STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

IN RE:	:	
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PROPOSAL OF DOMINION NUCLEAR CONNECTICUT, INC. TO MODIFY THE EXISTING MILLSTONE POWER STATION TO ESTABLISH AN INDEPENDENT SPENT FUEL STORAGE INSTALLATION (DRY STORAGE SYSTEM) ON PROPERTY LOCATED OFF ROPE FERRY ROAD IN THE TOWN OF WATERFORD, CONNECTICUT	:	DOCKET NO. 265
	:	OCTOBER 3, 2003

RESPONSES TO CONNECTICUT SITING
COUNCIL PRE-HEARING INTERROGATORIES

On September 19, 2003, Dominion Nuclear Connecticut, Inc. ("DNC"), received from the Connecticut Siting Council pre-hearing interrogatories relating to the above-captioned application (the Application). Below are DNC's responses.

Question No. 1

Provide a copy of the Federal Code of Regulations guiding the Department of Energy (DOE) in its responsibility for establishing a nuclear spent fuel repository.

Response

Included as Attachment 1 is a copy of the federal Nuclear Waste Policy Act of 1982 as amended, 42 U.S.C. 10101 *et seq.* ("NWPA"). The NWPA designates the U. S. Department of Energy ("DOE") as the entity responsible to take possession and permanently dispose of spent nuclear fuel from commercial nuclear power reactor sites, including Millstone Power Station

("Millstone"). *See* Section 302, 42 U.S.C. 10222. Also included as Attachment 2 is a copy of the text of the federal "Standard Contract for Disposal of Spent Nuclear Fuel and/or High - Level Radioactive Waste" under the NWPA, the terms of which are found at 10 CFR 961.11. The regulations of the U.S. Nuclear Regulatory Commission ("NRC") governing DOE's proposed repository at Yucca Mountain, Nevada can be found at 10 CFR Part 63 and are included as Attachment 3.

Question No. 2

Provide a current DOE schedule for the development of the national nuclear spent fuel repository, Yucca Mountain.

Response

Under the NWPA, the DOE was obligated to develop a federal spent fuel repository to begin accepting fuel in 1998. *See* Section 302 (a) of the NWPA (42 U.S.C. 10222(a)). The DOE has not met this obligation. In accordance with Section 114(a)(1) of the NWPA, the Secretary of Energy, on February 14, 2002, recommended to the President that the Yucca Mountain site be developed as a nuclear waste repository. On February 15, 2002, the President sent a letter to Congress stating that the Yucca Mountain site is qualified for filing an application for a construction permit for the repository. In July 2002, the Senate voted in support of the President's recommendation, which permitted commencement of the formal licensing proceedings for the repository before the NRC. The present official stated position of DOE is that DOE intends to submit to the NRC a license application for constructing the repository by December 2004, and its current target to begin accepting fuel for permanent disposal is 2010.

Question No. 3

Confirm or clarify a DOE graphic attached to a letter dated August 20, 2003 from Nancy Burton, Esq. to Paul Eccard, First Selectman of Waterford.

Response

DNC reviewed the DOE's website and was not able to confirm the graphic attached to Ms. Burton's correspondence. Regardless of its origin, the graphic does not accurately reflect existing conditions at Millstone. A separate spent fuel pool is maintained for each of the Millstone units. Under the NRC operating licenses for the units, DNC is presently authorized to store in each spent fuel pool only the fuel from the corresponding unit. The graphic, however, which purports to provide the status of spent fuel storage at Millstone, consolidates the three Millstone generating units and the units' three separate spent fuel pools into one category. By depicting spent fuel storage in this manner, the graphic presents an inaccurate picture of spent fuel storage capacity at Millstone. DNC's response to Question No. 8, below, addresses the storage capacity of each of the Millstone spent fuel pools.

The graphic also fails to take into account the DNC policy of maintaining full core reserve capability in the Units 2 and 3 spent fuel pools. As stated in Section III.A.3 of the Application, in planning for spent fuel management and in evaluating when additional storage will be needed, one operational objective is to maintain sufficient capacity in a unit's spent fuel pool to store all fuel from the reactor core as well as the spent fuel that has been permanently removed from the reactor during past refuelings. This practice of assuring that there is always adequate reserve space in the spent fuel storage pools for the fuel in the reactor core is referred to as maintaining "full core reserve" capability. Full core reserve capability is 217 assemblies for

Unit 2 and 193 assemblies for Unit 3. Following the Spring 2005 refueling outage, DNC will lose full core reserve capability in the Unit 2 spent fuel pool.

Question No. 4

What are Nuclear Regulatory Commission (NRC) requirements for siting an independent spent fuel storage installation (ISFSI)?

Response

Section III.A.6 of the Application discusses the NRC licensing requirements associated with the interim storage of spent nuclear fuel and high-level radioactive waste in an ISFSI. This section of the Application references sections of the NRC regulations - 10 CFR Part 72 - which is included as Attachment 4. As stated in the Application, DNC will construct and operate the ISFSI and store spent fuel in NRC-certified canisters under the general license granted by the NRC, the requirements for which are found in Subpart K of Part 72. Subparts E and F of Part 72 specifically address ISFSI siting and design issues.

Questions No. 5

List security measures as ordered by the NRC.

Response

10 CFR Part 72 of the NRC's regulations, specifically 10 CFR 72.212(b)(5), contains the requirements for the physical protection (i.e. security) of spent nuclear fuel stored in an IFSFI under the general license granted by the NRC. Section 72.212(b)(5) requires that spent fuel stored in an ISFSI be protected against radiological sabotage in accordance with the same provisions and requirements set forth in the physical security plan required for the entire nuclear facility, and imposes additional conditions and exceptions. "Radiological sabotage" is defined in 10 CFR 72.3(a). One such condition is that storage of spent fuel at an ISFSI must be within a

"protected area" encompassed by physical barriers and to which access is controlled. The NRC further indicates than an existing protected area may be expanded, or new protected areas added, to accommodate the storage of spent fuel.

Following the events of September 11, 2001, the NRC established additional security measures for dry storage facilities and issued orders imposing the additional requirements to those companies with ISFSIs in operation. The actual details of the new requirements, called Interim Compensatory Measures, are classified as "Safeguards Information," and are protected from public disclosure in accordance with 10 CFR 73.21. "Safeguards Information" is defined in 10 CFR 73.2(a).

In NRC Regulatory Issue Summary ("RIS") 2003-05, dated March 19, 2003, the NRC discussed the issuance of orders to its licensees holding general licenses for ISFSIs using dry storage pursuant to 10 CFR Part 72. In its RIS, the NRC indicated that such orders were not issued to licensees who are authorized to store spent nuclear fuel pursuant to the general license but had not notified the NRC of their plans to exercise the general license before the end of 2003. The NRC indicated that if the holder of a general license subsequently decides to exercise the general license, the NRC would consider the current threat environment and issue, as appropriate, any necessary orders to implement the Interim Compensatory Measures. A copy of NRC's RIS is included as Attachment 5. Because an ISFSI has not yet been constructed at Millstone and DNC has not yet exercised the general license issued under Part 72 of the NRC regulations, DNC has not been issued an order imposing additional security requirements pertaining to the proposed ISFSI. However, DNC, along with all other nuclear power reactor licensees in the U.S., has been issued five orders from the NRC, beginning in February 2002, imposing additional security requirements applicable to other aspects of the Millstone facility.

DNC anticipates that the Millstone ISFSI will be required to comply with all new or interim compensatory measures applicable to dry spent fuel storage facilities promulgated by the NRC following September 11, 2001, in order to operate the ISFSI.

Question No. 6

Identify the NRC's docket number and address for correspondence.

Response

The Millstone ISFSI docket is 72-47. The NRC address is United States Nuclear Regulatory Commission, Document Control Desk, Washington, DC 20555-0001. Included as Attachment 6 is correspondence from the NRC to DNC dated December 17, 2002, establishing the docket number for the Millstone ISFSI.

Question No. 7

Does the NRC docket initiate any proceeding for the approval or denial of the proposed ISFSI?

Response

As stated in Section III.A.6 of the Application, NRC regulations (10 CFR Part 72) establish the requirements for the interim storage of spent nuclear fuel and high-level radioactive waste in an ISFSI. In 10 CFR Part 72, Subpart K, the NRC has issued a general license for the storage of spent fuel in an ISFSI located at any power reactor site licensed by the NRC under 10 CFR Part 50, if the ISFSI utilizes a dry storage system that has been certified by the NRC. DNC holds such Part 50 licenses for Millstone Units 1, 2 and 3, and plans to use an NRC certified dry storage system. Accordingly, DNC will construct and operate the ISFSI under this general license granted by the NRC. No further application to the NRC or NRC proceeding is required or necessary to authorize an ISFSI at Millstone. Although there is no formal application process

under the NRC general license, DNC is required to notify the NRC and complete certain technical evaluations. The NRC will conduct a series of detailed technical inspections and reviews prior to and during the construction of the ISFSI, and the operation of the ISFSI will be subject to continuing NRC oversight and inspection. The NRC, prior to initiation of spent fuel loading activities, will monitor and inspect the technical reviews that DNC is required to perform. Pursuant to 10 CFR § 72.212(b)(1), DNC will notify the NRC at least 90 days prior to the first storage of spent fuel under the general license. The NRC will observe initial fuel loading activities at an ISFSI.

As indicated in Section III.A.6 of the Application, DNC will utilize the Transnuclear, Inc. Standardized NUHOMS® System for the Millstone ISFSI. As required by 10 CFR § 72.212(a)(2), the NUHOMS® System has been previously certified for use by the NRC. Specifically, the NRC has approved and issued a Certificate of Compliance (Certificate Number 1004) to Transnuclear for the Standardized NUHOMS® System. This approval is listed in 10 CFR §72.214. Through this certificate, the NRC has certified that the NUHOMS® storage design meets the applicable NRC safety standards, including those in 10 CFR Part 72, Subpart L.

Question No. 8

Identify the existing number of spent fuel assemblies and the maximum number of spent fuel assemblies for Millstone Unit I, II, and III spent fuel pools. Is each spent fuel pool capable of storing each units spent fuel for the existing license period?

Response

As of October 1, 2003, Millstone maintains 2885 spent fuel assemblies in the Unit 1 spent fuel pool; 1019 spent fuel assemblies in the Unit 2 spent fuel pool; and 654 spent fuel assemblies in the Unit 3 spent fuel pool. The Unit 2 spent fuel pool has a current installed

capacity of 1346 spent fuel assemblies and the Unit 3 spent fuel pool has a current installed capacity of 1779 spent fuel assemblies. As stated above, under the NRC operating licenses for the units, DNC is presently authorized to store in each spent fuel pool only the fuel from the corresponding unit.

As stated in Section III.A.1 of the Application, Unit 1 is shutdown, is not generating new spent fuel, and its spent fuel pool is not full. Therefore, Unit 1 is capable of storing its spent fuel for the unit's existing license period. Unit 1, however, cannot, as a technical matter, store spent fuel from either Unit 2 or Unit 3. As noted in Section III.A.4 of the Application, Unit 1 is a boiling water reactor ("BWR") and Units 2 and 3 are pressurized water reactors ("PWR"). BWRs and PWRs use different fuel designs and have different spent fuel storage requirements.

The Unit 2 spent fuel pool is near its capacity and, without further action, will lose full core reserve capability following the Spring 2005 refueling outage. Therefore, Unit 2 is not capable of storing its spent fuel for the existing license period.

The Unit 3 spent fuel pool maintains the largest capacity at Millstone. While there is sufficient room in the Unit 3 spent fuel pool to store its spent fuel generated during the existing license period, the installation of an additional fuel storage rack (which has already been authorized by the NRC) would be necessary. Should DNC seek and obtain NRC approval to increase the thermal output of Unit 3, the available storage space in the spent fuel pool would be utilized and full core reserve capability would be lost several years before the end of the unit's existing license period.

If DNC sought, and the NRC approved, an amendment to its operating license, DNC could store spent fuel from Unit 2 in the Unit 3 pool. However, there is insufficient capacity in the Unit 3 pool to store the spent fuel from both Units 2 and 3 resulting from operation during the

existing license period. Therefore, transfer of spent fuel from Unit 2 to Unit 3 would delay but not eliminate the need for the ISFSI. It is unlikely, however, that appropriate approvals for transfer of spent fuel from Unit 2 to Unit 3 could be accomplished in sufficient time to preclude loss of full core reserve capability at Unit 2. Further, transfer of spent fuel from Unit 2 to Unit 3 and then eventually to an ISFSI increases the number of times the spent fuel must be handled.

Question No. 9

Define interim and long-term storage.

Response

For the purposes of this application, the term "interim" is used to describe the temporary storage of fuel on-site at Millstone until such time as the federal government meets its statutory and contractual obligations to remove the fuel from the site for storage in a permanent federal repository. Long-term storage is used to describe the type of permanent disposal proposed to be undertaken by the federal government at Yucca Mountain. The NRC defines an ISFSI as "... a complex designed and constructed for the interim storage of spent nuclear fuel ..." 10 CFR 72.3 (emphasis added).

Question No. 10

List advantages and disadvantages to storing spent fuel in a spent fuel pool and a dry cask unit.

Response

Storage of spent fuel in either the spent fuel pool or in a dry storage installation is safe. The primary advantage to storing spent fuel in dry storage is the simplicity of the storage system. As discussed in Section III.A.3 of the Application, dry storage allows spent fuel that has already been cooled in a spent fuel pool for a minimum of five years, to be stored in a welded, leak-tight,

steel dry-shielded canister ("DSC"), within a reinforced concrete horizontal storage module ("HSM"). Furthermore, as discussed in Section III.A.5 of the Application, the NUHOMS® system is a passive installation without moving equipment or components. There are no operating motors, fans or other similar devices associated with the HSMs. Once fuel transfer is completed, the ISFSI requires modest operation and maintenance efforts and no new full-time staff. Moreover, as discussed in response to Question No. 8 above, by storing the spent fuel in the ISFSI, spent fuel handling is minimized.

These advantages notwithstanding, use of the spent fuel storage pools will still be required for the initial cooling of the spent fuel assemblies and for fuel loading operations. Interim storage of all of Millstone's spent fuel in spent fuel pools is not a viable solution to the station's spent fuel storage needs given the limited capacity of the existing Millstone spent fuel pools.

Question No. 11

Describe the equipment and activities for the equipment laydown area.

Response

Initially, the equipment laydown area would be used for the staging of certain equipment and materials during the ISFSI construction process. Following development of the ISFSI, this area would or could be used for equipment and material storage associated with other improvement projects at Millstone. Any activity conducted in this area will be evaluated, for among other reasons, to ensure that the heights, clearances, etc. meet DNC and Occupational Safety and Health Administration ("OSHA") standards with respect to the overhead transmission lines.

Question No. 12

Can ISFSI units be located under active transmission lines? If not, provide the standard that would prohibit locating ISFSI under active transmission line.

Response

The restrictions associated with the area located underneath the Unit 2 and Unit 3 transmission lines are associated with construction activity and not with the presence of the individual dry storage units. Construction activity near or under active transmission lines is regulated strictly by OSHA and associated guidelines. Given the location and height of the existing Unit 2 and Unit 3 transmission lines and the anticipated construction activity (e.g. cranes, hydraulic excavators, etc.), it would be difficult, if not impossible, to prepare the site, construct the ISFSI and install the dry storage units in accordance with the applicable OSHA requirements. Attachment 7 includes the applicable OSHA Safety Guidelines, which are found at 29 CFR 1926.550(a)(15).

It is also not feasible for the Unit 2 and/or Unit 3 transmission lines to be de-energized during periods of construction activity and loading of dry-shielded canisters. Requirements of the Technical Specifications which are part of the NRC operating licenses for Millstone Units 2 and 3 require that the transmission lines be energized at all times except when the units are fully shutdown or during refueling. Further, de-energizing the transmission lines for extended periods of time during ISFSI construction and eventually canister loading, would disrupt the flow of electricity generated by Millstone to the New England power grid. Locating the storage units under the Unit 1 transmission lines eliminates these issues, as that unit is fully shut down and NRC Technical Specifications for Unit 1 would allow for its transmission lines to be de-energized.

Question No. 13

Provide four copies of the Transnuclear Final Safety Analysis Report.

Response

Included as bulk file exhibits are a compact disc and one paper copy of Revision 6 of Transnuclear's Non-Proprietary Final Safety Analysis Report ("FSAR") for Certificate of Compliance No. 1004. A paper copy of this bulk file exhibit has also been sent to all of the parties and intervenors.

Question No. 14

Does Department of Environmental Protection ("DEP") Radiological Division have any oversight of the proposed ISFSI? Are any permits required from DEP?

Response

The Connecticut Department of Environmental Protection ("DEP") Radiological Division reviews, evaluates, monitors and studies the effects of nuclear operations within the State of Connecticut. With respect to Millstone, which is a federally licensed nuclear power generating station, the DEP maintains a general familiarity with Millstone site programs that assure the safe operation of the facility, such as security, training and operations. The DEP also performs independent monitoring of the environment surrounding Millstone through collection of various samples throughout the year to monitor for releases of radioactivity associated with Millstone operations. This monitoring confirms that exposures in the Millstone environment are within established NRC regulatory limits.

The radiological health and safety requirements applicable to Millstone and the ISFSI are established, administered and enforced by the NRC. These requirements, which are contained in Appendix I of 10 CFR Part 50, 10 CFR Part 20 and 10 CFR 72.104, include the limitations on

release of radioactivity and on dose to the public from these releases and limitations from direct exposure to radiation. Exposure to radiation from a nuclear facility is also limited by the requirements in 40 CFR Part 190. These federal requirements are implemented at Millstone through specific provisions in the NRC license issued to each Millstone unit.

The ISFSI project will need to comply with DEP requirements with regard to stormwater discharges. Prior to construction of the ISFSI, DNC will need to register with the DEP under the DEP's General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. DNC currently maintains an individual National Pollutant Discharge Elimination System ("NPDES") permit for the discharge of stormwater and plant process wastewater and a General Permit for the Discharge of Stormwater Associated with Industrial Activity. The individual NPDES permit currently includes the stormwater run-off from the SAP Parking Lot where the ISFSI is proposed to be located, including outfall DSN011 described in the Application. *See* Application Section III.B.2 and Application Attachment 8. Upon the completion of the ISFSI and prior to discharge of stormwater from the facility, DNC will need to confirm or obtain coverage under its NPDES permit or register DSN 011 under the DEP's General Permit for the Discharge of Stormwater Associated with Industrial Activity.

Question No. 15

What is the level of radioactivity at the outside shell of the steel canister and at the outside shell of the horizontal storage module (HSM)? Provide existing and proposed occupational and general public radiological dose limits.

Response

The outer surfaces of both the steel canister and the HSM are free of removable radioactive contamination and therefore are "clean." The canister is leak-tight and sealed with

two independent welded lids. The only measurable radioactive exposure from a loaded canister is from radiation that emits from the canister. The canister is always shielded to further reduce radiation that is emitted; that shielding being the transfer cask when being transported from the spent fuel pool to the HSM or the HSM itself. The robust design of the HSM with multiple feet of concrete reduces radiation from a canister. Dose rates on the exterior surface of the HSM on the side facing the nearest residential boundary are expected to be less than 10 millirem/hr. These dose rates decrease rapidly with distance. Dose rates at the site boundary will be indistinguishable from normal fluctuations in exposure that naturally exist from cosmic and terrestrial background radiation. The National Commission on Radiological Protection, in publication NCRP94, estimates that a normal Connecticut resident receives 284 millirem in a year from all sources. The standards set in 40 CFR 190 by the U.S. Environmental Protection Agency ("EPA"), limit the allowed annual radiation dose to a member of the public at or beyond a nuclear facility's site boundary to 25 millirem/yr. from the plant. For the last twenty years, dose to a member of the public from Millstone operation has been a small fraction of the EPA limit. The additional contribution to dose beyond Millstone's land boundaries from ISFSI exposure will be insignificant and will not alter future compliance to any standards or dose limits.

Two dose limits were used to evaluate the proposed siting of the ISFSI installation. Both are based on federal regulatory requirements. For areas on-site within the owner controlled area, the annual occupational dose limit established by the NRC is 100 millirem/yr. This limit corresponds to the yearly exposure limit allowed to a member of the public under NRC regulations found at 10 CFR Part 20. Exposure to members of the general public, outside of the owner controlled area, is limited to 25 millirem/yr under NRC requirements found in 10 CFR

Part 72 and 40 CFR 190, discussed above. DNC's exposure estimates, which assume a fully developed ISFSI (135 HSMs), and take into account appropriate occupancy factors for on-site locations (for example, workers do not occupy locations or buildings 24 hours a day) show that expected yearly exposures to workers and/or members of the public both on-site and off-site to be a small fraction of the regulatory limits.

Question No. 16

What happens to the HSM when the containerized spent fuel assemblies are removed from Millstone Power Station?

Response

The HSMs DNC intends to use at Millstone are modular units, delivered in pieces and are assembled on site. Once the spent fuel assembles are removed from all the HSMs and shipped to the federal repository for permanent storage, the reinforced concrete HSM can be disassembled and removed or demolished and disposed of in accordance with applicable laws and requirements. Regardless of how the HSMs are disposed of, as discussed in the response to Question 15 above, the units are clean.

Question No. 17

Does Dominion Nuclear Connecticut have any reservations to the orders issued by the Town of Waterford? If so, list those reservations.

Response

On September 19, 2003, DNC filed with the Siting Council an appeal of several of the Town of Waterford's conditions and restrictions as set forth in the Regulate and Restrict Orders from the Planning and Zoning Commission and Conservation Commission. DNC's reservations are listed in that filing.

CERTIFICATE OF SERVICE

I hereby certify that on the 3rd day of October, 2003, a copy of the foregoing was mailed, postage prepaid, to:

PARTY – TOWN OF WATERFORD

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