGATORY 18

In preparing the EA, did the NRC assess the radiological impacts of the proposed action over the life of the plant? Other than those involving the actual reracking operation, such as worker exposure resulting from maintenance activities, and placing new spent fuel assemblies in the rack after subsequent refuelings? If the answer is no explain why these impacts were not assessed. If yes, describe the activities assessed, and the exposures, in person-rems, attributable to each such activity.

RESPONSE

Yes. The NRC assessed the radiological impact of the additional 870 assemblies which will be placed in the spent fuel pool during the life of the plant. The additional dose to workers from and in the pool will not change significantly, because the addition of crud is greater during refuelings when crud is first brought into the pool with the assemblies and primary coolant. The additional dose generated by the refuelings was estimated and is included in the total estimated doses for the proposed action. The direct dose attributable to the additional assemblies will not increase the dose to the spent fuel pool area or to workers, due to the depth of the water which shields the assemblies.

INTERROGATORY 19

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, inter alia, "the expansion of the existing pool is a resource that should be used". The following questions relate thereto:

INTERROGATORY 19a

Identify and describe the "expansion" capacity of 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.

INTERROGATORY 19b

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.

INTERROGATORY 19c

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 explain.

RESPONSE

a-c. See response to Interrogatories 3a-e in the "NRC Staff Response to NECNP's First Set of Interrogatories and Request for Production of

Documents to the NRC Staff on the Staff's Environmental Assessment," dated December 8, 1988.

INTERROGATORY 20

Has the NRC or its contractors reviewed or analyzed the radiological impact on the public of designing and installing the dry cask storage alternative described in the EA (p.4). If yes, describe the results of such a review or analysis, including the projected dose goal resulting from that alternative, and provide copies of all documents related thereto.

RESPONSE

See responses to Interrogatories 2a-g and 13 in the "NRC Staff Response to NECNP's First Set of Interrogatories and Request for Production of Documents to the NRC Staff on the Staff's Environmental Assessment," dated December 8, 1988.

INTERROGATORY 21

Has the NRC of its contractors reviewed or analyzed the economic costs (projected) to Vermont Yankee of designing and installing the dry cask storage alternative described in the EA (p.4). If yes, provide a breakdown of these costs, and provide all documents related thereto.

RESPONSE

Same as response to Interrogatory 19 above.

INTERROGATORY 22

The EA (page 4) states that "assessments for the dry cask ISFSI at the Surry Power Station and the dry modular concrete ISFSI at the H.B. Robinson Steam Electric Plant Unit 2 resulted in a Finding of No Significant Impact". The following questions relate thereto:

INTERROGATORY 22a

State how much time (days, months, and years) it took the NRC or its contractors to review these applications in order to make this findings.

INTERROGATORY 22b

State how much time (days, months, and years) it took to design and install the Robinson and Surry Independent Spent Fuel Storage Installations.

INTERROGATORY 22c

Identify any other nuclear power plants where a dry cask Independent Spent Fuel Storage Installation was reviewed by the NRC, and state how much time (days, months, and years) it has taken the NRC or its contractors to review these applications.

RESPONSE

a-c. Same as response to Interrogatory 19.

INTERROGATORY 23

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.

RESPONSE

The NRC relies on the factual knowledge, opinions, and technical expertise of Michael A. Lamastra and John L. Minns, who prepared the answers to these Interrogatories, and of the Staff members who participated in the preparation of the EA, listed at page 13.

INTERROGATORY 24

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

The NRC Staff does not intend to call witnesses to testify on NECNP's environmental contention. Subpart K - Hybrid Hearing Procedures for Expansion of Spent Nuclear Fuel Storage Capacity at Civilian Nuclear Power

Reactors does not provide for calling witnesses. 10 C.F.R. §§ 2.1113 and 2.1115. The Staff has not determined who will prepare sworn written testimony or sworn written submissions.

Respectfully submitted,

Patricia A. Jehle

Patricia A. Jehle
Counsel for NRC Staff

Dated at Rockville, Maryland
this 16th day of March, 1988.